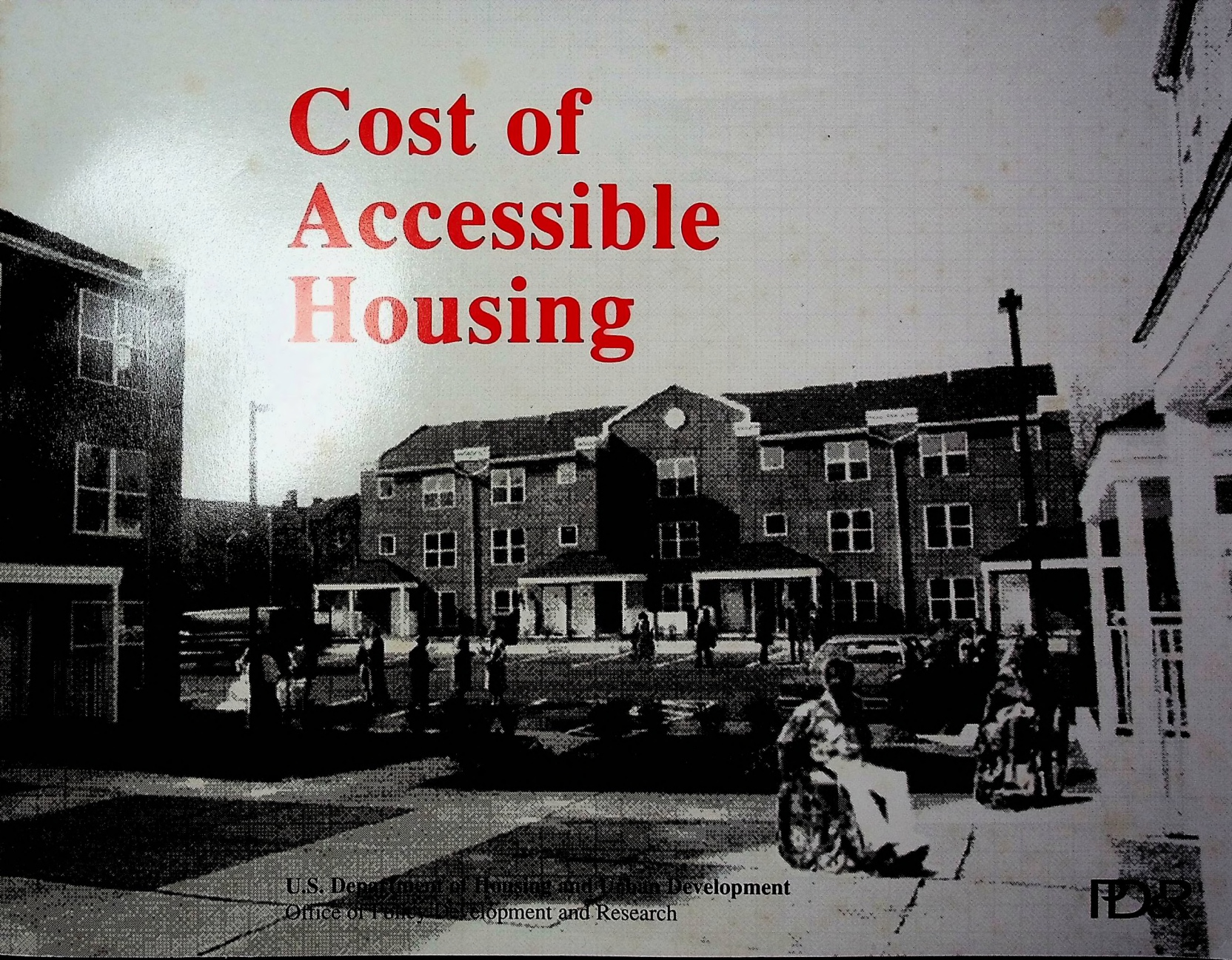
Cost of Accessible Housing



U.S. Department of Housing and Urban Development
Office of Policy Development and Research

PD&R

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Cost of Accessible Housing

An Analysis of the Estimated Cost of Compliance with the *Fair Housing Accessibility Guidelines* and *ANSI A 117.1*

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FOREWORD

In March 1991, the Department of Housing and Urban Development published the final *Fair Housing Accessibility Guidelines*, which provide guidance to builders and developers in designing and building multifamily housing that is accessible to all Americans. This report, ***Cost of Accessible Housing***, examines the cost and design impact of the *Guidelines* on eight representative multifamily housing projects. The report contains detailed illustrations of both the site and unit plans, showing changes required. In addition to designing units in accordance with the *Guidelines*, the report contains a comparison of the *Guidelines* and the 1986 American National Standard Institute's Standard for Accessible Building (ANSI A117.1).

Housing and community environments that are accessible to all persons can be designed and built without creating special "handicapped units." The report finds that the changes required to make the study's projects comply with the *Guidelines* are neither extensive nor excessively costly. Designing for basic accessibility, while required under the Fair Housing Act of 1988, should be done not only because it is the law but because it can provide opportunities for aesthetic and efficient designs that are marketable to all people.

I am pleased to present this useful publication, which provides excellent examples of design options and documentation of the costs of complying with the *Guidelines*.

Michael A. Stegman
Assistant Secretary for Policy
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INTRODUCTION

The first national acknowledgement that eliminating architectural barriers required explicit design standards was the American National Standards Institute's *ANSI A117.1 Standard*. This 1961 publication, which set minimum requirements for accessibility, became the model for states and local municipalities. It has been revised periodically since 1961, including the 1980 edition, which set the standards for housing. The 1986 revision eliminated "scoping" provisions and left individual administrative jurisdictions to decide which provisions would be enforced and to what degree. A new version is scheduled to be released in 1993. The use of the *ANSI Standard* has varied considerably from state to state, and it is only recently that it has begun to be enforced with any consistency.

U.S. Government initiatives with accessible design standards have included: the 1968 Architectural Barriers Act, which covered public housing but not privately owned housing; the Architectural and Transportation Barriers Compliance Board (ATBCB) in 1973, which developed standards to enforce the 1968 legislation; the *Uniform Federal Accessibility Standards* (UFAS) in 1984 (similar to the 1980 *ANSI Standard*); and the *1988 Fair Housing Amendments Act*, which extended coverage of the *Civil Rights Act of 1968* to persons with disabilities and created design and construction requirements for new multi-family housing built for first occupancy after March 13, 1991. *The Fair Housing Amendments Act of 1988* directed the Secretary of the Department of Housing and Urban Development (HUD) to provide technical assistance to states, local governments and individuals in implementing the Act's accessibility requirements. This led to the publication on March 6, 1991 of the final *Fair Housing Accessibility Guidelines* (referred to in this study as the *Guidelines*). The most recent federal legislation is the *Americans with Disabilities Act of 1990 (ADA)*, which primarily covers public accommodations, commercial facilities and transportation facilities and systems.

The *Guidelines* apply to new construction of "covered multi-family dwellings," defined as:

- Buildings consisting of four or more dwelling units if such buildings have one or more elevators; and
- Ground floor dwelling units in other buildings consisting of four or more units.

"Dwelling unit" is defined as a single unit of residence for a household of one or more persons. Examples of dwelling units covered by the Guidelines include: condominiums, apartment units within apartment buildings, dormitory rooms, and shelters for homeless persons where toilet or cooking accommodations are shared by occupants of more than one room.

"Ground floor" is defined as a floor of a building with a building entrance on an accessible route. A building must have at least *one* accessible ground floor unless it is impractical as demonstrated by an analysis of the *Guidelines' Requirement 1, Accessible Building Entrance on an Accessible Route*. Even if the entire site is impractical, a portion of the site must be redesigned so that the building has at least one accessible entrance, or, if the units have separate entries, these entries must be adapted to the sloping terrain, so that a minimum of 20% of the project's total ground floor units in non-elevator buildings comply with the *Guidelines*.

Realizing that the cost of meeting the *Guidelines* is a concern, HUD undertook this cost analysis. This study of eight housing sites and eighty-eight variants of twenty-five dwelling unit types significantly adds to the body of knowledge on this subject and confirms past research by HUD that the cost of providing for accessibility, under the terms of the *Guidelines*, appears to be consistent with or less than the cost derived in HUD's regulatory impact analysis. We hope the information generated in this study will be useful to all members of the housing industry -- the developers, builders, industry associations, architects and designers and the many other participants in an industry that has long been considered key to the economic welfare of this country.

Readers should be aware that the report's analysis and application of the *Guidelines'* requirements is in light of the purpose of this study -- to research cost factors of accessible housing. For a complete understanding of the requirements of the *Guidelines*, readers should refer to the Appendix which reproduces the *Guidelines* in its entirety.

EXECUTIVE SUMMARY

This study estimates the cost of accessible housing using two different standards: the *Guidelines for the 1988 Fair Housing Amendments Act* and the comparable *ANSI A117.1 (1986) Standard.*

The estimated costs of meeting the *Guidelines* and *ANSI Standards* have generated a considerable degree of controversy. In an effort to assemble fair and accurate prices which are representative of the building industry nationwide, this study uses cost estimates generated by builders and developers themselves.

Outline of Research Methods

- A literature search produced a list of twenty-six previous cost studies which were reviewed and analyzed as potential models. These studies were of limited use due to their narrow scope, lack of documentation, and publication prior to the development of the current *Guidelines*.
- In the interest of developing reasonable cost estimates, it was determined to use actual projects already built or being built as case studies. These projects were modified to meet the requirements of the *Guidelines* and *ANSI*, and the cost differentials were computed. This was a conservative approach, because had accessibility requirements been considered as part of the original design process rather than as a modification to an existing design, costs would have been lower.
- After consultation with over fifty architects, developers, builders and housing industry professionals, eight representative projects were selected: three from the West; two from the Midwest; two from the South and one from the Northeast. Seven projects consist of two and three-story walk-up buildings; one is a seven-story mid-rise elevator building. Five projects have community facilities, including a separate recreational building or recreational space within the building proper. Three sites are essentially flat, three sites were slightly-to moderately sloped and two sites are moderate-to steeply sloped. The individual sites represent the cross section of varying soil conditions found throughout the U.S.
- Each of the eight site plans was analyzed for compliance with the *Guidelines* and *ANSI* in terms of accessibility to individual buildings and to common facilities. Resulting modifications were documented and revised material quantities were determined.
- Twenty-five unit plans from the eight case study projects were reviewed and revised into eighty-eight separate design variants reflecting the *Guidelines'* requirements and their *ANSI* equivalents.
- The revisions to sites, common facilities and individual units were referred to the developers responsible for the individual projects.
- Cost estimates were prepared by the developers' own staffs or by their general contractor's estimators who were familiar with the original cost estimates of the case study projects.
- Estimates were prepared for each item covered by the *Guidelines* and *ANSI* on an item-by-item, as well as project, basis. Costs of modifications, including applicable hard and soft costs, profits and fees, were normalized in current dollars.

Summary Cost Findings:

Guidelines' requirements led to the following cost increases as a percentage of project costs:

- Dwelling unit cost increases ranged from 0.06% to 0.57% with an average of 0.29%.
- Site cost increases ranged from 0 for flat sites to 8.58% for moderate to steep sites with an average for sloping sites of 6.4%.
- Total project cost increases ranged from 0.07% to 0.85% with an average of 0.34%.

ANSI A117.1 requirements led to the following cost increases as a percentage of project costs:

- Dwelling unit cost increases (with both bathrooms complying) ranged from 0.36% to 1.21% with an average of 0.73%.
- Total project cost increases ranged from 0.23% to 0.98% with an average of 0.63%.

Conclusions:

- *Guidelines'* requirements, when considered as part of the original design process, do not lead to significantly larger or more expensive units.
- *Guidelines'* requirements can lead to increases in site costs on steeply sloping sites, but these costs can be mitigated by careful site design during the site analysis phase.
- *ANSI* requirements can lead to larger units and cost increases averaging three times that of the *Guidelines* when more than one bath is required. When only one bath is required to comply, the estimated costs are between 1.5 and 2.0 times that of the *Guidelines' Option B.*

PROJECT DESCRIPTION AND SUMMARY OF RESEARCH METHODS

Cost of Accessible Housing is the product of a study undertaken for the U.S. Department of Housing and Urban Development. The intent of the study is to determine realistic costs of meeting the requirements of the *Guidelines for the 1988 Fair Housing Amendments Act* (hereafter referred to as the *Guidelines*). Since some communities require compliance with the *ANSI A117.1 (1986) Standard*, and since this *Standard* has been considered a "safe haven" as an alternative to compliance with the *Guidelines*, the cost of meeting the *ANSI A117.1 Standards* has also been estimated.

The basic concept behind the research is a three-step process of estimating costs: the selection for review of a number of recent representative projects that were built prior to the initiation of the *Guidelines*; the redesign of these projects to meet the *Guidelines'* requirements in the most cost-effective way; and the determination by individuals familiar with the projects of the added costs, if any, associated with the redesign.

The *Cost of Accessible Housing* study was divided into five phases, including: a literature search of previous cost studies; the identification and selection of appropriate projects; project redesign; cost analysis; and project report. An outline of the methods used to develop information and the significant issues which arose during the various phases follows:

Previous Cost Studies

A literature review of previous cost studies identified twenty-six reports. Many of these reports simply described the results of other studies; many did not focus on or include housing costs; some were concerned with forecasting the economic impact of policy decisions. In-depth analyses were undertaken on five studies that provided original data on housing costs including actual redesign of unit plans. The analyses identified many limitations in the previous cost studies including:

- The limited number of projects and design variations.
- An emphasis on low cost public housing projects.
- The use of "standard" item costs generated by project staff rather than costs derived from actual builders.
- Poor design approaches for accessibility redesign.
- Undocumented assumptions.
- Poorly documented or undocumented data sources.
- Poor understanding of code requirements.
- Previous cost studies which were prepared prior to the publication of the *Guidelines* did not include requirements specified in the *Guidelines*.

The literature search findings were used to develop improved strategies that would avoid these limitations.

Project Identification and Selection

A list of criteria was developed to assure that the projects chosen would be representative of typical market-rate housing currently being developed throughout the United States. Selection criteria included requirements that the projects represent:

- The major geographic regions, in order to provide diversity of dwelling unit and site design.
- A range from flat to steeply-sloping sites, in order to assess the impact of grade characteristics on the cost of accessibility.
- A variety of densities, climatic conditions and soil types.
- A range of project size from medium to large (under two hundred to over four hundred units) both with and without common facilities.
- A range of market segments from "affordable" lower cost housing to larger upper-end condominium units, with an emphasis on mid-range rental projects.
- A range of building types from two and three-story walk-up apartments that typify the majority of multi-family housing to a mid-rise elevator apartment building which has all the characteristics of a high-rise building.

It was decided that the development of sufficiently comprehensive data would require the selection of a minimum of eight projects with an average of three to four unit types each.

The search for appropriate projects began with a series of discussions with individuals from leading industry associations, nationally recognized architectural firms specializing in the design of multifamily housing, and builder/developers who historically have been the most active in the construction of housing units. The discussions focused on the need for well-designed, representative projects for which accurate cost data was available.

It soon became apparent that the selection task would be more difficult than anticipated due to the current (1989-1992) economic recession. Many builder/developers were preoccupied with developing new work and had severely reduced staffs with limited estimating capabilities.

Finally, after an extensive referral process during which over fifty individuals or companies were contacted, eight projects were chosen.

A description of the projects' characteristics is found on page 7 entitled *Project Characteristics*. The diversity of projects is illustrated by the fact that:

- They were chosen from each of the four Census Regions: three from the West; two from the Midwest; one from the Northeast; and two from the South.
- Three projects were on flat sites; one was on a slightly sloping site; and four were on sites with from 23% to 57% of the ground at slopes greater than 10%.
- Project densities ranged from low density (less than 12 units/acre) to mid-density (13.6 to 23.7 units/acre) to high density (30-121 units/acre).
- Seven out of eight projects were two and three-story walk-up "garden-type" apartments. One was a mid-rise apartment tower.
- Five projects were rental units; three were condominium units.

Project Redesign

Project site plans were reviewed and design changes were made to meet the *Guidelines'* requirements in the most cost-effective manner keeping the design concepts intact. Adjustments were made by manipulating grades of buildings and site features; reducing or eliminating steps to ground floor units (at times adding one or two steps to upper units); realigning walks; introducing ramps; adding retaining walls or banks; and slightly relocating buildings (although this was kept to a minimum).

Common facilities plans were reviewed for compliance with the *Guidelines*. Sketches were made of revisions to noncomplying items, which for the most part consisted of level changes, such as depressed seating areas. Several projects had mezzanine levels with limited functions on those levels. The project's developers generally felt that the spaces provided for at the mezzanine level could be incorporated into the first floor with almost no adverse effect from a functional or marketability standpoint. The sketches showing plan changes were used for cost estimating, but they were not considered significant enough to be included in this report.

Unit plans were revised based on the following criteria:

- Units were redesigned wherever possible within the existing footprint.
- If one area of an apartment required enlarging, attempts were made to "trade off" space from another area without diminishing the usefulness or marketability of that space or the unit as a whole.
- Sketch furniture layouts were made of the most significantly revised plans to make certain that they would function properly.
- A few rooms in a few plans were considered larger than necessary due to a limiting plan geometry. With modifications to the plan, space was taken from the oversized rooms and reapportioned to other spaces (e.g., *Project VII, Unit A, ANSI*).
- Some exterior walls were moved outward when required to maintain an acceptable room size (e.g., *Project VI, Unit D, ANSI*).
- Some plan changes improved marketability by increasing the size of one room, such as a kitchen (e.g., *Project I, Unit B*).

In this survey, according to the projects' developers, none of the plan changes have significantly reduced project marketability, except for *Project III* where the developers felt the *ANSI* units were less marketable because of the 4' wide corridor.

Cost Analysis

Site Costs

Based on design changes illustrated in each of the eight case studies, material quantities were determined for additional cost items such as new ramps, railings, sidewalks, regrading, retaining walls, etc. Descriptions of the work involved and lists of material quantities were forwarded to individual builder/developers who established unit prices. Costs were developed for the *Site Analysis Test* only, as the *Individual Building Test* would require additional units to be made accessible.

Community Facilities

Sketches were prepared for changes to exterior accessways and interior plans and estimates for the revisions were prepared by individual builder/developers.

Unit Plans

Revisions necessary to meet the *Guidelines* and *ANSI* were prepared and forwarded to individual builder/developers to estimate the cost of design changes. These changes reflected the need for additional material (such as gypsum board partitions); more expensive material (such as adjustable kitchen counters or 2′-10″ in lieu of narrower doors); increases in plumbing, electrical or heating, ventilating, air conditioning (HVAC) costs; changes to the building's structure; or other costs related to the plan changes.

Cost Summaries

Cost summaries were prepared to illustrate the cost of changes to the sites, common facilities and unit designs. These summaries are discussed at greater length in the *Cost Estimates and Summaries* section.

Report

This report presents the information obtained during the *Cost of Accessible Housing* study in as simple and graphic a format as possible. This is because data can be difficult to extract from any report, and because the plan revisions can be instructive to architects, designers and builder/developers. Many of the plans contain good suggestions for design for accessibility and also represent well-designed plans that can be helpful in the planning of any new units.

Project Characteristics

The significant characteristics of the selected projects are displayed on the adjacent page under the following headings:

- Census Region and Sector
- Site Area
- Number of Dwelling Units
- Ground Characteristics
- Density
- Building Coverage
- Number of Ground Floor Units
- Number of Initial Accessible Ground Floor Units
- Minimum Number of Ground Floor Units Required to be Accessible
- Number of Units Required to be Accessible as a Percentage of Total Units

PROJECT CHARACTERISTICS

Projects	Census Region and Sector	Site Area (acres)	Number of Dwelling Units	Ground Character-istics	Density (units/ acre)	Building Coverage (% of site)	Number of Ground Floor Units	Number Initial Accessible Ground Floor Units	Minimum Number Ground Floor Units Required to be Accessible	Number of Units Required to be Accessible as % of Total	Comments
I. **SUNTREE** Brevard, FL	South/ South Atlantic	21.8	326	Flat	15.0	16.3	120	120	120	36.8	Negligible Redesign
II. **SUNBROOK** St. Charles, MO	Midwest/ West North Central	20.3	480	23% Site with > 10% slope	23.7	13.3	240	136	214	44.6	Slight to Moderate Slope, High Density, Extensive Redesign
III. **BRENTWOOD PARK** Harford County, MD	South/ South Atlantic	20.1	192	40% Site with > 10% slope	9.5	8.4	64	34	38	19.8	Slight to Moderate Slope, Low Density, Little Redesign
IV. **ANDOVER PARK** Beaverton, OR	West/Pacific	17.6	238	57% Site with > 10% slope	13.6	19.1	80	80	50	21.0	Slight Top Slopes, No Redesign because Units Adapt to Slope
V. **SUN VALLEY** Layton, UT	West/Mountain	14.3	430	24% Site with > 10% slope	30.0	15.8	217	74	174	40.5	Moderate Slopes, High Density, Extensive Redesign
VI. **SANTA MARGARITA** Orange County, CA	West/Pacific	10.5	150	Flat	14.3	26.0	60	60	60	40.0	Previously Accessible, No Redesign
VII. **WINDSONG** Amherst, NY	Northeast/ Middle Atlantic	16.6	168	Flat	10.1	16.8	84	84	84	50.0	Low Density, No Redesign
VIII. **ARLINGTON PLAZA** Arlington Heights, IL	Midwest/ East North Central	1.2	147	Slightly Sloping	121.0	50.0	Elevator Building: All Units Accessible				Elevator Building, Negligible Redesign

Site Costs

The development of site costs was fairly straightforward. The material quantities were derived from detailed analyses of the changes required to make routes to individual units as well as common facilities accessible. The quantities are shown in each case study section. Individual builder/developers provided unit prices, and the total cost for site work for each project was determined.

Typical unit prices were:

Sunbrook and Sun Valley projects:
Asphaltic concrete - $18/cu. yd.
Double hand rails - $38/lin. ft.
Concrete walks and steps - $2.18/sq. ft.
Fill - $12.50/cu. yd.

Common Facilities

Estimates were prepared by individual builder/developers. In one instance, *Project IV, Andover Park*, a small amount of activity space was located on a second floor mezzanine. To be accessible, the spaces had to be reached by elevator. The cost of an elevator was estimated to be $44,795.00, a high figure because of the need to bring in 3 phase 440 V power. In the developer's opinion, the high cost of the elevator was not warranted by the limited activity in the mezzanine space, and he felt that the required space could be provided on the ground floor at no increase in price.

Dwelling Units

A discussion of the most common unit revisions required by the *Guidelines* and *ANSI* and their cost follows: A cost summary of the major items can be found on the opposite page.

Doors

The most typical door revision was to bedroom, bath and walk-in closet doors. The cost of the change from 2'-6" or 2'-8" doors to 2'-10" doors ranged from $1.20 to $5.50. Changes from 2'-0" to 2'-10" doors cost slightly more. Other typical changes, required for *ANSI* compliance, included the substitution of bifold for single doors at side by side washer/dryers used in lieu of stacked washer/dryers. Cost increases for this item ranged from $56.00 to $70.00. Cost increases for pocket doors replacing single doors ranged from $50.00 to $66.00.

Hardware

The requirement for lever handles at unit entrance doors resulted in cost differentials ranging from a savings of $14.00, to no additional cost, to an additional cost of $8.60. The consensus was that lever handles for exterior doors led to modest ($5-$8), if any, additional cost. Doors within individual units are *not* required to have lever handles.

Thresholds

The *Guidelines* state that thresholds can be ¾" high and can be in addition to the ½" entry door elevation differential allowed when the exterior landing/apron is made of an impervious material such as concrete. Builder/developers were generally divided on whether the use of ¾" high or less thresholds added to their cost. In colder climates, where insulated entry doors are utilized, adjustable thresholds over 2" high are normally supplied as part of the door package. Many door suppliers will modify the package to include a ¾" or ½" sill at a slight increase in price ($12-$20). It is likely that door manufacturers will supply thresholds that do conform with the *Guidelines* in the near future, if they do not already. Many door suppliers provide prefinished wooden ramp assemblies to be used where sliding door thresholds cannot be recessed and project more than ¾" above the floor. Most projects had concrete patios which would allow for a 4" differential between the patio and the unit finish floor which is in accordance with the *Guidelines'* requirements. The only project that did not have an impervious material, such as concrete, was *Project No. IV, Andover Park* where the material was wood decking which allowed drainage through the decking. In this instance the exterior wood deck would have to be level with the finished interior floor and the entry threshold could not exceed ¾".

Grab Bar Blocking in Bathrooms

Grab bar blocking was provided by 2"x6", 2"x8" or 2"x10" members framing horizontally between studs. In some instances the blocking was doubled up so that it projected beyond the face of the studs to provide blocking immediately next to a fiberglass tub/shower. In this way, grab bars installed at a later date would not pull through the thin fiberglass layers of the tub/shower when they were installed. Plywood was not used on walls over the studs as a ground for grab bars, because it was considered more expensive than solid blocking. The cost of blocking was in most cases below $20 a bathroom. In one instance it was $75, because the builder felt that metal connectors were necessary to develop the pull-out resistance required by ANSI. However, most builders felt that toe nailing was adequate. The cost of the grab bars themselves was not included, because they are not required by the *Guidelines*.

Removable Vanity Cabinets

Estimated costs were based on a removable vanity cabinet design that was described on pages 48 and 49 of *Adaptable Housing - Marketable Housing for Everyone*, published by HUD in 1987. This system, reproduced in the Appendix, consists of a removable vanity cabinet that fits over a wood or metal bracket that supports the lavatory countertop. The cabinet would have either no back or a partial back which would allow it to be slid out without interfering with the lavatory's "P" trap. Temporary bracing of the back would be furnished by the manufacturer to provide rigidity during shipping, handling or installation.

The bracket would have a plastic laminate, vinyl or other finished surface, so that it would have an acceptable appearance when the cabinet was removed. A matching protection/appearance face panel would be installed at the time the cabinet was removed. Estimates for the additional cost of the bracket and removable vanity cabinet were for the most part obtained from custom cabinet manufacturers, as the major national cabinet suppliers contacted were unable to estimate the costs without an elaborate R&D program. It was generally agreed, however, that the cost of modification to standard cabinets would be minimal, and that the majority of estimated additional cost would be in the cost of the bracket and its installation. The estimated costs ranged from $25 to $68 with most estimates in the high $40s and $50s.

A removable vanity cabinet would require a finished wall behind the cabinet and a finished floor under the cabinet. Most developers provided one or both of these features as part of their normal installation. Several did not install flooring under vanity cabinets and therefore included the cost of the additional flooring in their new estimate.

A table of individual costs for the items previously discussed, as well as two typical *ANSI* requirements discussed on the following page, is included below.

TABLE 1: COST DATA FOR COMMON DWELLING UNIT REDESIGN ITEMS REPORTED BY BUILDERS

Redesign Component/Item	Unit of Cost ($) by Project							
	I	II	III	IV	V	VI	VII	VIII
Doors								
Increase to 2'-10" Width (ea.)	2.30	5.10	5.50	1.20	5.10	5.00	2.70	4.00
Hardware								
Entrance Door Lever Handle	0.00	7.80	0.00	8.60	7.80	-14.00	6.75	0.00
¾" Threshold at Entrance and Patio Door (ea.)	0.00	7.00	12.00	4.50	7.00	0.00	0.00	0.00
Grab Bar Blocking (per bath)	11.30	12.50	58.50	19.00	12.50	75.00	17.00	25.50
Cabinets								
Design for Removable Vanity Cabinet (ea.) (Including Brackets)	68.00	47.00	30.00	47.00	47.00	59.00	25.00	65.00
***ANSI* REQUIREMENTS**								
Cabinets								
Design for 30" Wide Adjustable Kitchen Counter Top with Clear Space Below (ea.)	45.00	41.50	0.00	52.00	41.50	59.00	25.00	0.00
Design for Adjustable Height for Kitchen Sink (ea.)	84.00	41.50	0.00	63.00	41.50	0.00	45.00	0.00

Cost items associated with *ANSI* requirements, but not the *Guidelines* included:

Adjustable or Replaceable 30" Kitchen Work Counter

This counter section is required to be adjustable at variable heights between 28" and 36", or it may be mounted at a fixed height no greater than 34". The base cabinet must be removable and the finished floor must extend under the counter to the wall.

This requirement would necessitate that the counter top be seamed, so that it could be dropped to an appropriate height and cleated to the adjacent cabinets. The adjacent cabinets would, in turn, require finished sides since they would be exposed. Most builders did not provide finished flooring under a typical kitchen cabinet and added the cost of the flooring to their general construction estimate. Estimates for the adjustable countertop ranged from zero, from a developer whose cabinets were already furnished with finished sides (and who was not charged more for seaming) to another who received estimates of $59. The average of all estimates was $33.

Adjustable or Replaceable Kitchen Sink Counter

This requirement is very similar to that of the adjustable work counter with the exception that this item would require that either a flexible hot and cold water connection be provided or the supply pipes be cut down at such time as the counter was adjusted. In addition, the sink drain pipe to the "P" trap would have to either be adjustable or be cut at the time of adjustment. The cost estimates for the adjustable sink counter were similar to but slightly higher than the kitchen work counter, as some builders included the cost of flexible fittings and a face panel to screen the trap.

Emergency Alarms

Alarm systems within the dwelling unit, other than smoke alarms, are generally determined by local code authorities. According to the builders surveyed, local requirements could be met by adding a non-hard wired flashing smoke alarm, a flashing exit signal or, as in one case, a package of signals and pull stations that added over $1,000 to the unit's cost. Because there appears to be no universally enforced standard, and the requirements are usually set at a local level, cost estimates for emergency alarms have *not* been included in the *ANSI* cost estimate.

Controls

No extra costs for non-complying controls have been included as it is assumed that the dwelling units could be designed to meet all requirements.

Storage

Other than making walk-in storage accessible, no special costs have been allocated, as it was assumed the complying features could be designed in.

Offset Shower Controls

Estimates varied from no additional cost to a $25 increase in cost.

Hand-Held Shower Sprayer

The only additional cost item was an hand-held shower with a 5'-0" long hose (a vertical bar is *not* required). Estimates for this item ranged up to $88, but we included in each estimate an allowance of $46 as the cost differential for the addition of the hose, diverter and wall bracket. The shower head would have been installed in any case.

Ovens

Some developers already included self cleaning ovens, some did not. It was felt that those developers that did not supply self cleaning ovens could design a kitchen with an adjustable work surface adjacent to the oven, in which case a self-cleaning oven is not required.

Refrigerators/Freezers

Over-and-under type refrigerators are available that meet *ANSI* requirements. Side by side refrigerators are considerably more expensive than over-and-under types and take up more floor space.

Washer/Dryers

To meet the requirement for accessible controls, washer/dryer combinations have to be side by side. This requirement leads to the increase in size of a number of unit plans. In some cases the side by side washer/dryer required venting when smaller stacked units did not. (*Project VIII, Arlington* required a separate vent stack.)

Cost items associated with both the *Guidelines* and *ANSI*:

Patios and Decks

Each of the projects chosen, with the exception of *Project IV, Andover Park*, was built with a slab-on-grade. Providing accessible patios did not lead to significant additional costs with this type of construction as patios can be as much as 4" below the finished floor when made of an impervious material such as concrete. Sliding door tracks can be recessed into the floor, if necessary, so that the ¾" threshold limit is maintained. Alternatively, transition pieces are available if required.

Where patios or decks are made of wood and not impervious materials such as concrete, accessibility can be achieved in a number of ways. In conventionally-framed houses with floor joists placed on top of a wood plate, the finished floor is 16" to 18" above the grade. A typical deck/patio in this instance is made of treated wood joists anchored to "sonotubes" with spaced decking. The decking must be even with the unit's finished floor as the decking allows water to drain and therefore is *not* considered an impervious material. Wood decking that is level with the finished floor may cost more than wood decking that is closer to the ground, because some codes require railings. Railings can add approximately $10 a running foot to the cost of a deck.

A detail that allows the decking to be set approximately 8" from the finished grade provides a shelf on a "split" foundation wall in which an exterior 4" or 6" portion of the wall extends past the bearing plate and alongside the ends of the individual joists. In this way the joists are protected, the finished floor elevation can be reduced to 8" above the finished grade, and either a concrete patio or a wood deck can be used without the need of a railing.

Cost Estimating Strategies

In an effort to make the cost estimates respond to site and location-specific influences, estimators employed either by the projects' developers or the general contractors who built the projects for the developers, were responsible for estimating cost differentials. In each case study, the estimators were involved in the original project, and for this reason could apply the same estimating concepts that they had originally employed.

Most estimators determined the original quantities, such as linear feet of partitions, number and type of doors, increased floor area, etc., and then determined the equivalent numbers for the revised plan. The difference in quantities such as linear feet of wall, or the substitution of one item for another, such as 2'-10" for 2'-6" doors,was tabulated and multiplied by the appropriate unit price to establish the net additional cost or savings for each item. Either costs were estimated entirely in 1992 dollars, or, previous costs were adjusted to 1992 dollars through the use of nationally recognized cost comparison tables such as *Means Cost Data*.

Various percentages were added to include items such as general conditions, or what one developer referred to as "project requirements," to arrive at unit "hard costs". These percentages varied considerably because each developer carried different overhead items and apportioned them differently depending on such factors as whether he built with his own forces or employed a General Contractor; or whether he developed his own land or purchased already developed subdivisions.

In addition to "hard" costs, builder/developers were asked to add their normal overhead, profit or fee to the site, community facilities and unit costs to reflect the real cost of any changes. These numbers also varied considerably, as overhead was apportioned differently and profit centers varied. Finally, total project costs were developed that included all hard and soft costs including land costs.

The tables at the end of each case study project identify the costs for each of the eight case study projects. The cost summaries list costs before and after builders' overhead have been applied and summarize the percentage increases in each of the following categories:

- As a percentage increase in the total dwelling units costs.
- As a percentage increase in common facilities cost.
- As a percentage increase in the total units and common facilities cost.
- As a percentage increase in the site cost.
- As a percentage increase in the total buildings and site cost.
- As a percentage increase in the total project costs.

A summary of all the project cost increases as a percentage of original project cost can be found at the end of this section on page 14.

Summaries and Conclusions

Dwelling Units - Guidelines

- The *Guidelines* did not lead to significantly larger units. Only 3 out of 38 unit plans, or 8%, of the units increased in size, and those increases averaged only 12 sq. ft., or 1.4% of the unit's area.

- If these units had been designed with accessibility as part of the original design concept, few if any of the units would have had to increase in size to meet *Guidelines'* requirements.

- The *Guidelines* did not lead to significantly more expensive units. Dwelling unit cost increases averaged 0.28%, when the least expensive of the Option A or Option B plan revisions were used. Total project cost increases averaged 0.33%.

- Option B was less expensive by 19% in five out of the six projects that had units with two bathrooms. In the other project (*Project V, Sun Valley*), Option B cost 22% more, because of the requirement that the toilet cannot overlap the 30"x48" clear floor space next to the tub, which led to increased plumbing, partition and door costs. Generally, Option B solutions were less expensive than Option A, because, except for 2'-10" doors and grab bar reinforcement, one bath does not have to meet *Guidelines'* requirements. One builder, however, opted for Option A, even with a slight cost increase, because both bathrooms would be accessible, and he felt he would be free from local building department or user complaints.

- Costs for items such as removable vanity cabinets, blocking for grab bars, 2'-10" doors, ¾" thresholds and lever door hardware will inevitably go down, as manufacturers see a large new market for these items and gear up accordingly.

- Certain plans, such as the *Brentwood* with its split-level entry, will be phased out and replaced with grade-level entries. Certain kitchen plan features, such as corner sink cabinets, may be phased out, as they do not allow a parallel approach unless the base cabinet is 48" wide.

- The need for accessible patios and balconies did not become a serious cost problem for several reasons: Many lower cost units did not have patios; patios occurred on the ground floor in all cases but one, (*Project V, Sun Valley*) and the concrete patio could be up to 4" below the finished floor, which did not prove to be a problem for slab-on-grade construction; wood decks can be raised to be level with a finished floor economically, as long as they are below 16" from finished grade, at which point a railing is required.

Dwelling Units - ANSI

- *ANSI* requirements led to modest increases in unit size with an average increase of 20 sq. ft. (3%). 36% of the total *ANSI* units had to be increased in size. If these units had been designed with accessibility as part of the original design concept, significantly fewer units would have had to be increased in size. If only one bathroom was required to be accessible, it is likely that the number of units that would have been increased in size would be similar to that required by the *Guidelines'* Option B.

- *ANSI* led to project cost increases of an average of 0.75%, more than twice the *Guidelines* average cost increase of 0.31%. The *ANSI* cost would have been cut nearly in half if only one bathroom was required to be accessible, because the cost associated with size increase, grab bar reinforcement and removable vanities would be absent.

Community Facilities

- It seems reasonable to assume that if the need for accessibility is included in the design process, the cost of providing for accessibility will be minimized.

  Architectural devices such as high common space ceilings could be maintained, but the frequent use of mezzanine or balcony spaces would have to justify the cost of an elevator which would run in the range of $40 - $50,000.00. In *Project IV, Andover Park* the developer felt that the buildings' functions could be accommodated on a single level. In the two other projects with community facilities on sloping sites, *Project II, Sunbrook* and *Project V, Sun Valley* which required ramps and plan adjustments that cost approximately $10,200 and $9,780 respectively, the developer also felt that a total redesign could eliminate the need for multiple stories. The provision of accessible features within buildings such as toilets, phones, drinking fountains, doors, etc., did not appear to add significant costs.

Site

- Cost increases of meeting the *Guidelines'* accessibility requirements for moderate to steeply sloping sites by means of the *Guidelines' Site Analysis Test* ranged up to 8.58% of the original site costs, but only 0.85% of the total project costs. Corresponding costs for flat or slightly sloping sites were negligible.

- The *Individual Building Test*, however, would appear to significantly add to site improvement costs when applied to moderate to steeply sloping sites. In two of the projects examined, *Project II, Sunbrook* and *Project V, Sun Valley*, use of the *Individual Building Test* concluded that *all* ground floor units had to be accessible (240 and 217 respectively) compared to 214 and 174 by the Site Analysis Test - 26 more units in the first case and 43 more in the second.

  As a proportion of all ground floor units to be made accessible, the additional number is not large. However, access to these units is the "hardest" to achieve through redesign. Solutions involve some combination of ramps, retaining walls and regrading, hitherto often avoided. It is estimated that the site costs per unit, for these additional units, will be in the order of two to three times the costs per unit incurred to meet the less stringent *Site Analysis Test*.

  Projecting this second round of costs to the Sunbrook and Sun Valley projects, the *Individual Building Test* would add $26,468 - $39,702 over the $37,253 site costs in the first case, and $53,105 - $79,682 over the $55,169 site costs in the second case. The percentage of additional site costs would increase from 8.14% to an average of 15.4% in the first case, and from 8.25% to an average of 18.5% in the second case.

  From this analysis, it seems clear that builder/developers, in almost every case, would choose the *Site Analysis Test* in lieu of the *Individual Building Test*.

- In *Project III, Brentwood* site costs included $15,280 for walkways to the rear of the buildings. If these buildings had been designed for accessibility from the outset, grade-level entries could have been provided which allow entry to all units on the ground floor from the front of the building, thereby eliminating the need for rear walkways and saving on site costs.

- Parking required by the *Guidelines* does not ordinarily lead to a cost increase because the number of accessible spaces required by local zoning usually exceeds the *Guidelines* requirement. The exception occurs when there are other types of parking, such as carports and garages. The *Guidelines* require accessible parking for each type.

- It is critical to have one central accessible circulation system linking all accessible units and the supporting common facilities. It is much more cost-efficient to make one major circulator route accessible than to make parts of many.

- The ease of providing accessibility to building unit entries from arrival points is in proportion to the distance from the arrival points. Distance provides the opportunity to ramp without introducing steps. On some sites, this may suggest turning buildings perpendicular to parking or arrival areas.

Summary of Project Cost Increases as a Percentage of Original Project Cost

A summary of project cost increases is illustrated on the following page.

SUMMARY OF PROJECT COST INCREASES AS A PERCENTAGE OF ORIGINAL COSTS

Project Name	Project No.		Accessible Dwelling Units (%)	Dwelling Units and Common Facilities (%)	Site (%)	Total Buildings and Site (%)	Total Project (%)
SUNTREE	I	FHA-A	0.53	•	0.05	0.47	0.36
		FHA-B	0.47	•	0.05	0.42	0.32
		ANSI	1.21	•	0.05	1.07	0.83
SUNBROOK	II	FHA-A	0.42	0.54	8.14	0.87	0.60
		FHA-B	•	•	•	•	•
		ANSI	0.81	0.93	8.14	1.24	0.84
BRENTWOOD	III	FHA-A	0.12	•	8.58	0.38	0.31
		FHA-B	0.10	•	8.58	0.37	0.31
		ANSI	0.45	•	8.58	0.70	0.59
ANDOVER PARK	IV	FHA-A	0.08	0.08	0.45	0.13	0.08
		FHA-B	0.06	0.06	0.45	0.11	0.07
		ANSI	0.40	0.40	0.45	0.39	0.25
SUN VALLEY	V	FHA-A	0.41	0.53	8.25	1.11	0.75
		FHA-B	0.57	0.69	8.25	1.26	0.85
		ANSI	0.79	0.90	8.25	1.46	0.98
SANTA MARGARITA	VI	FHA-A	0.32	•	0.86	0.40	0.27
		FHA-B	0.26	•	0.86	0.36	0.24
		ANSI	0.75	•	0.86	0.76	0.51
WINDSONG	VII	FHA-A	0.24	•	0.00	0.21	0.15
		FHA-B	•	•	•	•	•
		ANSI	0.36	•	0 .00	0.31	0.23
ARLINGTON	VIII	FHA-A	0.28	•	0.49	0.29	0.22
		FHA-B	0.25	•	0.49	0.26	0.20
		ANSI	1.04	•	0.49	1.02	0.80

• = No Unit or Common Facility

REVIEW OF ACCESSIBILITY REQUIREMENTS

This section provides an outline review of the key requirements of the *Guidelines* and their similarities and differences with *ANSI A117.1 (1986)*. For a detailed understanding of these requirements, the individual documents should be carefully reviewed in their entirety.

Requirement 1 Accessible Building Entrance on an Accessible Route

This requirement provides that covered multifamily dwellings both with and without elevators shall be designed and constructed to have at least one building entrance on an accessible route, unless it is impractical to do so because of terrain or unusual site characteristics. All units in multifamily dwellings with elevators must comply regardless of terrain or unusual site conditions. Site impracticality caused by steep terrain is determined by applying two alternative tests, the *Individual Building Test* and the *Site Analysis Test*.

A site with a single building having a common entrance for all units may be analyzed only under the *Individual Building Test*. All other sites, including a site with a single building having multiple entrances serving either individual dwelling units or clusters of dwelling units, may be analyzed under *either* test. Regardless of which test is selected, at least 20% of the total ground floor units in non-elevator buildings, on any site, must comply with the *Guidelines*.

A more detailed discussion of the *Individual Building Test* and the *Site Analysis Test*, as they relate to the analysis of individual sites selected in the survey, is found under the section entitled *Case Study Analysis and Redesign Strategies*.

In addition to establishing site impracticality criteria due to terrain features, Requirement 1 includes criteria for unusual site characteristics including floodplains and coastal high-hazard areas. These unusual site conditions only impact projects where flooding is a consideration.

ANSI Standard A117.1, referenced by the *Guidelines*, has no corresponding requirement to Requirement 1 because it does not include "scoping" criteria. The *Standard* is a technical specification. Administrative authorities, such as a national, state or local building code agency, who adopt the *ANSI Standard* and apply it to housing, must add their own scoping criteria that determineto which buildings and to what extent the *ANSI Standard* applies. Regulations in specific jurisdictions should be reviewed carefully and compared against the *Guidelines* to determine which requirements should be followed. Some administrative authorities have adopted the more extensive *ANSI* unit design requirements.

Requirement 2 Accessible and Usable Public and Common Use Areas

This requirement provides that covered multifamily dwellings with a building entrance on an accessible route shall be designed in such a manner that the public and common use areas are readily accessible, based on the *ANSI Standard*. A chart in the *Guidelines* identifies the public and common use areas, cites the appropriate *ANSI* section and describes the appropriate application including modifications to the *Standard*.

Requirement 2 prescribes accessibility requirements to buildings, common use areas within buildings (such as laundry, toilet, and recreational facilities) and common use areas outside of the buildings (such as remote recreational centers, playgrounds, pools, etc). Where there are multiple facilities of a similar kind, at least one of each type must be accessible to provide "sufficient accessible facilities of each type to assure equitable opportunity for use" by people with disabilities. While this requires at least one of each type at a minimum, it may sometimes require more than one. The decision of how many "is sufficient" is left to the discretion of the designer/builder. Accessible parking spaces required to be provided at common use areas must equal at least 2% of the total number of parking spaces.

Although Requirement 2 references *ANSI* for specific technical design criteria, there are a few variances:

- Unlike *ANSI*, walks that have grades between 5% and 8.33% do not have to have hand rails *unless they are part of routes required to be accessible.*

- On-grade paths between separate buildings with covered multifamily dwellings are *not required* to be accessible, but it is recommended that they should be (i.e., no steps) if the grade does not exceed 8.33%.

- Where site impracticality or legal constraints prevent an accessible route to wheelchair users between covered multifamily dwellings and public or common use facilities elsewhere on the site, vehicular access is acceptable so long as there is accessible parking on an accessible route to at least 2% of the covered dwelling units and so long as necessary site provisions (such as parking and curb cuts) are available at the public or common use area.

Requirement 3 Usable Doors

This requirement provides that covered multifamily dwellings with a building entrance on an accessible route shall be designed in such a manner that all doors designed to allow passage into and within buildings are sufficiently wide to permit passage by persons in wheelchairs.

This requirement has two parts. The first applies to doors that are part of accessible routes in public and common use areas and to primary entry doors to covered units. For these doors, compliance with *ANSI 4.13* is referenced. The second part applies to doors within dwelling units. The general rule is that doors intended for passage within units must have a clear opening of at least 32" (nominal width). Door widths of 34" for a standard hinged door and 6'-0" for a sliding patio door are both considered to have acceptable nominal opening widths.

The *ANSI* requirements for doors differ substantially. The most important difference is that *ANSI* has minimum maneuvering clearance requirements. These are based on the direction of approach to the door. The clearances are more stringent for pull and latch side approaches than for other approaches. The clearance requirement that has the greatest impact on the design of housing units is the 18" latch side clearance that *ANSI* requires for a direct forward approach to the pull side of a door. This is significant because very few typical multifamily bathroom designs have spaces adjacent to doors that aren't already occupied by toilets or lavatories. Doors can be made to swing out into corridors, but that frequently requires the widening of the corridors. Pocket doors are a potentially useful alternative because they do not need latch clearance, but many builders are reluctant to use them because they are not generally perceived as a quality item by potential purchasers, and they occasionally come off their tracks, requiring more maintenance than conventional doors. A walk-in closet is another design element that is affected by *ANSI* in terms of the need to provide adequate maneuvering space for wheelchairs within the closet. A more detailed discussion of these and other issues, as they relate to the redesign strategy of the units included in this study, is found in section entitled *Case Study Analysis and Redesign Strategies* on page 23.

Requirement 4 Accessible Route Into and Through the Covered Dwelling Unit

This requirement provides that all covered multifamily dwellings with a building entrance on an accessible route shall be designed and constructed in such a manner that they contain an accessible route into and through the unit.

There are several parts to this requirement. First, the minimum clear width of any space must be 36". Second, in single-story dwellings, changes in floor level within the dwelling units with heights between ¼" and ½" are to be beveled with a slope no greater than 1:2. Changes in level greater than ½" are to be ramped or have other means of access. There are two exceptions to this rule: lofts and sunken living rooms. Lofts need not be accessible if all other spaces in the dwelling unit are on an accessible route. Sunken or raised design features are permitted if they do not interrupt the accessible route through the remainder of the dwelling unit. Third, the primary entry level of multistory units in buildings with elevators must be accessible and contain an accessible bathroom or powder room. Fourth, door thresholds and sliding door tracks must be a maximum of ¾" high and have beveled level changes. Fifth, the floor level of exterior decks, patios and balconies must be no more than ½" below the interior floor level; however, the difference in height can be up to 4" if the exterior construction is of impervious material, such as concrete or masonry. Last, the surface level of the landing immediately outside the primary entry door to units with direct exterior access must be level with the interior floor, unless the landing is constructed of an impervious material, such as concrete, in which case the landing may be up to ½" (but no more than ½") below the interior floor level.

The *ANSI Standard* differs from the *Guidelines* in several ways. It requires that at least one bedroom be accessible, although it does not prohibit additional bedrooms or bathrooms on the second floor. It also requires an accessible full bathroom on the primary access level. The restriction on level changes is a maximum of ½" in all situations including door thresholds and sliding door tracks. In addition, *ANSI* requires larger circulation clearances at doors.

Requirement 5 **Light Switches, Electrical Outlets, Thermostats and Other Environmental Controls in Accessible Locations**

This requirement provides that all covered multifamily dwellings with a building entrance on an accessible route be designed and constructed so that the units contain light switches, electrical outlets, thermostats and other environmental controls in accessible locations.

This requirement is meant to insure that all operable parts of environmental controls are within reach of people with disabilities. The basic rule is that all such controls must be within 15″ to 48″ above the floor. In addition, if controls are placed over an obstruction that is deeper than 20″ (e.g., countertop), the top limit is reduced to 44″ if only a forward approach from a wheelchair is possible and to 46″ if a side approach is possible. The depth of any obstruction is limited to 25″ if a control is located above it. The requirement does not apply to outlets intended for refrigerators, clocks or other types of equipment that are not meant to be accessed by residents on a frequent basis. In addition, outlets and switches that *do not* meet the requirements are permitted if other outlets and switches are provided within the same area that *do* meet the requirements.The *ANSI Standard* has similar requirements; however, *ANSI* allows controls that have side access to be higher (54″). *ANSI* also specifically covers controls on kitchen appliances.

Requirement 6 **Reinforced Walls for Grab Bars**

This requirement provides that all covered multifamily dwellings with a building entrance on an accessible route contain reinforcement in bathroom walls to allow later installation of grab bars around toilets, tubs and shower stalls. Powder rooms are not included in the requirement unless they are the only toilet facilities located on an accessible level of a multistory dwelling in an elevator building. The *Guidelines* include diagrams illustrating areas of reinforcement for typical bath conditions. When toilets are not placed next to adjacent sidewalls, other types of grab bars, such as foldaway or floor-mounted grab bars, will be necessary, and the appropriate reinforcement should be provided based on the type of grab bar selected. (See the Appendix for illustrations of some options.) Other non-standard bathroom fixtures, such as sunken tubs, will also require specialized floor-mounted grab bars. Reinforcement for grab bars in walls may be provided in a number of ways, including 2x blocking between studs, additional studs, and plywood underneath the bathroom finish. Most low-rise housing utilizes plywood, OSB or particleboard floor sheathing, which is adequate for the attachment of floor-mounted grab bars. Floor materials other than plywood will require the use of special fasteners.

The *ANSI Standard* has similar requirements to the *Guidelines*; however, grab bar reinforcement for toilets is required to a point 54″ from the rear wall, whereas in the *Guidelines* the recommended equivalent distance is 36″. The 54″ requirement effectively mandates that the toilet be adjacent to a wall because, if the grab bar was floor-mounted and not adjacent to a wall, it would obstruct passage in a bathroom.

Requirement 7 **Usable Kitchens and Baths**

This requirement provides that all covered multifamily dwellings with a building entrance on an accessible route be designed and constructed so that the units contain kitchens and baths within which a wheelchair can maneuver.

Kitchens

Kitchens comply if:

- A clear space of at least 30″x48″ is provided that allows a parallel approach by a wheelchair to the range/cooktop or sink and either a parallel or forward approach to the oven, dishwasher, refrigerator/freezer or trash compactor.

- Clearance between counters and all opposing base cabinets, countertops, appliances or walls is at least 40″.

- In "U"-shaped kitchens with a sink or range/cooktop at the base of the "U", a 60″ turning diameter is provided to allow a parallel approach, or base cabinets are removable at that location to allow knee space for a forward approach.

The *ANSI Standard* has similar requirements to the *Guidelines*; however, it includes additional requirements that affect cost issues.

- Ovens shall be the self-cleaning type or be located adjacent to an adjustable-height counter with knee space below.

- At least one work surface, a 30″ minimum section of counter, shall be adjustable or replaceable, as a unit, at variable heights between 28″ and 36″ or shall be mounted at a fixed height no greater than 34″ from the floor. Base cabinets shall be removable under the full 30″ frontage of the counter. Counter thickness and supporting structure shall be 2″

maximum over the required clear area.

- Kitchen storage requirements prescribe that the maximum height for at least one shelf of all cabinets and storage shelves mounted above cabinets be no more than 48".

- Additional *ANSI* requirements prescribe characteristics of hardware and controls for appliances such as ovens, refrigerator/freezers and dishwashers.

Bathrooms

The *Guidelines'* criteria for bathrooms allow two basic approaches to making bathrooms usable: complying with either paragraph (a) or paragraph (b) of Section 100.205(c)(3)(IV). For the sake of simplicity, we have labeled these approaches Option A and Option B.

All bathrooms in the dwelling unit must *either* comply with Option A *or* at least one bathroom in the dwelling unit must comply with Option B. In Option B, all other bathrooms within the dwelling unit must be on an accessible route with usable entry doors in accordance with Requirements 3 and 4; accessible light switches and other controls must be in accordance with Requirement 5; and, reinforced walls for grab bars must be in accordance with Requirement 6.

There are exceptions with respect to multistory units, however:

- For multistory units in elevator buildings, the level served by the building elevator must be the primary entry level for the unit.

- All spaces on the accessible (entry) level of these multistory units must be accessible, including any bathrooms (i.e., bathrooms as defined in the *Guidelines*), must comply with Requirements 2 through 7 of the *Guidelines*.

- There must be at least one accessible bathroom or powder room on the accessible level of the multistory dwelling. If there is only a powder room, then the powder room must be accessible.

The differences between Option A and Option B are subtle and require careful study. A detailed comparison of the two requirements is found on page 20-21. The two significant differences that have an impact on bathroom layout and cost are:

- Option B requires a 30" x 48" clear floor space adjacent to the bathtub and would not allow a toilet to occupy this clear floor space. (See Figure 8 in the *Guidelines*.)

- Option A would allow either a lavatory or a toilet to occupy the space next to the bathtub, as long as the necessary clear floor space is provided for each of the fixtures in the bathroom. (See Figure 7(a)(b)(c) and (d).)

Both of the options allow the required clearances at the lavatory to overlap the clearance at the tub. Thus, the effect of these two differences is that in Option B bathrooms, when the fixtures are lined up against the same plumbing wall, the toilet cannot be located immediately adjacent to the tub, whereas in Option A bathrooms it can be.

The relative location of the toilet and entrance door have a significant impact on the size of some bathrooms. Most bathrooms in low and middle end projects have depths of 60", determined by the length of a typical tub. However, if the toilet is *opposite* the entry door, whether or not the door swings in or out, the *Guidelines* and *ANSI* require that the depth of the bathroom must be 66" for a frontal approach. This means that in Option B bathrooms, since the toilet cannot be adjacent to the tub/shower, the entry door has to be in the center of the bath, adjacent to the tub and opposite the lavatory, if the bath depth is to remain 60". In Option A bathrooms, the entry can be either adjacent to the end wall or adjacent to the tub because the location of the sink and toilet can be interchangeable. (See page 26 for a general discussion of bathroom design).

The maneuvering clearance requirements in Option A and B have slight differences in wording, but the net effect is the same. In both cases, if there is enough space for an individual in a wheelchair to enter and close the door, the requirements would be met. *Neither* option requires space for a person in a wheelchair to turn around in the bathroom. The 30"x48" clear floor space can include any knee space and toe space available below bathroom fixtures.

If the bathroom has enough space, a removable vanity cabinet is not necessary as long as a parallel approach can be made *on center* with the lavatory. Otherwise, a removable vanity cabinet is required to allow the necessary knee space for a forward approach to the lavatory. These requirements can necessitate changing the swing direction of a door or replacing a swinging door with a pocket door.

The *ANSI Standard*'s requirements for space planning of adaptable bathrooms are similar to the *Guidelines* with six important differences:

1. *ANSI* requires 18" from the centerline of a toilet to an adjacent wall, fixture or cabinet on *both* sides, not just one side.

2. Doors can only swing into the clear area required for fixtures if there is enough space in the bathroom to turn around in a wheelchair.

3. All vanity cabinets beneath lavatories must be removable.

4. *ANSI* does not have scoping criteria and therefore does not mandate how many bathrooms have to be accessible. This would be set by the individual jurisdiction that adopted the *ANSI* requirement.

5. Grab bars in *ANSI* units are required to be 42" long as opposed to 24" in the *Guidelines*.

6. *ANSI* has additional bathroom criteria relating to the design and placement of controls, mirrors and medicine cabinets. The only two that have a potential cost impact are hand-held flexible shower heads and mirrors set closer to the countertop.

ANSI has requirements for two items not covered by the *Guidelines*. These include provisions for accessible laundry facilities (when provided) and for visual alarm systems in addition to audible alarm systems, if provided in accessible dwelling units.

The requirement for accessible laundry facilities has a significant cost impact because the 48" reach limit required by *ANSI* Section 4.2.6 necessitates side-by-side washer/dryer units in lieu of stacked units. This will take up substantially more space than stacked units and usually will require major plan changes and additional costs.

The requirement for visual alarm systems, where audio alarms are already provided, does not have an initial impact on costs, as these can be retrofitted on an as-needed basis.

Comparison of Bathroom Option A and Option B Requirements
(See the *Guidelines*, Requirement 7(2).)

Option A

A. General (when door swings in)

- Wheelchair maneuvering space to enter, close door, use fixtures, reopen, exit. *(2(a)(i))*
- Knee and toe space below fixtures may overlap maneuvering space. *(2(a)(i))*
- Clear floor spaces may overlap. *(2(a)(ii))*

B. General (when door swings out)

- Wheelchair maneuvering space to enter, close door, use fixtures, reopen, exit. *(2(a)(i))*
- Knee and toe space below fixtures may overlap maneuvering space. *(2(a)(i))*
- Clear floor spaces may overlap. *(2(a)(ii))*

C. Toilet

- 18″ on center from wall. *(Figure 7(a))*
- 15″ o.c. from lavatory. *(Figure 7(a))*
- 66″ deep x 48″ wide clear floor space necessary to accommodate both front transfer and 90-degree pivot; lavatory can overlap this clear floor space. *(Figure 7(a))*
- 56″ deep x 48″ clear floor space necessary to accommodate a 90-degree pivot transfer. *(Figure 7(a))*
- 56″ deep x 60″ wide clear floor space necessary to accommodate forward, 90-degree pivot, and side transfer. *(Figure 7(a))*

Option B

A. General (when door swings in)

- 30″x48″ clear floor space clear of door swing and at all fixtures. *(2(b)(i))*
- Knee and toe space below fixtures may overlap 30″x48″ of clear floor space. *(2(b)(i))*
- Not explicitly required but implied.

B. General (when door swings out)

- Clear floor space to reopen door to exit. *(2(b)(ii))*
- Clear floor space at all fixtures. *(2(b)(ii)*
- Not explicitly required, but implied.

C. Toilet

- 18″ on center from wall or bathtub. *(2(b)(iv) and Figure 7(a))*
- 15″ on center from wall, vanity or lavatory. *(2(b)(iv) and Figure 7(a))*
- 66″ deep x 48″ wide clear floor space necessary to accommodate both front transfer and 90-degree pivot; a lavatory can overlap this clear floor space. *(Figure 7(a))*
- 56″ deep x 48″ clear floor space necessary to accommodate a 90-degree pivot transfer. *(Figure 7(a))*
- 56″ deep x 60″ wide clear floor space necessary to accommodate forward, 90 degree pivot, and side transfer. *(Figure 7(a))*

Option A

D. Lavatory

- 30"x48" clear floor space for front approach. *(Figure 7(c))*
- With knee and toe space provided underneath lavatory (either wall hung or with removable vanity cabinet), lavatory can overlap front approach clearance by up to 19". *(Figure 7(c))*
- 30"x48" clear floor space for side approach. *(Figure 7(c))*
- No requirement.
- Figure 7(c) indicates minimum and maximum lavatory depth.

E. Bathtub and Tub/Shower

- Either a lavatory or a toilet may be located adjacent to a bathtub.
- Lavatory can overlap 19".
- For a parallel approach to the bathtub, only a lavatory could be located adjacent to the bathtub, with clear floor space beneath the lavatory, and a clear floor space of 30" x 60" at the lavatory and the bathtub.
- For a forward approach to the bathtub, a toilet could be located adjacent to the bathtub, with clear floor space 48" x 60" in front of the toilet and perpendicular to the bathtub.

F. Stall Showers

- 30"x48" clear floor space adjacent to and starting at the seat side (opposite the shower controls).
- Lavatory can overlap clear floor space at control side of wheelchair clearance in showers 48" or larger (HUD interpretation).
- If stall shower is the only bathing facility in the dwelling unit, it must be 36"x36" minimum. *(2(a)(iii))*

G. Multiple Fixtures
(Tub and shower or two lavatories in one bathroom)

- All fixtures must meet requirements.

Option B

D. Lavatory

- 30"x48" clear floor space. *(Figure 7(c))*
- Knee space and toe space can overlap clear floor space. *(Figure 7(c))*
- 30"x48" clear floor space. *(Figure 7(c))*
- Lavatory 15" on center from adjoining wall or fixture. *(2(b)(v))*
- If knee space is provided, rim height of 34" maximum, knee clearance of 27" minimum high and 17" minimum deep. *(2(b)(v) and Figure 7(c))*

E. Bathtub and Tub/Shower

- 30"x48" clear floor space measured from the drain end of the tub.
- Lavatory can overlap 19". *(Figure 7(c))*
- No toilet overlap allowed.

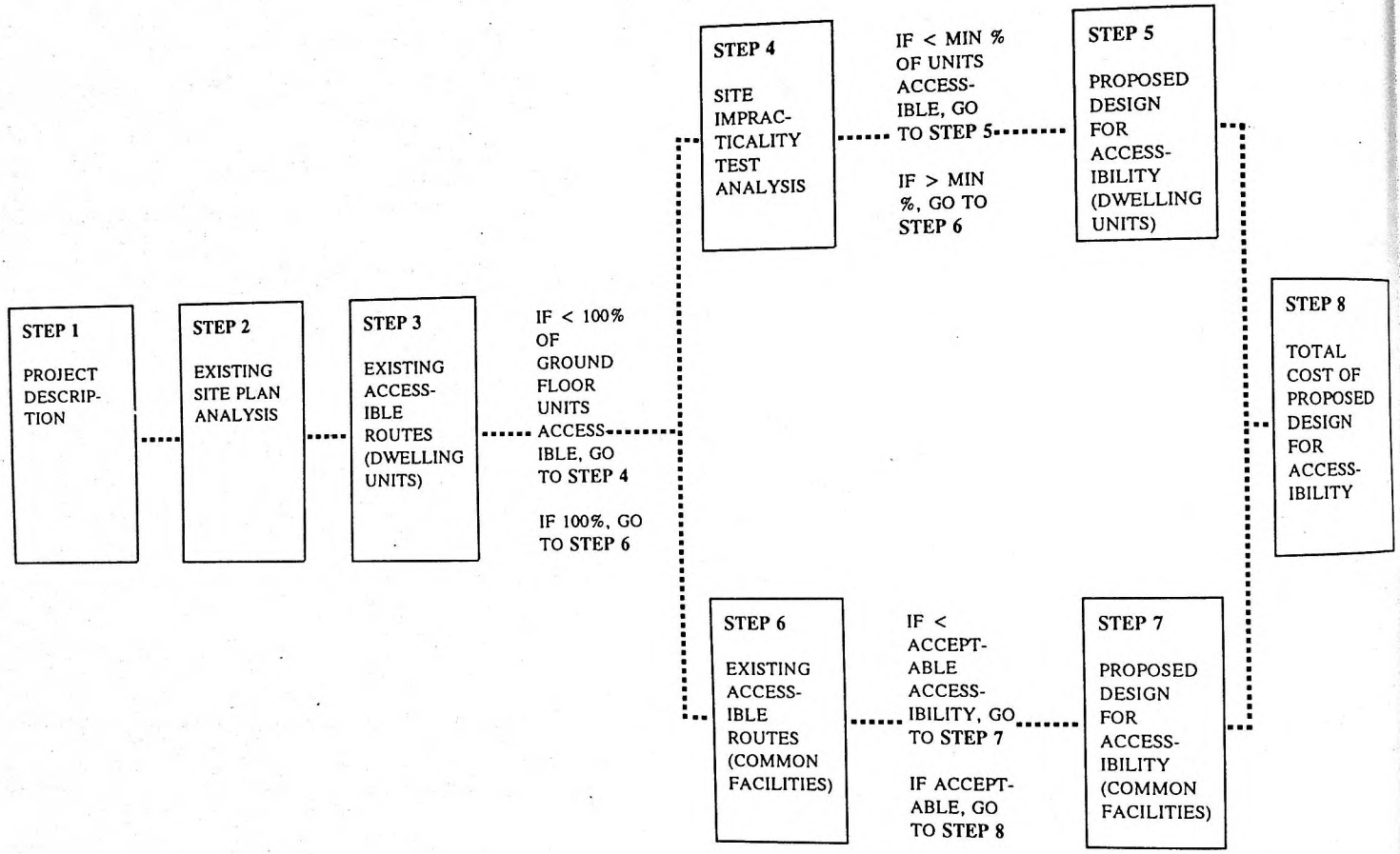
F. Stall Showers

- 30"x48" clear floor space adjacent to and starting at the seat side (opposite the shower controls).
- Lavatory can overlap clear floor space at control side of wheelchair clearance in showers 48" or larger (HUD interpretation).
- If shower stall is only bathing facility in the dwelling and is equal to or less than 36"x36", reinforcing is required for installation of wall-hung bench seat. *(2(b)(vii))*

G. Multiple Fixtures
(Tub and shower or two lavatories in one bathroom)

- If both a tub and a shower are provided in one bathroom, only one needs to be accessible.

PROCESS DIAGRAM FOR ANALYZING SITE COSTS OF ACCESSIBILITY



CASE STUDY ANALYSIS AND REDESIGN STRATEGIES

This section describes the methods chosen to evaluate individual case study projects and reviews the design strategies and goals employed to bring the projects into compliance with the *Guidelines* and *ANSI A117.1 Standard* in a cost-effective way. In doing so it follows in sequence the seven requirements of the *Guidelines*.

Requirement 1 Accessible Building Entrance on an Accessible Route
and
Requirement 2 Accessible Common and Public Use Areas

The *Guidelines* for the site development of covered multifamily dwellings address two basic requirements: accessibility to ground floor unit entrances; and accessibility to and use of public or common use areas, generically referred to hereafter as common facilities.

Entrances to buildings or units reached by pedestrian routes from arrival points must be accessible, i.e., on accessible routes. Similarly, movement between ground floor units and common facilities must be on vehicular or pedestrian ways without obstructions to free movement, such as barrier curbs, steps, stepped walks or ramps in excess of 8.33%. Not *all* routes have to be accessible, but at least one primary route from arrival points to building/unit entrances *and* from building/unit entrances to common facilities must be accessible.

The percentage of units the *Guidelines* require to be accessible ranges from 100% accessibility for multifamily units in elevator buildings to as few as 20% for multifamily units in non-elevator buildings on sites with steep terrain or unusual conditions making for "site impracticality". Since the majority of problems affecting site accessibility arise in the second category, most of the projects selected for analysis are "walk-up" developments with surface parking.

The projects selected range throughout the continental U.S. and represent all regions. Some are on flat or slightly sloping sites; others are on moderately sloping to steeply-sloping sites. Seven of the eight projects (numbered I to VII) are low-rise garden apartments; one (Project VIII) is a medium-rise, elevator apartment building.

To facilitate comparisons and to clarify site accessibility requirements and their interpretation, a procedure for analyzing the project site plans was developed. It is an eight-step process shown on the preceding page in a *Process Diagram for Analyzing Site Costs of Accessibility.*

The eight steps are as follows:

1. Project Description The project name, location, regional context, program and basic statistics (size, number of units, density and building coverage) are listed. A simplified illustrative site plan is provided.

2. Existing Site Plan Analysis The overall site concept and its constituent elements (the building layout, circulation, parking and open-space) are discussed and evaluated. The number and location of required accessible parking spaces are identified.

3. Existing Accessible Routes (Dwelling Units) The site plan is analyzed for accessibility to building entrances and ground floor units. Primary routes from points of arrival to the building entrance (in the case of a single building) or entrances (in the case of multiple buildings) are identified and marked on the site plan in an *Accessible Routes to Dwelling Units Analysis.* All obstructions to free movement (such as steps, stepped walks, steep ramps and the like) are noted and marked on the plan. (It is assumed that curbs and building/unit entrance door thresholds met the *Guidelines*.) The number of accessible and inaccessible ground floor units is specified.

For units in buildings without elevators (represented in this study by Projects I to VII), at least one entrance per building must be accessible and on an accessible route, unless terrain or unusual conditions make for *site impracticality*. If *less than* 100% of the ground floor units are accessible, the issue of site impracticality must be considered in Step 4 and subsequent steps. If 100% of the ground floor units are accessible, site impracticality is not an issue, and the analysis can proceed to examine accessibility to common facilities in Step 6 and subsequent steps.

For units in buildings with elevators (represented in this study by Project VIII), at least one building entrance must be accessible and on an accessible route, regardless of terrain or unusual conditions. The issue of site impracticality, therefore, does not apply: 100% accessibility to units has to be provided. The analysis can proceed to examine accessibility to common facilities in Step 6 and subsequent steps.

4. Site Impracticality Test Analysis There are two tests: an *Individual Building Test* and a *Site Analysis Test*. For multiple buildings, either test may apply, but irrespective of either, at least 20% of ground floor units in non-elevator buildings have to be accessible and on an accessible route.

Each test follows the *Guidelines*, and concludes with a minimum required number of accessible units. The *Individual Building Test* accepts as inaccessible, on account of site impracticality due to terrain, all ground floor units in which the elevation difference between the undisturbed site grade and the proposed finished site grade from arrival points and the planned building entrance, measured in a straight line, is over 10%. If either the undisturbed slope or the proposed finished slope, measured in a straight line, is 10% or less, then site impracticality due to terrain does not exist.

The *Site Analysis Test* measures the site area of undisturbed or natural grade having an existing slope before grading less than 10% (*Guidelines'* Step "A"). The area of less than 10% slopes is expressed as a percentage of the total site area (less any restricted use areas such as wetland or floodplains). The percentage establishes the minimum percentage of ground floor units to be made accessible (*Guidelines'* Step "B"), subject to the additional requirements of Step "C". The *Guidelines'* Step "C" requires that, in addition to the percentage established in Step "B", all ground floor units in a building, or ground floor units served by a particular entrance, shall be made accessible if the entrance to the units is on an accessible route, defined as a walkway with a slope between the planned entrance and a pedestrian or vehicular arrival point that is no greater than 8.33%.

If the number of ground floor units provided is *less than* the minimum required, design changes to achieve accessibility to units have to be considered and the analysis proceeds to Step 5. If the number of ground floor units is *more than* the minimum required, no design changes are needed and the analysis can proceed to Step 6 and subsequent steps.

5. Proposed Design for Accessibility (Dwelling Units) To make up the difference between the number of accessible ground floor units provided and the number required by the *Guidelines*, each inaccessible unit and building entrance is analyzed for the least cost/most direct resolution of the noted obstruction. The analysis starts with those units with entrances on walks in which the elevational difference from arrival point to building entrance measured along the walk is 8.33% or less and which, therefore, would have to be made accessible under Test "C" in the *Guidelines*. Each design change is tabulated, building entrance by building entrance, and shown on a marked up site plan as *Redesign for Accessible Units*. All changes are quantified as Add Changes and Deduct Changes.

In approximate order of ascending costs, typical changes are:

- Realignment of walks to be 5% or less
- Minor regrading, i.e., minor raising or lowering of Finished Floor Levels (FFLs), and minor raising or lowering of arrival areas
- Minor relocation of buildings
- Elimination of all steps, stepped walks, and ramps greater than 8.33%, by substituting them with ramps of 8.33% or less, with handrails, or walks of 5% or less, without handrails
- Introduction of banks and/or retaining walls to reduce the slopes of accessible routes to 8.33% or less, for ramps or 5% or less, for walks.

6. Existing Accessible Routes (Common Facilities). The site is analyzed for accessibility to common facilities from accessible ground floor units. Primary accessible routes between units and public or common use areas are identified and marked on the site plan in an *Accessible Routes to Units Analysis*. All obstructions to free movement, such as steps, stepped walks, ramps and the like, are noted and marked on the plan, and conditions of less than acceptable accessibility are identified.

For any less than acceptable conditions, design changes must be considered and the analysis proceeds to Step 7. If there are no unacceptable conditions, design changes are not needed, and the analysis can be concluded with Step 8.

Design changes made in Step 5 are included in the analysis of Step 6 and 7.

7. Proposed Design Changes for Accessibility (Common Facilities). Each unacceptable condition is analyzed for the least cost/most direct resolution of the noted obstructions. Each design change is tabulated and shown on a marked up site plan as *Additional Redesign for Accessible Common Facilities*.

All of the changes under Step 5, as well as the introduction of new walks to improve internal circulation, are considered.

8. Site Cost of Proposed Design Changes for Accessibility.

The design changes for accessibility to units (Step 5) and common facilities

(Step 7), including any changes for accessible parking in the Existing Site Plan Analysis (Step 2), are tabulated and expressed as a percentage of the total documented site improvement costs of the project as built, pro-rated in 1991 dollars. (See cost summaries.)

Requirement 3 Usable Doors

This requirement has two parts. The first applies both to doors on accessible routes in public and common use areas and to primary entry doors to covered dwelling units. For these doors, *ANSI A117.1* is the referenced standard. The second part applies to doors within individual dwelling units.

A review of the accessible routes to and through the public and common use areas both within individual buildings, such as the Arlington tower and the recreation buildings of the Andover Park, Sunbrook and Sun Valley projects indicated that, with a few exceptions relating to level changes, projects already met the *ANSI Standards*. In addition, all projects met the corresponding requirements for individual apartment entry doors.

The *Guidelines* require that doors for passage within units must have a clear opening of at least 32″ nominal width. A 34″ hinged door and a 6′-0″ pair of sliding glass doors comply with this requirement.

Design strategies for the relocation or modification of doors were based on a number of considerations:

- The desire to respect the type of doors originally chosen by the unit's designers by replacing or modifying them with similar door types. An exception to this would be the replacement of a single hinged door leading to a stacked washer/dryer with a pair of bifold doors provided for access to a side-by-side washer/dryer required by *ANSI* (Project VI, Unit A).
- Occasionally pocket doors were substituted for inswinging doors where inswinging doors would interfere with circulation (Project VI, Unit D, *ANSI*), or where an outswinging door was required, but there wasn't room for 18″ side clearance next to the latch on the pull side of the door (Project VIII, Unit 7, *ANSI*). Pocket doors had been included in the original designs of two projects: Project I, Unit B, where it was used to form a privacy suite, and Project VII, Unit A, where it was used to separate a master bedroom from its bath. The use of a pocket door directly separating a bedroom from its own bath was considered a more appropriate use than that of a pocket door on a more public corridor that served a number of spaces. Pocket doors offer less acoustical privacy and often have less secure locking mechanisms.
- Where possible, door swings were kept in the direction originally indicated on plans, except that in a number of cases, doors were swung outward to maintain existing bathroom sizes. This was done in those instances where bathrooms did not open directly onto living/dining spaces and where outswinging doors would not adversely affect the functioning or marketability of units. In fact, one builder/developer changed the swing of corridor bathroom doors outward to meet the *Guidelines* and received few adverse comments (Project III, Unit A, Option B and *ANSI*).
- The use of 34″ doors rarely led to an increase in the size of spaces within dwelling units. However, in corridors with rooms opening at their ends, the corridor width had to be increased from 3′-0″ to 3′-4″ to allow for a 34″ door and a minimum 2¼″ trim. Wider trim would require a wider corridor.
- Walk-in closets require 34″ doors. Closets that required an individual to move entirely through the doorway to access the shelves and clothes hangers were considered walk-in. The front end of a wheelchair and its occupant's legs are generally less than 24″ wide. Thus, closet doors that are smaller than the 32″ clear space are still usable as long as a person does not have to pass through the opening.

ANSI requirements differ from the *Guidelines* in that *ANSI* has minimum maneuvering clearance requirements. These are based on the direction of approach to the door and are most stringent for pull and latch side approaches, which require 18″ latch side clearance for a direct forward approach.

This requirement, combined with the larger 34″ door, frequently led to significant plan changes (Project 3, all *ANSI* units) and frequently to the use of pocket doors, which do not require side clearance.

In addition to the requirement for 18″ latch side clearance on the pull side of doors, apartment entry doors are required to have 12″ clear space adjacent to the latch on the push side of doors when the doors have closers. In addition, door closers should have delayed-action features. The only project in this study that had door closers was the mid-rise Arlington project. Plan redesigns reflect the 12″ clear space requirement for entry doors.

Requirement 4 Accessible Route Into and Through the Dwelling Unit

Meeting the requirements did not necessitate any changes to the unit plans for

the following reasons:

- There were no spaces with less than a 36" dimension.
- There were no multistory units.
- There were no interior level changes greater than ¼".
- There were no lofts or sunken living rooms in accessible units.
- The requirement for specific elevation differentials between interior floor levels and exterior surfaces at decks, patios and entrance landings did not require plan changes.

Requirement 5 Accessible Light Switches and Other Controls

Meeting Requirement 5 did not necessitate any changes to the unit plans. All controls could be located within the reach limits with careful planning. The only exceptions for housing projects, in general, would be mechanical equipment controls for items such as baseboard electric heaters, which would be below the minimum 15" requirement, and controls for fan coil units in highrise projects, which were mounted higher than the maximum allowed height limit of 48". These items would have a cost but not a plan impact.

Requirement 6 Reinforced Walls for Grab Bars

There are four types of grab bars available for use in accessible bathrooms. Whichever type is used, it should be "functional and appropriate".

- Conventional fixed wall-mounted bars used at ends and backs of tub/showers and behind and aside toilets. The blocking locations and sizes for those bars are found in the *Guidelines* and *ANSI* requirements.
- Foldaway grab bars that are mounted behind and aside toilets where toilets are not adjacent to sidewalls or where sidewalls are not long enough to receive grab bars, which is typically the case in most narrow bathrooms that are entered on the ends (see page 28, figure 3 and page 29, figure 13).
- Floor-mounted grab bars that are used in conjunction with sunken tubs or tubs that are not adjacent to walls).
- Grab bars that are mounted onto the bolts that secure toilets to the floor.

Wall-mounted grab bars, both fixed and foldaway, are usually mounted through a wall finish to 2x blocking members that span between vertical wood, or in the case of the Arlington project, metal studs. Floor-mounted bars are attached to plywood, OSB, particleboard or cement/fiber board floor sheathing that are typically used in low-rise construction. In mid and high-rise construction, floor mounted grab bars are secured to the concrete floor with expansion bolts.

Specific arrangements of grab bars are discussed in the follow section.

Requirement 7 Usable Kitchens and Bathrooms

As the previous section discussed grab bars, this section will discuss the strategies for the design of bathrooms before that of kitchens.

Bathrooms

Of all the elements of dwelling unit design, the *Accessibility Guidelines* most critically impact bathrooms. In analyzing plans, the most important issues were:

- Location and number of doors.
- Maintaining a 30"x48" clear floor space.
- Providing either a parallel approach to and centered on the lavatory or using a removable vanity base cabinet to allow a frontal approach.
- Providing appropriate locations for grab bar reinforcement.
- Allowing for 34" wide doors.
- Providing 18" side clearance next to the latch on the pull side of doors in *ANSI* conforming bathrooms.

Historically, the typical bathroom in low and mid-market rate projects has reflected, as one dimension, the industry standard 5'-0" tub/shower or a 4'-0" shower that occupies the same space. The other dimensions usually vary from 7'-6" to 9'-0" and include space for the tub/shower, lavatory and toilet. Typically these fixtures back up to a common plumbing wall with the toilet adjacent to the tub (as a convenient seat) and the lavatory adjacent to the side wall to provide space for a convenient towel rack.

This arrangement is difficult to achieve in the most compact guideline-complying bathrooms with one 5'-0" dimension, as can be seen in the display of typical bathrooms on page 29 unless the lavatory is shallow, and the door swings out (figure 13). In fact, the only compact baths that work are Figures 3, 4, 12 and 13, which have outswinging doors, because, except for Figure 3, an inswinging door would violate the 30"x48" clear floor space. The other way for this arrangement to work is to elongate the bath so there is a 30"x48" clear floor space adjacent to the inswinging door (Figures 8, 17 and 18).

Another useful arrangement, used extensively as a redesign strategy in this study, allows an inswinging door and a 5′-6″ wide bathroom, in which the lavatory is adjacent to the tub/shower and the toilet is adjacent to the wall (Figures 1, 2, 6, 7). The arrangement works because the required clear space is available underneath the lavatory when the base cabinet is removed (see the Appendix for details of a removable vanity base cabinet). This arrangement is required in the *Guideline's* Option B, when the toilet cannot be located in the clear floor space next to the tub/shower. With a 30″ wide tub and a 30″ vanity, this can be accomplished in a 5′-0″x7′-9″ space. With a 27″ vanity, it can be accomplished in a 5′-0″x7′-6″ space where the clear floor space under the lavatory overlaps the required 15″ dimension from the lavatory to the toilet. In one arrangement, Figure 3, with a 5′-0″ tub, a foldaway grab bar has to be used as the *Guidelines* require a minimum 27″ (24″ + trim) wall adjacent to the toilet to mount a 24″ grab bar.

An entrance on the long wall with an inswinging door requires a 5′-6″ depth as the forward approach is opposite the toilet (Figure 10). Another common compact bathroom arrangement is one in which the tub/shower is on a wall opposite the lavatory and toilet (Figures 14 and 15). The *Guidelines* require a minimum depth of 5′-0″ using a 27″ vanity, and *ANSI* requires 5′-3″. Both utilize outswinging doors.

Another important planning consideration is the number of bathroom doors. Fortunately, this is not a serious design problem because it is not necessary for the clear space to be free of the paths of all bath doors at the same time.

The approach to bathroom redesign used the following process:

1. Identify any problems in meeting the criteria for Option A.
2. Make minor adjustments in door and fixture location keeping the relative location of fixtures the same.
3. If step 2 did not bring the bathroom into compliance, relocate fixture without increasing the size and configuration of the bathroom.
4. If step 3 did not work, change the door swing or substitute a pocket door.
5. If step 4 did not work, increase the size of the bathroom.
6. If step 5 did not work, redesign the entire bathroom from scratch as necessary.
7. Make any other changes to the dwelling unit plan to accommodate the revisions in step 6.
8. If the unit had two bathrooms, repeat the process using the Option B criteria.
9. Repeat the process again using the *ANSI* criteria.

Kitchen

There are four key *Guidelines* requirements that affect the design of kitchens:

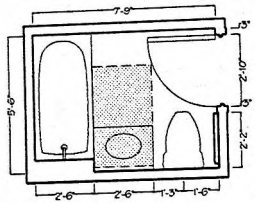
- A 30″x48″ clear floor space must be available directly in front of each appliance or fixture.
- The clear space must allow a parallel approach to the sink and range/cooktop.
- The clearance between opposing countertops, base cabinets, walls and appliances must be at least 40′.
- In U-shaped kitchens that have the sink, cooktop or range at the base of the "U", a 60″ turning radius is required to allow a parallel approach, or, alternatively, removable base cabinets are required to allow knee space for a forward approach.

Although not stated in the text, the illustration to the *Guidelines* shows the clear floor space centered on the object to be reached. HUD interprets this to mean that this space must be centered on the fixture or appliance.

There were three types of kitchen layouts in the case study units: galley, U-shaped and L-shaped. The galley kitchens were the smallest and tended to be designed to a minimum size. In many cases the space between counters had to be increased slightly, especially when the refrigerator (always several inches deeper than a countertop) was opposite a counter. Some U-shaped counters required a slight increase between opposing sides of the counters, but this was generally minimal. The key to designing U-shaped kitchens is to make sure that the sink and stove/cooktop are far enough away from an interior corner, so that a parallel approach is possible.

ANSI has similar requirements to the *Guidelines*, but also has other requirements that affect kitchen planning. The most important of these requirements is for an adjustable or replaceable 30″ sink counter and a 30″ adjustable or replaceable work counter. There are several design strategies that reflect this requirement: one is to make one 60″ surface to save money by providing fewer finished end panels on cabinets adjacent to the adjustable counter; another is to have one 30″ section placed adjacent to an oven/range which will eliminate the need to have a self-cleaning oven; and a third is to have custom base cabinets built at a height of 32½″ so with a 1½″ countertop the finished height would be 34″, which does not require further adjustment. At least one cabinet supplier involved with the units studied provided that alternative.

BATHROOM CONFIGURATIONS



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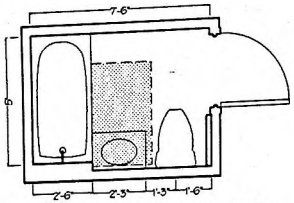
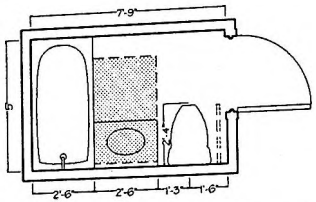
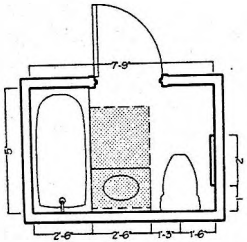


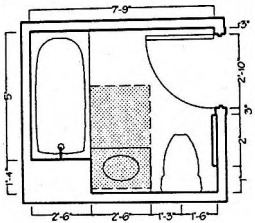
2 With 24" or 27" vanity, 30"x48" clear space can overlap vanity.



3 In 5'-0" wide bathrooms, toilet cannot exceed 28" deep. Deeper toilets require correspondingly wider bathrooms. Foldaway grab bar required because side wall is not long enough to take 24 " grab bar.



4 Plan accommodates either 24" or 42" grab bars.



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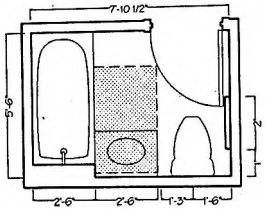
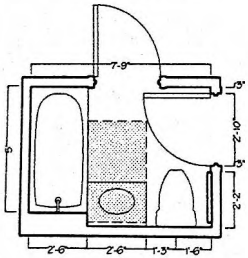


6 Plan accommodates either 24" or 42" grab bars.



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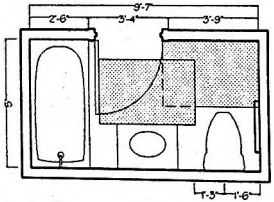

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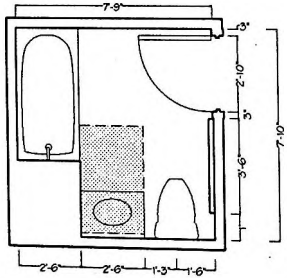

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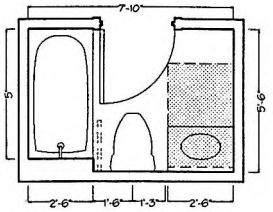
Bath tubs shown are 2'-6" wide, wider bath tubs will require correspondingly longer bathrooms.

24" long grab bars can be placed on wall adjacent to toilet when wall is a minimum of 24" long between back wall and door trim. However, it is preferrable to have grab bar begin 12" from back wall.



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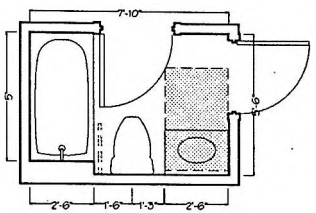

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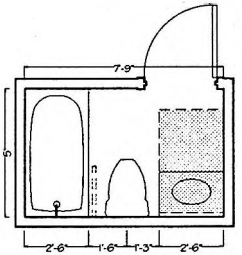

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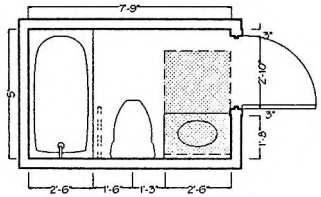
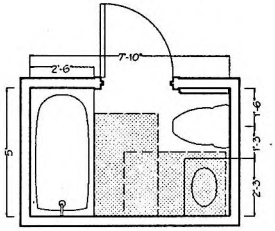


13 In 5'-0" wide bathrooms, toilet cannot exceed 28" deep. Deeper toilets require correspondingly wider bathrooms.



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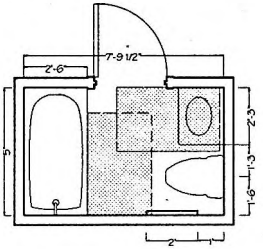

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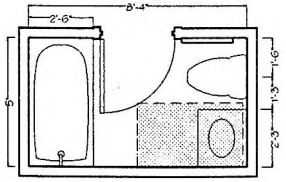

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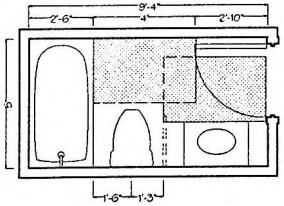

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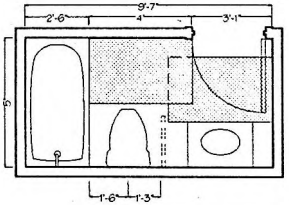
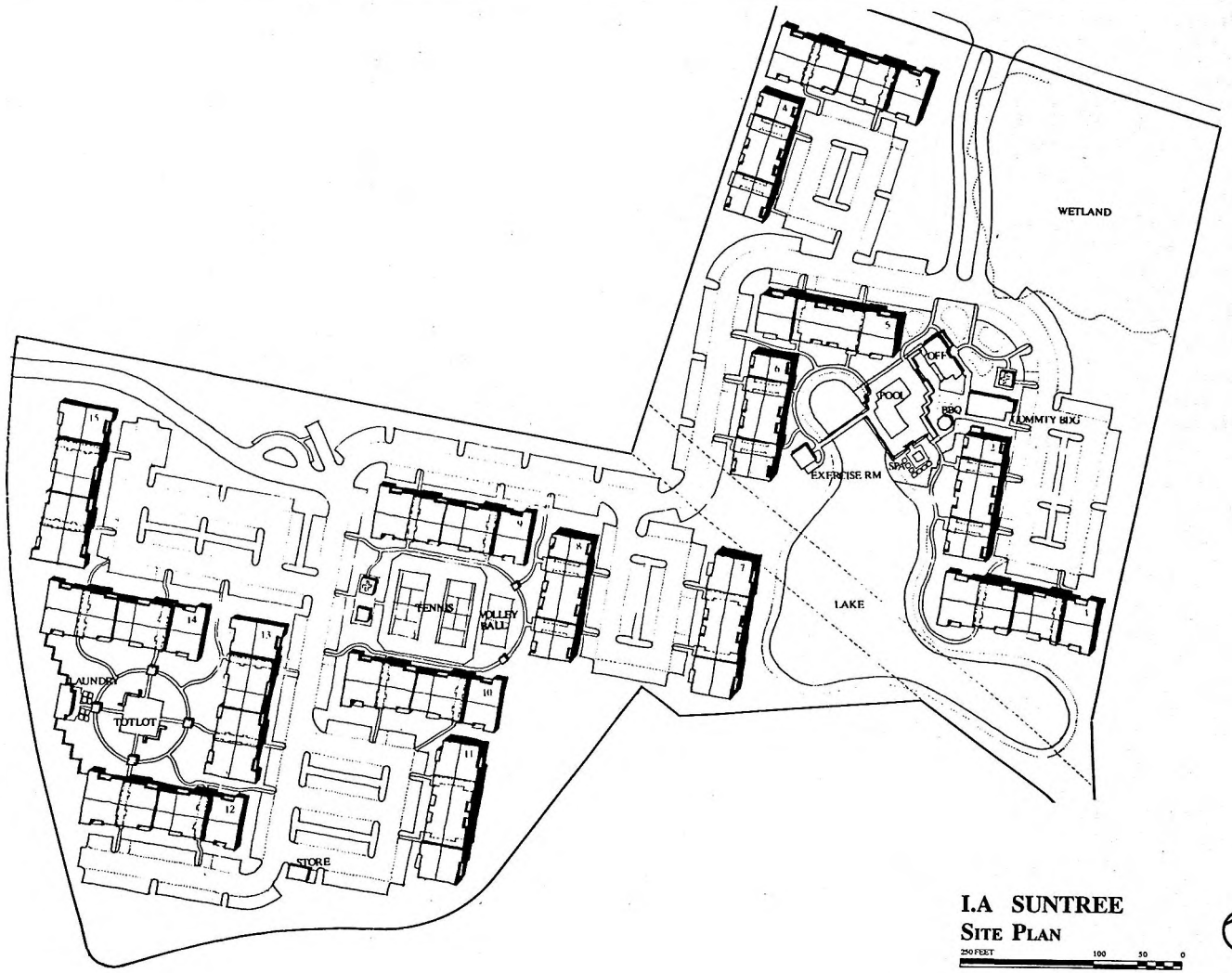


18 Lavatories with centered paralell approach do not require removable vanities.

CASE STUDY I: SUNTREE APARTMENTS, BREVARD COUNTY, FL.



I.A SUNTREE
SITE PLAN

250 FEET 100 50 0

I. SUNTREE

1. Project

This project is called Suntree Apartments in Brevard County, Florida. It is a representative garden apartment project for Central Florida and the Southeast Sunbelt. The developers are First Pioneers Partners, Ltd. of Jacksonville, FL. The architects are Stottler Stagg & Associates.

The site is part of a large Planned Unit Development (PUD) of the same name, Suntree PUD. The program is small one-bedroom to three-bedroom units in three-story walk-up buildings of moderate density, with a strong focus on recreational amenities.

1.1 Basic Statistics

The gross site area is 21.79 acres. There are 326 apartment units at a density of 14.96 units/acre (327 units @ 15 units/acre is allowed). The building coverage is 16.25%. Out of 326 units, 120 are ground floor units.

2. Existing Site Plan Analysis

2.1 Site Concept

Plan I.A illustrates the basic configuration of the site and building development. The site is "L"-shaped, about 1500 feet east-west, 1,000 feet north-south, with highway frontage at the north and west sides. The natural grade is essentially flat, varying about three feet from the south (±34-35) to the north (±30-33). There is a wetland preserve at the northeast corner of 1.1 acres. Because of the site's flatness, considerable recourse has been exercised in ground modelling, which, besides the preserved wetland, includes an ornamental lake and many small earth berms.

Buildings are tightly arranged as blocks around two or three sides of "courtyards". Some courtyards contain parking lots, others recreation facilities of various kinds. The largest one, opening to the south is occupied by a lake of roughly 1.5 acres, a portion of which coincides with a 60 foot wide drainage easement.

2.2 Building Layout

There are 15 buildings, typically three floors (with some two-floor sections), in three basic types identified as Series 100, 200 and 300:

Table I.1: Existing Distribution of Ground Floor Units

Type	Building #s	Floors	Units	Total Units	Total GF Units
100	2, 4, 6, 8	3	24	96	32
200	7, 11	3	24	48	16
200A	5	3/3/2	22	22	8
300	1, 3, 9, 10, 12-15	3/2	20	160	64
Total				326	120

Buildings typically consist of blocks of four units on three floors (12 in total), i.e. two pairs of units (one front, one back) separated by a covered breezeway on each floor. Two blocks of 12 units are joined to make a typical 24-unit building (Table I.1 shows variants in the 200A and 300 Series). Buildings are slab on grade, paralleling the lines of property lines, or streets/parking areas which take their general directions from the site's boundaries.

Units are of three types: Building Type 100 are all As; Type 200 and 200A are Bs (ends) and As; Type 300 are Cs (ends) and Bs. Unit sizes are average:

- A, one-bed/one-bath, 694 sq.ft.
- B, two-bed/two-bath, 1,023 sq.ft.
- C, three-bed/two-bath, 1,192 sq.ft.

The common facilities consist of:

- A lease office, opposite the main entrance
- A community building
- A swimming pool, pool deck and spa
- An exercise room
- A family laundry
- Two tennis courts
- A sand volleyball court
- A tot-lot
- A barbecue at the pool area
- A bridge across the end of the lake, and
- Several gazebos, pavilions and mail kiosks.

2.3 Circulation

The principal entrance from the north leads to one main distributor street with head-in parking on both sides. Parking bays are subdivided into rows of 3-10 spaces by planted parking islands.

There is a fairly extensive network of paved walks throughout the site. Short walks run directly to breezeways from the nearby parking, typically as close as 10-20 feet from the buildings. Rear walks continue in many cases to the nearest common facilities, convenient for sub-groups of users (e.g. tennis players, parents with children).

2.4 Parking

The site plan provides 652 parking spaces which is 2 spaces/unit. 13 of these spaces are accessible spaces required by local codes. From paragraph **3.2** of this section, Number of Accessible Ground Floor Units, 120 units are required to be accessible. The *Guidelines* require accessible parking spaces equal to 2% of the covered (accessible) units (2%×120=3 spaces). In addition, the *Guidelines* require sufficient accessible visitor parking to provide access to grade level dwelling units and accessible parking at common facilities. This would mean at least one space, as a minimum, for visitors and one space at each common facility. The number of accessible spaces provided 13, therefore, exceeds the *Guidelines* requirements.

2.5 Open Space

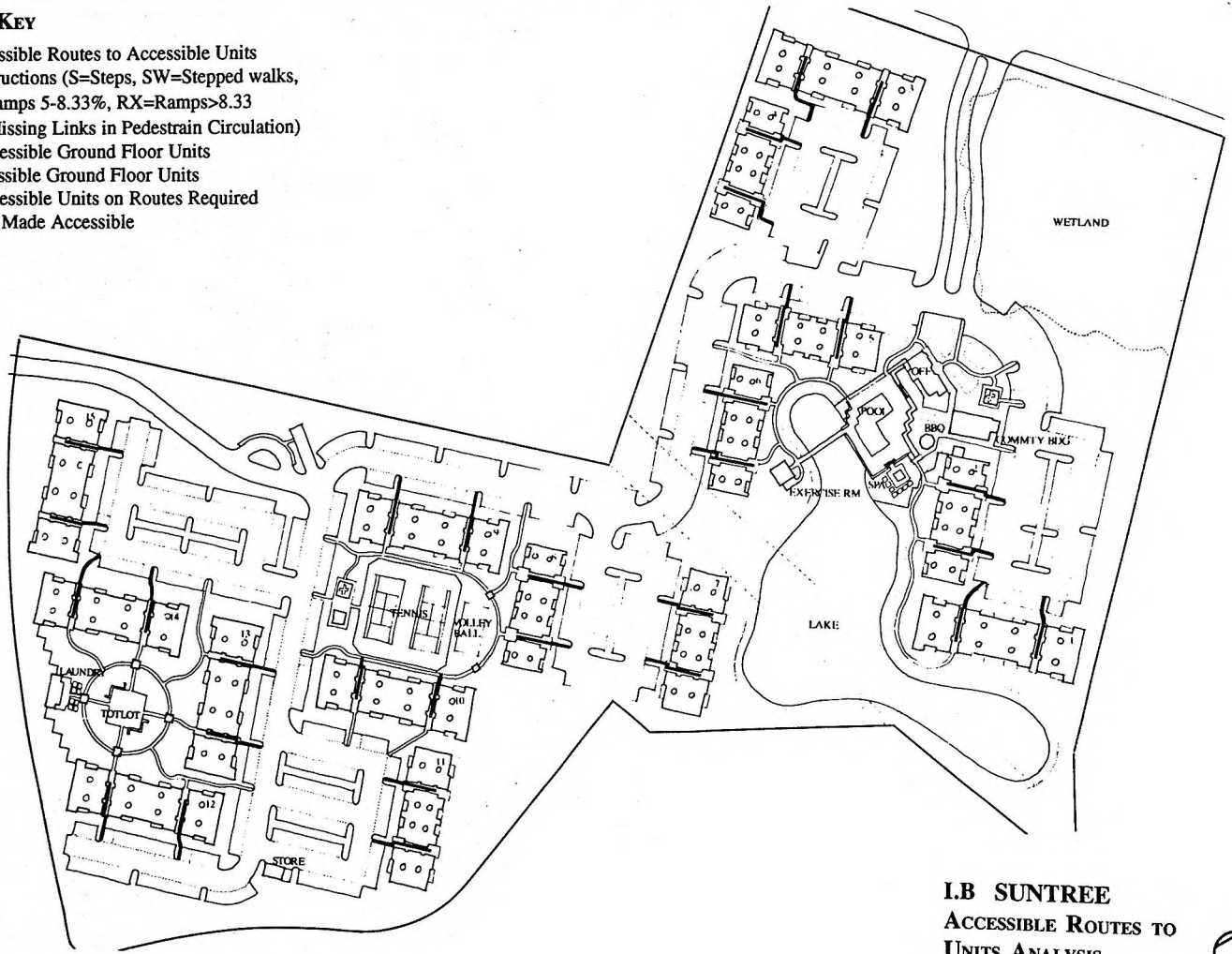
The "courtyard" plan maximizes the "inside" space enclosed by the buildings. Spaces between buildings, and in front of and between buildings and the parking areas, are small: 20' minimum between buildings and 10' minimum between buildings and parking.

Designated open space in the various courtyards and around the site is computed at 5.77 acres out of the total site area of 21.79 acres, or 26.48%. The designated "common recreation and open space" is distinguished from the narrow strips of open space throughout the site, in front of buildings, between buildings, or in site setback areas. Total open space is about 11.0 acres or just over half of the total site area.

I.B EXISTING ACCESSIBLE ROUTES (DWELLING UNITS)

SYMBOL KEY

- ⊥ Accessible Routes to Accessible Units
- ◌ Obstructions (S=Steps, SW=Stepped walks, R=Ramps 5-8.33%, RX=Ramps>8.33 ✖=Missing Links in Pedestrain Circulation)
- ● Inaccessible Ground Floor Units
- ○ Accessible Ground Floor Units
- ◉ Inaccessible Units on Routes Required to be Made Accessible



I.B SUNTREE
ACCESSIBLE ROUTES TO UNITS ANALYSIS

250 FEET 100 50 0

3. Existing Accessible Routes (Dwelling Units)

3.1 Analysis for Accessible Building Entrances on Accessible Routes

Plan I.B is an analysis of the existing site plan. It shows the accessible routes from arrival points (in this case, the edge of the nearest parking) along the walks to the concrete apron at each breezeway. As noted, breezeways are very close to the parking, even less than the 10' minimum dimension because breezeways extend some feet in front of the building line.

All walks start at the outer edge of each parking island, giving them an extra 18 feet in length. Only the parking islands are curbed. Walks are typically concrete and 4 feet wide, starting flush with the bituminous street paving and ramping less than 8.33%. Typically, they slope around 5% or less. Building slabs are set at the same floor level throughout, 35.5. Edge of parking is typically one foot less, 34.5. Parking areas are dished to many collecting points, ±34.0.

In computing an accessible route, the difference in finish floor elevations (FFEs) of ground floor unit entries and the outer edge of the concrete apron is assumed to be .25 of a foot (1/2" from the finished unit floor to the concrete apron outside the entrance door plus a 2.5" slope to the outer edge of the apron). A 1/2" differential at the main dwelling unit entry door is allowed under the *Guidelines*, when the outside landing (apron) is made of impervious material, in this case, concrete.

Because of the extremely flat grades, no obstructions to clear accessways to building/unit entrances are identified.

3.2 Number of Accessible Ground Floor Units

Plan I.B diagrams the accessible routes from the parkway to each breezeway entrance. There are no obstructions. **All** 120 ground floor units are accessible.

4. Site Impracticality Test Analysis

Since 100% accessibility to ground floor units is provided, the tests for site impracticality, by either ***4.1 Individual Building Test*** or ***4.2 Site Analysis Test*** are superfluous.

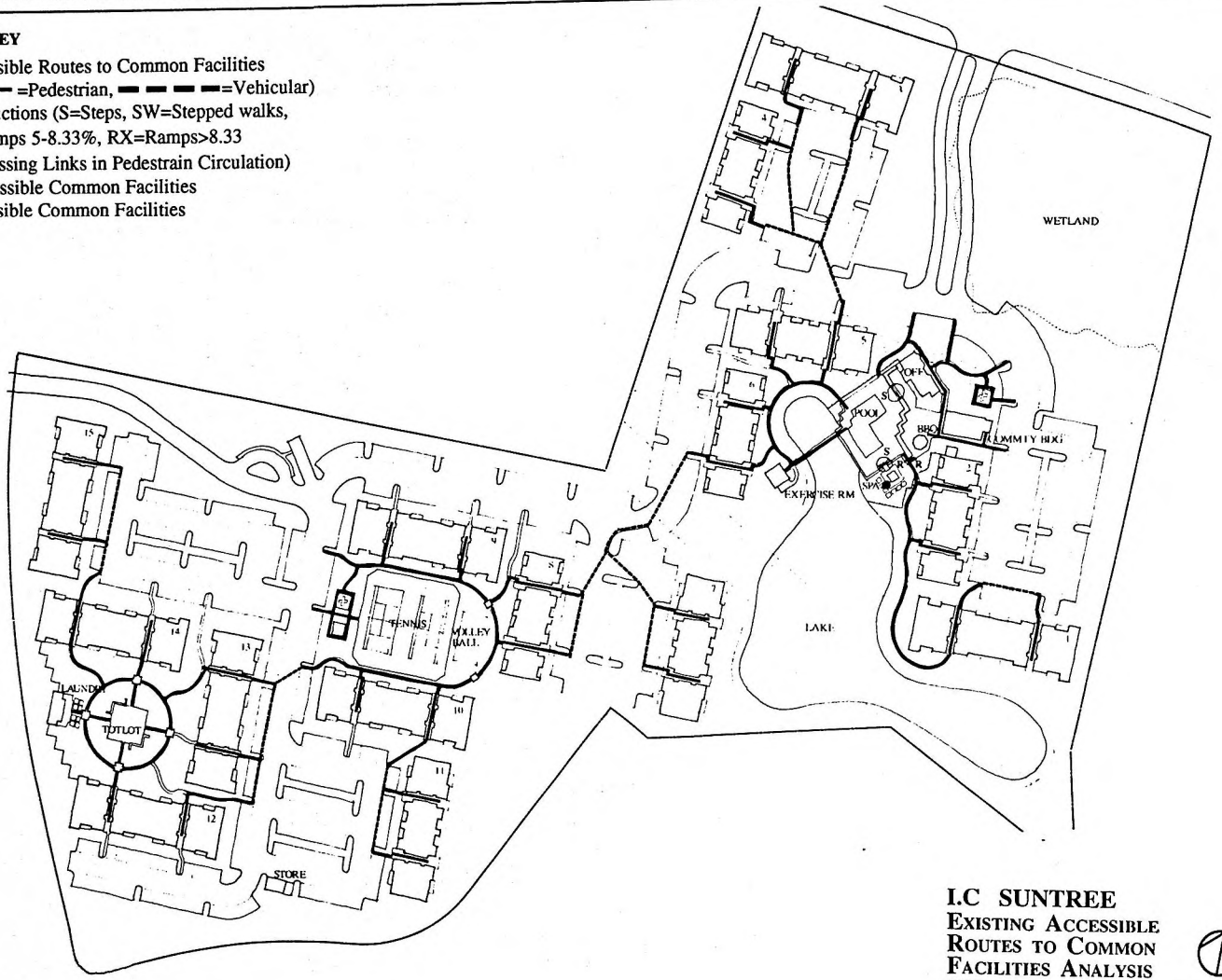
5. Proposed Design for Accessibility (Dwelling Units)

For the same reason, ***5.1 Redesign to Provide a Minimum Number of Accessible Ground Floor Units*** is unnecessary.

I.C EXISTING ACCESSIBLE ROUTES (COMMON FACILITIES)

SYMBOL KEY

- ⊥ Accessible Routes to Common Facilities
  (——— =Pedestrian, ▬ ▬ ▬ ▬=Vehicular)
- ◌ Obstructions (S=Steps, SW=Stepped walks,
  R=Ramps 5-8.33%, RX=Ramps>8.33
  ✖=Missing Links in Pedestrain Circulation)
- ● Inaccessible Common Facilities
- ○ Accessible Common Facilities



I.C SUNTREE
EXISTING ACCESSIBLE ROUTES TO COMMON FACILITIES ANALYSIS

250 FEET 100 50 0

6. Existing Accessible Routes (Common Facilities)

6.1 Analysis for Accessible Routes to Common Facilities

Plan I.C diagrams the accessible routes from each ground floor unit to the common facilities. Again, no obstructions to free movement throughout the site are identified, with the single exception of the pool deck and spa area discussed below. All common facilities are accessible, including tennis courts, tot-lot, and all the mail kiosks (the documents don't indicate but, presumably, at least one row of mailboxes is mounted within the reach of a person in a wheelchair).

The lease office has a terrace and barbecue area three risers above the community building main pool area, but a ramp to one side provides an alternative accessible route. In addition, there are separate entrances to the fenced pool area through 4 foot gates.

The spa is elevated by three steps and no alternative provision is shown.

7. Proposed Design for Accessibility (Common Facilities)

7.1 Redesign to Provide Acceptable Access to and Use of Common Facilities

The restriction at the spa can be simply rectified with a small section of new walk shown on the **Plan I.D** on the following page and noted below in Table I.2

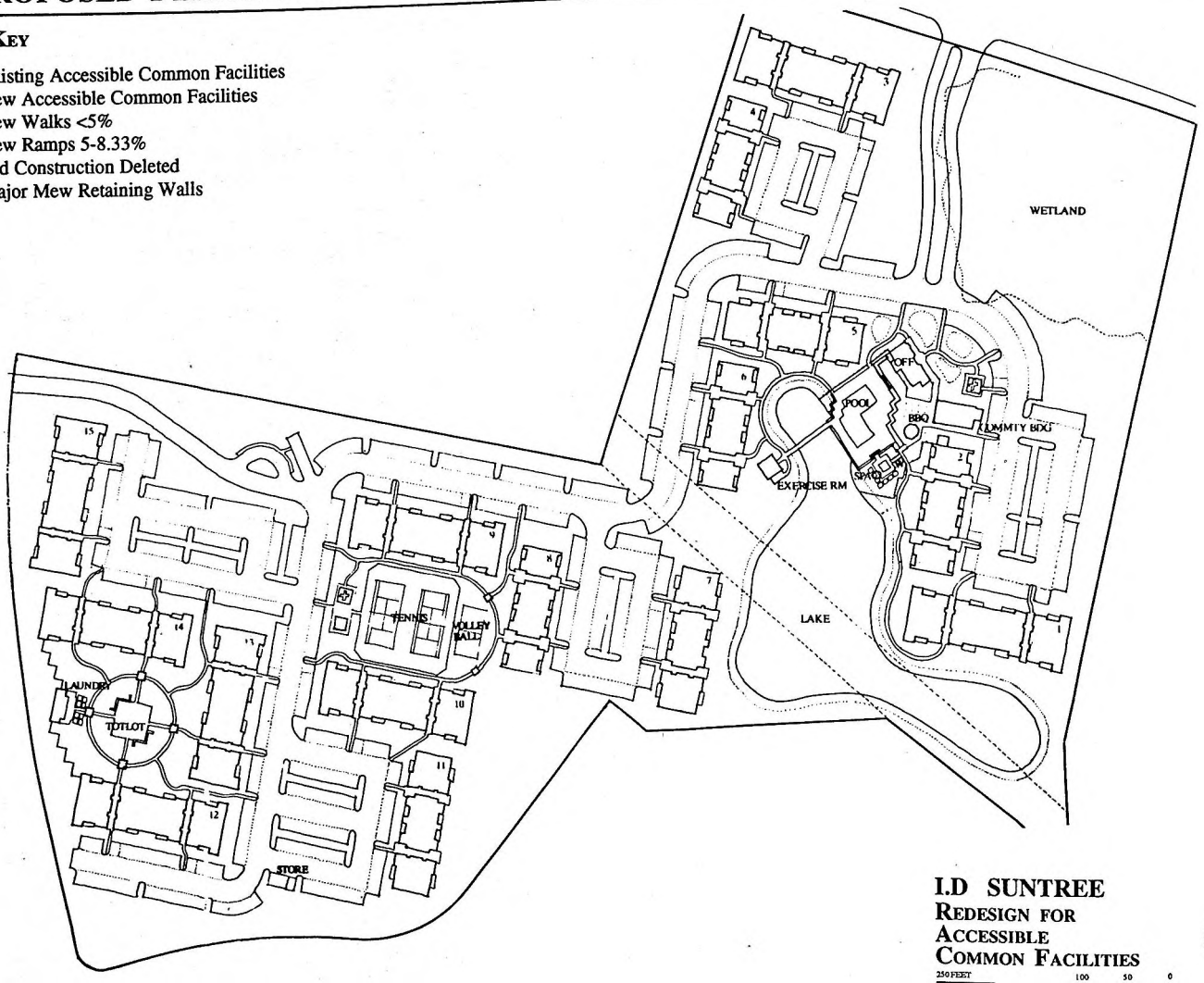
Table I.2: Design Changes for Common Facilities

Location	Redesign	Change Add	Change Deduct
Spa	New walk Add paving, 15' × 4'	60 SF(square feet)	

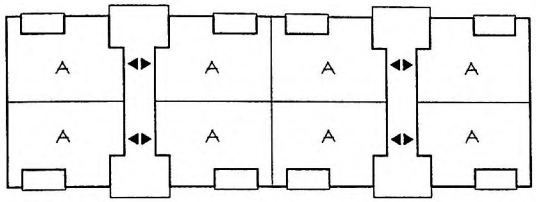
I.D PROPOSED DESIGN FOR ACCESSIBILITY (COMMON FACILITIES)

SYMBOL KEY

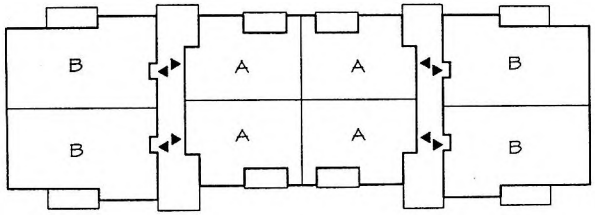
- ○ Existing Accessible Common Facilities
- ◎ New Accessible Common Facilities
- = = New Walks <5%
- = ▬ New Ramps 5-8.33%
- ✕ ✕ Old Construction Deleted
- ▬ Major Mew Retaining Walls



I.D SUNTREE
REDESIGN FOR ACCESSIBLE COMMON FACILITIES
250 FEET 100 50 0



TYPE I



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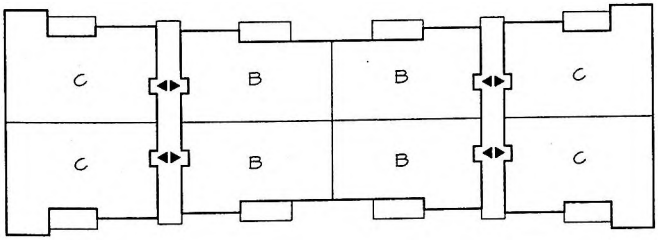


TYPE III

TYPICAL BUILDING KEY PLAN

Building Description

Three different building types were developed utilizing different two and three-story combinations of one-bedrooms (A units), two-bedrooms (B units) and three-bedrooms (C units). Combinations included:

Building Type 100:

8 units/floor of mirrored back-to-back A units, separated by entry/stair halls.

Building Type 200:

8 units/floor of mirrored back-to-back B units separated by entry/stair halls from a core of mirrored side-to-side and back-to-back A units.

Building Type 300:

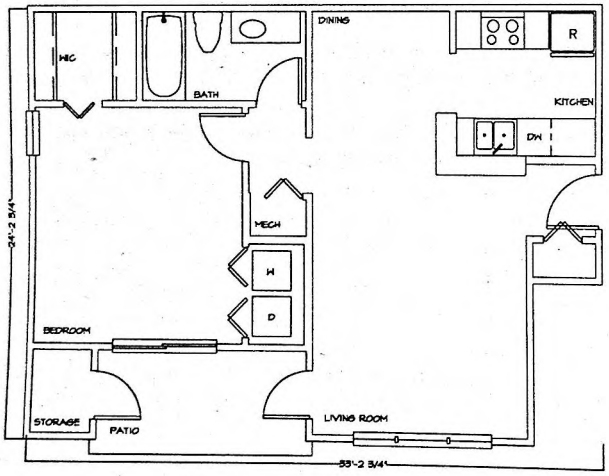
8 units/floor of mirrored back-to-back C units separated by entry/stair halls from a core of mirrored side-to-side and back-to-back B units.

All building have grade-level concrete patios on the ground floors and decks off the living room on the upper floors.

I. SUNTREE UNIT A

Original Unit Plan

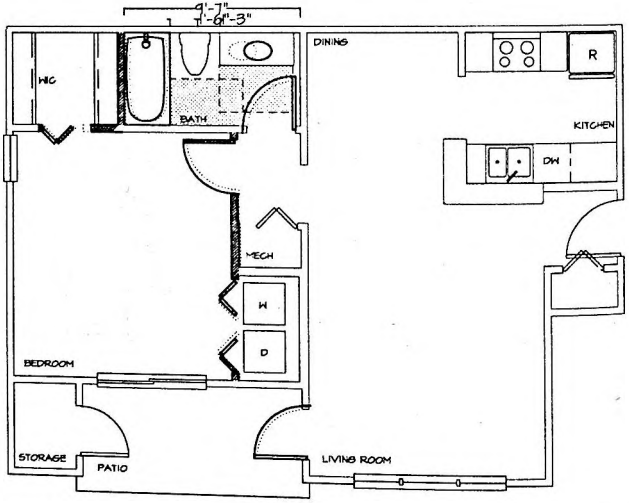
The 694 sq.ft. one-bedroom unit locates the kitchen and dining area in the interior of the plan opening onto the exterior living room. The bedroom has one or two exterior exposures depending on the location within individual building type. The distance between the refrigerator and the opposite counter exceeds 40", therefore modifications are unnecessary.



FHA

Very minor modifications are required due to the large original bath which can already accommodate the 30"×48" clear floor space and an inswinging 2"-10" door.

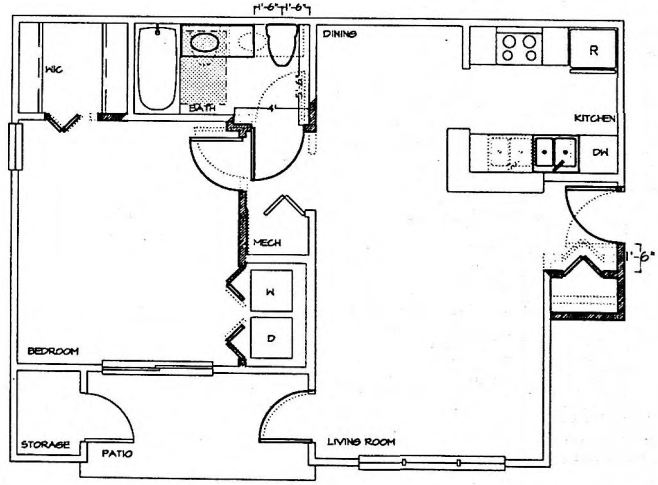
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bar at tub/shower and foldaway grab bar at toilet.



ANSI

Minor changes include: the relocation of the toilet to provide sidewall grab bar reinforcement; a widening of the bath to 5'-6" to allow for a frontal approach at the toilet; a relocation of the kitchen sink to provide adjustable sink and adjacent work counter and a widening of the entry to provide clear space.

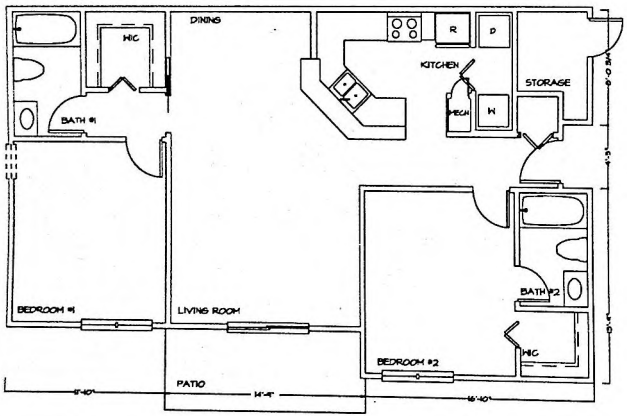
- 2'-10" doors at bedrooms and baths.
- Adjustable 30" kitchen sink counter and 30" work surface.
- 18" clear space next to latch on swing side of doors.
- Wall reinforcement for fixed grab bar at tub/shower and toilet.
- Removable vanity cabinet.



I. SUNTREE UNIT B

Original Unit Plan

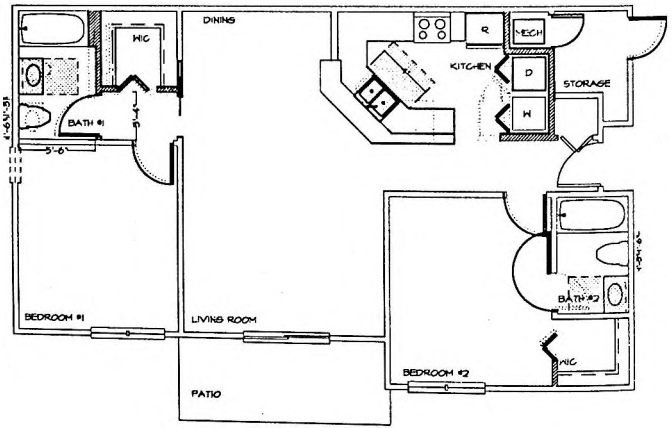
The 1023 sq.ft. two-bedroom unit locates bedrooms either side of the living/dining room for privacy. This twin master bedroom arrangement is common in retirement communities such as Suntree. Bedroom #1 and bath are made into a "privacy suite" by the use of a pocket door to separate them from the living room.



FHA Option A

Modifications include the switching of the lavatory and toilet in Bath #1 to provide a 30"×48" clear space and the widening of the bath to 5'-6" to allow for a frontal approach to the toilet. The developer felt that bedroom #2 was not large enough to absorb the 6" decrease in size without affecting marketability and preferred an outswinging bathroom door which allowed the depth of the Bath #2 to tremain 5'-0". A pocket door would also have been a possibility.

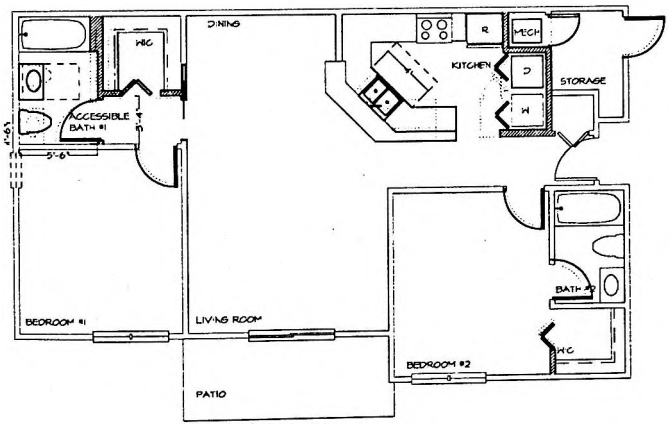
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bar at tub/shower and toilet in Bath #1 and foldaway grab bar at toilet in Bath #2.
- Removable bath vanity cabinets.
- Kitchen counter extended to provide 4'-0" side approach to sink.



FHA Option B

Modifications identical to Option A except that Option B requires only one bath to be accessible. Therefore, Bath #2 can remain as originally designed.

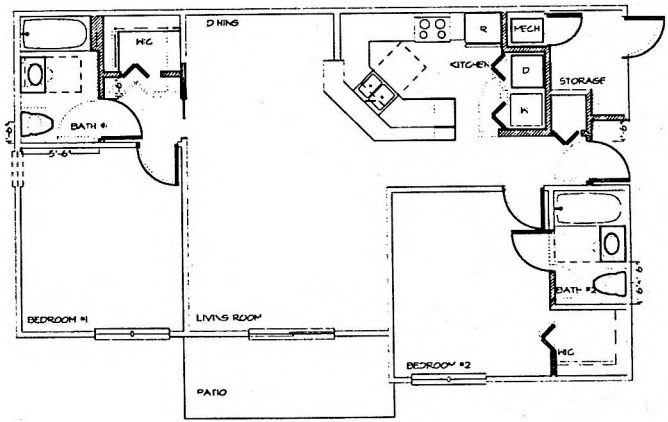
- 2'-10" doors at bedrooms and baths and walk-in closets.
- Wall reinforcement for fixed grab bar at tub/shower and toilet in Bath #1 and at tub/shower and foldaway toilet grab bar in Bath #2.
- Removable vanity cabinet Bath #1.
- 30"×48" clear floor space next to tub/shower in Bath #1.



ANSI

Similar to option A except for modifications to allow 18" side clearance next to out-swinging Bath #1 door and apartment entry door. Lavatory and toilet switched to allow sidewall grab bar reinforcing for toilet.

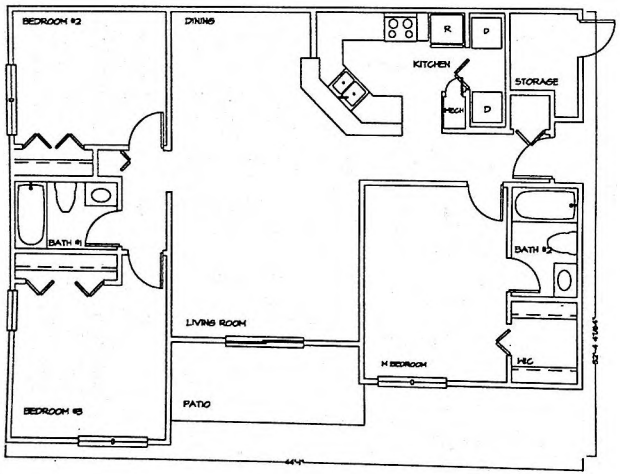
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bar at tub/shower and toilet.
- Removable bath vanity cabinets.
- 18" side clearance next to latch on pull side of doors.
- Adjustable 30" kitchen sink counter and 30" work surface.



I. SUNTREE UNIT C

Original Unit Plan

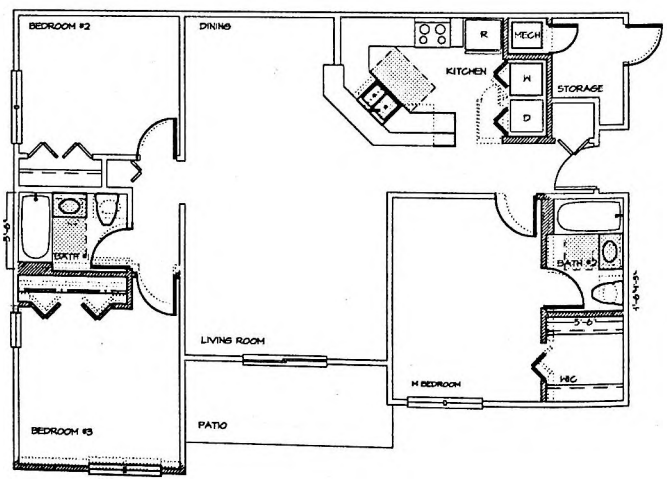
This 1192 sq.ft. three-bedroom unit plan is similar to the B unit except that two smaller bedrooms are located in place of a single large Bedroom.



FHA Option A

Minor changes include the switching of the toilet and lavatory in Bath #1 to provide a 30"×48" clear space, the switching of the lavatory and toilet in Bath #2 and the widening to 5'-6" to allow for an inswinging door and a frontal approach at the toilet. An alternative strategy would have been to have swung the bath door out similar to the plan indicated in Unit B where the master bedroom was smaller. The developer, however, felt that in this instance, the bedroom was large enough (11×14.5) to absorb the 6" decrease in size and have the bath door swing inward. The developer felt it was important to enter at the end of the bath away from the tub rather than in the middle of the bath, so that the bath would appear as large as possible.

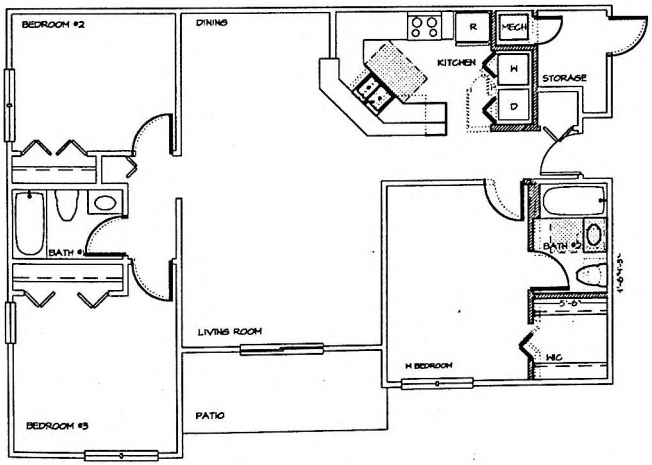
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bar at tub/shower and toilet in both bathrooms.
- Removable bath vanity cabinets.



FHA Option B

Similar to Option A except that since Bath #2 qualifies for Option B with 30"×48" clear floor space next to tub/shower, Bath #1 can remain as originally designed except for the addition of a 2'-10" door.

- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bar at tub/shower and toilet in Bath #2 and tub/shower and flodaway toilet grab bar in Bath #1.
- Removable bath vanity cabinet Bath #2.
- 18" between toilet centerline and wall in Bath #2.

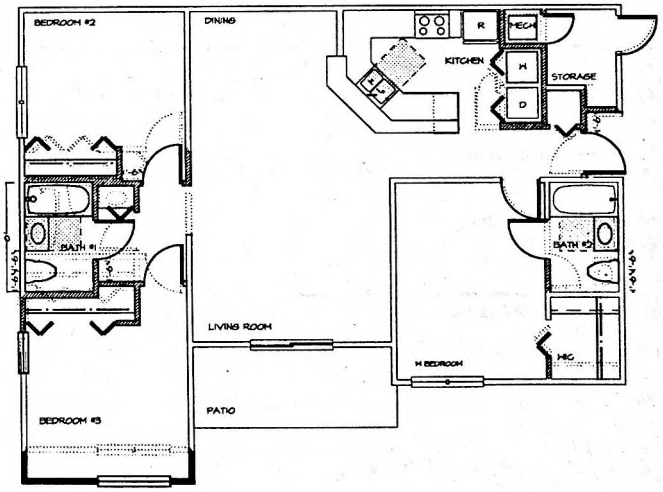


ANSI

The requirement of sidewall reinforcement for a 42" grab bar forces the reconfiguring of Bath #1 which, in turn, necessitates the enlargement of the bedroom wing by 50 sq. ft.

Bath #2 is similar in arrangement to the described in Option B.

- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bar at tub/showers and toilets.
- Removable vanity cabinet both baths.
- 18" side clearance next to latch on pull side of doors.
- Adjustable 30" kitchen sink counter and 30" work surface.



CASE STUDY I — SUNTREE COST SUMMARIES

ORIGINAL PROJECT COSTS

Dwelling Units Cost ($)	8,103,980
Sitework Cost ($)	1,137,340
Dwelling Units and Site Cost ($)	9,241,320
Project Cost ($)	11,954,423

ADDITIONAL SITE, DWELLING UNIT AND COMMON FACILITIES COSTS

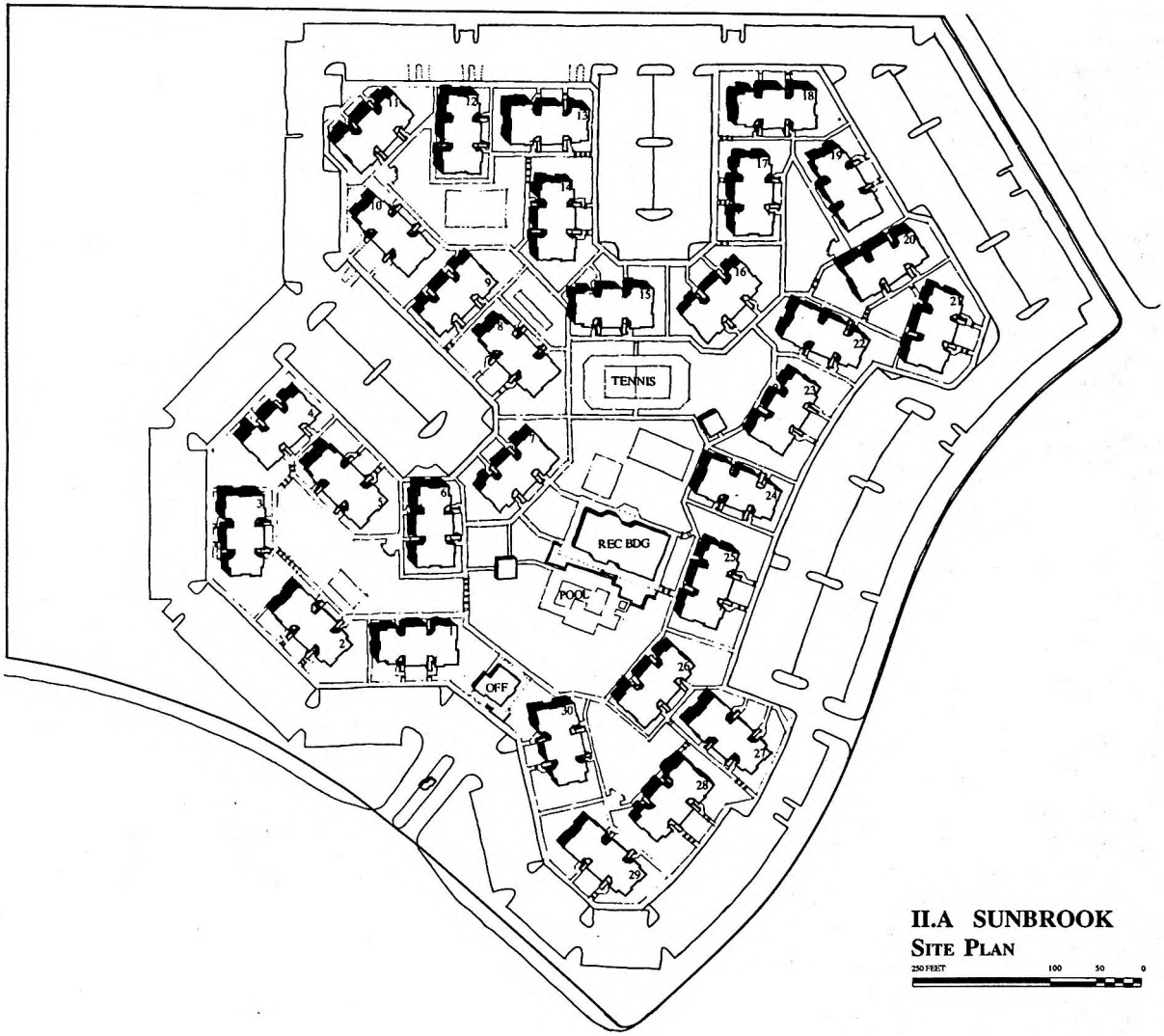
Unit Type	# of Accessible Units	Additional Cost Per Unit FHA-A $	FHA-B $	ANSI $	Additional Cost Per Unit x No. of Units FHA-A $	FHA-B $	ANSI $
A	44	49	49*	384	2,156	2,156*	16,896
B	44	465	407	615	20,460	17,908	27,060
C	32	443	387	1,265	14,176	12,384	40,480
Total Additional Cost Before Overhead and Profit:					$	$	$
Accessible Dwelling Units					36,792	32,448	84,436
Site					480	480	480
Total Additional Cost with Overhead and Profit:					$	$	$
Accessible Dwelling Units					42,899	37,834	98,452
Site					560	560	560
Total Buildings and Site ($)					43,459	38,394	99,012
Cost Increase (% of Original Cost):					%	%	%
Accessible Dwelling Units					0.53	0.47	1.21
Site					0.05	0.05	0.05
Buildings and Site					0.47	0.42	1.07
Total Project (% of Original Cost):					0.36	0.32	0.83

* FH-A Unit Cost Used Because There Is No FHA-B Unit Alternate

ADDITIONAL SITE COST SUMMARY

Item	Description	Qty.	Unit	$/Unit	$/Add	$/Deduct
Dwelling Units						
1	Walk Paving	60	SF	8.00	480	
	Net Total ($)				480	

SF = Square Feet



II.A SUNBROOK
SITE PLAN
250 FEET 100 50 0

II. SUNBROOK

1. Project

This project is called Sunbrook Apartment in St. Charles, MO. It is a representative garden apartment project for the Midwest region. The developer and designer is the Empire West Companies.

The site fronts an important arterial boulevard. The project consists of small studio, one-bedroom and two-bedroom units in two-story walk-up buildings at high density, with varied recreational amenities.

1.1 Basic Statistics

The gross site area is ±20.26 acres. There are 480 apartment units at a density of 23.7 units/acre. The building coverage is 13.3%. Out of 480 units, 240 are ground floor units.

2. Existing Site Plan Analysis

2.1 Site Concept

Plan II.A illustrates the basic configuration of the site and building development. The site is roughly square, about 1,000 feet north to south and 900 feet west to east. The major highway frontage is on the west side; secondary streets abut the south side. Most of the site has slight to moderate grades (3-6%), except for a very steeply sloping area to the north (20-40%). A typical profile across the site from east to west has a forty foot crossfall in about 1,000 feet.

Buildings cluster on the southern two-thirds of the site with shallower slopes. Because of the density of development, the ground has been regraded into several fairly well-defined terraces separated by 3:1 grass banks and connected by stair flights of 4-12 risers or ±10% ramps. The stairs typically consist of pairs of steps separated by landings (e.g. two pairs make a flight of four, three pairs a flight of six, etc.).

2.2 Building Layout

There are 30 two-story buildings, each containing sixteen units, eight per floor, back to back, four in the front and four in the back. The buildings are placed fairly tightly (about 30 feet apart) and irregularly around a central area reserved for a recreation building, making a broken cordon of buildings with openings between the buildings.

Buildings favor no particular orientation. The site has been graded so that all finished floor elevations (FFEs) are level throughout each building.

Unit sizes are:

- Unit A, studio/bath, 323 sq.ft.
- Unit B, 1-bed/1-bath, 424 sq.ft.
- Unit C, 2-bed/1-bath, 614 sq.ft.

The common facilities include:

- A lease office
- A recreation building and pool
- A tennis court
- Volleyball, badminton and basketball courts
- A paved sports court
- Horseshoes
- Several barbecue areas
- Two gazebos.

There is an asphalt jogging path around the inner edge of the perimeter parking, typically seven feet wide.

2.3 Circulation

There are two vehicular entrances to a perimeter street having continuous parking on both sides running around the outside, with several large parking areas. There is a complete network of paved walks throughout the site from the parking areas to the "front" units and between the buildings and around to the "back" units, where there is an irregular but continuous interior loop of walks around the various recreation facilities. As noted, there are many stairs and double steps (two risers), even some single steps (one riser). Walks to the "front" entrances are typically 20-35 feet long and over half of these have 1-4 steps. Walks to the "back" entrances traverse a greater distance and few have steps. Walks are typically 3-4 feet wide and sometimes 5-6 feet wide.

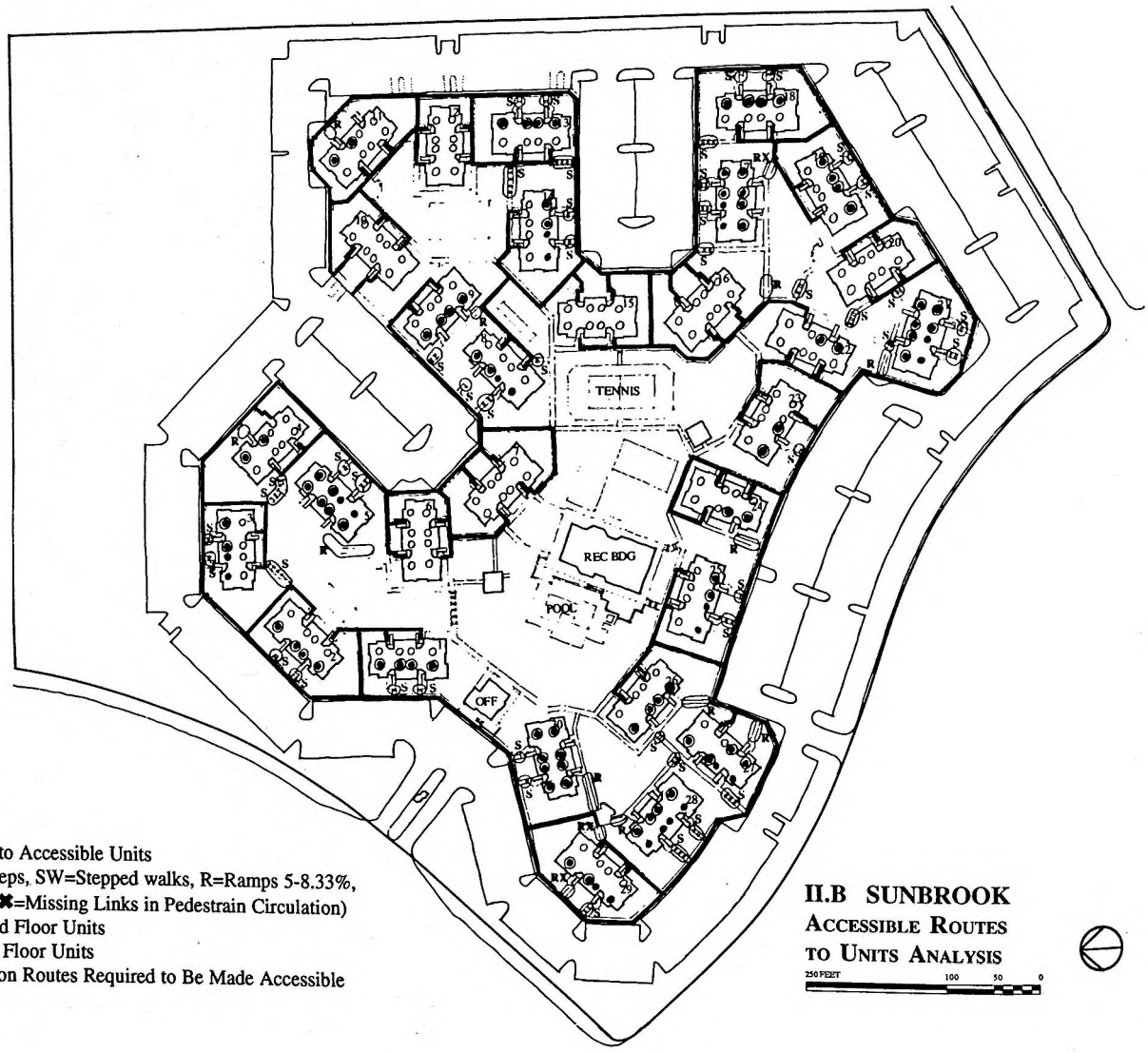
2.4 Parking

The site plan provides 840 parking spaces which is 1.75 spaces/unit. 10 of these spaces are accessible spaces required by local codes. From paragraph **4.2** of this section, *Site Analysis Test for Site Impracticality*, 214 units are required to be accessible. The *Guidelines* require accessible parking spaces equal to 2% of the covered (accessible) units (2%x214=5 spaces). In addition, the *Guidelines* require sufficient accessible visitor parking to provide access to grade level dwelling units and accessible parking at common facilities. This would mean at least one space, as a minimum, for visitors and one space at each common facility. The number of accessible spaces provided (10), therefore, meets or exceeds the *Guidelines'* requirements.

2.5 Open Space

A central area of approximately 350' x 200' contains the recreation building, pool, tennis and other playcourts, and two gazebos. Smaller open spaces are developed in each corner, directly adjoining five to seven buildings and are provided with local facilities, such as barbecue areas, a badminton court, a totlot and an all-purpose paved sports court.

II.B EXISTING ACCESSIBLE ROUTES (DWELLING UNITS)



SYMBOL KEY

- ⊥ Accessible Routes to Accessible Units
- ◌ Obstructions (S=Steps, SW=Stepped walks, R=Ramps 5-8.33%, RX=Ramps>8.33 ✖=Missing Links in Pedestrain Circulation)
- ● Inaccessible Ground Floor Units
- ○ Accessible Ground Floor Units
- ◉ Inaccessible Units on Routes Required to Be Made Accessible

II.B SUNBROOK
ACCESSIBLE ROUTES TO UNITS ANALYSIS

250 FEET 100 50 0

3. Existing Accessible Routes (Dwelling Units)

3.1 Analysis for Accessible Building Entrances on Accessible Routes

Plan II.B is an analysis of the existing site plan. It shows the accessible routes from arrival points (in this case, the curb line of the nearest parking) along the walks to the concrete apron at each building. Each apron is 4' x 6'-8", overhung by a second floor balcony accessed by an outside straight stair, and serves two ground-floor unit entrances.

In computing an accessible route, the difference in finished floor elevations (FFEs) of ground floor unit entries and the outer edge of the concrete apron is assumed to be .1 of a foot (1/2" from the finished unit floor to the concrete apron outside the entrance door plus a 3/4" slope to the outer edge of the apron). A 1/2" differential at the main dwelling unit entry door is allowed, under the Guidelines, when the outside landing (apron) is made of impervious material, in this case concrete.

Noted obstructions to a clear accessway to building entrances are:

- Steps (1 or more), marked "S"
- Stepped walks (risers separated by broad treads) marked "SW"
- Ramps (walks sloping more than 5%), marked "R"
- Extreme ramps (walks sloping more than 8.33%) marked "RX".

Where direct routes are obstructed, alternative longer routes are shown up to distances of about 200 feet (see Buildings 8,13 and 24).

Most "back" ground floor units have clear accessways because of the longer distances from the closest arrival point. But some are restrictive for disabled persons because of ramps greater than 5% or excessively long indirect routes in excess of ±200 feet (e.g. RR, right rear, units in Building 22).

3.2 Number of Accessible Ground Floor Units

Plan II.B diagrams the accessible routes from the perimeter parking to each building entrance. Obstructions interrupting clear access to building entrances are marked, and units served by affected entrances are counted as inaccessible. All others are counted as accessible.

The total count for 240 ground floor units is:

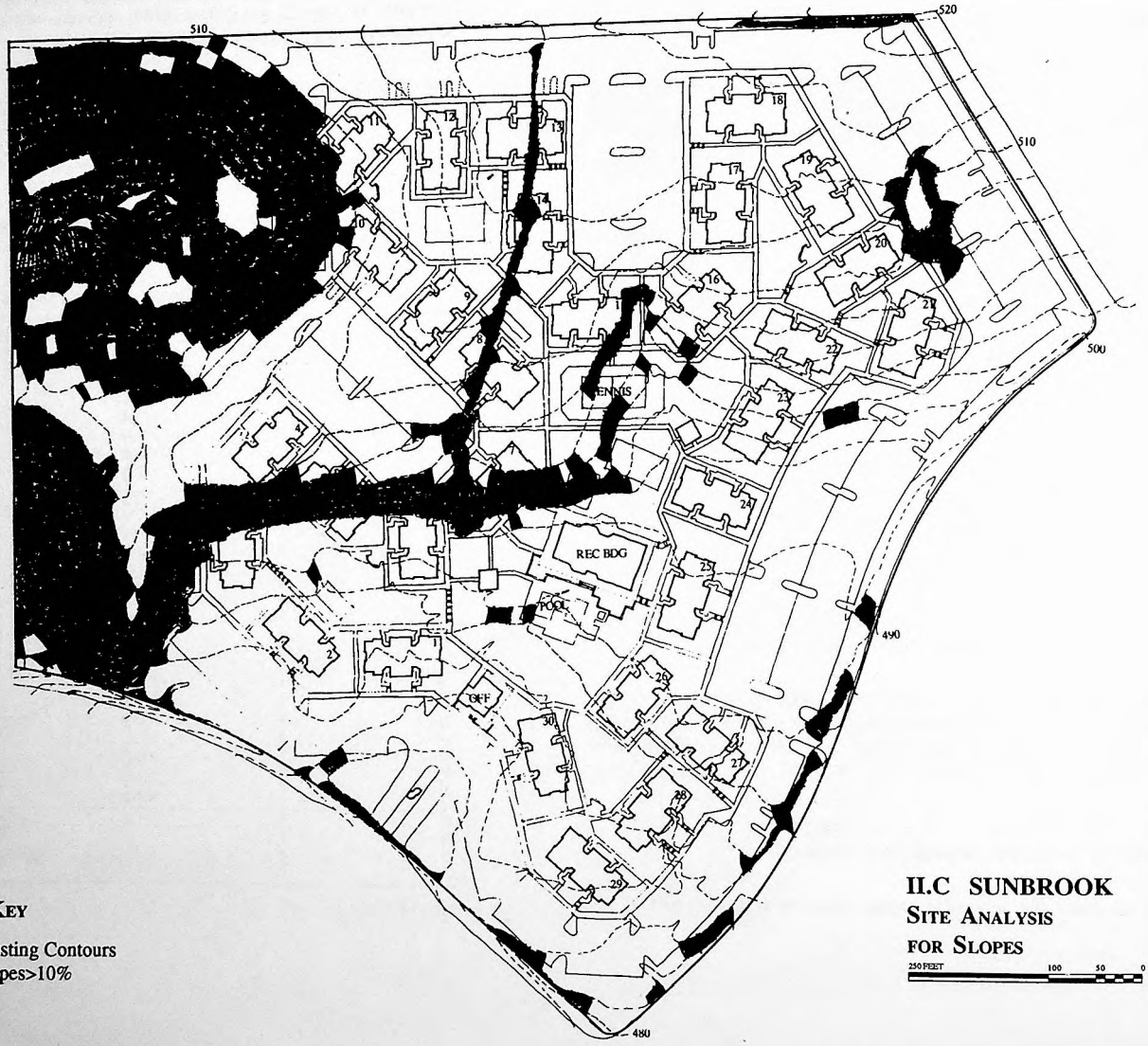
- 136 accessible or 56.7%
- 104 inaccessible or 43.3%

Table II.2 below indicates the breakdown of accessible/inaccessible units by building:

Table II.2 Existing Distribution of Accessible Ground Floor Units

Building #	Total GF Units/Bldg	No. of GF Units Accessible	No. of GF Units Inaccessible
1	8	4	4
2	8	4	4
3	8	4	4
4	8	6	2
5	8	0	8
6	8	8	0
7	8	8	0
8	8	4	4
9	8	4	4
10	8	8	0
11	8	6	2
12	8	8	0
13	8	4	4
14	8	4	4
15	8	8	0
16	8	8	0
17	8	0	8
18	8	4	4
19	8	4	4
20	8	8	0
21	8	0	8
22	8	6	2
23	8	6	2
24	8	6	2
25	8	4	4
26	8	4	4
27	8	2	6
28	8	0	8
29	8	4	4
30	8	0	8
TOTALS	240	136	104

II.C EXISTING SITE SLOPES ANALYSIS



SYMBOL KEY

Existing Contours

Slopes>10%

II.C SUNBROOK

SITE ANALYSIS FOR SLOPES

250 FEET 100 50 0

4. Site Impracticality Test Analysis

4.1 Individual Building Test for Site Impracticality

Measuring in a straight line from the outside edge of the concrete apron at each building entrance to all arrival points within 50 feet (or the closest arrival points beyond 50 feet), existing undisturbed slopes and proposed finished slopes were tabulated for 120 individual building entrances.

Three have original slopes over 10% and five have proposed slopes over 10%. But none have **both** original and proposed slopes over 10%. Therefore, none demonstrates site impracticality. By this test, all 240 ground floor units have to be made accessible. The plan provides 136, 104 **less** than the number required.

4.2 Site Analysis Test for Site Impracticality

Plan II.C shows the property's existing contours at two foot intervals. There are no floodplains, wetlands or other restricted use areas. Out of the site's gross area of 20.26 acres, 4.75 acres are measured as having natural or original slopes greater than 10%, leaving 15.51 acres or 76.6% of the undisturbed site with existing natural grades of less than 10%. Following the Guidelines' procedure:

- By Step "A", 76.6% of the undisturbed site has a natural grade less than 10%
- By Step "B", the minimum percentage of ground floor units to be made accessible is 76.6% of 240 or 184 units; 136 are provided, 48 **less** than required
- By Step "C", however, there are 78 inaccessible ground floor units served by 39 entrances which are accessed by walks with proposed slopes of 8.33% or less.

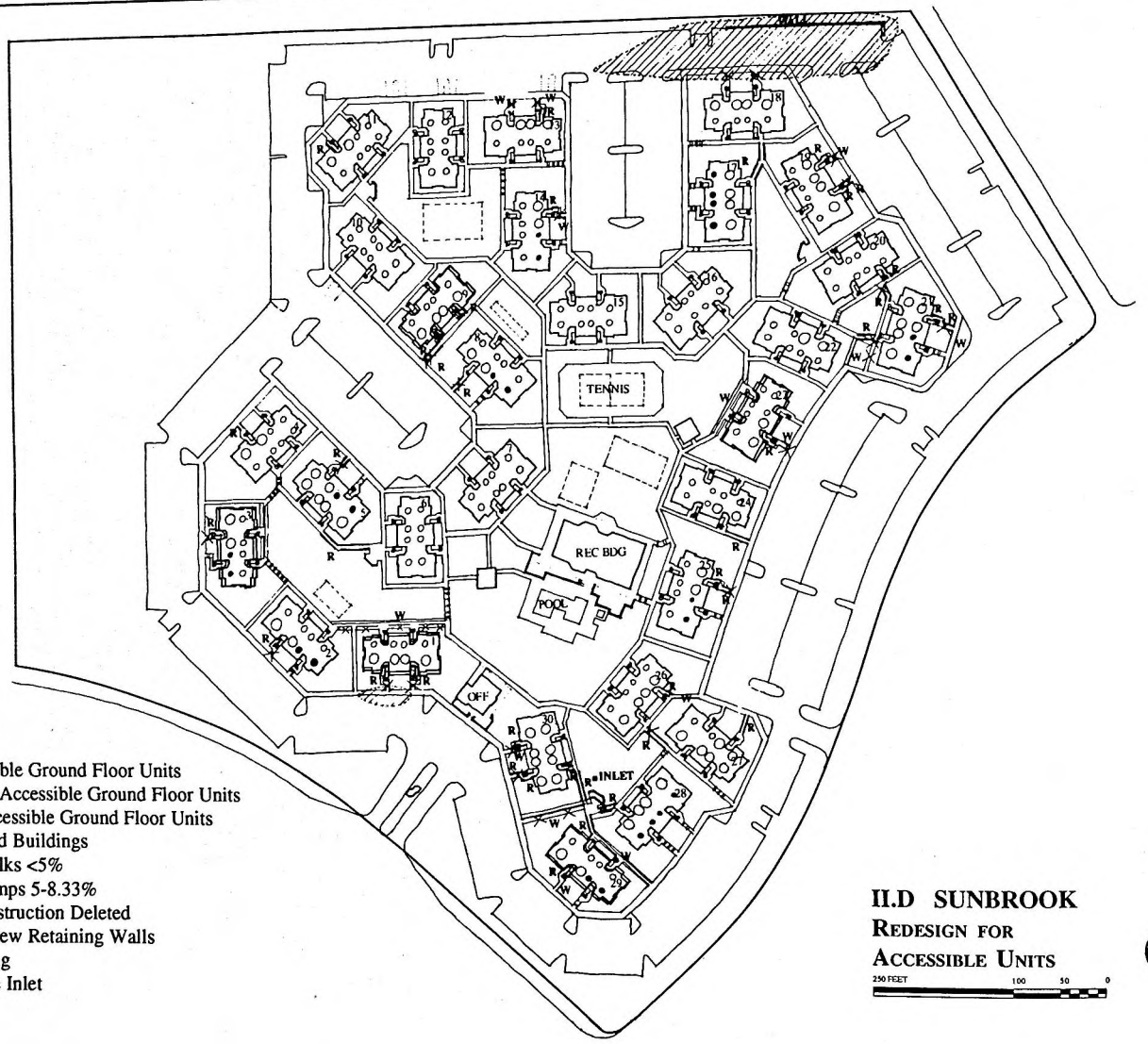
Therefore, by this test, 136 + 78 or 214 ground floor units have to be accessible. The plan provides 78 **less** than required.

The distribution of inaccessible ground floor units on routes required to be accessible, i.e. proposed walks sloping 8.33% or less from building apron to all arrival points within 50 feet (or the closest arrival point over 50 feet), is shown in Table II.3.

Table II.3 Existing Inaccessible Units on Routes Required to be Accessible

Building #	Entrance Location	Obstruction	No. of GF Units
1	RF	2 Steps	2
1	LF	2 Steps	2
2	LF	2 Steps	2
3	LF	2 Steps	2
4	RF	Ramp @ 8.33%	2
5	RF	2 Steps	2
5	RB & LB	Ramp > 5%	2
8	LF	1 Step	2
9	RF & RB	4 Steps	4
11	RF	Ramp > 5%	2
13	RF	1 Step	2
13	LF	2 Steps	2
14	RF	2 Steps	2
17	RB	4 Steps	2
17	LB	Ramp > 8.33%	2
18	RF	1 Step	2
18	LF	2 Steps	2
19	RF	2 Steps	2
19	LF	2 Steps	2
21	RF	2 Steps	2
21	RB & LB	2 Steps	4
22	RF	Ramp > 5%	2
23	LF	2 Steps	2
24	LF	Ramp > 5%	2
25	RF	2 Steps	2
26	RF & LF	Ramp > 5%	4
27	LF	Ramp > 5%	2
27	RB	2 Steps, Ramp > 5%	2
28	RB & LB	Ramp > 8.33%	4
29	LF	Ramp > 8.33%	2
30	RF	2 Steps	2
30	LF	1 Step	2
30	RB & LB	Ramp > 5%	4
Total	39 Entrances		78 Units

II.D PROPOSED DESIGN FOR ACCESSIBILITY (DWELLING UNITS)



SYMBOL KEY

- ● Inaccessible Ground Floor Units
- ○ Existing Accessible Ground Floor Units
- ○ New Accessible Ground Floor Units
- Relocated Buildings
- = = New Walks <5%
- = = New Ramps 5-8.33%
- ✕ ✕ Old Construction Deleted
- Major Mew Retaining Walls
- Regrading
- ■ Drainage Inlet

II.D SUNBROOK
REDESIGN FOR ACCESSIBLE UNITS

250 FEET 100 50 0

5. Proposed Design for Accessibility (Dwelling Units)

5.1 Redesign to Provide Minimum Number of Accessible Ground Floor Units

The minimum number of accessible ground floor units, as determined by the second of the two tests for site impracticality, the *Site Analysis Test*, is 214. Each building is analyzed for the least cost/most direct resolution of the noted obstruction. The recommended design changes are listed below in Table II.3 and illustrated on **Plan II.D.**

Table II.3 Design Changes for Minimum Accessible Ground Floor Units

Building	Redesign	Change Add	Change Deduct
1 RF & LF	Raise parking grade ±.3'Add fill	5 CY (cubic yard)	
	Move building 3' East		
	Add paving 9' x 4', 3' x 7'	57 SF (square foot)	
	Add 1 step to foot of stairs to 2nd Fl.	8 LF (lineal foot)	
	Make walk into 8.33% ramp		
	Add handrails	48 LF	
	Replace existing steps w/ramp (LF), walk (RF)		
	Deduct 4 steps x 4'		16 LF
	Add handrails	20 LF	
2 LF	Add 1 step to foot of stairs to 2nd Fl.	4 LF	
	Make walk into 8.33% ramp		
	Add handrails	24 LF	
	Replace existing steps w/walk		
	Deduct 2 steps x 4'		8 LF
	NOTE. RF unit entrance unimproved.		
3 LF	Move building 4' South		
	Add paving 12' x 4'	48 SF	
	Add 1 step to foot of stairs to 2nd Fl.	4 LF	
	Make walk into 8.33% ramp		
	Add handrails	24 LF	
	Replace existing steps w/ramp		
	Deduct 2 steps x 4'		8 LF
	Add handrails	16 LF	
	NOTE. RF unit entrance unimproved.		
4 RF	Add handrails to existing 8.33% ramp	16 LF	
5 RF	Replace existing steps w/ramp		
	Deduct 2 risers x 4'		8 LF
	Add handrails	28 LF	
	NOTE. LF unit entrance unimproved.		
5 RB & LB	Add handrails to existing ramp < 8.33%	104 LF	
8 LF	Replace existing step w/ramp		
	Deduct 1 riser x 4'		4 LF
	Add handrails	42 LF	
	NOTE. RF unit entrance unimproved.		
9 RB	Move building back 3'		
	Add paving 3' x 4'	12 SF	
	Add 1 step to foot of stairs to 2nd Fl.	4 LF	
	Make walk into ramp		
	Add handrails	12 LF	
	Replace existing steps w/ramp		
	Deduct 4 risers x 4'		16 LF
	Add handrails	60 LF	
9 RF	Add 1 step to foot of stairs to 2nd Fl.	4 LF	
	Make walk into ramp		
	Add handrails	24 LF	
	NOTE. The above improvement which lowers the grade at the foot of the 2nd floor stairs, allows a ramp to become a walk @ 5%, and makes a more direct accessible route to the rear unit entrances of Building 8.		
11 RF	Add 1 step to foot of stairs to 2nd Fl.	4 LF	
	Make walk into a ramp		
	Add handrails	24 LF	
	Make ramp in front into a walk @ 5%	NC	
13 RF	Replace existing steps w/ramp		
	Deduct 1 riser x 4'		4 LF
	Add handrails	20 LF	
13 LF	Add 1 step to foot of stairs to 2nd Fl.	4 LF	
	Make walk into ramp		
	Add handrails	24 LF	
	Replace existing steps w/walk @ 5%		
	Deduct 2 risers x 4'		8 LF
14 RF	Add 1 step to foot of stairs to 2nd Fl.	4 LF	
	Make walk into ramp		
	Add handrails	24 LF	
	Replace existing steps w/walk @ 5%		
	Deduct 2 risers x 4'		8 LF
	NOTE. LF unit entrance unimproved.		
17 RB & LB	Reduce existing 10% ramp to 8.33%		
	Add handrails	68 LF	

II. SUNBROOK

Building	Redesign	Change Add	Change Deduct
18 RF & LF	Lower curb @ parking 1.7' & regrade		
	Add cut	510 CY	
	New retaining wall on east side parking		
	Add 190' x 1.4' avr. HT.	266 face SF	
	Replace steps w/walks		
	Deduct 3 risers x 4'		12 LF
19 RF & LF	Add 1 step to foot of stairs to 2nd Fl.	8 LF	
	Make walk into ramp @ 8.33%		
	Add handrails	48 LF	
	Replace steps w/8.33% ramp (LF), walk (RF)		
	Deduct 4 risers x 4'		16 LF
	Add handrails	16 LF	
20 LF	NOTE. This improvement is part of providing access to rear entrances of Building 21		
	Add 1 step to foot of stairs to 2nd Fl.	4 LF	
	Make walk into ramp @ 8.33%		
	Add handrails	24 LF	
21 RF	Add 1 step to foot of stairs to 2nd Fl.	4 LF	
	Make walk into ramp		
	Add handrails	24 LF	
	Replace existing steps w/ramp		
	Deduct 2 risers x 4'		8 LF
	Add handrails	26 LF	
21 RB & LB	Replace existing steps w/ramp		
	Deduct 2 risers x 4'		8 LF
	Add handrails	32 LF	
22 RF	Relocate walk, regrade @ 5%, replace steps w/ramp		
	Deduct paving 35' x 4', 19' x 4'		216 SF
	Add paving 31' x 4', 19' x 4'	200 SF	
	Deduct 2 risers x 4'		8 LF
	Add handrails	38 LF	
23 LF	Move building back 3'		
	Add paving 6' x 4'	24 SF	
	Add 1 step to foot of stairs to 2nd Fl.	4 LF	
	Make walk into ramp @ 8.33%		
	Add handrails	24 LF	
	Replace steps w/walk		
	Deduct 2 risers x 4'		8 LF
24 LF	Add handrails to existing ramp @ 8.33%	54 LF	
25 RF	Add 1 step to foot of stairs to 2nd Fl.	4 LF	
	Make walk into ramp @ 8.33%		
	Add handrails	24 LF	
	Replace steps w/ramp		
	Deduct 2 risers x 4'		8 LF
	Add handrails	26 LF	
	NOTE. LF unit entrance unimproved.		
26 RF & LF	Add 1 step to foot of stairs to 2nd Fl (RF)	4 LF	
	Make walk into ramp @ 8.33% (RF)		
	Add handrails	24 LF	
	Make 6.3% ramp into walk @ 5%	NC	
27 LF	Add handrail to existing 7.3% ramp	44 LF	
27 RB	Replace steps w/ramp		
	Deduct 2 risers x 4'		8 LF
	Add handrails	56 LF	
	NOTE. LB unit entrance does not require to be improved but becomes accessible from the above improvement and is included.		
28 RB & LB	Relocate BBQ area 4' West & regrade		
	Relocate inlet	NC	
	Replace ramps > 8.33% w/ramp @ 8.33%		
	Add handrails	74 LF	
29 LF	Move building 2' back		
	Add paving, 6' x 4'	24 SF	
	Add 1 step to foot of stair to 2nd Fl.	4 LF	
	Make walk into ramp @ 8.33%		
	Add handrails	24 LF	
	Make ramp into walk	NC	
	NOTE. RF unit entrance unimproved.		
30 RF & LF	Add 1 step to foot of stair to 2nd Fl.	8 LF	
	Make walk into ramp @ 8.33%		
	Add handrails	48 LF	
	Replace steps w/ramp (RF), walk (LF)		
	Deduct 3 steps x 4'		12 LF
	Add handrails	26 LF	
30 RB & LB	Add 1 step to foot of stair to 2nd Fl. (RB)	4 LF	
	Make walk into ramp @ 8.33%		
	Add handrails	24 LF	
	Relocate walk between Bldgs. 29/30	NC	
	Replace ramp > 8.33% w/ramp @ 8.33%		
	Add handrails	56 LF	
	Relocate inlet	NC	

All of these design changes result in 216 accessible ground floor units (2 more than the minimum required)

6. Existing Accessible Routes (Common Facilities)

6.1 Analysis for Accessible Routes to Common Facilities

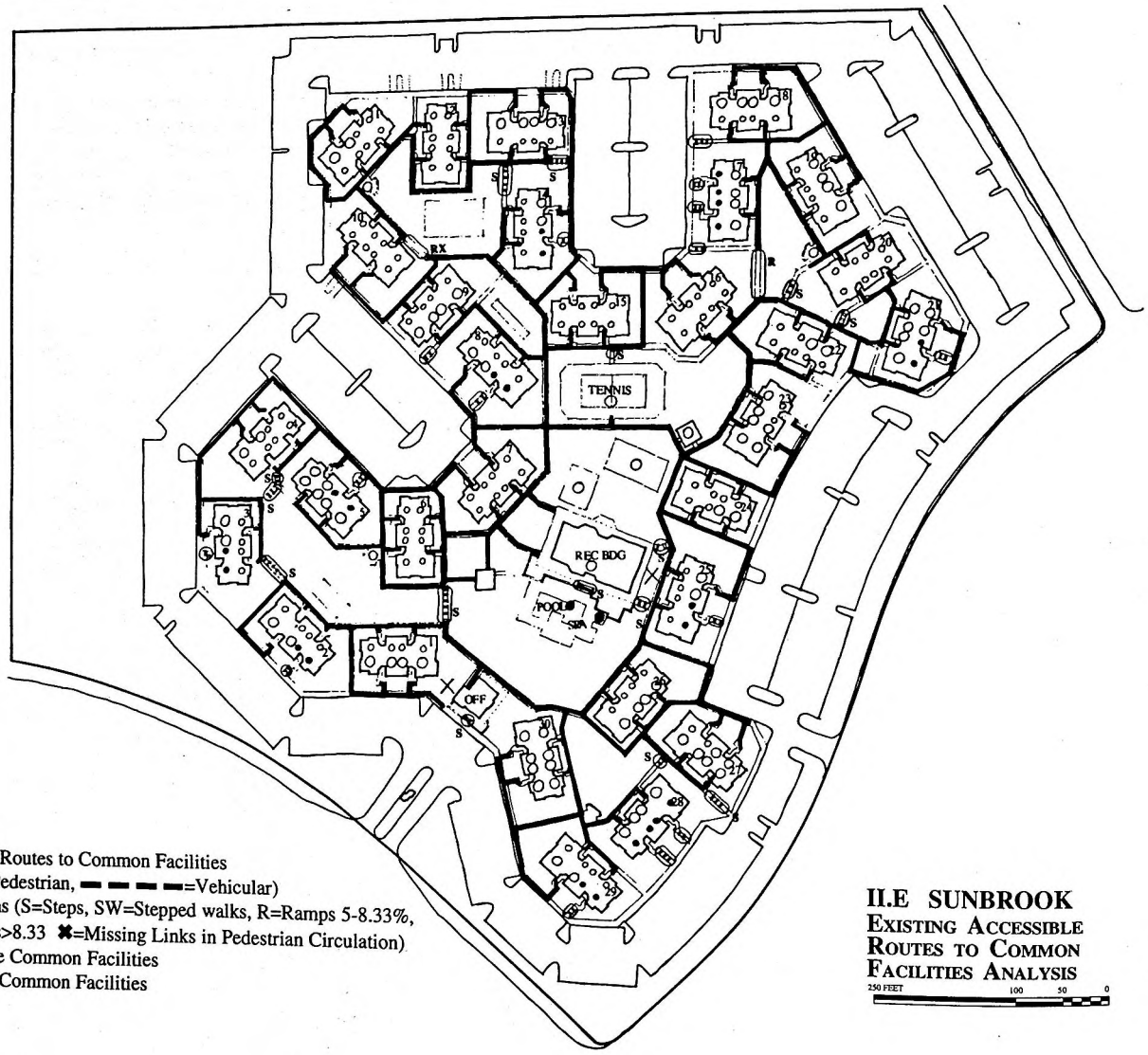
Plan II.E on the following page, diagrams the accessible routes from each accessible ground floor unit to the common facilities. It is drawn over the previous plan, incorporating all of the design improvements for achieving 216 accessible ground floor units. Remaining obstructions, limiting access to the recreation center, pool, office, play courts and barbecue areas, are marked.

Considering the site in quadrants:

- In the Northeast quadrant (Buildings 8-15), there are two stairflights of 8 and 10 steps, 2 steps on the east side of the tennis court and a 30' ramp in excess of 8.33% restricting access to the local and central recreation facilities.
- In the Southeast quadrant (Buildings 16-23), there are two stairflights of 4 and 6 steps, and a 50' ramp @ 8.33% without handrails.
- In the Southwest quadrant (Buildings 24-30), there is one stairflight of 4 steps.
- In the Northwest quadrant (Buildings 1-7), there are four stairflights of 4, 6, and two of 12 steps.

The recreation center complex has at-grade entrances from the north, but the two entrances from the south have stairflights, each of 4 steps. Buildings 1, 2, 25, 26, 27, 28, 29 and 30 cannot easily reach the barrier-free entrance ways on the north side. In addition, the recreation building terrace is 2.5 feet and 4 steps above the pool deck and spa. The office is approached from the parking by two steps. A walk connection from an existing accessible parking space is missing.

II.E EXISTING ACCESSIBLE ROUTES (COMMON FACILITIES)



SYMBOL KEY

- Accessible Routes to Common Facilities (——— =Pedestrian, - - - - =Vehicular)
- Obstructions (S=Steps, SW=Stepped walks, R=Ramps 5-8.33%, RX=Ramps>8.33 ✖=Missing Links in Pedestrian Circulation)
- ● Inaccessible Common Facilities
- ○ Accessible Common Facilities

II.E SUNBROOK
EXISTING ACCESSIBLE ROUTES TO COMMON FACILITIES ANALYSIS

250 FEET 100 50 0

7. Proposed Design for Accessibility (Common Facilities)

7.1 Redesign to Provide Acceptable Access to and Use of Common Facilities.

In considering design improvements to make the common readily accessible to and usable by people with disabilities, not every stairflight needs to be replaced with ramps. The recommendations that follow are based on:

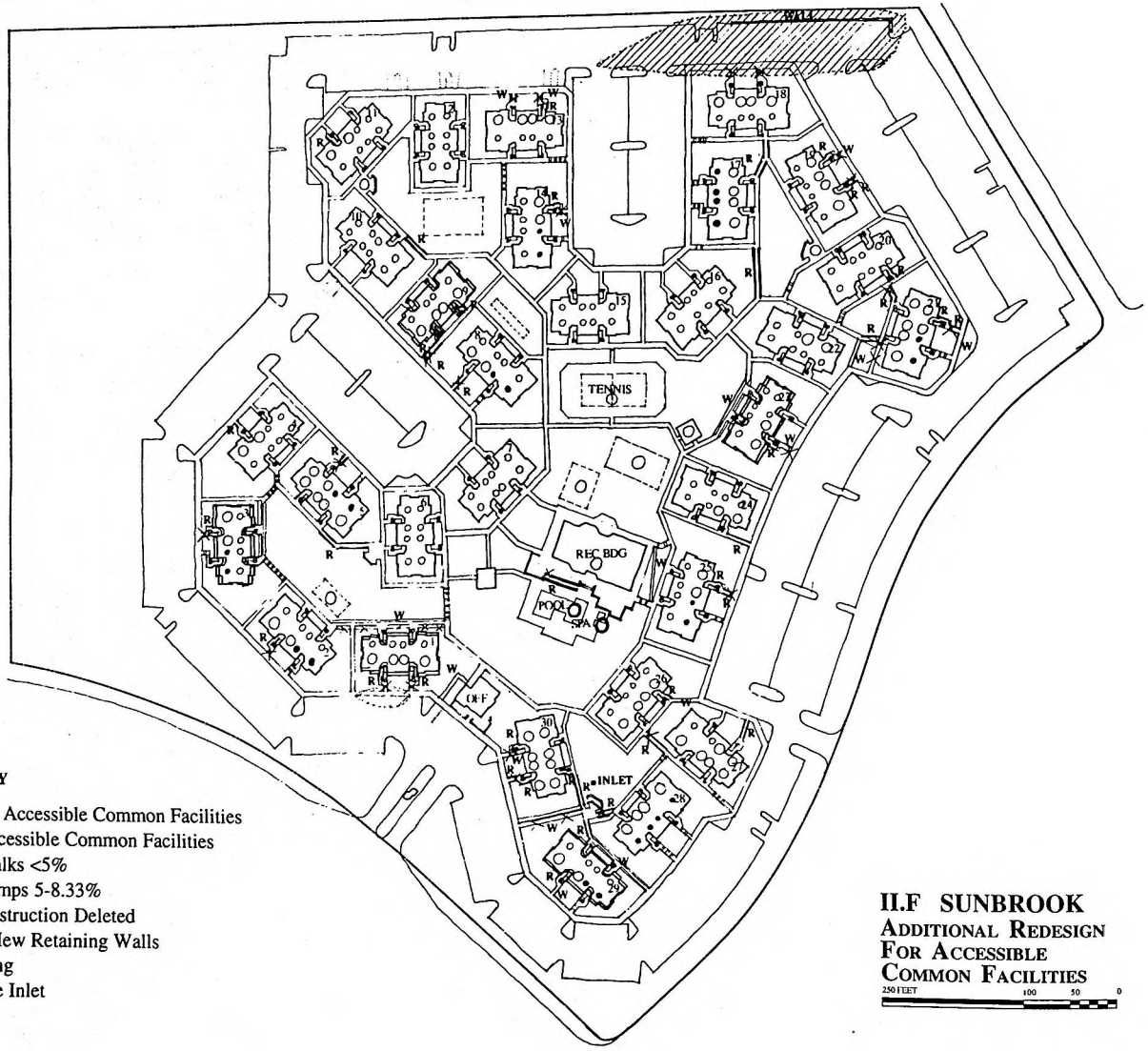
- Reducing ramps in excess of 8.33% to 8.33%, or from over 5% to 5% in the Northeast and Northwest quadrants.
- Creating a new barrier-free walk on the south side of the recreation building for Buildings 1, 2, 25, 26, 27, 28, 29 and 30.
- Providing a new ramp between the recreation building terrace and the pool deck and spa.
- Providing a new walk to the office from the accessible parking space.

These improvements are detailed in Table II.4 and shown on **Plan II.F** on the following page.

Table II.4 Design Changes for Common Facilities

Location	Redesign	Change Add	Change Deduct
Northeast Quadrant	Replace ramp at > 8.33% w/ramp < 8.33%		
	Add handrails	60 LF	
Southeast Quadrant	Replace ramp at 8.33% w/walk @ 5%		
	Regrade, add	9 CY	
Recreation Building	New walk on south side @ 5%	240 SF	
	Add paving, 60' × 4'		
	New ramp between terrace & pool deck		
	Add paving, 38' × 4'	152 SF	
	Add fill	2 CY	
	Add handrails	60 LF	
	New retaining/garden wall		
	Add 38' × 1.25' avr. HT.	48 SF face	
	& 3' HT. garden wall both sides	230 SF face	
Office	New walk @ < 5%		
	Add paving 48' × 4'	192 SF	

II.F PROPOSED DESIGN FOR ACCESSIBILITY (COMMON FACILITIES)

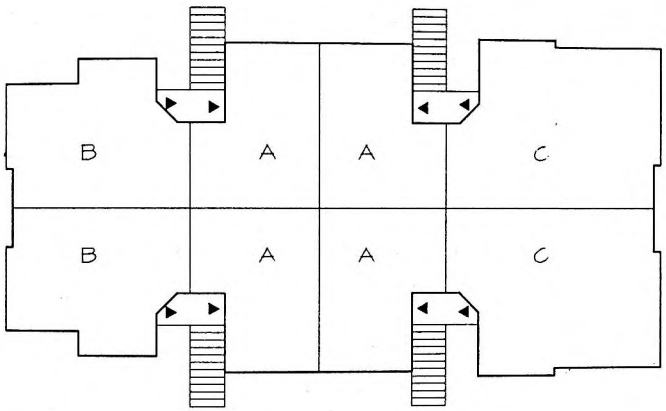


SYMBOL KEY

- ○ Existing Accessible Common Facilities
- ◎ New Accessible Common Facilities
- = New Walks <5%
- = New Ramps 5-8.33%
- ✕ Old Construction Deleted
- = Major Mew Retaining Walls
- ▨ Regrading
- ■ Drainage Inlet

II.F SUNBROOK
ADDITIONAL REDESIGN FOR ACCESSIBLE COMMON FACILITIES

250 FEET 100 50 0



TYPICAL BUILDING KEY PLAN

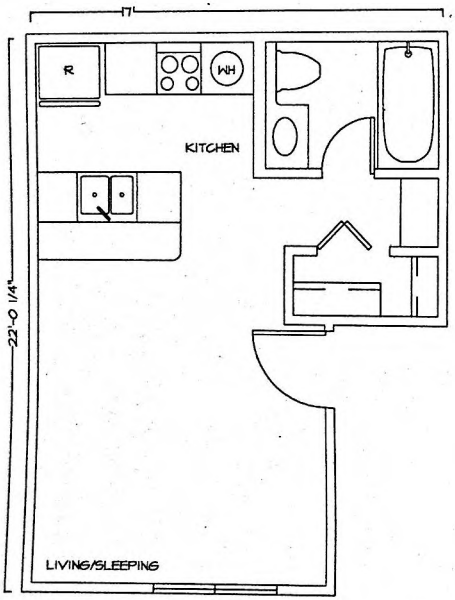
Building Description

The project site comprises 30 two-story buildings all of a similar type. Each of the two building floors contains two mirrored back-to-back B and C units flanking a cluster of four mirrored side-by-side and back-to-back A units. Second story A units have sleeping lofts over the kitchen and bath area. Entryways occur at the buildings quarter points and do not penetrate through the buildings, thereby requiring access walks along both the fronts and the backs of the buildings.

II. SUNBROOK UNIT A

Original Unit Plan

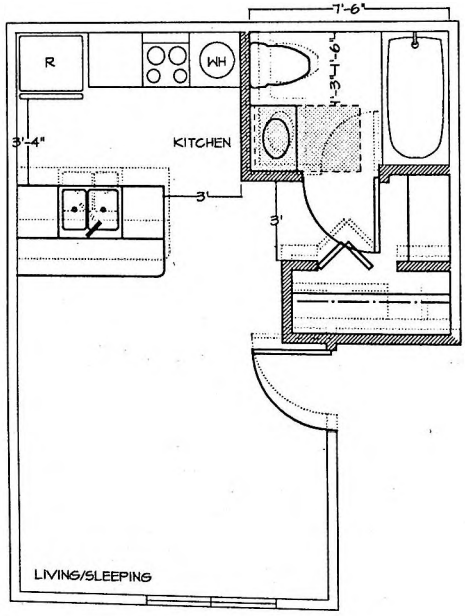
The 323 sq.ft. efficiency unit represents a very compact plan. The bath is screened from the living area by the entry closet.



FHA

Minor changes include the widening of the bath corridor, the moving of the sink counter to provide 3'-4" from the refrigerator to the opposite counter and the outward extension of the exterior closet wall.

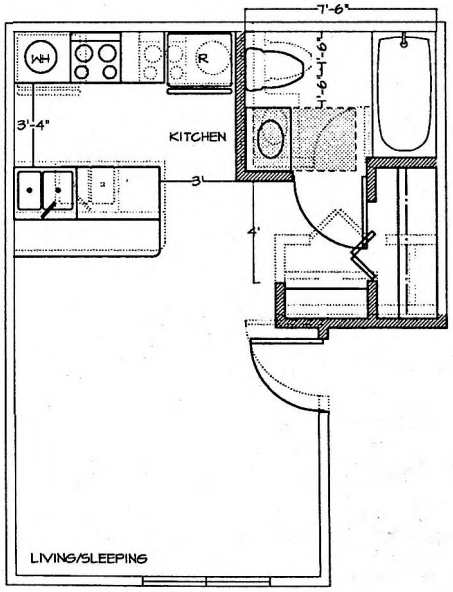
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bar at tub/shower and toilet.
- Removable bath vanity cabinet.
- 3'-4" between refrigerator and opposite counter.



ANSI

Similar to FHA revision except the required 4 ft. dimension at outswinging bathroom door necessitates the switching of closet and shelves. Bath is required to be 5'-6" deep to provide 18" from toilet centerline to adjacent wall and 30" lavatory. The refrigerator is relocated opposite the kitchen entry so that the 3'-4" clearance dimension is from counter to counter and not refrigerator to counter.

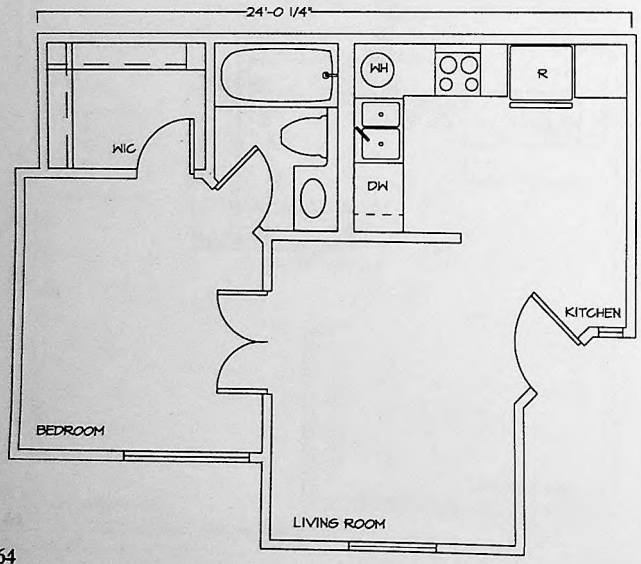
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bar at tub/shower and toilet.
- Removable bath vanity cabinet.
- 18" side clearance next to latch on pull side of doors.
- Adjustable 30" kitchen sink counter and 30" work surface.
- 3'-4" between opposite kitchen counters.



II. SUNBROOK UNIT B

Original Unit

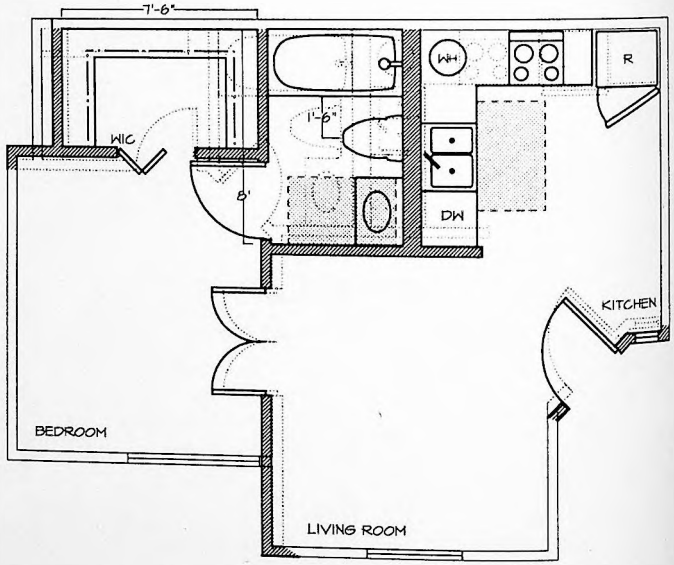
The very compact 424 sq.ft. one bedroom one bath unit features an "eat-in" kitchen. The unit's bath is accessible through the bedroom. French doors open into the bedroom to allow the living room to "borrow" space from the bedroom.



FHA

The bath was made larger and reconfigured to provide for a 30"x48" clear space. The bath door is swung outward as this does not adversely affect the use of the bedroom. The eat-in kitchen width is reduced slightly, but the developer felt this was acceptable and was more than compensated for by the larger bath and walk-in closet.

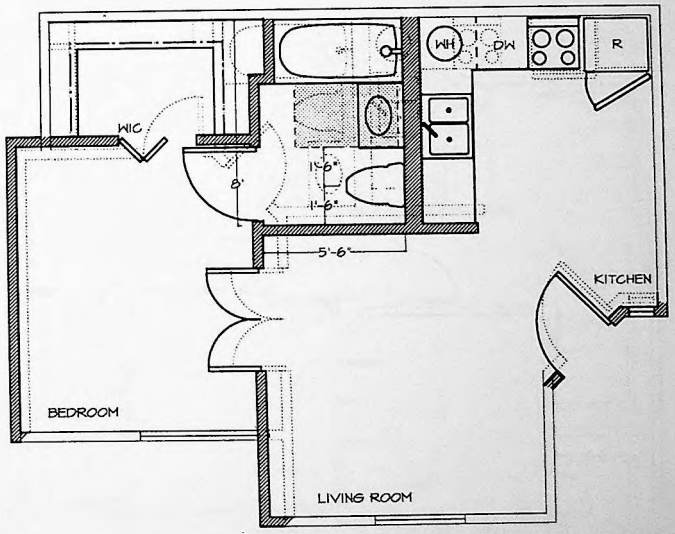
- 2'-10" doors at bedroom and bath and walk-in closet.
- Wall reinforcement for fixed grab bar at tub/shower and foldaway grab bar at toilet.
- Removable bath vanity cabinet.



ANSI

The unit's bath is lengthened, and the lavatory and toilet switched, to provide 18" from the toilet centerline to the adjacent 30" lavatory and reinforced sidewall. Bath depth is increased to 5'-6" to allow frontal approach to toilet. Living and bedroom walls are extended slightly to maintain original areas.

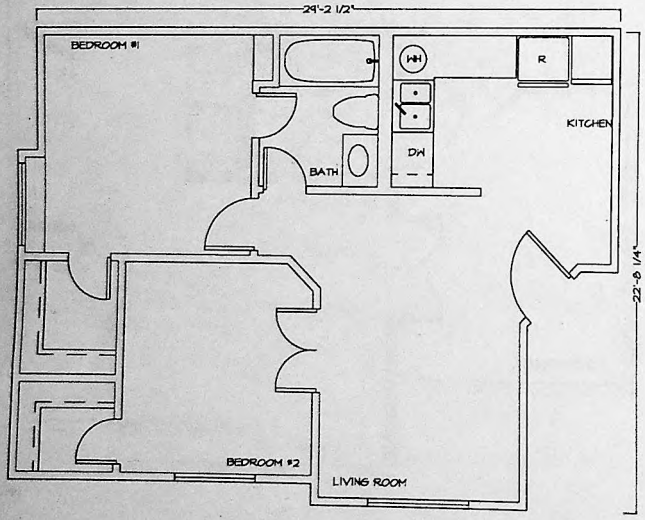
- 2'-10" doors at bedrooms and baths and walk-in closet.
- Wall reinforcement for fixed grab bar at tub/shower and toilet.
- Removable bath vanity cabinet.
- 18" side clearance next to latch on pull side of doors.
- Adjustable 30" kitchen sink counter and 30" work surface.



II. SUNBROOK UNIT C

Original Unit

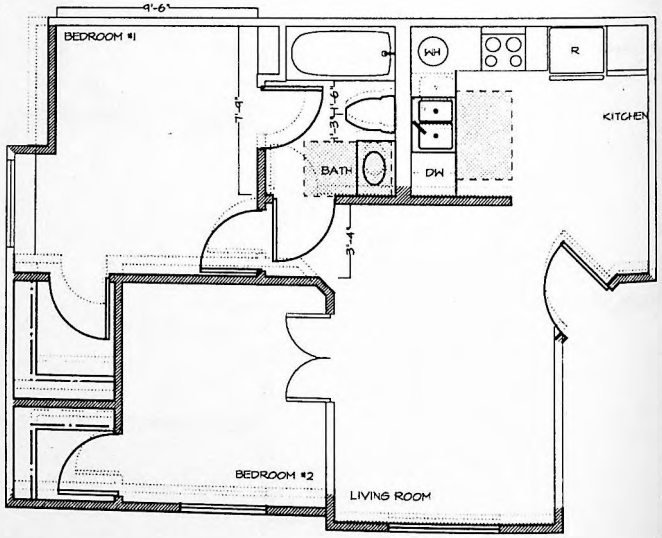
The 614 sq.ft. C unit is similar in plan to the B unit except that it has two bedrooms in lieu of one and the unit's bathroom is accessible from the living room as well as Bedroom #1.



FHA

The unit's bath is enlarged slightly to provide 18" from the toilet centerline to the tub and 15" to the adjacent lavatory. Bedroom #1 is reconfigured slightly to allow for a 2'-10" entry door. Bedroom #2 and the living room exterior walls are shifted outward to provide space equivalent to the original unit.

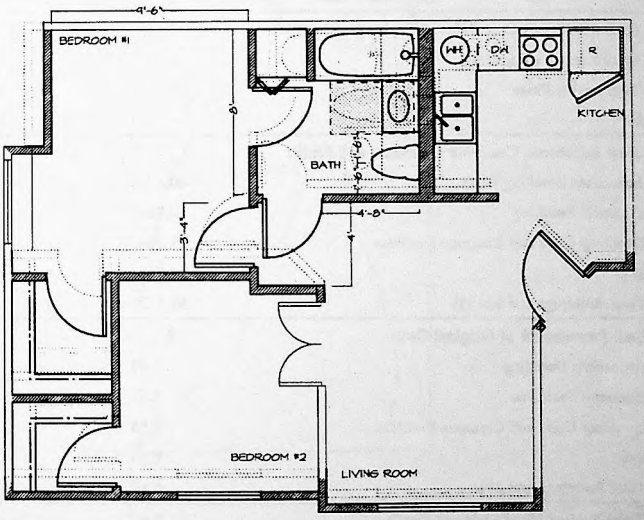
- 2'-10" doors at bedrooms, baths and walk-in closets.
- Wall reinforcement for fixed grab bar at tub/shower and foldaway grab bar at toilet.
- Removable bath vanity cabinet.



ANSI

Similar to unit B except that the unit's bath is increased in depth to allow for a 2'-10" door from the living room and sidewall grab bar blocking for a 42" min. grab bar adjacent to the toilet.

- 2'-10" doors at bedrooms and baths and walk-in closet.
- Wall reinforcement for fixed grab bar at tub/shower and toilet.
- Removable bath vanity cabinet.
- 18" side clearance next to latch on pull side of doors.
- Adjustable 30" kitchen sink counter and 30" work surface.



CASE STUDY II — SUNBROOK COST SUMMARIES

ORIGINAL PROJECT COSTS

Dwelling Units Cost ($)	9,575,000
Common Facilities Cost ($)	125,000
Dwelling Units and Common Facilities Cost ($)	9,700,000
Sitework Cost ($)	457,833
Project Cost ($)	14,920,000

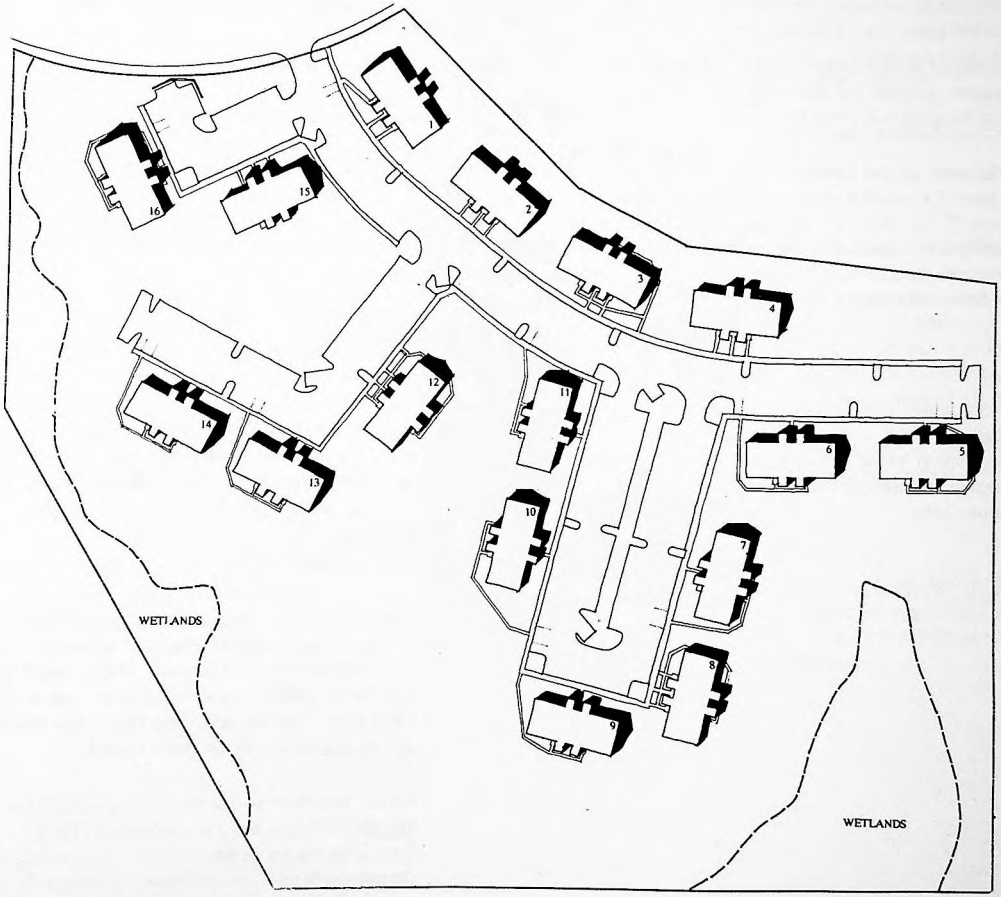
ADDITIONAL SITE, DWELLING UNIT AND COMMON FACILITIES COSTS

		Additional Cost Per Unit			Additional Cost Per Unit x No. of Units		
Unit Type	# of Accessible Units	FHA-A $	FHA-B $	ANSI $	FHA-A $	FHA-B $	ANSI $
A	54	168	-	334	9,072	-	18,036
B	107	158	-	340	16,906	-	36,380
C	53	227	-	344	12,031	-	18,232
Total Additional Cost Before Overhead and Profit:					$	$	$
Accessible Dwelling Units					38,009	-	72,648
Common Facilities					10,200	-	10,200
Site					34,816	-	34,816
Total Additional Cost with Overhead and Profit:					$	$	$
Accessible Dwelling Units					40,670	-	77,733
Common Facilities					10,914	-	10,914
Dwelling Units and Common Facilities					51,584	-	88,647
Site					37,253	-	37,253
Total Buildings and Site ($)					88,837	-	125,900
Cost Increase (% of Original Cost):					%	%	%
Accessible Dwelling Units					0.42	-	0.81
Common Facilities					8.73	-	8.73
Dwelling Units and Common Facilities					0.53	-	0.91
Site					8.14	-	8.14
Total Buildings and Site					0.87	-	1.24
Total Project (% of Original Cost):					0.60	-	0.84

ADDITIONAL SITE COST SUMMARY

Item	Description	Qty.	Unit	$/Unit	$/Add	$/Deduct
Dwelling Units						
1	Fill	5	CY	12.50	63	
2	Cut	510	CY	8.00	4,080	
3	Walk Paving	149	SF	2.18	325	
4	Handrail	645	LF	38.00	24,510	
5A	Steps	80	LF	4.20	336	
5B		157	LF	4.20		659
6	Retaining Wall	266	face SF	4.75	1,264	
	Subtotal				30,578	659
	Net Total ($)				29,919	
Community Facilities						
1	Fill	11	CY	12.50	138	
2	Walk Paving	584	SF	2.18	1,273	
3	Handrails	60	LF	38.00	2,280	
4	Retaining Walls	48	face SF	4.75	228	
5	Garden Wall	230	face SF	4.25	978	
	Net Total ($)				4,897	
Dwelling Units and Common Facilities						
Net Total ($)					34,816	

CY = Cubic Yards SF = Square Feet LF = Lineal Feet



III.A BRENTWOOD
SITE PLAN

250 FEET 100 50 0

III: BRENTWOOD PARK

1. Project

This project is called Brentwood Park Condominiums in Harford County, MD. It is a garden apartment project, for the lower end of the housing market. The developer and designer is Ryland Homes of Columbia, MD.

The site is in the hilly Piedmont of the Eastern Seaboard, one of several multifamily sites that are part of a mixed housing development. It appears to have been "pre-developed" for sales as an improved subdivision of single family and multifamily lots. The basic plat, streets, curbs and utilities were completed prior to the buildings. This not uncommon situation limited the options for the form and siting of buildings.

1.1 Basic Statistics

The gross site area is 20.09 acres. There are 192 apartment units at a density just over 9.5 units/acre. This density is low for multifamily but reflects the difficult terrain which limits development to only half of the ground. The building coverage is correspondingly low, only 8.4%. Out of 192 units, 64 are ground floor units.

2. Existing Site Plan Analysis

2.1 Site Concept

Plan III.A illustrates the basic configuration of the site and building development. The site is about 750 feet north to south and 1,200 feet west to east. The northern half is the developable portion with natural slopes in the 4-10% range, increasing sharply to 12-30% slopes into a steep-sided valley occupying the southern half of the site, marked as a Natural Resource District containing non-tidal wetlands. Although protected, the valley contains a main trunk sewer to which connections are made from the development and several storm water detention basins from the street inlets.

Buildings are arranged along the hillside above and below a dead-end curving street, and up and down the hillside around three very unequally sized cul-de-sacs: one is a large parking lot and two are L-shaped dead-end streets. Between and around are belts and fingers of open space. The arrangement of the lower buildings is the classic one in which streets and open space "interlock", the uphill side of the buildings fronting the streets and the downhill side facing the open space.

2.2 Building Layout

There are 16 identical buildings, each containing four units on three floors (12 in total), two front, two back, left and right of a central lobby with a split-level arrangement of stair. The entrance to each building is up a half-floor to the lobby from which ground floor units are reached by descending a half-floor. Second and third floor units are reached by a ascending half and one-and-a-half floors, respectively.

Eleven buildings utilize the sloping terrain by presenting three floors on the downhill side and two-and-a-half floors on the uphill side, i.e. ground floor units are set in the grade by ±3 feet, or a maximum of 6.0 feet below the second level Finished Floor Elevations (FFEs). Six back ground-floor units in Buildings 1, 2 and 4, and 16 front ground floor units in Buildings 5-7, 9-11, 13 and 14, are treated this way, all on the uphill side of each building. Altogether, twenty-two ground-floor units are partly "buried".

(This arrangement does exploit the existing slopes, but the twelve buildings with "front" units set into the grade don't take advantage of this to reduce or eliminate the steps up to the split level lobby. In fact, only Buildings 13 and 14 have clear walkways to the main building entrances).

Five buildings on more level terrain have three stories front and back; the ground floor units in Buildings 3, 8, 12, 15 and 16 are "walk out" units.

There are two basic units, front and back. Units sizes are:

- Front, 2 bed/2 bath: 840 sq.ft.
- Back, 2 bed/2 bath: 930 sq.ft.

There are no common facilities.

2.3 Circulation

There is one vehicular entrance from the northwest off the main boulevard of the subdivision to a single street following the contours, from which there are three shorter streets running down the hillside. All terminate at dead ends; two have a back-up space for turning around and one is a large parking lot of two aisles. All streets have head-in parking both sides.

Grades for the street paralleling the contours range from 0.5-7.5%, and for the ones crossing the contours 6-10%. All streets have six foot sidewalks incorporating curb ramps at accessible parking spaces. Most walks are both sides of each street, except where there are no buildings. Individual entrance walks are three feet wide.

Sidewalks slope with the streets at grades up to 5% along the single street and 6-8% on the two short streets off it. A 70 foot section of sidewalk in the parking lot slopes at 6%.

Entrance walks to building entrances are stepped in 14 out of 16 cases, from 2.5-8.5 feet, leading to an internal lobby a half floor above the ground floor. Because there is no accessibility to back ground floor units from inside the building, 36 back ground floor units have separate three foot walks from the parking directly to glass-enclosed entries off each living area ("solariums"). Front walks are short and direct; in some cases (Buildings 3, 8, 12 and 16) they are joined to the entrance walks by a second walk across the front of the building paralleling the sidewalk. In three of the cases (Buildings 3, 8 and 12), the second walk coordinates with a landing between the stairs to the building entrance.

Back walks are much longer, 100-175 feet, and graded gently from .5-2%.

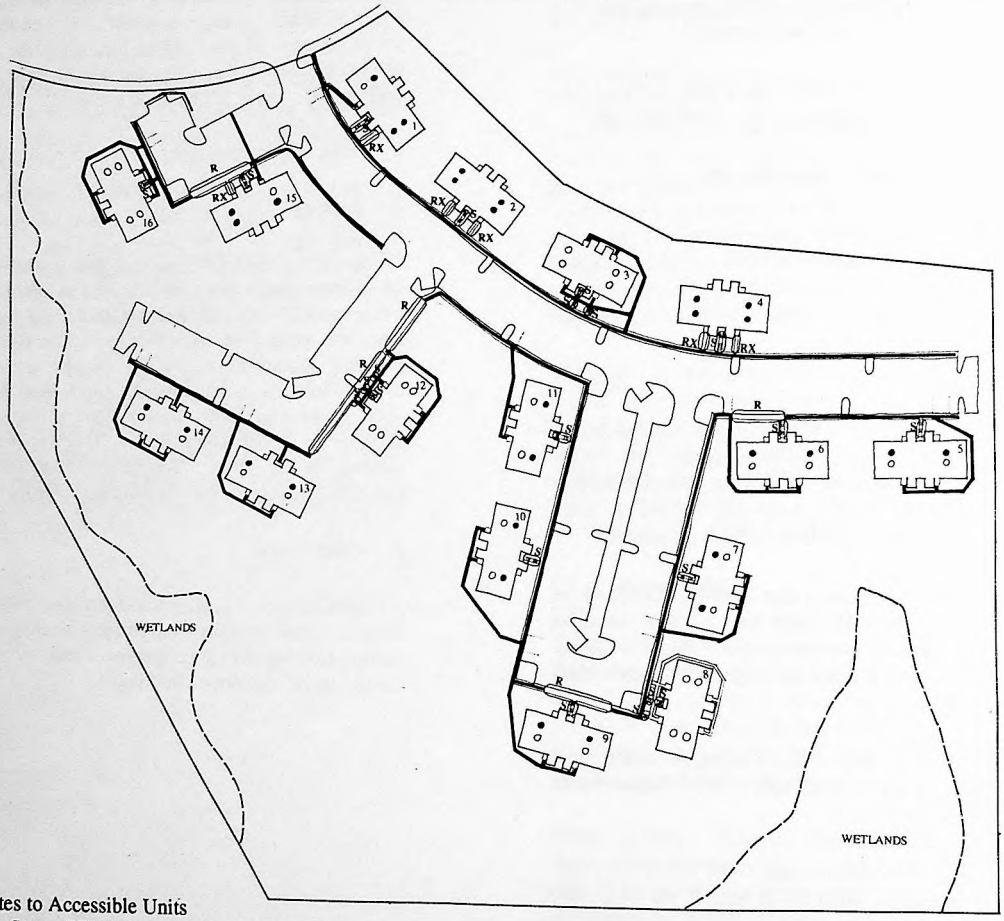
2.4 Parking

The site plan provides 391 parking spaces which is just over 2 spaces/unit. 14 of these spaces are accessible spaces required by local codes. From paragraph **4.2** of this section, *Site Analysis Test for Site Impracticality*, 38 units are required to be accessible. The *Guidelines* require accessible parking spaces equal to 2% of the covered (accessible) units 2%x38=1space). In addition, the *Guidelines* require sufficient accessible visitor parking to provide access to grade level dwelling units, and accessible parking at common facilities. This would mean at least one space, as a minimum, for visitors. The number of accessible spaces provided (14), therefore, exceeds the *Guidelines'* requirements.

2.5 Open Space

As noted, fingers of open space separate the cul-de-sacs and connect to the wooded valley, partially cleared for regrading, utility lines and detention basins. Existing trees are preserved at undisturbed areas between Buildings 12-13 and 15, and east of Building 4.

III.B EXISTING ACCESSIBLE ROUTES (DWELLING UNITS)



SYMBOL KEY

- ⊥ Accessible Routes to Accessible Units
- ◌ Obstructions (S=Steps, SW=Stepped walks, R=Ramps 5-8.33%, RX=Ramps>8.33 ✖=Missing Links in Pedestrain Circulation)
- ● Inaccessible Ground Floor Units
- ○ Accessible Ground Floor Units
- ◉ Inaccessible Units on Routes Required to Be Made Accessible

III.B BRENTWOOD
ACCESSIBLE ROUTES TO UNITS ANALYSIS

250 FEET 100 50 0

3. Existing Accessible Routes (Dwelling Units)

3.1 Analysis for Accessible Building Entrances on Accessible Routes

Plan III.B is an analysis of the existing site plan. It shows the accessible routes from arrival points (in this case, the curb line of the nearest parking) along the walks to the solarium entry at each ground floor unit.

In computing existing routes, the difference in finished floor elevations (FFEs) of ground floor unit entries and the outer edge of the concrete apron is assumed to be .1 of a foot (1/2" from the finished unit floor to the concrete apron outside the entrance door plus a 3/4" slope to the outer edge of the apron). A 1/2" differential at the main dwelling unit entry door is allowed under the *Guidelines* when the outside landing (apron) is made of impervious material, in this case concrete.

Noted obstructions to a clear accessway to building entrances are:

- Steps (1 or more), marked "S"
- Stepped walks (risers separated by broad treads) marked "SW"
- Ramps (walks sloping more the 5%), marked "R"
- Extreme ramps (walks sloping more than 8.33%) marked "RX".

Not all "front" walks to the solariums qualify as accessible routes because they slope excessively (e.g. 1 RF, 2 LF and RF, 4 LF and RF and 15 RF) and some "back"walk-out units are not provided with a walk (e.g. 15 LB and RB).

3.2 Number of Accessible Ground Floor Units

Plan III.B diagrams the accessible routes from the parking to each ground floor unit. Obstructions interrupting clear access to units are marked, and units so affected are counted as inaccessible. All others are counted as accessible.

The total count for 64 ground floor units is:

- 34 accessible or 53.1%
- 30 inaccessible or 46.9%

Table III.1 below indicates the breakdown of accessible/inaccessible units by building:

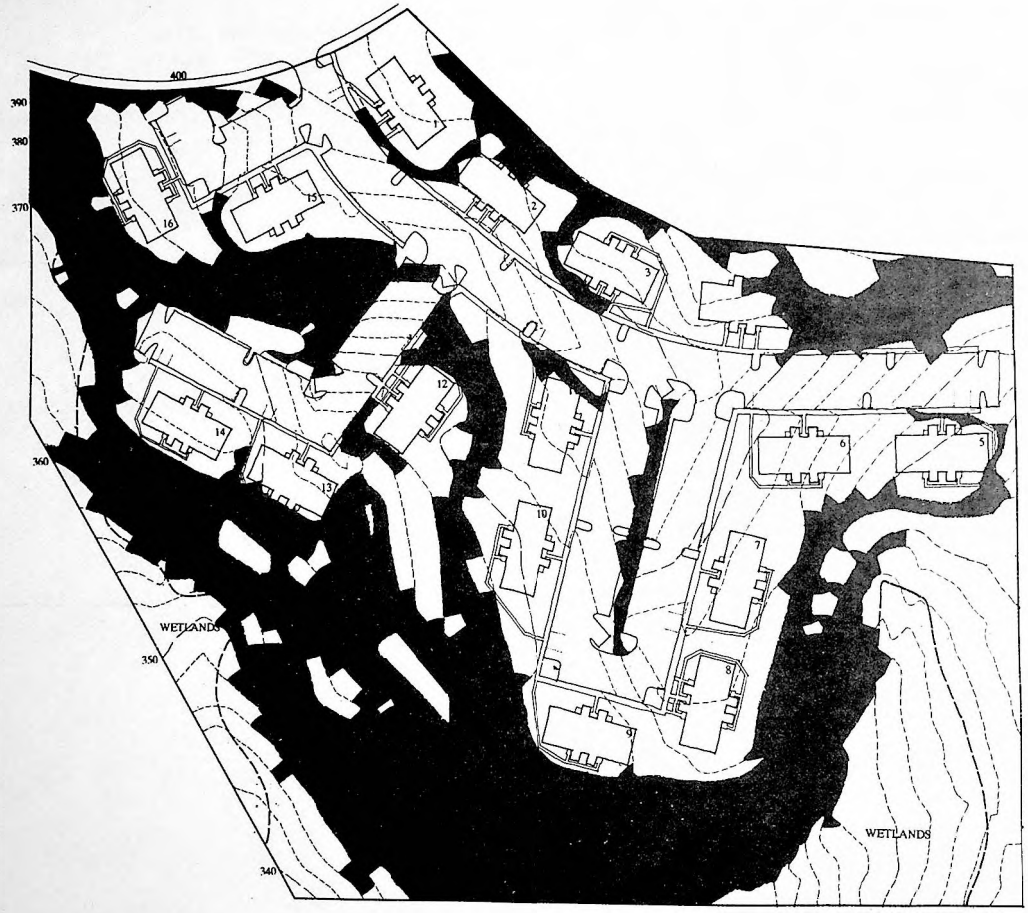
Table III.1 Existing Distribution of Accessible Ground Floor Unit

Building #Units/Bldg	Total GF	No. of GF Units Accessible	No. of GF Units Inaccessible
1 *	4	1	3
2 *	4	0	4
3	4	4	0
4 *	4	0	4
5 **	4	2	2
6 **	4	2	2
7 **	4	2	2
8	4	4	0
9 **	4	2	2
10 **	4	2	2
11 **	4	2	2
12	4	4	0
13 **	4	2	2
14 **	4	2	2
15	4	1	3
16	4	4	0
Totals	64	34	30

* Back units set in grade

** Front units set in grade

III.C EXISTING SITE SLOPES ANALYSIS



SYMBOL KEY

Existing Contours

Slopes>10%

III.C BRENTWOOD
SITE ANALYSIS FOR SLOPES

250 FEET 100 50 0

4. Site Impracticality Test Analysis

4.1 Individual Building Test for Site Impracticality

Measuring in a straight line from the outside edge of each solarium to arrival points within 50 feet (or the closest arrival point beyond 50 feet), existing undisturbed slopes and proposed finished slopes were tabulated for 31 individual building entrances.

None have original slopes over 10% and only one has proposed slopes over 10%. None have **both** original and proposed slopes over 10%. Therefore, none demonstrate site impracticality. By this test, all 64 ground floor units have to be made accessible. The plan provides 34 units, 30 **less** than the number required.

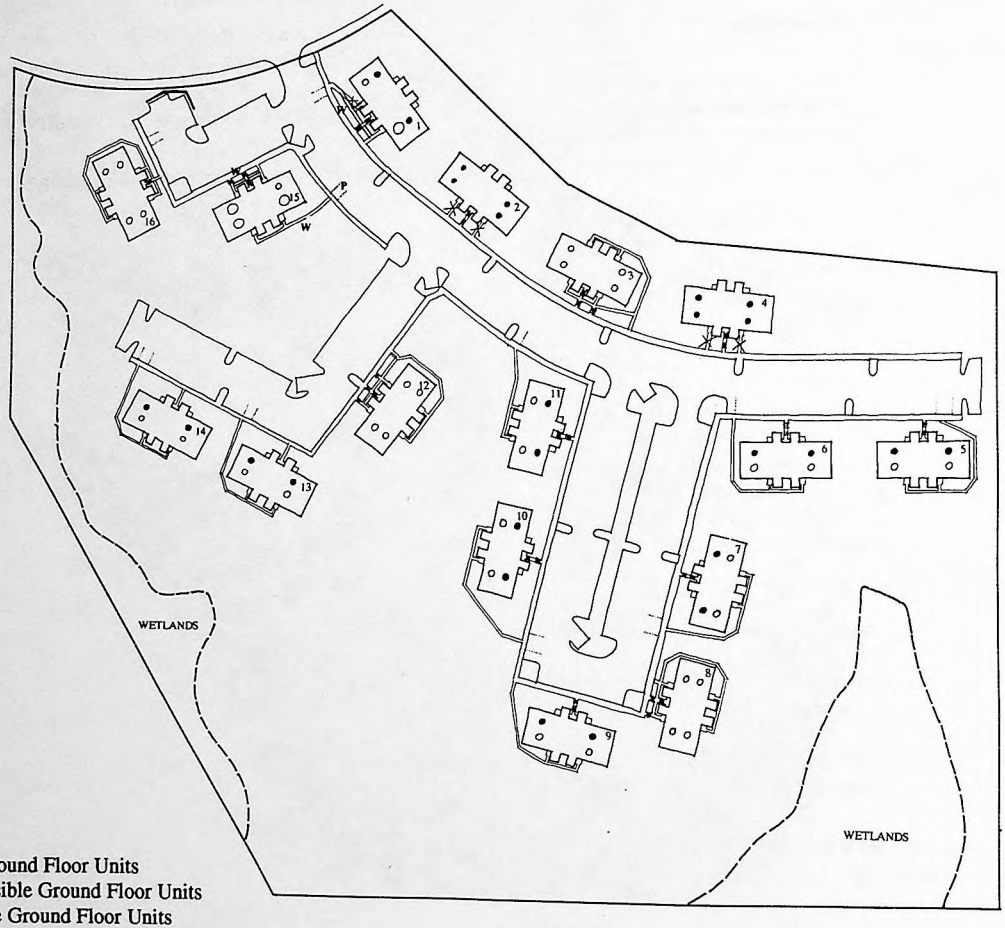
4.2 Site Analysis Test for Site Impracticality

Plan III.C shows the property's existing contours at two foot intervals. There are wetlands of 1.97 acres reducing the gross acreage of 20.09 to a net of 18.12 acres. Out of this, 7.28 acres are measured as having natural or original slopes greater than 10%, leaving 10.84 acres or 59.8% of the undisturbed site with existing natural grades of less than 10%. Following the Guidelines' procedure:

- By Step "A", 59.8% of the undisturbed site has a natural grade less than 10%
- By Step "B", the minimum percentage of ground floor units to be made accessible is 59.8% of 64 or 38 units; 34 are provided, 4 **less** than required.
- By Step "C", there are no inaccessible ground floor units which are accessed by walks with proposed slopes of 8.33% or less.

Therefore, by this test, the plan provides 4 **less** than the number required: 38 ground floor units have to be accessible.

III.D PROPOSED DESIGN FOR ACCESSIBILITY (DWELLING UNITS)



SYMBOL KEY

- ● Inaccessible Ground Floor Units
- ○ Existing Accessible Ground Floor Units
- ◯ New Accessible Ground Floor Units
- ▭ Relocated Buildings
- = New Walks <5%
- = New Ramps 5-8.33%
- ✕ Old Construction Deleted
- — Major New Retaining Walls

III.D BRENTWOOD
REDESIGN FOR ACCESSIBLE UNITS

250 FEET 100 50 0

5. Proposed Design for Accessibility (Dwelling Units)

5.1 Redesign to Provide Minimum Number of Accessible Ground Floor Units

The minimum number of accessible ground floor units by the second of the two tests for site impracticality, the Site Analysis Test, is 38. Each currently inaccessible unit is analyzed for the least cost/most direct resolution of the noted obstruction. The recommended design changes to make four additional units accessible are listed below in Table III.2 and illustrated on **Plan III.D:**

Table III.2 Design Changes for Minimum Accessible Ground Floor Units

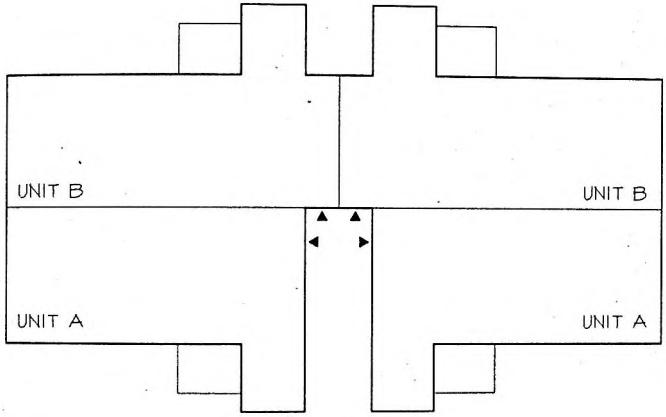
Building	Redesign	Change Add	Change Deduct
1 RF	Make new walk across front of building		
	Deduct paving 37' x 3'		81 SF
	Add paving, 55' x 4', 12' x 3'	256 SF	
2 LF & RF	NOTE. Solarium ramps slope > 8.33%		
4 LF & RF	and units are not required to be accessible		
	to achieve the minimum number.		
	Therefore, ramps may be deleted.		
	Deduct paving,38' x 3', 44' x 3'		246 SF
15 RF	Make new walk across front of building		
	Add paving, 30' x 4', 6' x 1'	126 SF	
	Replace ramp > 10% with part walk and steps		
	Add 5 risers x 4'	20 LF	
15 LB & RB	Make new walk & accessible parking space		
	Add street paving, 18' x 4'	72 SF	
	Add walk paving, 6' x 4', 100' x 4', 12' x 3'	460 SF	

6. Existing Accessible Routes (Common Facilities)

Since there are essentially no public or common use areas, consideration of *6.1 Analysis of Accessible Routes for Common Facilities* is not applicable.

7. Proposed Design for Accessibility (Common Facilities)

7.1 Redesign to Provide Acceptable Access to and Use of Common Facilities is unnecessary.



TYPICAL BUILDING PLAN

Building Description

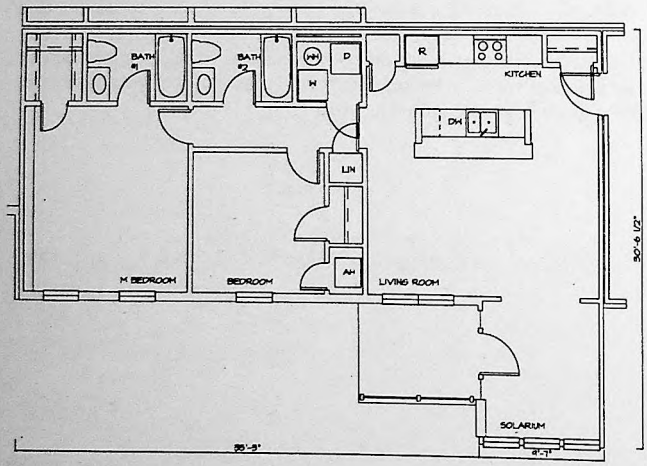
Each building comprises twelve units, four on each of the ground, second and third floors. The units are paired back to back with the front units separated at their entry by an entranceway and stair that provides access to the upper two floors. This arrangement provides a similar plan for front and rear units except that the rear units have a larger living/dining area because the entranceway stops at the front unit.

The units were designed in the mid-1980's and made use of a stair arrangement, common at that time, which utilized a front mid-level entry between the ground and second floor. This allowed the ground floor to be partially buried, either as an uphill unit or a downhill unit, thereby qualifying as a basement and not a story. By this means a three-story building could be classified as a two-story building utilizing unprotected rather than protected wood frame construction. This arrangement does not allow the front units to be accessible unless they are reached directly at grade bypassing the stairway. It also requires the rear units to be reached by means of a somewhat circuitous walk around the back of the building and an entry through the solarium. While this is still a current product, Ryland expects this building type to be phased out shortly in favor of one that allows more direct grade level access from the front.

III. BRENTWOOD PARK UNIT A

Original Unit Plan

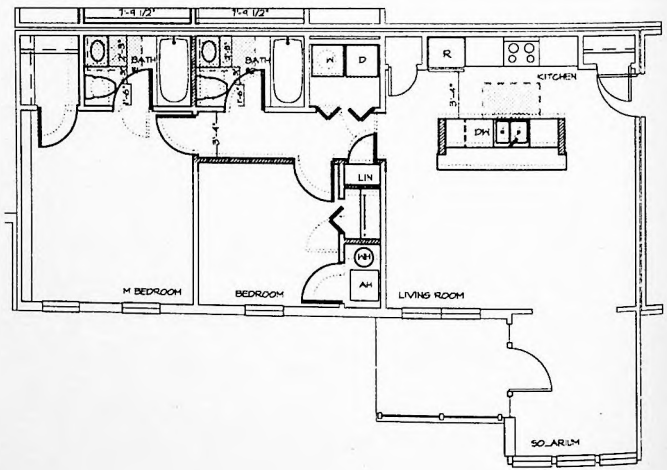
The original unit plan is entered by means of the split-level entry stair. This 840 sq.ft. plan designed as a low-end condo unit has two master bedroom closets. The larger closet is designed to be converted to an optional master bath the same size and configuration as the bath off of the bedroom corridor. The two-bath configuration is shown below.



FHA Option A

Plan revisions include the relocation of the hotwater heater adjacent to the airhandler; the switching of the toilet and lavatory to allow a 30"×48" clear space; and the widening of the bedroom corridor to 3'-4" to allow for a 2'-10" door at the master bedroom. Bath vanities are reduced to 27" to allow bath depth to remain at 5'-0".

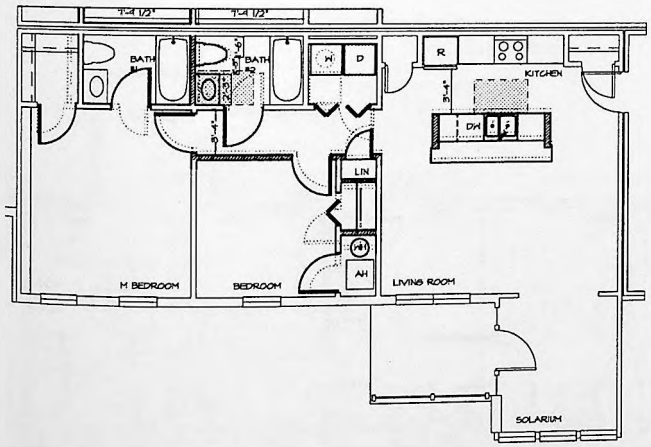
- 2'-10" doors at bedrooms and baths.
- Removable vanity Bath #1 and Bath #2.
- 3'-4" between refrigerator and opposite counter.
- Wall reinforcement for fixed grab bars at tub/showers and foldaway grab bar in both baths.



FHA Option B

Similar to Option A except that master bathroom can remain as originally designed, because only one bath has to be accessible. Bath #2 also reverts to original plan. Bath #2 door has to swing out to provide 30"×48" clear floor space at lavatory. This change was instituted by the developer in later models, and he has had few complaints about the outswinging doors.

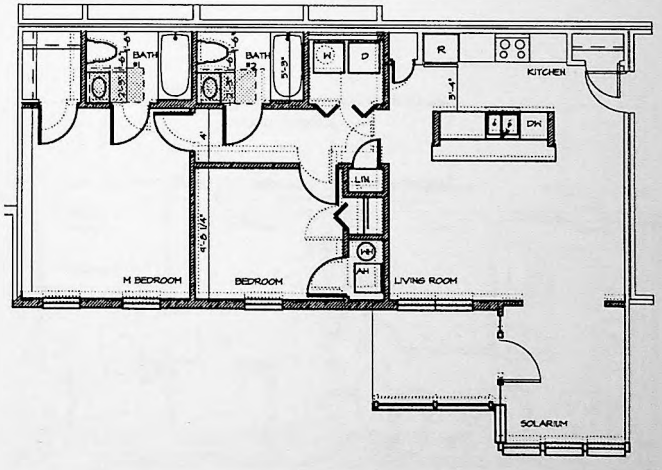
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bars at tub/showers and toilets in both bathrooms.
- 3'-4" between refrigerator and opposite counter.
- Removable bath vanity cabinet in Bath #2.



ANSI

Both baths are widened to 5'-3" to provide required 18" from toilet centerline to adjacent wall and lavatory. Bath doors are outswinging to provide 30"×48" clear space. Corridor increased to 4'-0" to allow for side entry to bath. Resulting decrease in Bedroom #2 width requires that to maintain marketable proportion, exterior wall shifts out approximately 6", and wall between bedrooms shifts 4" towards the elongated master bedroom.

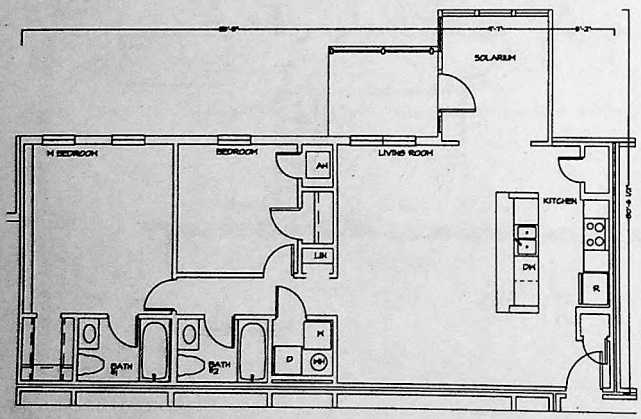
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bars at tub/showers and toilets.
- 18" clear space next to latch on pull side of doors.
- 3'-4" between refrigerator and opposite counter.
- Removable bath vanity cabinets.
- Adjustable 30" kitchen sink counter and 30" work surface.



III. BRENTWOOD PARK UNIT B

Original Unit Plan

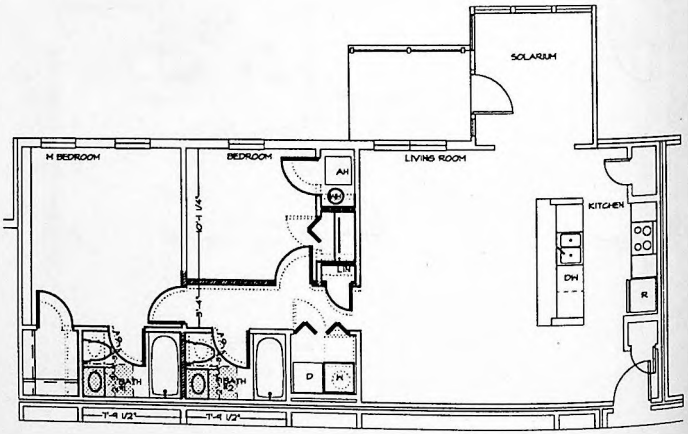
The original unit plan is entered by means of the split-level entry stair. This 930 sq.ft. plan has two master bedroom closets. As in Unit A, the larger closet is designed to be converted to an optional master bath of the same size and configuration as the bath off of the bedroom corridor. The two-bath configuration is shown below. The galley kitchen provides more than 40" between the refrigerator and the opposite counter and, therefore, does not require modification.



FHA Option A

Plan revisions include the relocation of the hotwater heater adjacent to the airhandler; the switching of the toilet and lavatory to allow a 30"×48" clear space; and the widening of the bedroom corridor to 3'-4" to allow for a 2'-10" door at the master bedroom. Bath vanities are reduced to 27" to allow bath depth to remain at 5'-0".

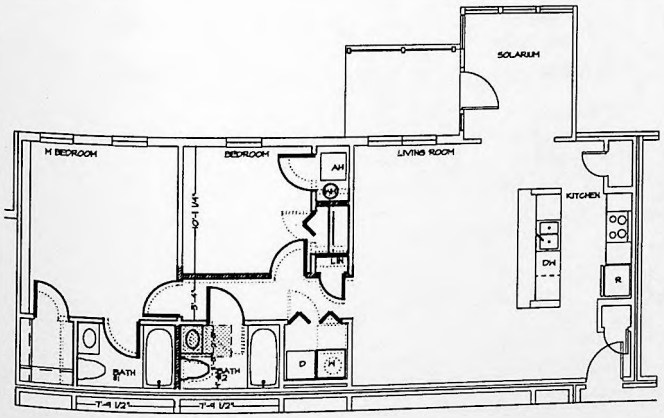
- 2'-10" doors at bedrooms and baths.
- Removable vanity Bath #1 and Bath #2.
- 3'-4" between refrigerator and opposite counter.
- Wall reinforcement for fixed grab bars at tub/showers and foldaway grab bar in both baths.



FHA Option B

Similar to Option A except that master bathroom can remain as originally designed, because only one bath has to be accessible. Bath #2 also reverts to original plan. Bath #2 door has to swing out to provide 30"×48" clear floor space at lavatory. This change was instituted by the developer in later models, and he has had few complaints about the outswinging doors.

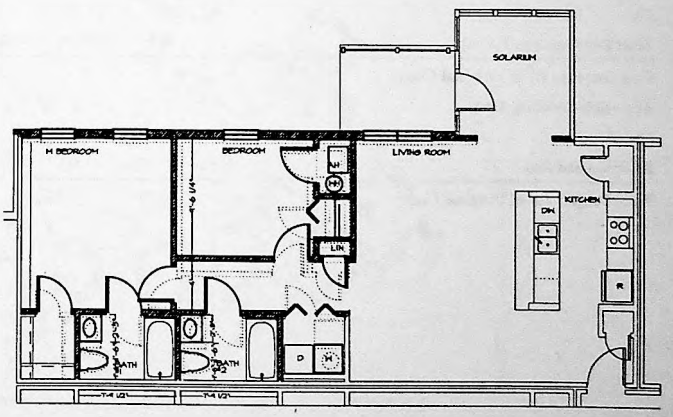
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bars at tub/showers and toilets in both bathrooms.
- 3'-4" between refrigerator and opposite counter.
- Removable bath vanity cabinet in Bath #2.



ANSI

Both baths are widened to 5'-3" to provide required 18" from toilet centerline to adjacent wall and lavatory. Bath doors are outswinging to provide 30"×48" clear space. Corridor increased to 4'-0" to allow for side entry to bath. Resulting decrease in Bedroom #2 width requires that to maintain marketable proportion, exterior wall shifts out approximately 6", and wall between bedrooms shifts 4" towards the elongated master bedroom.

- 2'-10" doors at bedrooms and baths
- Wall reinforcement for fixed grab bars at tub/showers and toilets.
- 18" clear space next to latch on pull side of doors.
- 3'-4" between refrigerator and opposite counter.
- Removable bath vanity cabinets.
- Adjustable 30" kitchen sink counter and 30" work surface.



CASE STUDY III — BRENTWOOD COST SUMMARIES

ORIGINAL PROJECT COSTS

Dwelling Units Cost ($)	8,028,670
Sitework Cost ($)	254,710
Dwelling Units and Site Cost ($)	8,283,380
Project Cost ($)	9,908,330

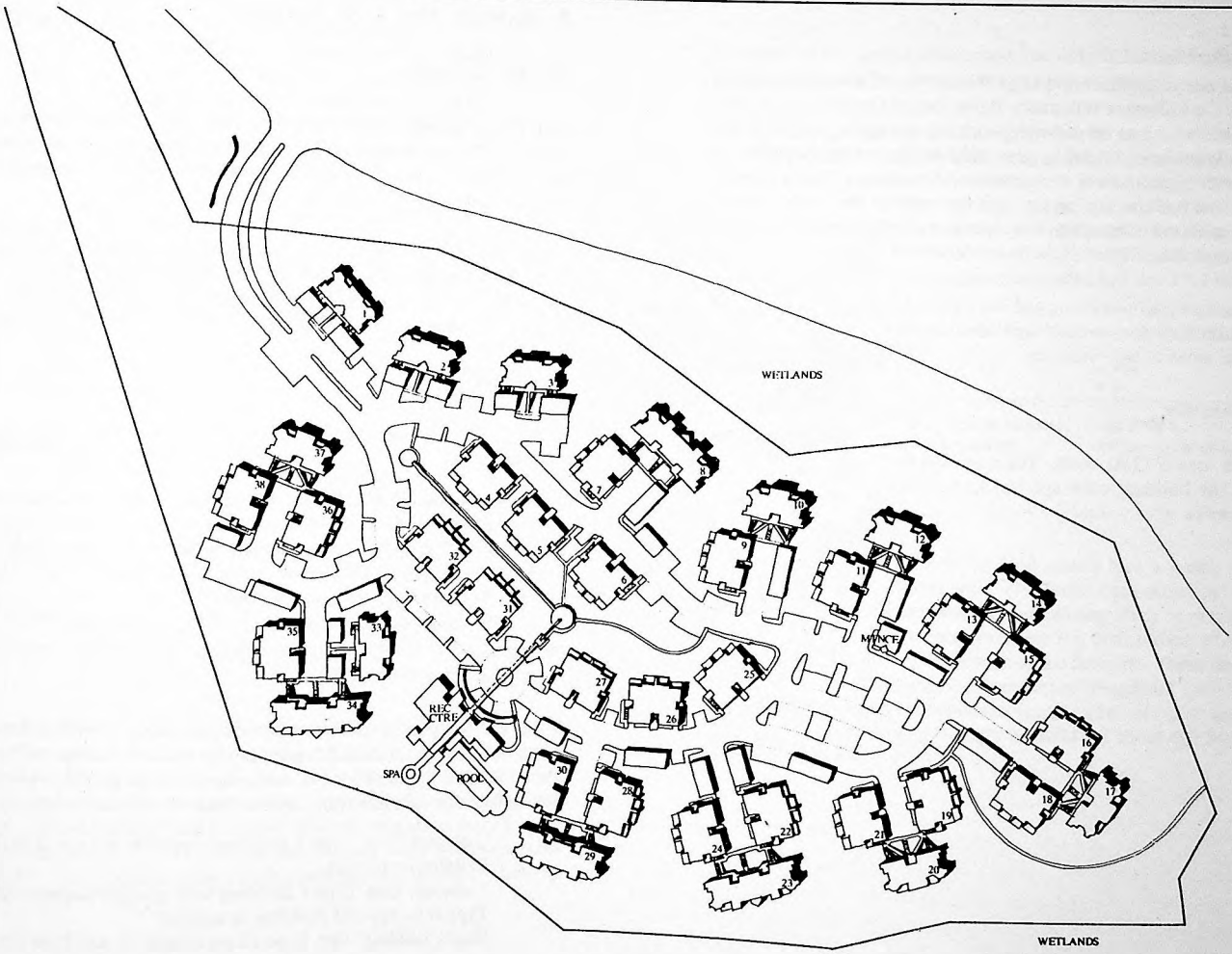
ADDITIONAL SITE, DWELLING UNIT AND COMMON FACILITIES COSTS

Unit Type	# of Accessible Units	Additional Cost Per Unit FHA-A $	FHA-B $	ANSI $	Additional Cost Per Unit x No. of Units FHA-A $	FHA-B $	ANSI $
A	12	202	183	792	2,424	2,196	9,504
B	26	202	183	792	5,252	4,758	20,592
Total Additional Cost Before Overhead and Profit:					$	$	$
Accessible Dwelling Units					7,676	6,954	30,096
Site					18,146	18,146	18,146
Total Additional Cost with Overhead and Profit:					$	$	$
Accessible Dwelling Units					9,249	8,379	36,265
Site					21,866	21,866	21,866
Total Buildings and Site ($)					31,115	30,245	58,131
Cost Increase (% of Original Cost):					%	%	%
Accessible Dwelling Units					0.12	0.10	0.45
Site					8.58	8.58	8.58
Buildings and Site					0.38	0.37	0.70
Total Project (% of Original Cost):					0.31	0.31	0.59

ADDITIONAL SITE COST SUMMARY

Item	Description	Qty.	Unit	$/Unit	$/Add	$/Deduct
Dwelling Units						
1A	Walk Paving	842	SF	2.00	1,684	
1B	Walk Paving	327	SF	2.00		654
2	Street Paving	72	SF	2.00	144	
3	Steps	20	LF	6.60	132	
	Subtotal				1,960	654
	Net Total ($)				1,306	
4	Separate Rear Walks*	7,640	SF	2.00	15,280	
5	Lights for Rear Walls	13	EA	120	1,560	
Net Total ($)					18,146	

* 13 Buildings
SF = Square Feet
LF = Lineal Feet



IV.A ANDOVER PARK
SITE PLAN
250 FEET 100 50 0

IV. ANDOVER PARK

1. Project

This project is one land parcel of a large Planned Unit Development called Murrayhill by the Columbia Willamette Development Company. The overall plan is subdivided into several neighborhoods containing single family and multifamily units, separated by greenbelts and joined by a curvilinear, hierarchical street system, very characteristic of traditional PUDs. Higher density parcels of multifamily units occupy the center of the plan, close to a community center and community park. Andover Park is one of these parcels. The architects are Fisher • Friedman Associates.

The site is markedly hilly and forested, very typical of the Northwest. The program is mid-sized one- to three-bedroom units with high standards for environmental amenity and recreation.

1.1 Basic Statistics

The gross site area is 17.62 acres. There are 238 units at a density of 13.6 units/acre. The building coverage is 19.1%. Out of 238 units, 80 are ground floor units.

2. Existing Site Plan Analysis

2.1 Site Concept

Plan IV.A illustrates the basic configuration of the site and building development. The site is about 1,200 feet long west to east and 600 feet from north to south. In landform, it is a promontory with a flattish top of slight to moderate slopes (1-6%) and very steep sides (10-30%).

About two-thirds of the buildings are two-stories occupying the ridge top. The other third are special three-story buildings with mid-floor units accessed by level bridges, with stairs up and down to the third and first floors, respectively, fitted to the steep slopes around three sides of the property.

2.2 Building Layout

There are 38 buildings of four building-types (I to IV) and seven unit-types (A to G):

- Building I: 2 Fls., 6 units, 1st Fl. 2 units (B) + 6 garages, 2nd Fl. 4 units (A,C)*
- Building II: 3 Fls., 9 units, each Fl. 3 units (D, E/F or G)*
- Building III: 3 Fls., 6 units, each Fl. 2 units (E/F or G)*
- Building IV: 3 Fls., 6 units, each Fl. 2 units (E/F)*
- Building (IV): 2 Fls., 4 units, each Fl. 2 units (E/F or G)*

* Lofts on upper floor units

There are 24 Type I buildings, 8 in a cluster on top of the ridge and 16 in combination with other building types (4 Type II buildings, 6 Type III, 3 Type IV and 1 Type (IV), a two-story variant of the usual three-story Type IV) on the edge escarpments. The three basic combinations are:

- U-shaped: Two Type I Buildings opposite + Type II or Type III Building on hillside
- L-shaped: One Type I Building with garages/carports opposite + Type II or Type III Building on hillside
- Single building: One Type IV on hillside or one Type (IV) on the level, with two pairs of 3 garages/carports in front.

Unit sizes are:

- Unit A, 1-bed/1-bath, 695 sq. ft., Upper Floor
- Unit B, 1-bed-1-bath, 783 sq. ft., Ground-Floor, accessible
- Unit C, 1-bed-1-bath + loft, 941 sq. ft., Upper Floor
- Unit D, 2-bed/2-bath, 1,030 sq. ft., Mid-Floor, accessible
- Unit E, 2-bed/2-bath, 1,099 sq. ft., Mid-Floor, accessible
- Unit F, 2-bed/2-bath + loft, 1,271 sq. ft., Upper-Floor
- Unit G, 3-bed/2-bath, 1,199 sq. ft., Mid-Floor, accessible

The common facilities consist of:

- A recreation center on two floors of 5,619 square feet, located roughly southwest of the center of the plan.
- A swimming pool, pool deck and spa.
- An office.
- A separate maintenance/laundry building at the east end of the site.
- A park at the center of the site with elaborate water features.

2.3 Circulation

Buildings are served by a loop street, beginning from the northwest off one of the PUD collector boulevards. There is some on-street head-in parking and a large parking area at the east end. One space/unit, or 238 spaces, are provided in garages/carports, integral to the two-story buildings, or as free-standing structures. Carports and trash-enclosures are distributed throughout the site. Total parking is 422 spaces, which is 1.77 spaces/unit. The only identified accessible parking spaces are four spaces at the recreation center.

The limited network of pedestrian walks consists of three "spokes" focusing on a water chute and fountain, opposite the circle in front of the recreation center, and a 250 foot long water channel aligned with the main entrance. Short walks access the side units (B) of Building I and close the ends of the autocourts created in the U- and L-shaped clusters. A special feature is the bridges directly accessing the mid-level units of three-story buildings, types II, III and IV. An exception to the rule is a straight walk access to Building #33.

2.4 Parking

As noted in the project description, the only indicated accessible parking spaces are four (in two pairs) at the recreation center.

Elsewhere, there appears to be no provision for accessible parking (i.e. 13 foot wide spaces combined with curb ramps). Garages/carports are only 9 feet wide, and inadequate for a person in a wheelchair. There is ample space in the plan to widen two end garages/carports to 13 feet to meet the Guidelines' standard of 2% of covered parking for the 80 accessible units (i.e. 80 × 0.02 = 1.6). 2% of the open parking would require two more accessible spaces. These changes are detailed in Table IV.1 below:

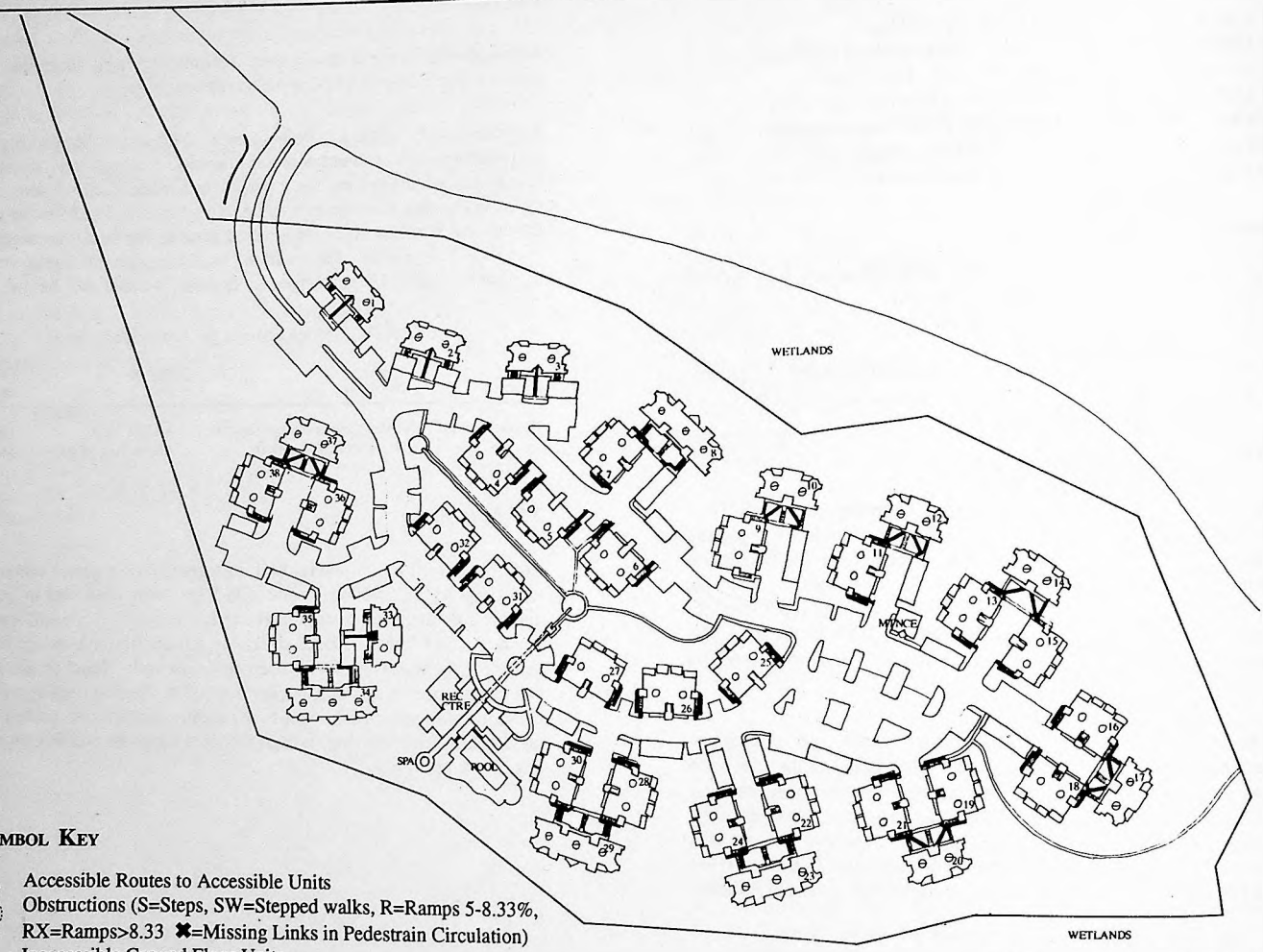
Table IV.1 Design Changes for Accessible Parking

Location	Redesign	Change Add	Change Deduct
Throughout Site	Extend carport/garage structure	Add 20'×4'×2	160 sq. ft.
	Extra accessible parking	Add paving 18'×4'×2	144 sq. ft.

2.5 Open Space

Eight "interior" units (inside the loop street) face a gently sloping park about 500 feet × 50-80 feet wide with forest trees preserved in grass and animated by the water features. The remaining thirty "exterior" units face outward to the forested slopes which are left undisturbed, except for paths leading to the community-wide open-space network. These on-site areas of "no disturbance" blend with the undisturbed designated open space around the property to make a continuous surrounding belt of forest, broken only by the entrance street curving through the trees for about 400 feet as a miniature divided parkway.

IV.B EXISTING ACCESSIBLE ROUTES (DWELLING UNITS)



SYMBOL KEY

- ⊥ Accessible Routes to Accessible Units
- ◌ Obstructions (S=Steps, SW=Stepped walks, R=Ramps 5-8.33%, RX=Ramps>8.33 ✖=Missing Links in Pedestrain Circulation)
- ● Inaccessible Ground Floor Units
- ○ Accessible Ground Floor Units
- ⊖ Accessible Mid-level Units
- ◉ Inaccessible Units on Routes Required to Be Made Accessible

IV.B ANDOVER PARK
ACCESSIBLE ROUTES TO UNITS ANALYSIS

250 FEET 100 50 0

3. Existing Accessible Routes (Dwelling Units)

3.1 Analysis for Accessible Building Entrances on Accessible Routes

Plan IV.B is an analysis of the existing site plan. It shows the accessible routes from arrival points (in this case, the curb line of the nearest parking) along the walks or across the bridges to the concrete apron or wooden deck at each building entrance.

In computing an accessible route, the difference in finished floor elevations (FFEs) of ground floor unit entries and the outer edge of the concrete entrance apron is assumed to be 0.1 foot (1/2" from the finished unit floor to the concrete apron outside the entrance door, plus a 3/4" slope to the outer edge of the apron). A 1/2" differential at the main dwelling unit entry door is allowed, under the *Guidelines*, when the outside landing (apron) is made of impervious material, in this case concrete. For accessible mid-level units in three-story buildings reached by bridges, the difference between FFEs and the exterior wooden deck is assumed to be zero. Bridges slope down or up less than 5% (usually about 2-3%) to meet grades away from the buildings.

3.2 Number of Accessible Ground Floor Units

Plan IV.B diagrams the accessible routes from the closest parking to each building entrance.

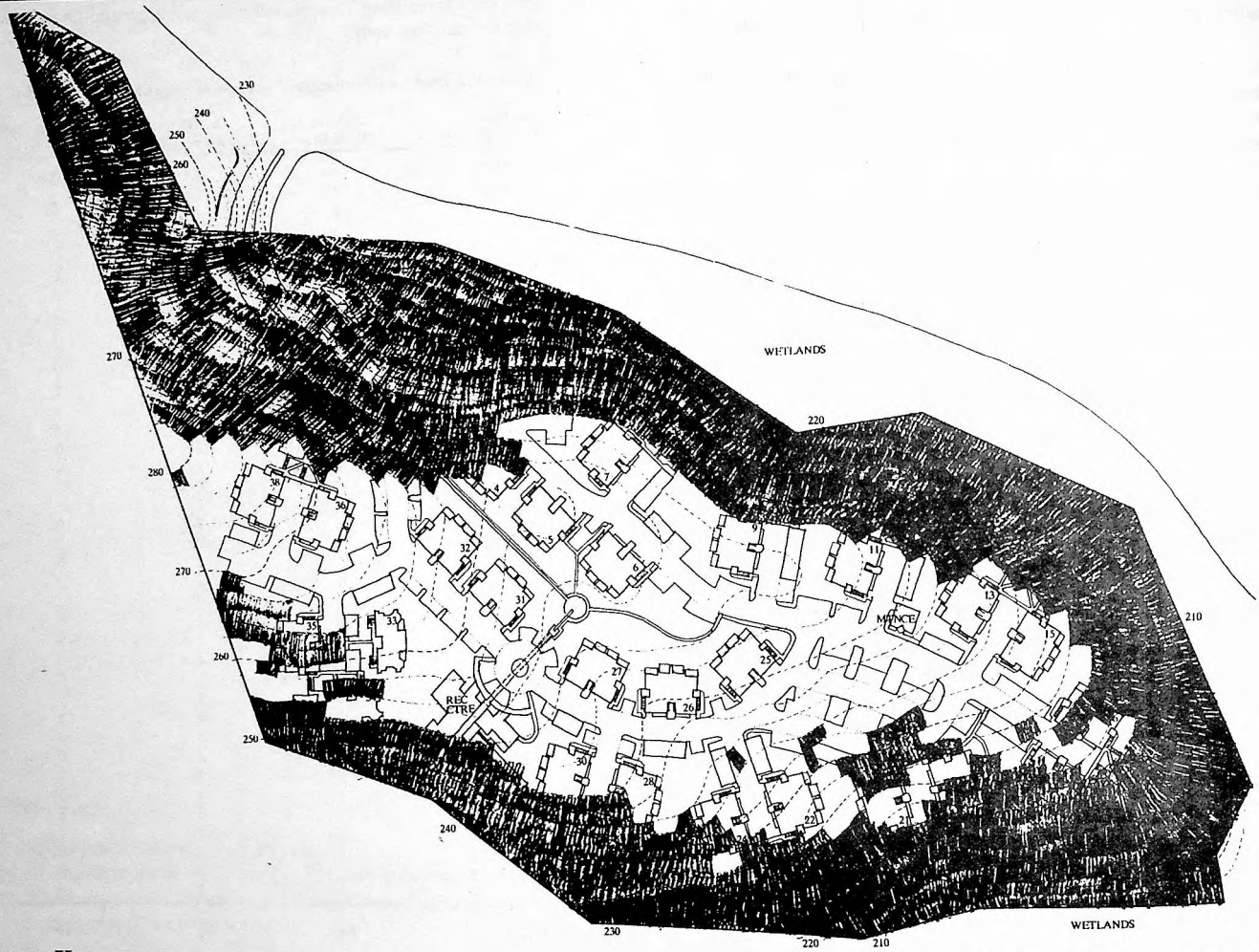
Access to building entrances is directly from the parking garages/carports or open parking areas, by short walks or by bridges. There are no steps. The assumption is that streets and parking areas are curbed and accessible ramps are (or can be) readily provided. Finished grades are slight to moderate throughout, ranging from a minimum for positive drainage to about 6% across the parking area and about 6.7% on the steepest walk. However, this is an exception and most walks are in the 2-5% range, and therefore, meet the standard for accessibility.

There are 50 ground-floor units in 24 Type I and one Type IV buildings, all of which are accessible. There are 30 mid-level units in 13 Type II, III and IV buildings which are accessible across bridges. Walks and bridges are typically 3'-6" wide. Table IV.2 below indicates the breakdown of accessible units by building, distinguishing accessible ground-floor units and accessible mid-floor units:

Table IV.2 Existing Distribution of Accessible Ground Floor and Mid-floor Units

Building #, Type & No. Flrs	Total GF Units/Bldg	No. GF Units Accessible	No. Mid-floor Units Accessible
1 IV 3	2	0	2
2 IV 3	2	0	2
3 IV 3	2	0	2
4 I 2	2	2	0
5 I 2	2	2	0
6 I 2	2	2	0
7 I 2	2	2	0
8 II 3	3	0	3
9 I 2	2	2	0
10 II 3	2	0	2
11 I 2	2	2	0
12 III 3	2	0	2
13 I 2	2	2	0
14 III 3	2	0	2
15 I 2	2	2	0
16 I 2	2	2	0
17 III 3	2	0	2
18 I 2	2	2	0
19 I 2	2	2	0
20 III 3	2	0	2
21 I 2	2	2	0
22 I 2	2	2	0
23 II 3	3	0	3
24 I 2	2	2	0
25 I 2	2	2	0
26 I 2	2	2	0
27 I 2	2	2	0
28 I 2	2	2	0
29 II 3	3	0	3
30 I 2	2	2	0
31 I 2	2	2	0
32 I 2	2	2	0
33 IV 2	2	2	0
34 II 3	3	0	3
35 I 2	2	2	0
36 I 2	2	2	0
37 III 3	2	0	2
38 I 2	2	2	0
Totals	80	50	30

IV.C EXISTING SITE SLOPES ANALYSIS



SYMBOL KEY

90 Existing Contours

Slopes>10%

IV.C ANDOVER PARK

SITE ANALYSIS FOR SLOPES

250 FEET 100 50 0

4. Site Impracticality Test Analysis

4.1 Individual Building Test for Site Impracticality

Measuring in a straight line from the outside edge of the concrete apron or wooden deck at each building entrance to arrival points within 50 feet (or the closest beyond 50 feet), existing undisturbed slopes and proposed finished slopes were tabulated for individual building entrances.

Out of 80 ground floor units, 8 have original slopes over 10% and 23 have proposed slopes over 10%. Only 7% of the units have **both** original and proposed slopes over 10%. Therefore, only 7 out of 80 demonstrate site impracticality. By this test, 73 ground floor units have to be accessible. The plan, provides 80, 7 **more** than the number required.

4.2 Site Analysis Test for Site Impracticality

Plan IV.C shows the property's existing contours at two foot intervals. There are no restricted use areas, such as floodplains or wetlands, within the property. Out of the site's gross area of 17.62 acres, 7.62 acres are measured as having natural grades of less than 10%. Following the Guidelines' procedure:

- By Step "A", 43.3% of the undisturbed site has a natural grade less than 10%
- By Step "B", the minimum percentage of ground floor units to be made accessible is 43.3% of 80 units or 35 units; 80 are provided, 45 **more** than required.
- By Step "C", **all** ground floor units in Buildings 4, 5, 6, 7, 9, 11, 13, 15, 16, 18, 19, 21, 22, 24, 25, 26, 27, 28, 30, 31, 32, 33, 35, 36 and 38 (i.e. 50 units) are accessible. The ground floor units in the three-story Buildings 1, 2, 3, 8, 10, 12, 14, 17, 20, 23, 29, 34 and 37 (i.e. 30 units) are regraded with banks and retaining walls to be set down the hillside and reached by stairs, but the mid-floor units above them are all accessible by bridges.

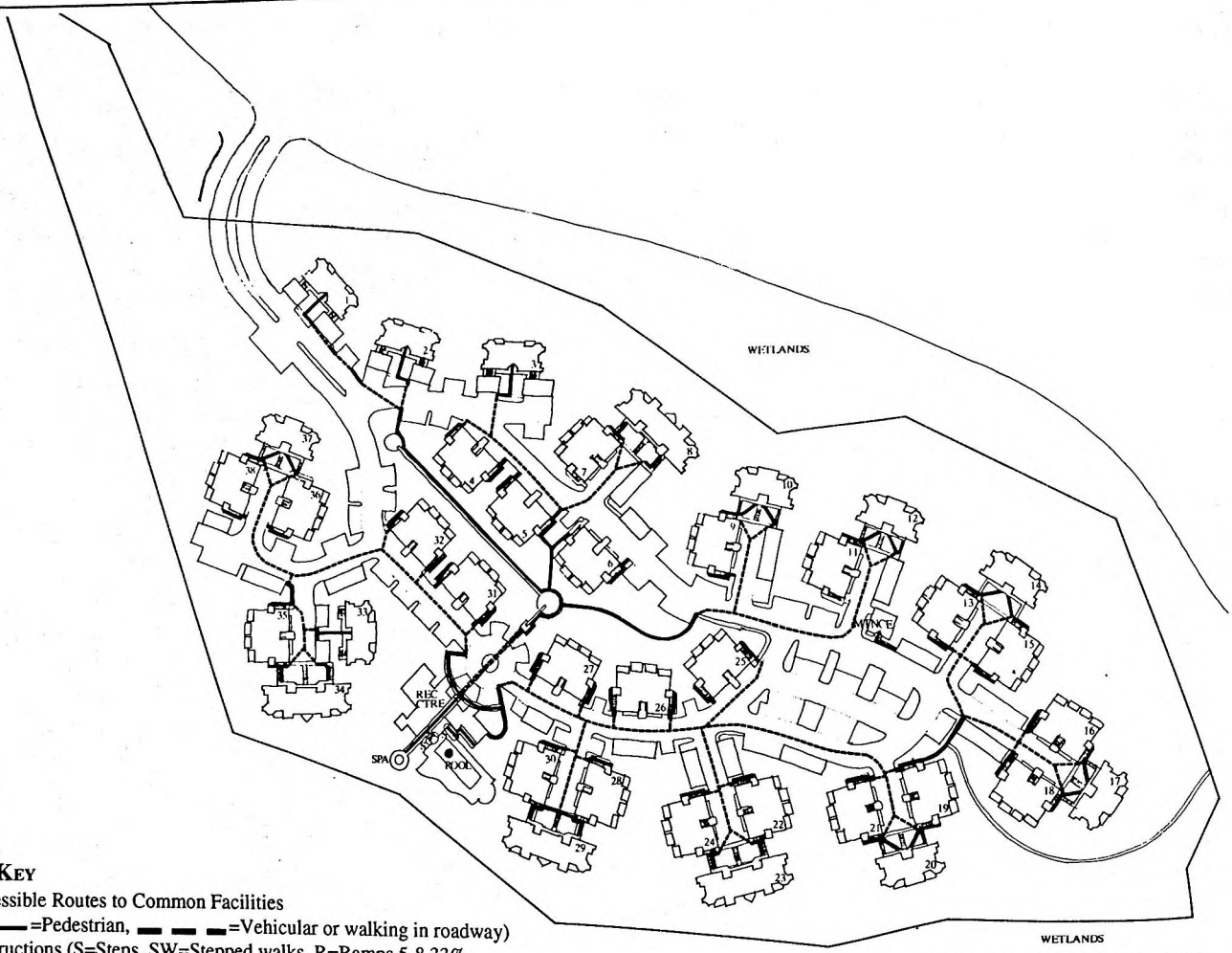
Therefore, by this test, the plan provides 45 **more** than the number required: **every building** has two or three accessible units each, in close association with covered parking in the same building or close by.

5. Proposed Design for Accessibility (Dwelling Units)

5.1 Redesign to provide minimum number of Accessible Ground Floor units

No redesign is required to satisfy either of the two tests for site impracticality.

IV.D EXISTING ACCESSIBLE ROUTES (COMMON FACILITIES)



SYMBOL KEY

- Accessible Routes to Common Facilities
  (——=Pedestrian, — — —=Vehicular or walking in roadway)
- Obstructions (S=Steps, SW=Stepped walks, R=Ramps 5-8.33%, RX=Ramps>8.33 ✖=Missing Links in Pedestrain Circulation)
- ● Inaccessible Common Facilities
- ○ Accessible Common Facilities

IV.D ANDOVER PARK
EXISTING ACCESSIBLE ROUTES TO COMMON FACILITIES ANALYSIS

250 FEET 100 50 0

6. Existing Accessible Routes (Common Facilities)

6.1 Analysis for Accessible Routes to Common Facilities

Plan IV.D diagrams the accessible routes from each accessible ground-floor or mid-floor unit to the common facilities. Obstructions limiting access to the recreation center, pool, laundry, office, park and water features are shown.

All of the public and common use areas are accessible with the single exception of the pool deck, which is four risers below the terrace outside the recreation building. The spa, water features and maintenance/laundry building are all accessible.

7. Proposed Design for Accessibility (Common Facilities)

7.1 Redesign to Provide Acceptable Access to and Use of Common Facilities

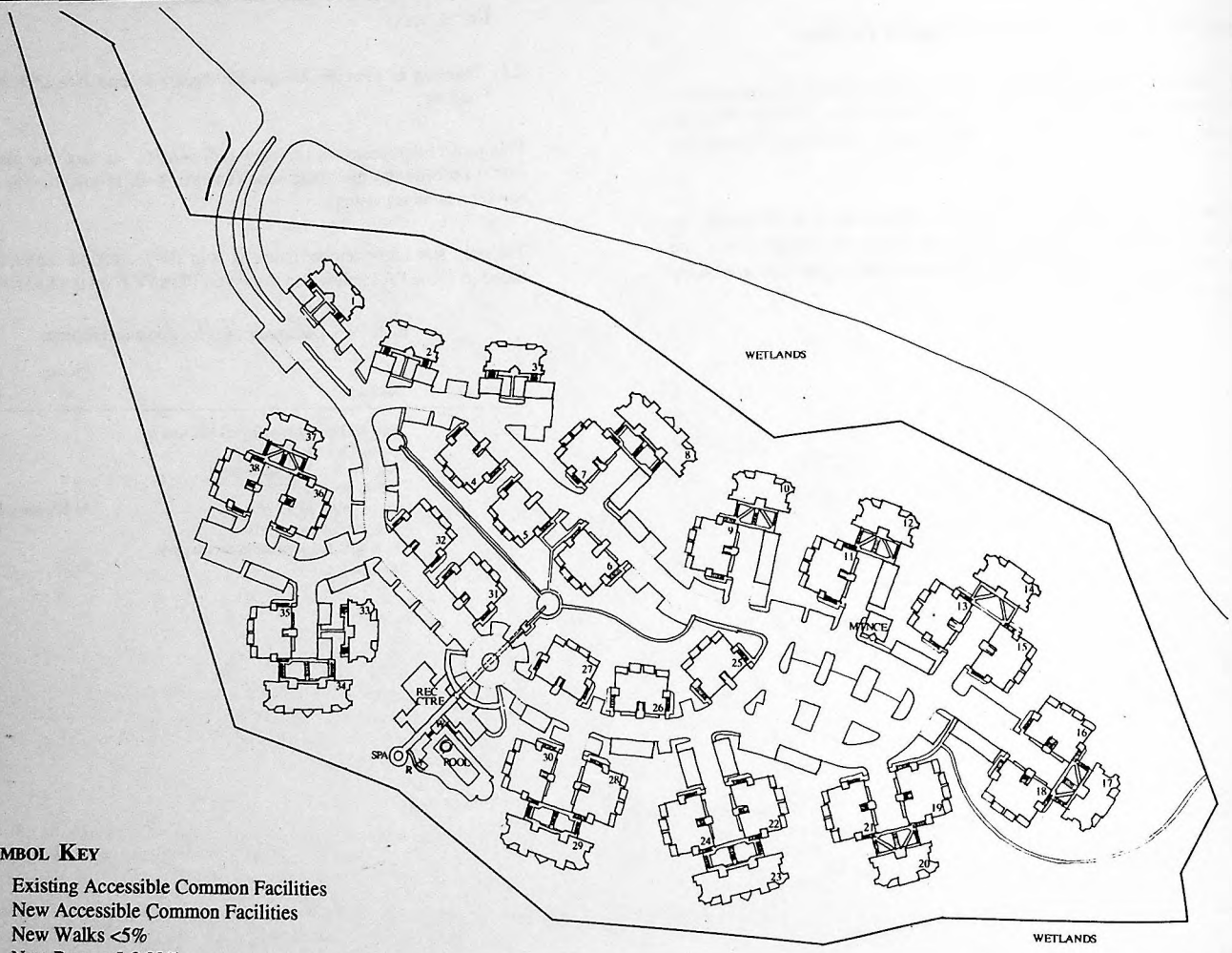
This project demonstrates very few deficiencies. In fact, the plan significantly **exceeds** the minimum requirements, both in layout, site amenities and recreation provision.

The only site improvement required is at the recreation center and is detailed in Table IV.3 below and shown on **Plan IV.E** on the following page.

Table IV.3. Design Changes for Common Facilities

Location	Redesign	Change Add	Change Deduct
Pool Deck	New 8.33% ramp/sloping bridge from covered way to pool deck		
	Add wooden deck structure w/ balustrades/handrails ± 3' above grade, 24'×3'-6"	84 SF(square feet).	
	Deduct pool deck, 8'×16'		128 SF
	New walk from terrace to covered way		
	Add paving, 8'×4'	32 SF	

IV.E PROPOSED DESIGN FOR ACCESSIBILITY (COMMON FACILITIES)



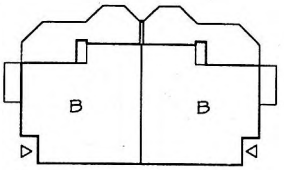
SYMBOL KEY

- ○ Existing Accessible Common Facilities
- ◎ New Accessible Common Facilities
- = New Walks <5%
- ≡ New Ramps 5-8.33%
- ✕ Old Construction Deleted
- ▬ Major Mew Retaining Walls

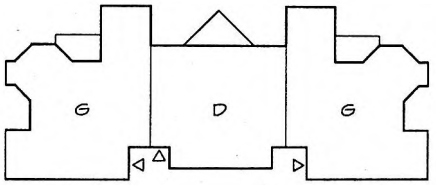
IV.E ANDOVER PARK
REDESIGN FOR ACCESSIBLE COMMON FACILITIES

250 FEET 100 50 0

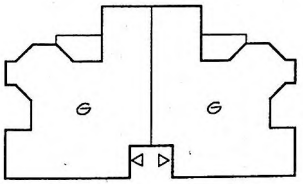
IV. ANDOVER PARK BUILDING TYPES



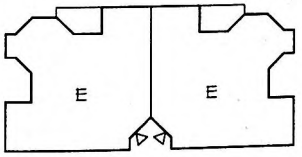
TYPE I



TYPE II



TYPE III



TYPE IV

TYPICAL BUILDINGS KEY PLAN

Building Description

Four different building types were developed to adjust to the steeply sloping site with a minimum of regrading, to preserve as many existing trees as possible and to take advantage of impressive views. Individual two-story buildings have a grade-level access and stairs to upper units where the grade is modest. Where the steeper grade allows for three-stories, buildings have grade-level ramps to mid-level units and stairs to both upper and lower units. Individual unit plans are combined with different adjacent unit types to provide varied and faceted building elevations.

Building Type I

A two-story building with mirrored side-by-side B units arranged in front of a six-car parking garage. Grade-level units are reached by a level entranceway on the unit side. Stairs are provided to second story B units.

Building Type II

A three-story building with three units on each of three floors. Typical combinations include either E, G or F units (a G unit with a loft) separated by a D unit. The units are reached by grade-level bridges and stairs to upper and lower units.

Building Type III

Typically a three-story building with mirrored side-by-side E, F or G units. The units are reached by a grade-level bridge to an E unit and stairs to upper F units and lower G units. In one two-story variant, two G units are entered on grade.

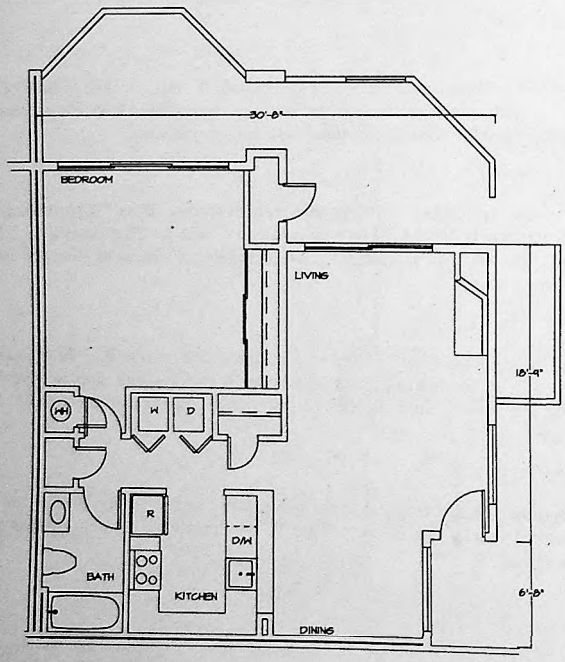
Building Type IV

Depending on the steepness of the grade, a two or three-story building with mirrored side-by-side E units. Type IV buildings have separate garages to their fronts.

IV. ANDOVER PARK UNIT B

Original Unit

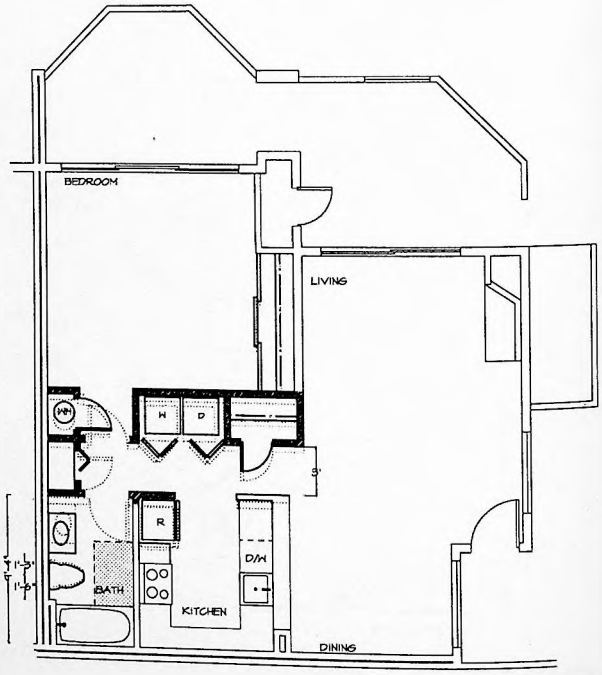
This 783 sq. ft. one-bedroom unit is the dominant unit type, typically used on the flatter portions of the site. It is usually combined with parking garages to its front.



FHA

Minor changes include the lengthening of the bath to allow an in-swinging door and a 30"×48" clear space. The "U" shaped kitchen does *not* require 5'-0" between the refrigerator and opposite counter, because there is neither a sink nor a range/cook top at the base of the "U".

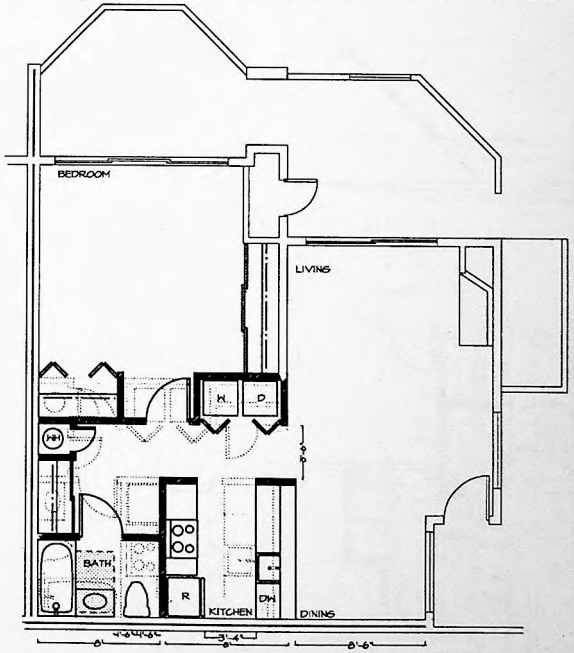
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bar at tub/shower and foldaway grab bar at toilet.
- 3'-4" between refrigerator and opposite counter.



ANSI

Bath is relocated to provide sidewall grab bar reinforcing and 18" clear space next to latch on pull side of doors. Entry coat closet and washer/dryer relocated to allow 18" clear space at bedroom door. ANSI requires "U" shaped kitchens to be 5'-0" wide, therefore, kitchen is changed to a gallery type.

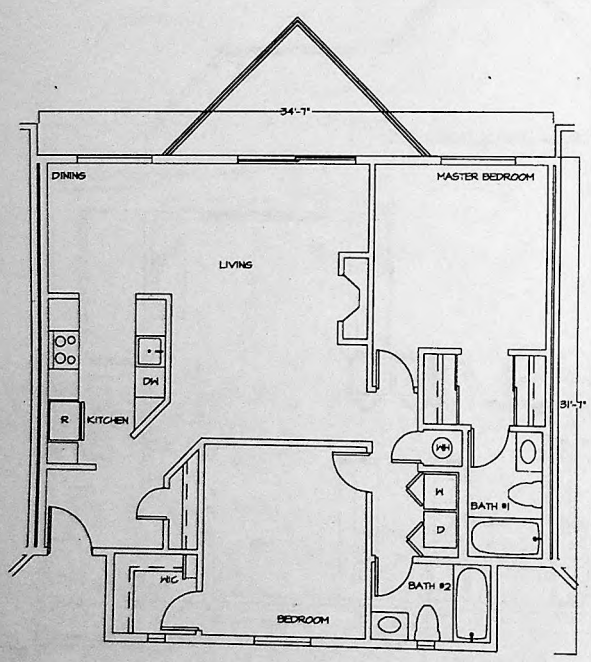
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bar at tub/shower and toilet.
- 18" clear space next to latch on swing side of doors.
- 3'-4" between refrigerator and opposite counter.
- Removable bath vanity cabinet.
- Adjustable 30" kitchen sink counter and 30" work surface.



IV. ANDOVER PARK UNIT D

Original Unit Plan

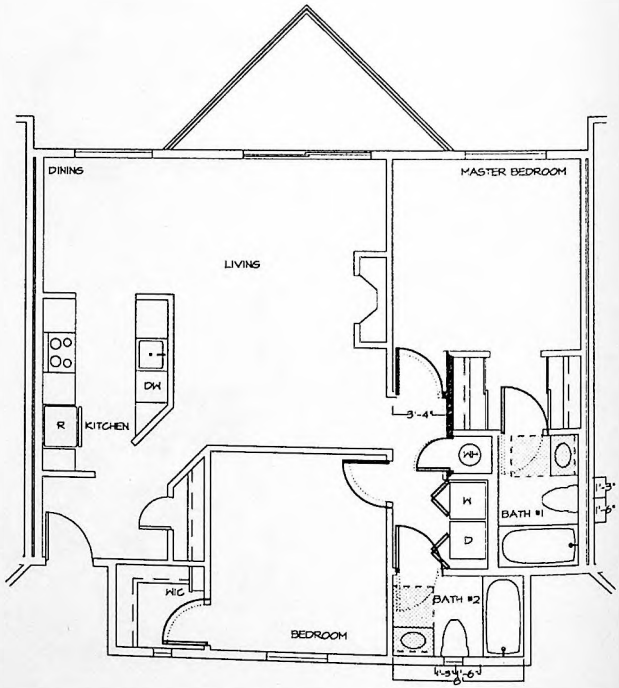
This straightforward 1030 sq. ft. two-bedroom unit is used to link together the more complex geometries of the E, G and F units. The gallery kitchen provides more than 3'-4" between the refrigerator and the opposite counter and, therefore, does not require modification.



FHA Option A

Minor plan modifications include the out-swinging of the door to bath #2 and the use of a pocket door to bath #1 (an out-swinging door is also possible).

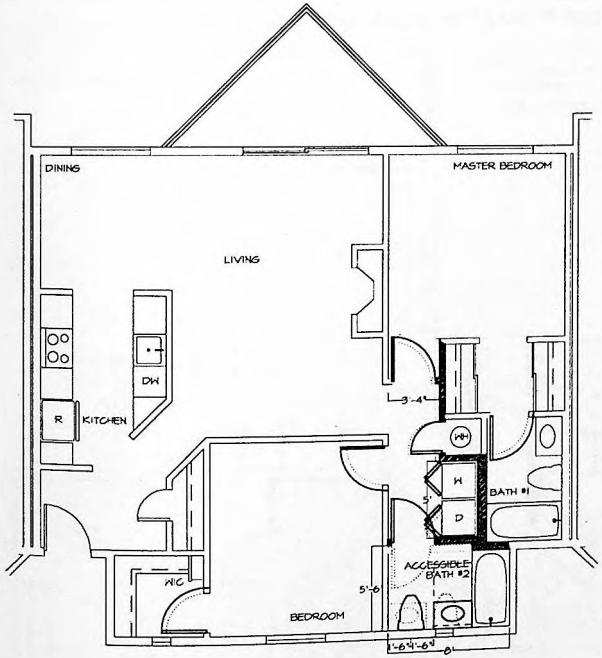
- 2'-10" doors at bedrooms, baths and walk-in closets.
- Removable bath vanity cabinets.
- Wall reinforcement for fixed grab bars at tub/showers and foldaway grab bars at toilets.



FHA Option B

Similar plan modifications to FHA Option A except that bath #1 can remain unchanged from original plan. Toilet and lavatory switched in bath #2 to allow 30"×48" door floor space in front of tub/shower. Bath #2 is enlarged to 5'-6" to allow for frontal approach to the toilet.

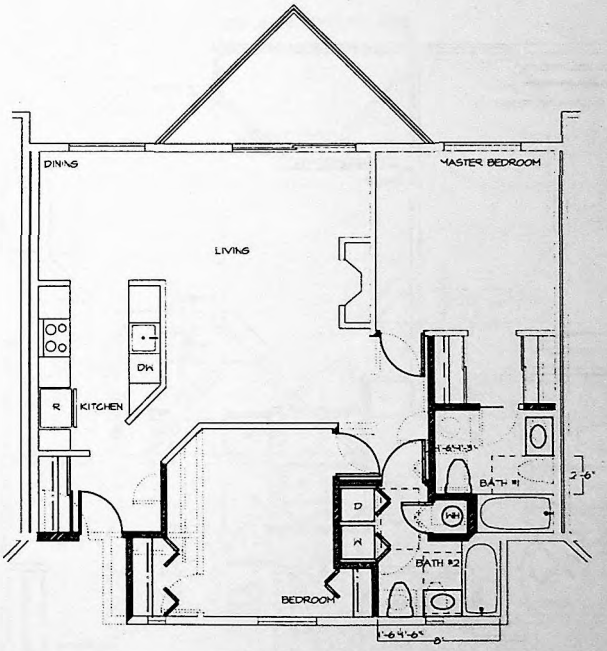
- 2'-10" doors at bedrooms, baths and walk-in closet.
- Removable vanity cabinet Bath #2.
- Wall reinforcement for fixed grab bar at tub/shower and toilet in Bath #2 and tub/shower and foldaway toilet grab bar in Bath #1.



ANSI

Grab bar reinforcement and 18" clear space requirements adjacent to the latch side of doors necessitates significant plan changes. The relocation of the washer/dryer causes reconfiguration of both the entry and the secondary bedroom.

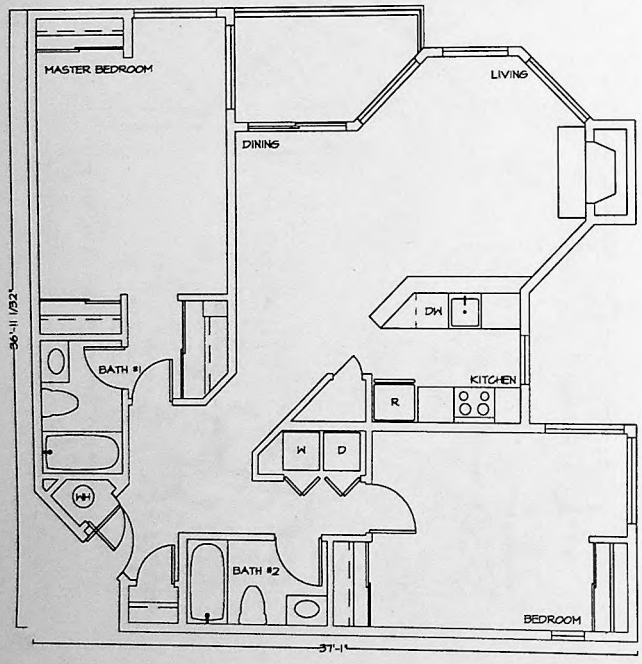
- 2'-10" doors at bedrooms and baths.
- Removable vanity cabinet Bath #2.
- Wall reinforcement for fixed grab bars at tub/showers and toilets.
- 18" side clearance next to latch on pull side of doors.
- Adjustable 30" kitchen sink counter and 30" work surface.



IV. ANDOVER PARK UNIT E

Original Unit Plan

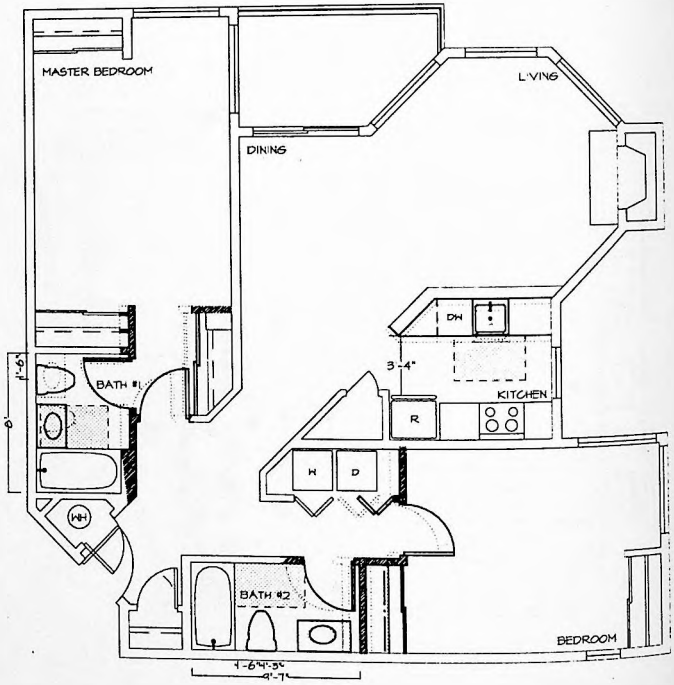
The 1099 sq. ft. two-bedroom plan organizes twin bedrooms, each with its own bath, off of a strong diagonal circulation spine that leads to the living/dining/kitchen spaces.



FHA Option A

Master bath widened to 5'-6" to allow for frontal approach at toilet. Toilet and lavatory switched to allow 30"×48" clear space. Secondary bathroom lengthened to allow in-swinging door and 30"×48" clear space. An out-swinging door would have enabled bathroom #2 to have remained unchanged in size.

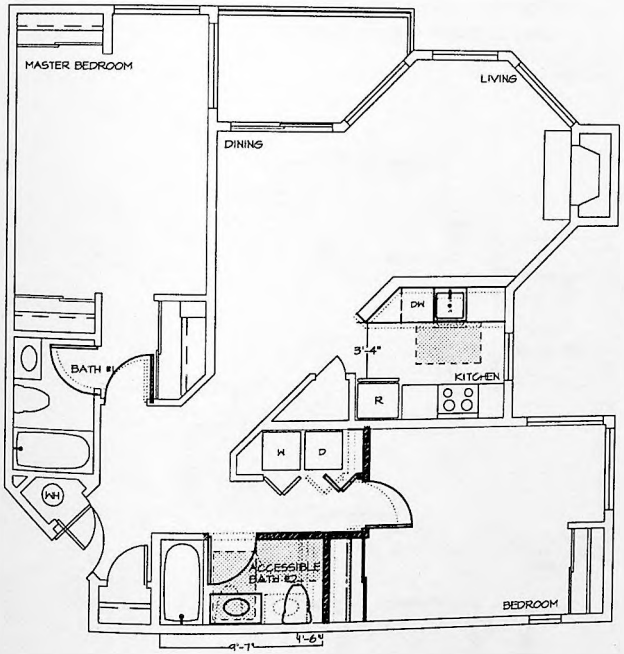
- 2'-10" doors at bedrooms and baths.
- Removable vanity Bath #1.
- 3'-4" between refrigerator and opposite counter.
- Wall reinforcement for fixed grab bars at tubs/showers and toilet in Bath #1 and foldaway grab bar in Bath #2.



FHA Option B

Bath #1 remains unchanged. Bath #2 enlarged to allow 30"x48" clear space adjacent to in-swinging door. Lavatory and toilet switched to provide the required 30"x48" clear floor space next to the tub. An out-swinging bathroom door would have enabled bath #2 to have remained unchanged in size.

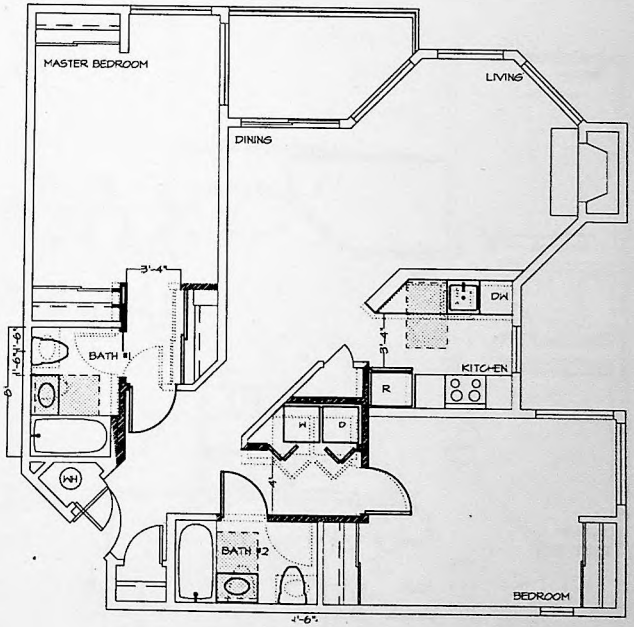
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bar at tub/shower and toilet in bath #2 and for tub/shower and foldaway toilet grab bar in Bath #1.
- 3'-4" between refrigerator and opposite counter.
- Removable vanity Bath #2 to provide 30"x48" clear floor space next to bathtub.



ANSI

Bath #1 widened to 5'-6" to allow for frontal approach at toilet. Lavatory and toilet switched in both baths to allow for sidewall grab bar reinforcing. Door to bath #2 swings out into corridor to allow bath size to remain unchanged. Corridor widened to 4 ft. to enable side approach to bath door.

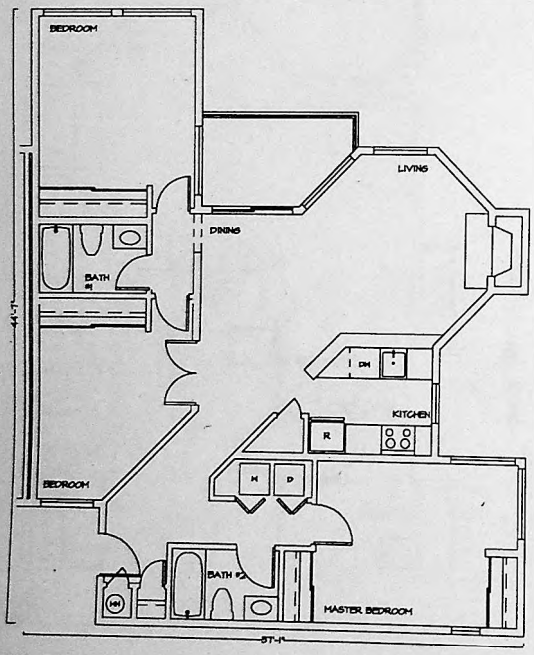
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bar at tub/shower and toilet.
- 18" clear space next to latch on pull side of doors.
- 3'-4" between refrigerator and opposite counter.
- Removable bath vanity cabinets.
- Adjustable 30" kitchen sink counter and 30" work surface.



IV. ANDOVER PARK UNIT G

Original Unit Plan

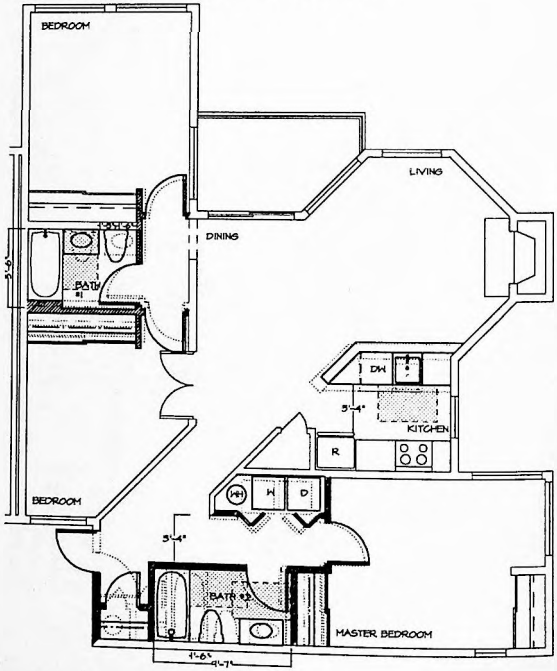
This 1199 sq.ft. three-bedroom unit is similar to Unit E except that it has three bedrooms instead of two. The unit typically occurs on the lowest floor of the Type III building where it is reached by stairs. It occurs at grade level and is accessible in only two instances.



FHA Option A

Plan changes include the reconfiguration of the entry closets to relocate the hot water heater next to the washer/dryer and the lengthening of the master bath to allow the in-swinging door and a 30"×48" clear space. An alternate arrangement would be to swing the bath door into the hallway similar to that shown in the ANSI arrangement thereby allowing the bath to remain the same size.

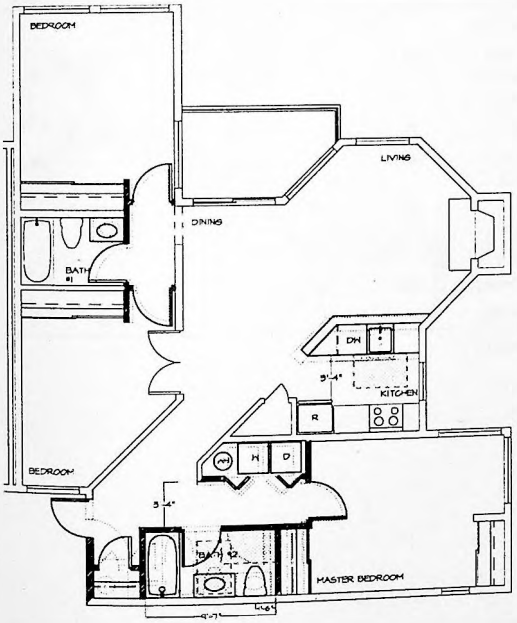
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bars at tub/showers and for fold-away grab bars at toilet.
- 3'-4" between refrigerator and opposite counter.
- Removable vanity cabinet at bath #1.



FHA Option B

Similar to Option A except that bath #1 remains unchanged from original unit. Toilet at bath #2 relocated adjacent to wall to provide the required 30"×48" clear floor space next to the tub.

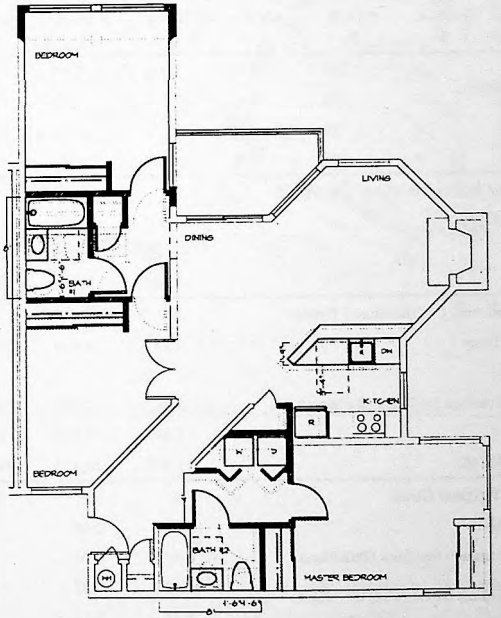
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bar at tub/shower and toilet in bath #2 and for tub/shower and foldaway toilet grab bar in Bath #1.
- 3'-4" between refrigerator and opposite counter.
- Removable vanity Bath #2 to provide 30"×48" clear floor space next to bathtub.



ANSI

Bath #1 reconfigured to allow for sidewall grab bar reinforcement and 18" side clearance for bedroom and bathroom doors. The reconfiguring requires that bedroom #2 be extended outward. Corridor to the master bedroom is widened to 4 ft. to allow side approach to out-swinging door.

- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bar at tub/shower and toilet.
- 18" clear space next to latch on swing side of doors.
- 3'-4" between refrigerator and opposite counter.
- Removable bath vanity cabinets.
- Adjustable 30" kitchen sink counter and 30" work surface.



CASE STUDY IV — ANDOVER PARK COST SUMMARIES

ORIGINAL PROJECT COSTS

Dwelling Units Cost ($)	7,407,000
Common Facilities Cost ($)	374,000
Dwelling Units and Common Facilities Cost ($)	7,781,000
Sitework Cost ($)	1,265,000
Total Buildings and Site Cost ($)	9,046,000
Project Cost ($)	13,800,000

ADDITIONAL SITE, DWELLING UNIT AND COMMON FACILITIES COSTS

		Additional Cost Per Unit			Additional Cost Per Unit x No. of Units		
Unit Type	# of Accessible Units	FHA-A $	FHA-B $	ANSI $	FHA-A $	FHA-B $	ANSI $
B	48	26	26*	273	1,248	1,248*	13,104
D	4	143	88	344	572	352	1,376
E	26	136	96	442	3,536	2,496	11,492
G	2	123	76	970	246	152	1,940
Total Additional Cost Before Overhead and Profit:					$	$	$
Accessible Dwelling Units					5,602	4,248	27,912
Common Facilities					0	0	0
Site					5,402	5,402	5,402
Total Additional Cost with Overhead and Profit:					$	$	$
Accessible Dwelling Units					5,882	4,460	29,308
Common Facilities					0	0	0
Dwelling Units and Common Facilities (Buildings)					5,882	4,460	29,308
Site					5,672	5,672	5,672
Total Buildings and Site ($)					11,554	10,133	34,980
Cost Increase (% of Original Cost):					%	%	%
Accessible Dwelling Units					0.08	0.06	0.40
Dwelling Units and Common Facilities (Buildings)					0.08	0.06	0.40
Site					0.45	0.45	0.45
Buildings and Site					0.13	0.11	0.39
Total Project (% of Original Cost):					0.08	0.07	0.25

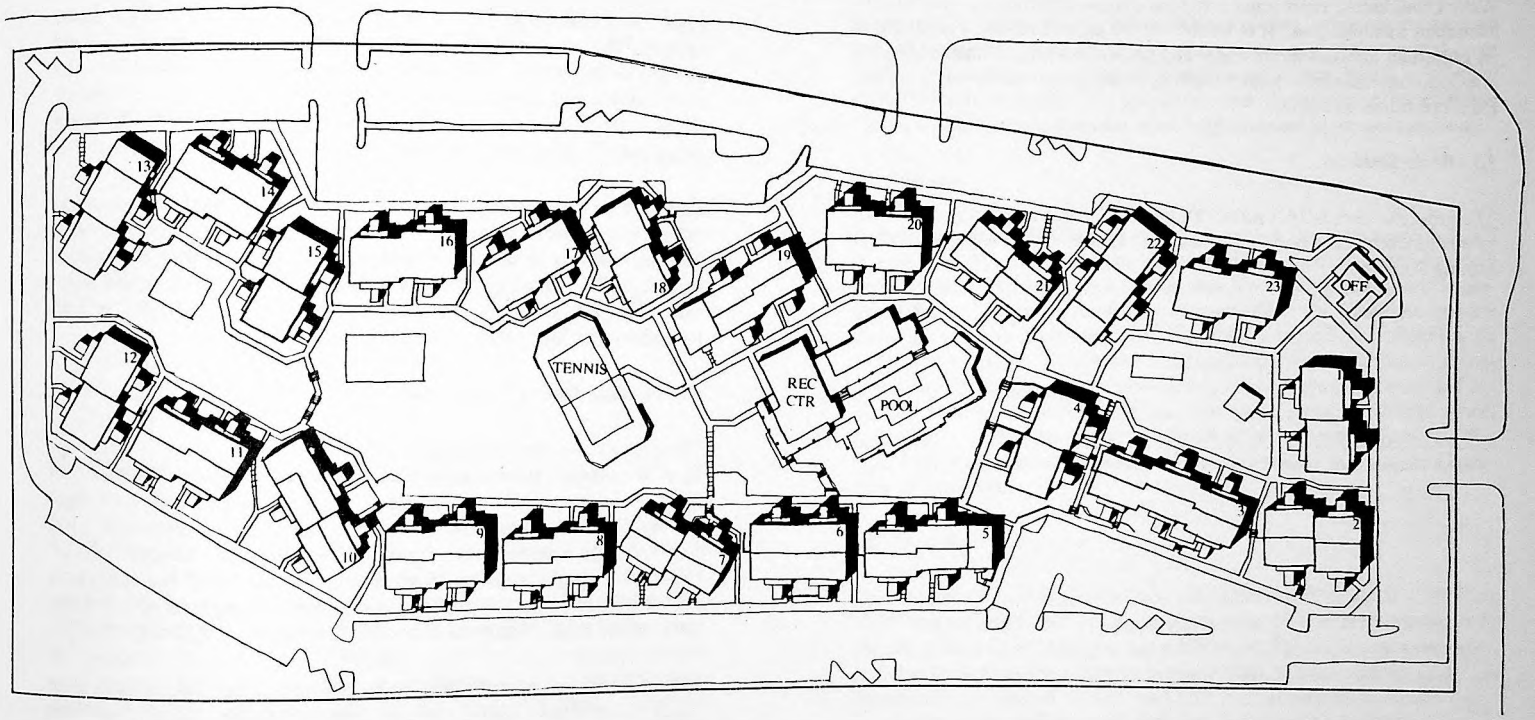
* FHA-A Unit Cost Used Because There Is No FHA-B Unit Alternate

ADDITIONAL SITE COST SUMMARY

Item	Description	Qty.	Unit	$/Unit	$/Add	$/Deduct
Community Facilities						
1	Wood Deck w/ Balustrade Handrails	84	SF	10	840	
2	Handrails	35	LF	38	1,330	
3	Concrete Rod Deck	128	SF	2		256
4	Extend Carport/ Garage	160	SF	20	3,200	
5	Street Paving	144	SF	2	288	
	Subtotal ($)				5,658	256
	Net Total ($)				5,402	

SF = Square Feet
LF = Lineal Feet

CASE STUDY V: SUN VALLEY APARTMENTS, LAYTON, UT.



V.A SUN VALLEY
SITE PLAN

250 FEET 100 50 0

V. SUN VALLEY

1. Project

Sun Valley Apartments, Layton, UT, developed and designed by the Empire West Companies, represents a typical garden apartment project for the Mountain States region. It is located on the urban fringe of a small city at an important arterial interchange. The project consists of small studio and one-bedroom units in two-story walk-up buildings of high density, with varied recreational amenities.

1.1 Basic Statistics

The gross site area is 14.3 acres. There are 430 apartment units at a density of 30 units/acre. The building coverage is 15.8%. Out of 430 units, 217 are ground floor units.

2. Existing Site Plan Analysis

2.1 Site Concept

Plan V.A illustrates the basic configuration of the site and building development. The site is a rectangle approximately 1,235 feet west to east and 541 feet north to south, with highway frontage on north and east sides. The natural grade falls 30-40 feet from north to south with slight to moderate slopes in the 5-8% range. The western half of the site is steeper, however, with a broad band of moderately sloping ground having slopes of 12-16%.

Buildings are arranged as a "superblock" around a traffic-free open space, served by a perimeter road with head-in parking on three of the four sides. The open space is graded into several terraces for the different recreational facilities. The site plan is basically an upper row of buildings and a lower row of buildings joined by a "central park" with an elevational change from the upper to the lower sides of about 10-20 feet.

2.2 Building Layout

There are 23 two-story buildings of two basic types. Six type "A" buildings have 24 units each (twelve ground-floor units each) and seventeen type "B" buildings have several variations: eleven buildings have 16 units each (eight ground-floor units); one building has 24 units (12 ground-floor units); and five buildings have nine units (with attached assistant manager or "AM" end-units making five ground-floor units). One additional manager's unit, "M" is located on the second floor over a free-standing lease office. Units are typically back-to-back, i.e. 8 or 12 in the "front", 8 or 12 in the "back".

The buildings are placed tightly and irregularly around the central open space. Most of them run west to east, paralleling the contours with one long side stepped 2-4 feet above or below the other long side to fit the grades. Other buildings are turned 30-60 degrees to the parking to maximize the perimeter, make room for doubling up the parking or to create courtyards at either end of the long central space. In these cases, one half of the building is stepped 2-4 feet above or below the other half to fit the grades. Altogether, only two out of the 23 buildings (# 16 and 17) are not stepped in one form or another.

The unit sizes are:

- Unit A, studio/bath, 310 sq. ft.
- Unit B, one-bed/one-bath, 402 sq. ft.
- Unit B, (handicapped), 1-bed/1-bath, 402 sq. ft.
- AM Units (assistant manager), 2-bed/1-bath, 836 sq. ft.
- AM Unit with storage, 2-bed/2-bath, 1,012 sq. ft.
- M Unit (manager), 2-bed/2-bath, 1,029 sq. ft.

The common facilities consist of:

- A centrally located recreation building and lounge/laundry building with terraces, pool and spa.
- A lease office.
- Two tennis courts (only one built).
- A gazebo.
- A volleyball court and a half basketball court.
- A badminton court.
- An area for horseshoes.
- Four barbecue areas.
- A perimeter walking/jogging track immediately behind the parking.

2.3 Circulation

There are three vehicular entrances to the perimeter street/parking: two on the north and one on the east. There is a complete network of paved walks throughout the site, from the parking areas directly to the front units and around to the back units. The front walks are connected by an outside walk/jog track, typically seven feet wide, which follows around the inside edge of the perimeter parking. The back walks are joined by an irregular inside loop walk, typically six feet wide, running around the central open space and accessing the main recreation center and subsidiary facilities. This loop is incomplete at the west end, where a forty foot long section was omitted from the final plan, probably on account of the steep existing grades.

Inside and outside loops are joined by walks between the buildings. Most of these walks run up and down the contours with steps, ramps or ramped stairs (i.e. with risers separated by 4-5' wide treads). These severely limit access by persons with disabilities to the interior of the site.

Further, many individual four foot walks to building entrances are stepped with one to seven risers. Also, walk connections across the central open space usually run up and down the contours with steps, ramps or stepped walks, severely limiting access by persons with disabilities to the common facilities. These obstructions are more fully analyzed in the next section.

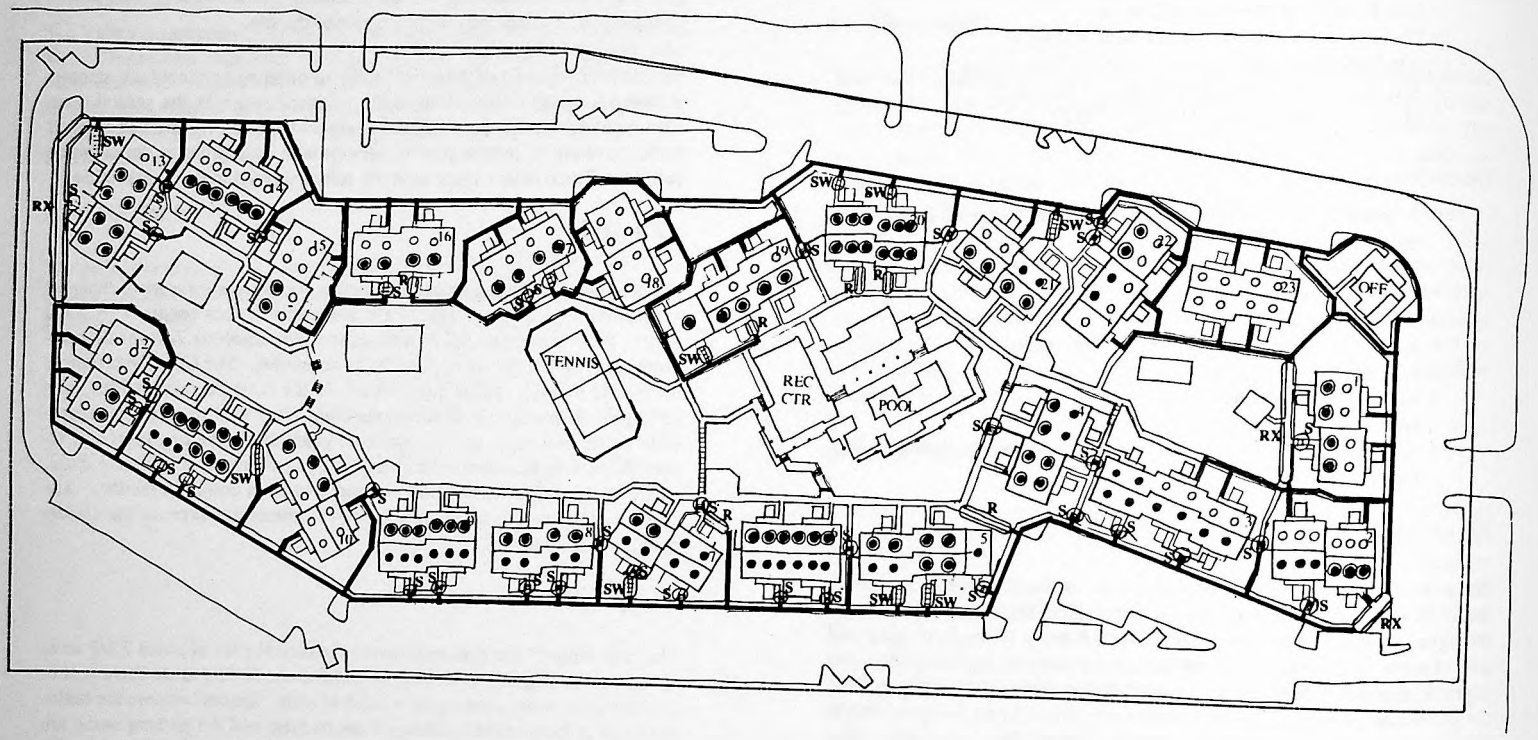
2.4 Parking

The site plan provides 564 parking spaces which is a little more than 1.3 spaces/unit. 41 of these spaces are accessible spaces required by local codes. From paragraph **4.2** of this section, *Site Analysis Test for Site Impracticality*, 174 units are required to be accessible. The *Guidelines* require accessible parking spaces equal to 2% of the covered (accessible) units (2%×174= 4 spaces). In addition, the *Guidelines* require sufficient accessible visitor parking to provide access to grade-level dwelling units and accessible parking at common facilities. This would mean at least one space, as a minimum, for visitors and one space at each common facility. The number of accessible spaces provided (41), therefore, exceeds the *Guidelines'* requirements.

2.5 Open Space

The "superblock" site plan emphasizes the central park of about 7 1/2 acres –2000 feet in length and varying in width from 50 feet at its narrowest to 230 feet at its widest, averaging ±165 feet wide. Spaces between the buildings, and in front of the buildings between them and the parking areas, are correspondingly limited: as close as 12-15 feet between building and building, and between building and parking. Front walks are sometimes no longer than 12-15 feet from the inner edge of the closest parking to the outer edge of the concrete apron at each building.

V.B EXISTING ACCESSIBLE ROUTES (DWELLING UNITS)



SYMBOL KEY

- ⊥ Accessible Routes to Accessible Units
- ◌ Obstructions (S=Steps, SW=Stepped walks, R=Ramps 5-8.33%, RX=Ramps>8.33 ✖=Missing Links in Pedestrain Circulation)
- ● Inaccessible Ground Floor Units
- ○ Accessible Ground Floor Units
- ◉ Inaccessible Units on Routes Required to Be Made Accessible

V.B SUN VALLEY
ACCESSIBLE ROUTES TO UNITS ANALYSIS

250 FEET 100 50 0

3. Existing Accessible Routes (Dwelling Units)

3.1 Analysis for Accessible Building Entrances on Accessible Routes

Plan V.B shows the accessible routes from the closest point of arrival (in this case, the curb line of the nearest parking) along the walks to the concrete apron at each building. Each apron is about five feet wide and 24 feet long, overhung by a second floor balcony accessed by an outside dogleg stair, and serves two or three ground-floor unit entrances.

In computing an accessible route, the difference in finished floor elevations (FFEs) of ground floor unit entries and the outer edge of the concrete entrance apron is assumed to be 0.2 foot (1/2" from the finished unit floor to the concrete apron outside the entrance door plus a 2" slope to the outer edge of the apron). A 1/2" differential at the main dwelling unit entry door is allowed, under the Guidlines, when the outside landing (apron) is made of impervious material, in this case concrete.

Noted obstructions to a clear accessway to building entrances are:

- Steps (1 or more), marked "S"
- Stepped walks (risers separated by broad treads) marked "SW"
- Ramps (walks sloping more than 5%), marked "R"
- Extreme ramps (walks sloping more than 8.33%) marked "RX".

Where direct routes are obstructed, alternative longer routes are shown up to distances of about 200 feet (see Buildings 3 and 12).

At the west end of the site is a 140 foot long section of driveway with a sidewalk sloping around 9-10%. This and another section of walk at the southeast corner are the only parts of the outside loop where grades exceed 5%. The inside loop walk has various conditions limiting access by disabled persons, such as:

- West of Building 1 is a 100 foot long walk sloping about 7%
- Between Buildings 3 and 22, are two walk sections sloping over 6%.

There are four north-south pedestrian links between the lower tier of buildings (2-12) and the upper tier (13-23): between Building 5 and 11, 6 and the recreation center, 7 and 19, 10 and 15. Each takes the form of several flights of stairs, ascending 9-13 feet.

3.2 Number of Accessible Ground Floor Units

Plan V.B diagrams the accessible routes from the perimeter parking to each building entrance. Obstructions interrupting clear access to building entrances are marked, and units served by affected entrances are counted as inaccessible. All others are counted as accessible.

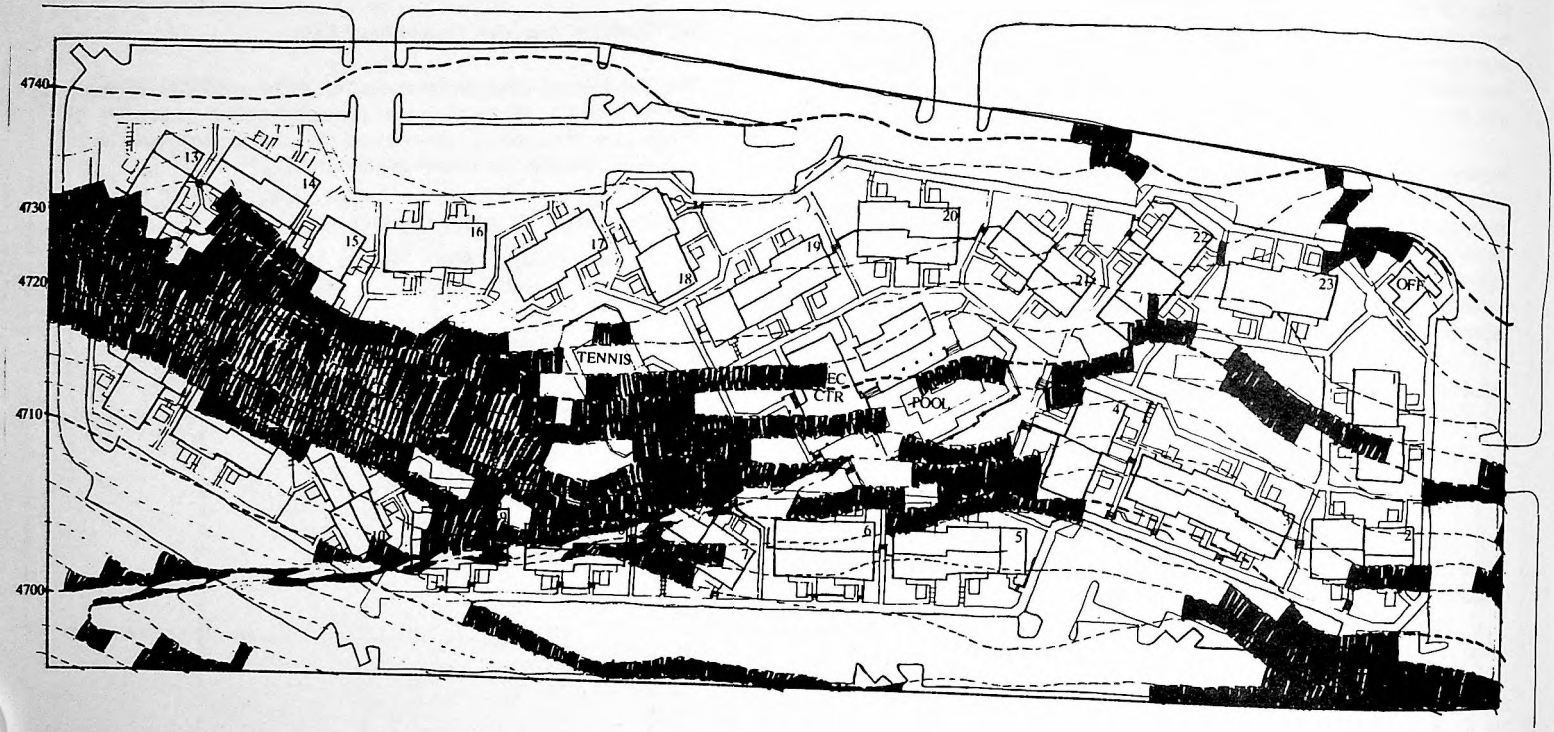
The total count for 217 ground floor units is:

- 74 accessible (34.1%)
- 143 inaccessible (65.9%)

Table V.1 Existing Distribution of Accessible Ground Floor Units

Building # & Type	Total GF Units/Bldg	No. of GF Units Accessible	No. of GF Units Inaccessible
1 B	8	4	4
2 A	12	6	6
3 B	12	4	8
4 B	8	0	8
5 B	9	0	9
6 A	12	0	12
7 B	8	2	6
8 B	8	0	8
9 A	12	0	12
10 B	9	6	3
11 A	12	0	12
12 B	8	6	2
13 B	9	1	8
14 A	12	6	6
15 B	8	6	2
16 B	8	4	4
17 B	8	4	4
18 B	8	8	0
19 B	9	4	5
20 A	12	0	12
21 B	8	2	6
22 B	9	5	4
23 B	8	8	0
Totals	217	74	143

V.C EXISTING SITE SLOPES ANALYSIS



SYMBOL KEY

Existing Contours
Slopes>10%

V.C SUN VALLEY
SITE ANALYSIS FOR SLOPES

250 FEET 100 50 0

4. Site Impracticality Test Analysis

4.1 Individual Building Test for Site Impracticality

Measuring in a straight line from the outside edge of the concrete apron at each building entrance to arrival points within 50 feet (or the closest beyond 50 feet), existing undisturbed slopes and proposed finished slopes were tabulated for 59 individual building entrances, serving 143 ground floor units shown as inaccessible.

Two have original slopes over 10% and 29 have proposed slopes over 10%. But none have **both** original and proposed slopes over 10%. Therefore, none demonstrate site impracticality. By this test, all 217 ground floor units have to be made accessible. The plan provides 74, 143 **less** than the number required.

4.2 Site Analysis Test for Site Impracticality

Plan V.C shows the property's existing contours at two foot intervals. There are no restricted use areas such as wetlands or floodplains. Out of the site's gross area of 14.30 acres, 10.87 acres or 76.0% of the undisturbed site have existing natural grades of less than 10%. Following the Guidelines' procedure:

- By Step "A", 76% of the undisturbed site has a natural grade less than 10%.
- By Step "B", the minimum percentage of ground floor units to be made accessible is 76% of 217, or 165 units; only 74 are provided, 91 **less** than required.
- By Step "C", upon examining all 143 inaccessible ground floor units, it is determined that 100 units served by 44 entrances are on accessible routes (i.e. accessed by walks with proposed slopes of 8.33% or less) and are required to be made accessible.

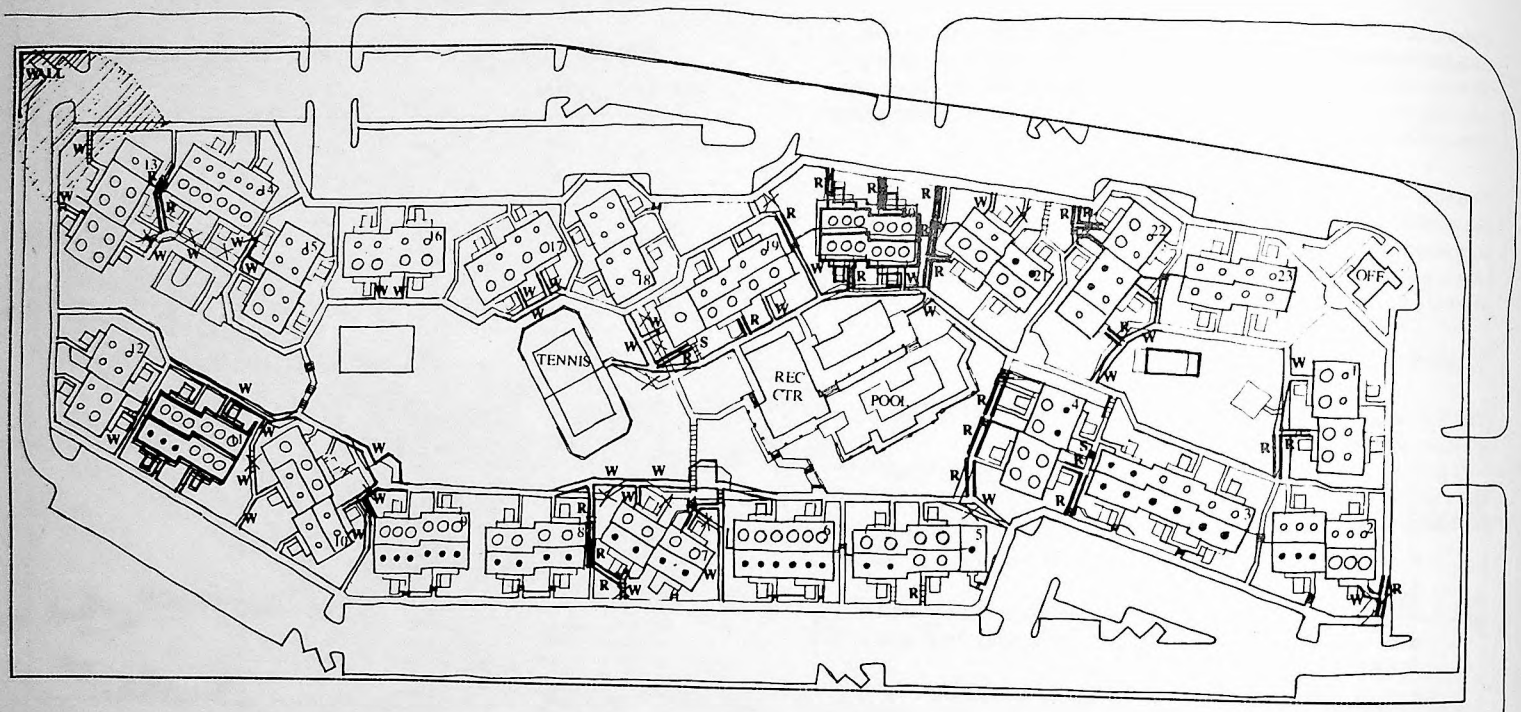
Therefore, by this test, 74 + 100 or 174 ground floor units have to be accessible. The plan provides 100 **less** than required.

The distribution of inaccessible ground floor units on routes required to be accessible, i.e. accessed by proposed walks sloping 8.33% or less from building apron to arrival points within 50 feet (or the closest arrival point over 50 feet), is shown one **Plan V.B** and listed in Table V.2:

Table V.2 Existing Inaccessible Units on Routes Required to be Accessible

Building #	Entrance Location	Obstruction	No. of GF Units
1	RB	Ramp > 5%	2
1	LB	2 Steps	2
2	RF	Ramps >8.3% & >5%	3
4	RB	6 Steps	2
4	LF	5 Steps	2
4	LB	Ramp > 5%	2
5	MF	4 Steps	2
5	MB	Ramp > 5%	2
5	LB	Ramp > 5%	2
6	RB	Ramp > 5%	3
6	LB	Ramp > 5%	3
7	RB	Ramp > 5%	2
7	LB	6 Steps	2
8	RB	7 Steps	2
8	LB	7 Steps	2
9	RB	5 Steps	3
9	LB	5 Steps	3
10	MB	4 Steps	2
10	LB	5 Steps	1
11	RF	1 Step	3
11	RB	4 Steps	3
11	LB	5 Steps	3
12	RB	2 Steps	2
13	RF	1 Step	2
13	RB	9 Steps	2
13	MF	5 Steps	2
13	MB	5 Steps	2
14	RB	5 Steps	3
14	LB	3 Steps	3
15	RF	3 Steps	2
16	RB	2 Steps	2
16	LB	Ramp > 5%	2
17	RB	2 Steps	2
17	LB	2 Steps	2
19	E	4 Steps	1
19	MB	Ramp > 8.33%	2
19	LB	6 Steps	2
20	RF	2 Steps	3
20	RB	Ramp > 5%	3
20	LF	2 Steps	3
20	LB	Ramp > 5%	3
21	RB4	Steps	2
21	LB4	Steps	2
22	LF	4 Steps	2
Totals	44 Entrances		100 Units

V.D PROPOSED DESIGN FOR ACCESSIBILITY (DWELLING UNITS)



SYMBOL KEY

- Inaccessible Ground Floor Units
- Existing Accessible Ground Floor Units
- New Accessible Ground Floor Units
- Relocated Buildings
- New Walks <5%
- New Ramps 5-8.33%
- Old Construction Deleted
- Major Mew Retaining Walls
- Regrading

V.D SUN VALLEY
REDESIGN FOR ACCESSIBLE UNITS

250 FEET 100 50 0

5. Proposed Design for Accessibility (Dwelling Units)

5.1 *Redesign to Provide Minimum Number of Accessible Ground Floor Units*

The minimum number of accessible ground floor units by the second of the two tests for site impracticality, the Site Analysis Test, is 174. Each building is analyzed for the least cost/most direct resolution of the noted obstruction. The recommended design changes are listed below in Table V.3 and illustrated on **Plan V.D:**

Table V.3 Design Changes for Minimum Accessible Ground Floor Units

Building		Redesign	Change Add	Change Deduct
1	RB	Make walk < 5%	NC (no charge)	
1	LB	Realign walk		
		Add paving, 6'×4	24 SF (square feet)	
			Make 8.33% ramp	
		Add handrails	108 LF (linear feet)	
		NOTE. Section of interior pedestrian loop between the RB and LB walks slopes at 10%. It is not part of the accessible route to building entrances and does not require to be improved.		
2	RF	Realign walk/track		
		Add paving, 10'×7', 5'×4'	90 SF	
		Make 8.33% ramp		
		Add handrails	60 LF	
4	LF	Replace steps w/ ramp		
		Deduct 5 risers×4'		20 LF
		Add 1 riser×4'	4 LF	
		Make 8.33% ramp		
		Add handrails	96 LF	
4	RB & LB	Realign walks and replace w/ramp		
		Replace steps w/ramp		
		Deduct 6 risers×6'		36 LF
		Make 8.33% ramps		
		Add handrails	180 LF	
		Extend retaining wall @ Bldg. 4		
		Add 30 LF×1.2' avr. HT	36 SF.	
5	RB & LB	Reduce 6% ramp to 5%	NC	
		Note: This improvement gains accessibility to 5 RB and 6 LB		
5	RF	Relocate walk	NC	
		Regrade steps w/ramp		
		Deduct 4 risers×4'		16 LF
		Make 8.33% ramp		
		Add handrails	46 LF	
6	RB&LB	See Note following 5 RB&LB		
7	LB	Realign walk		
		Add paving, 10'×4'	40 LF	
7	RB	Realign & make ramp < 5%		
		Add paving, 20'×4'	80 SF	
8	RB & LB	Replace steps w/ramp		
		Deduct 7 risers×4'		28 LF
		Make 8.33% ramps		
		Add handrails	156 LF	
		Extend retaining wall		
		Add 20 LF×1.7' avr. HT	34 face SF	
9	RB & LB	Realign walks		
		Add paving, 10'×4', 5'×6'	70 SF	
		Replace steps w/walk		
		Delete 5 risers×4'		20 LF
		Extend retaining wall		
		Add 20 LF×1.0' avr. HT	20 face SF.	
		Relocate barbecue	NC	
10	E & MB	Regrade existing ramp to walk<5%	NC	
11	LB & RB	Add paving, 3'×4'	12 SF	
		Realign main walk		
		Deduct paving, 4'×6'		24 SF
		Replace steps w/walk		
		Delete 4 risers×4'		16 LF
		Build retaining wall @ Bdg. 11		
		Add 40 LF×1.0' avr. HT	40 face SF	
11	RF	Relocate Bdg. 3' North	NC	
		Replace step w/ramp		
		Deduct 1 riser×4'		4F
		Extend walk & make 8.33% ramp		
		Add paving, 3'×4'	12 SF	
		Add handrail	44 LF	
		NOTE. 11 LF may also be made accessible by replacing step with 8.33% ramp and handrails, although not required and not included in estimate.		

Building	Redesign	Change Add	Change Deduct
12 RB	Regrade existing walk to < 5%	NC	
13 RF	Regrade North end of drive @ 5%		
	Realign walk		
	Replace steps w/walk @ 5%		
	Deduct 1 riserx4'		4 LF
13 MF	Regrade parking, lower ±2'		
	Add cut	216 CY	
	Regrade existing walks	NC	
	Replace steps w/walk < 5%		
	Delete 5 risersx4'		20 LF
	Build new retaining wall at Northwest corner of parking.		
	Add 100 LFx1.5' avr. HT	150 face SF	
13 MB & RB	Relocate and extend walks		
14 RB & LB	Add paving	104 SF	
	Replace steps w/8.33% ramp		
	Delete 5 risersx4', 4 risersx6'		44 LF
	Add handrail	98 LF	
	Make walks @ 5% or less		
	Extend retaining walls		
	Add 12 LFx1.3' avr. HT	16 face SF	
	Relocate BBQ	NC	
16 RB & LB	Regrade to raise walk ±.5'		
	Add fill	15 CY	
	Replace steps & ramp w/walks		
	Deduct 2 risersx4'		8 LF
17 RB & LB	Regrade to raise walk ±1'		
	Add fill	23 CY	
	Replace steps w/walks @ 5%		
	Delete 4 risersx4'		16 LF
19 E	Relocate main walk	NC	
	Replace steps w/ramp		
	Delete 9 risersx4'		36 LF
	Make new ramp @ 8.33%		
	Add paving, 30'x4'	120 SF	
	Add handrails	60 LF	
	New steps (optional)		
	Add 7 risersx4'	28 LF	

Building	Redesign	Change Add	Change Deduct
19 MB	Reduce ramp to 8.33%		
	Add handrails	31 LF	
19 LB	Realign walk	NC	
	Replace steps with 8.33% ramp		
	Delete 6 risersx4'		24 LF
	Add handrails	60 LF	
	Extend retaining wall		
	Add 10 LFx2.0' avr. HT	20 face SF	
	NOTE. This improvement creates an accessible route to 20 RB and LB, plus the other changes described below		
20 RF &LF	Relocate building ±6' Southwest		
	Replace steps with ramps @ 8.33%		
	Delete 4 risersx4'		16 LF
	Add handrails	80 LF	
20 RB	Realign main walk	NC	
	Reduce existing ramp to<8.33%	NC	
	Add handrails	36 LF	
20 LB	Realign main walk	NC	
	Relocate entrance walk	NC	
	Reduce existing ramp to < 5%	NC	
21 RB & LB	Regrade and realign walk		
	Replace steps w/8.33% ramps		
	Delete 4 risersx4'		16 LF
	Add handrails	180 LF	
	Extend retaining walls		
	Add 20 LFx1.5' avr. HT	30 face SF	
22 LF	Realign walks		
	Replace 1 flight of steps w/8.33% ramps		
	Delete 4 risersx4'		16 LF
	Add 1 riser to existing steps	4 LF	
	Add handrails	58 LF	
	Extend retaining wall		
	Add 8 LFx3.5' avr. HT	28 face SF	

All of these design changes result in 174 accessible ground floor units.

6. Existing Accessible Routes (Common Facilities)

6.1 Analysis for Accessible Routes to Common Facilities

Plan V.E on the following page, diagrams the accessible routes from each accessible ground floor unit to the common facilities. It is drawn over the previous plan, incorporating all of the design improvements for achieving 174 accessible ground floor units. Remaining obstructions limiting access to the recreation center, pool, laundry, office, play courts and barbecue areas also are marked.

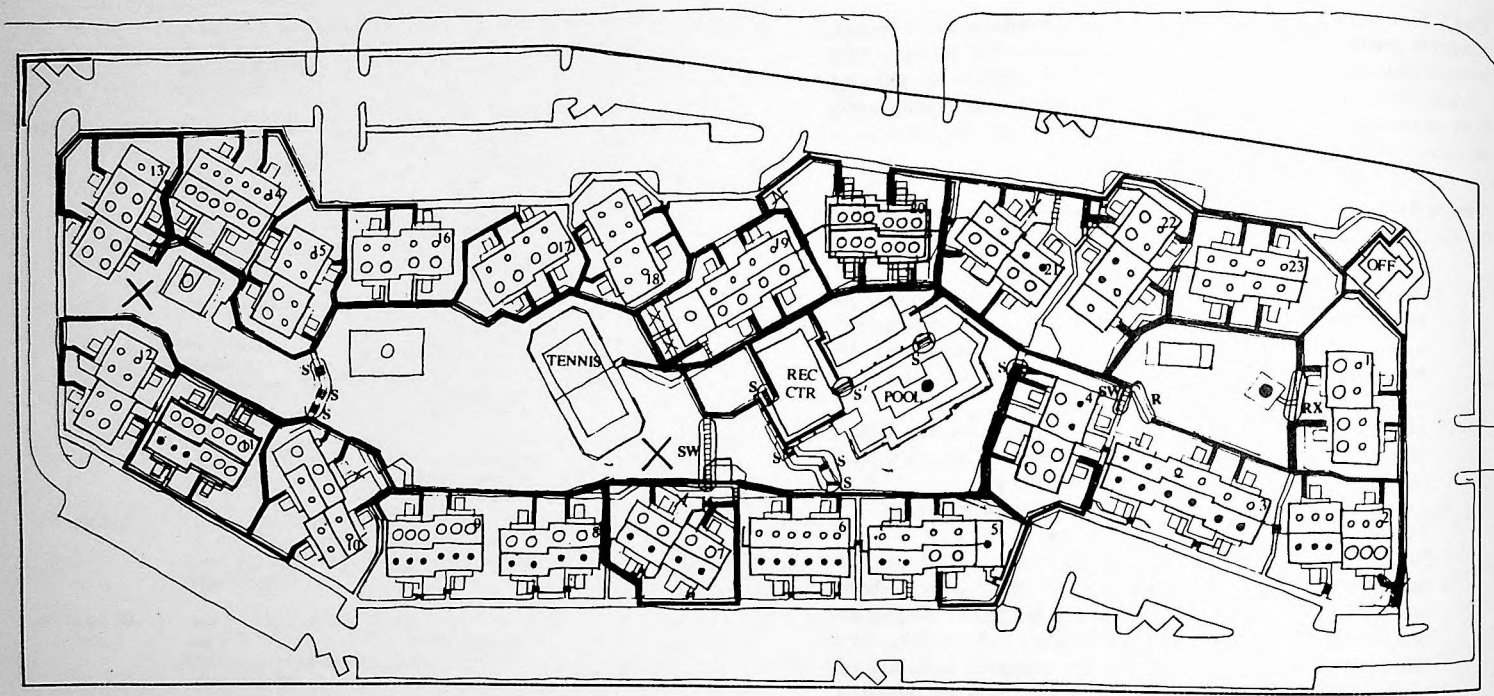
A major limitation is the steps and ramps between the lower tier of buildings (2-12) and the upper tier (13-23). Going west to east, these are:

- 21 steps between Buildings 10 and 15. Occupants in ground floor accessible units in Buildings 8-12 have no way of visiting the play courts or recreation center, except by a long circuitous route around the outside walk/jog track, using the eastern end (the western end slopes at ±10%).
- 13 steps between Building 7 and the recreation center, and 14 steps between Building 6 and the recreation center. Occupants in these two buildings have the same option as those above.
- 7 steps between Buildings 4 and 21. Occupants of Buildings 4 and 5 cannot reach the pool and recreation center.
- Two > 6% ramps between Buildings 3 and 22 and > 7% ramp between Buildings 2 and 23. (One of the 6% ramps has been reduced to a 5% walk as part of making Unit 22E accessible. To gain access to the rear ground floor units in Building 1, the ramp has been shortened and increased to ±10%). Occupants for Buildings 1-3 have no clear way to the play courts, gazebo, pool and recreation center. Because the recreation center and pool is internal, there is no alternative acceptable vehicular access.

In addition, the western end of the interior loop distributor is incomplete: there is no pedestrian connection between Buildings 12 and 13 and the outer walk/jog track and driveway slopes at ±10%.

The recreation center itself is on two levels: the upper terrace is separated from the pool deck and spa by 3.7 feet and two stair flights of 6 steps each.

V.E EXISTING ACCESSIBLE ROUTES (COMMON FACILITIES)



SYMBOL KEY

- Accessible Routes to Common Facilities
  (——— =Pedestrian, — — — —=Vehicular)
- Obstructions (S=Steps, SW=Stepped walks, R=Ramps 5-8.33%, RX=Ramps>8.33 ✖=Missing Links in Pedestrian Circulation)
- Inaccessible Common Facilities
- Accessible Common Facilities

V.E SUN VALLEY
EXISTING ACCESSIBLE ROUTES TO COMMON FACILITIES ANALYSIS

250 FEET 100 50 0

7. Proposed Design for Accessibility (Common Facilities)

7.1. Additional Redesign to Provide Acceptable Access to and Use of Common Facilities

In considering design improvements to make the common features readily accessible to and usable by persons with disabilities, not every stairflight needs to be replaced with ramps. The recommendations that follow are based on:

- Completing the western end of the interior loop
- Creating a ramped alternate route in the center of the site, permitting handicapped access to the recreation center and pool
- Making the ramp between Buildings 3 and 22 into a walk at 5%
- Providing a ramped connection at the recreation center and pool between terrace and pool deck.

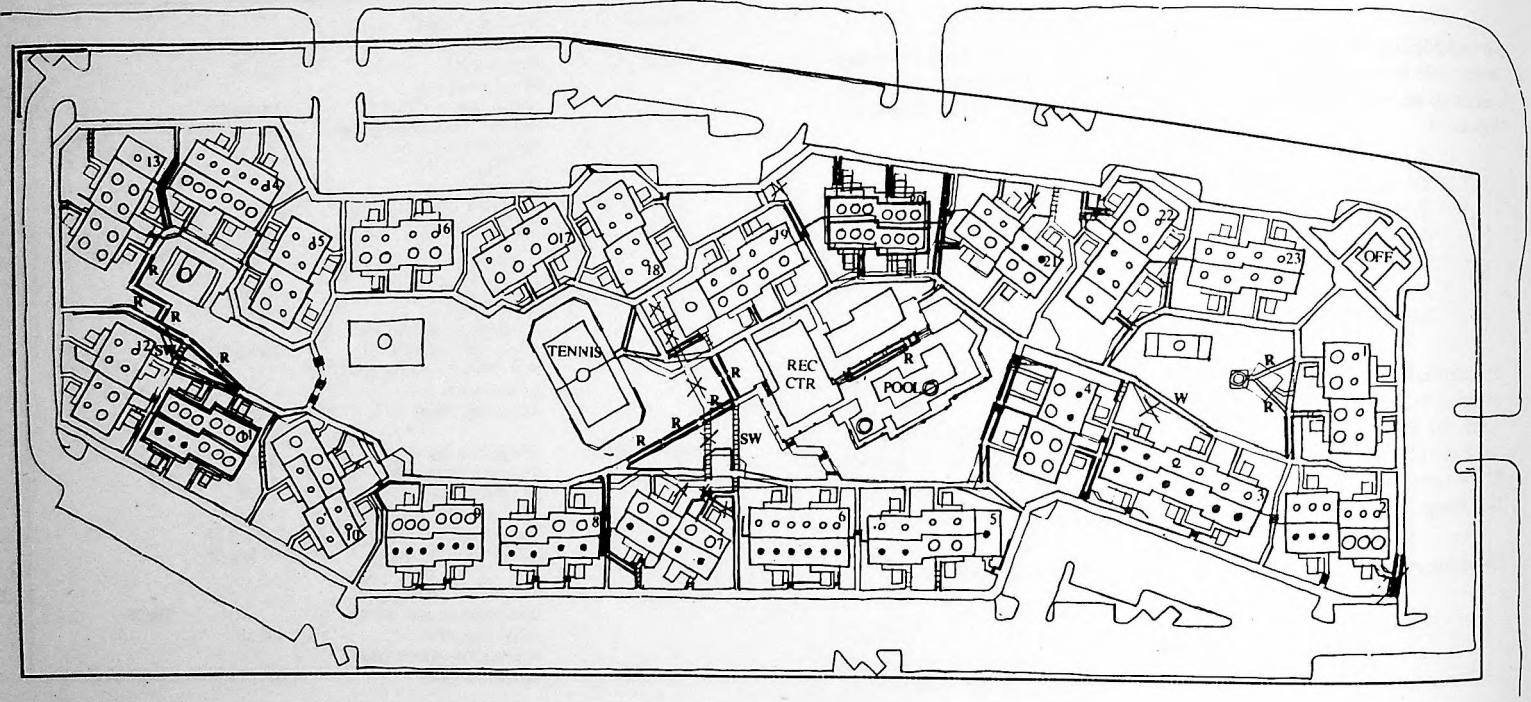
In addition, short sections of new walk have been introduced to improve circulation to the tennis court and the gazebo at the east end. At the tennis court, the existing walk at 5% provides accessibility from the east; a new ramp at 10% affords an alternate approach from the north. At the gazebo, the two new walks provide an alternate 5% pedestrian access bypassing the 10% ramp.

These improvements are detailed in Table V.4 and shown on **Plan V.F.**

Table V.4 Design Changes for Common Facilities

Location	Redesign	Change Add	Change Deduct
West End	New 8.33% ramps		
	Add paving, 160'×6', 65'×4'	1,220 SF	
	Add handrails	320 LF	
	New retaining wall		
	Add 20 LF×avr. 1.5' HT	30 face SF	
	Replace existing retaining wall		
	Deduct 65 LF×1.2' avr. HT		78 face SF
	Add 100 LF×2.8' HT	280 face SF	
	New stepped walk		
	Add paving, 20'×4'	80 SF	
	Add 6 steps×4'	24 LF	
Center	New 8.33% ramps		
	Add paving, 85'×6'	510 SF	
	Add handrails	260 LF	
	Lower foot of retaining wall		
	Add ±1' HT, 50 LF×1.0' Ht	50 face SF	
	New 10% ramp at tennis court (no handrails)		
	Add paving, 40'×4'	160 SF	
At Rec Center	New 8.33% ramp and retaining walls/planters		
	Add paving, 60'×4'	240 SF	
	Add handrails	104 LF	
	Add wall, 128 LF×2.0' avr.HT	256 face SF	
	Add wall, 87 LF×4.0' HT	312 face SF	
East End	Realign main walk to < 5%		
	Deduct existing walk, 86'×6'		516 SF
	Add paving, 80'×6'	480 SF	
	Alternate 5% walks at gazebo		
	Add paving, 84'×4'	336 SF	

V.F PROPOSED DESIGN FOR ACCESSIBILITY (COMMON FACILITIES)

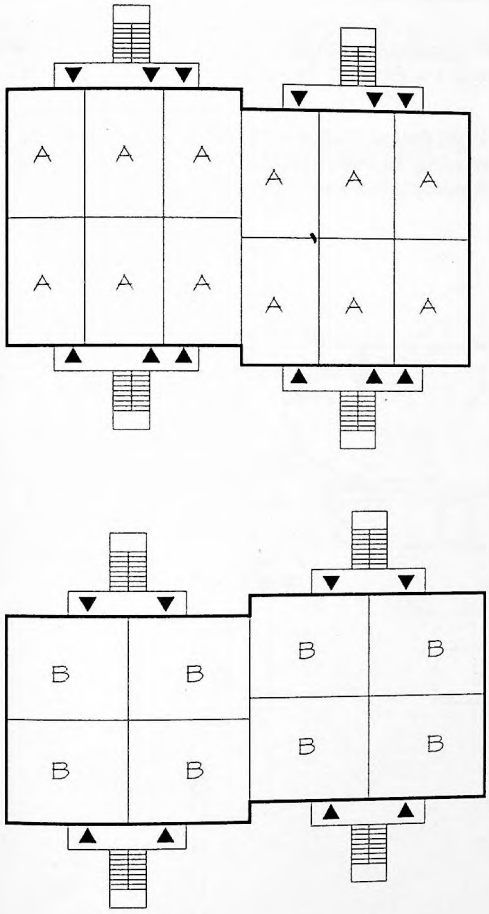


SYMBOL KEY

- ○ Existing Accessible Common Facilities
- ◎ New Accessible Common Facilities
- = = New Walks <5%
- = = New Ramps 5-8.33%
- ✕ ✕ Old Construction Deleted
- ═ Major Mew Retaining Walls

V.F SUN VALLEY
REDESIGN FOR ACCESSIBLE COMMON FACILITIES

250 FEET 100 50 0



TYPICAL BUILDINGS KEY PLAN

Apartment Building Description

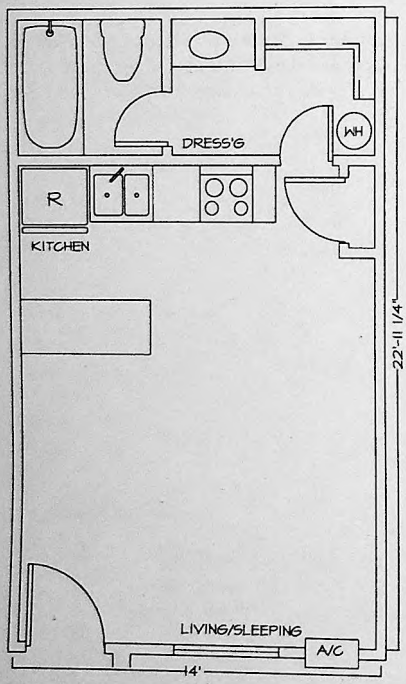
The buildings containing "A" and "B" apartment units are similar in concept in that they provide an envelope for varying number of back to back units. The use of back to back units eliminates the need for interior corridors, thereby reducing construction costs. Units are typically arranged in blocks of four for the wider "B" units and six for the narrower "A" units, these blocks are, in turn, offset from each other to add interest to the elevations and allow for adjustments to varying grade conditions.

Ground floor units are entered from a common concrete apron. Second floor units are reached by means of an exterior stair the leads to an entrance balcony which overhangs and provides protection for the ground floor apron.

V. SUN VALLEY UNIT A

Original Unit Plan

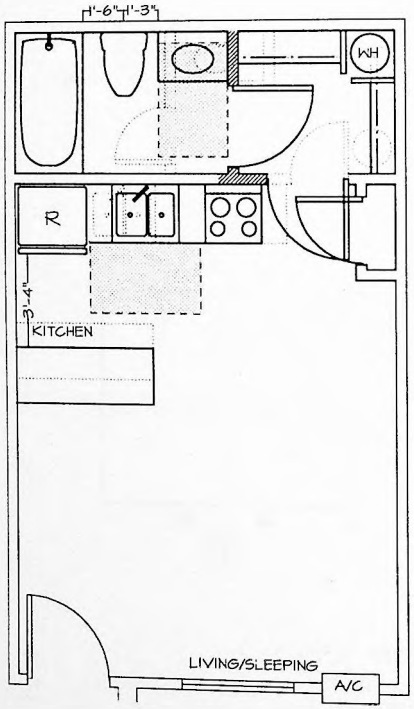
The 310 sq. ft. efficiency unit plan organizes all the service elements into compact, compartmentalized spaces in the rear of the unit providing maximum space available for the living/sleeping area.



FHA: Alternate One

Entry to bath remains through closet area, but compartmentalized bath is reconfigured as a conventional bath to allow 30"×48" clear space.

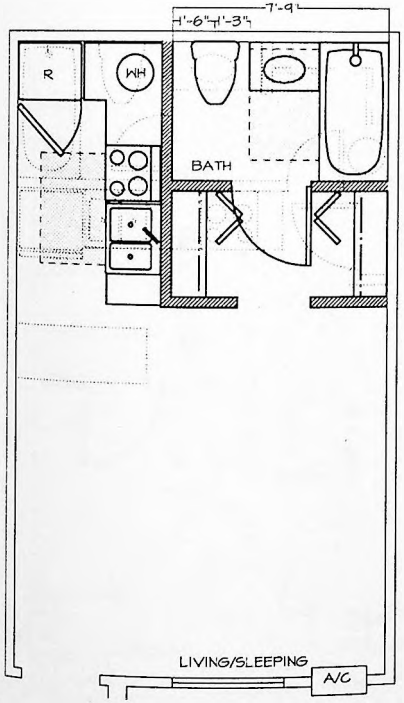
- 2'-10" door at closet entry and bath.
- Blocking for fold away bath grab bar.
- Removable bath vanity cabinet.



FHA: Alternate Two

Plan is totally reconfigured to allow more direct entry to bath and separate kitchen alcove; living space is, however, decreased somewhat.

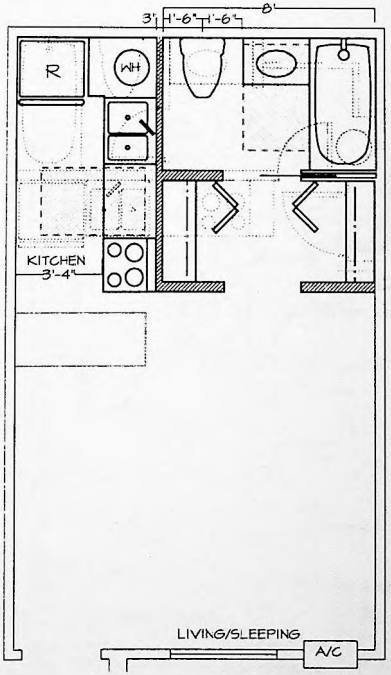
- 2'-10" door at bath.
- Blocking for fixed grab bar at toilet and tub/shower.
- Removable bath vanity cabinet.



ANSI

Similar to FHA Alternate Two, except toilet is adjacent to wall to allow for wall mounted grab bar; bath entry door is changed to a pocket door because 18" side clearance is not available for an out-swing door, and space is provided in kitchen for an adjustable sink and counter

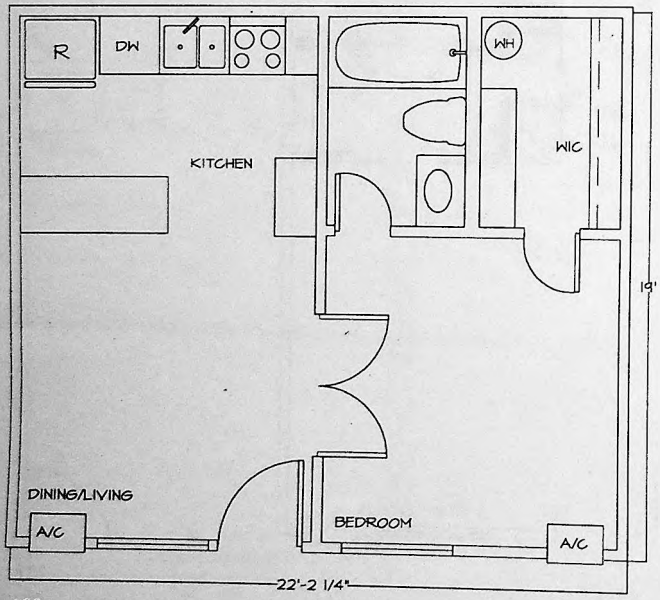
- 2'-10" opening at pocket door.
- Removable bath vanity cabinet.
- Blocking for 42" fixed toilet grab bar and at tub/shower.
- Adjustable 30" kitchen sink counter and 30" work surface.



V. SUN VALLEY UNIT B

Original Unit Plan

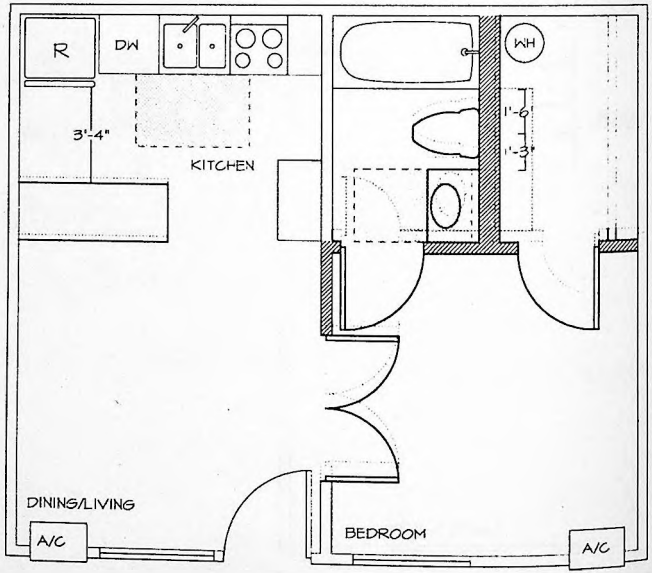
This 402 sq. ft. one bedroom one bath plan organizes the plan elements in compact clusters to eliminate separate circulation space. French doors open from the living room to the bedroom to increase the sense of spaciousness if desired.



FHA: Alternate One

The simplest plan revision involves the swinging of the bathroom door out and the inclusion of a 30"×48" clear floor space.

- 2'-10" doors at walk in closet and bath.
- Removable bath vanity cabinet.
- Blocking for foldaway toilet grab bar and fixed grab bars at tub/shower.



CASE STUDY V — SUN VALLEY COST SUMMARIES

ORIGINAL PROJECT COSTS

Dwelling Units Cost ($)	8,100,500
Common Facilities Cost ($)	99,500
Dwelling Units and Common Facilities Cost ($)	8,200,000
Sitework Cost ($)	668,344
Total Buildings and Site Cost ($)	8,868,344
Project Cost ($)	13,200,000

ADDITIONAL SITE, DWELLING UNIT AND COMMON FACILITIES COSTS

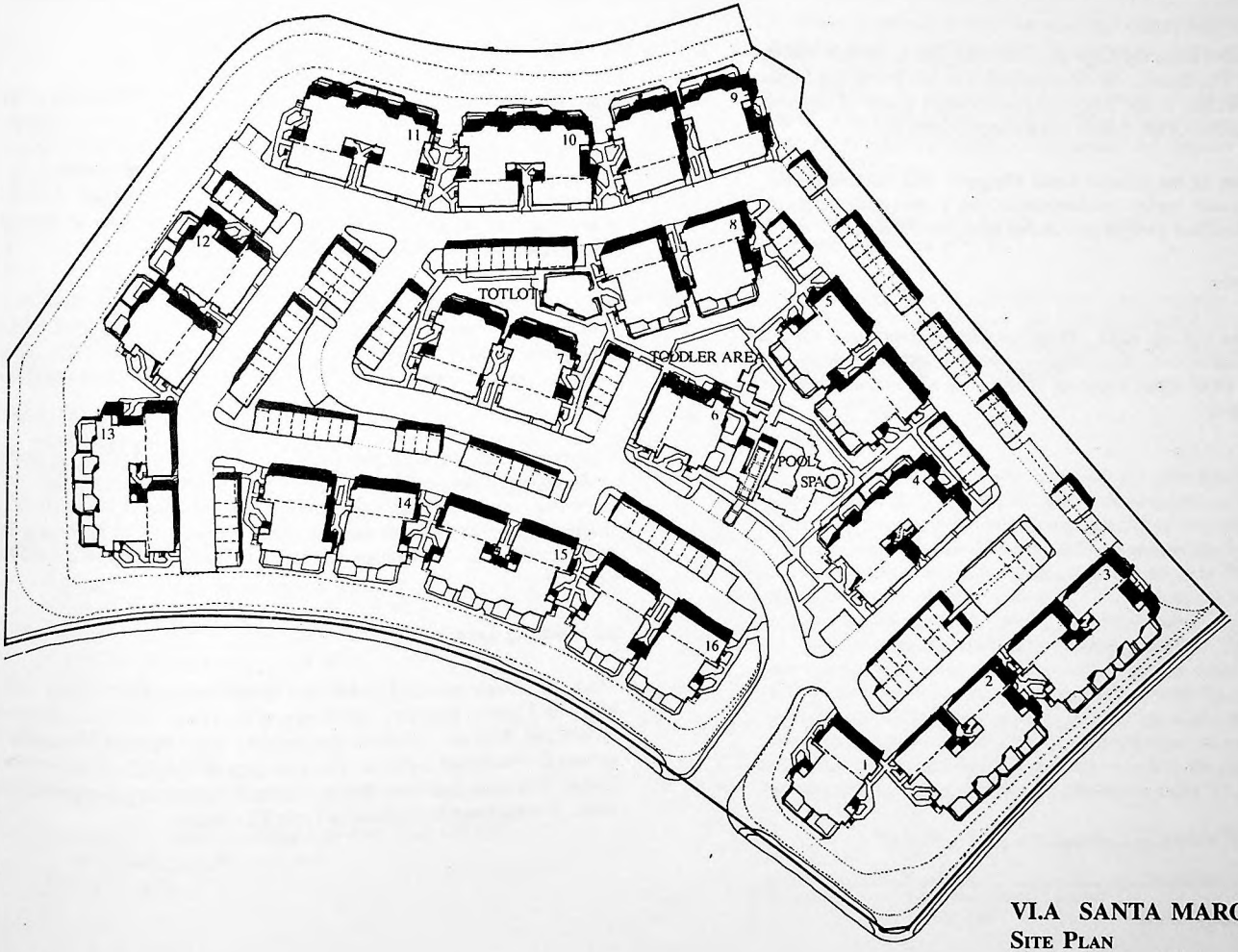
		Additional Cost Per Unit			Additional Cost Per Unit x No. of Units		
Unit Type	# of Accessible Units	FHA-A $	FHA-B $	ANSI $	FHA-A $	FHA-B $	ANSI $
A	54	116	251	373	6,264	13,554	20,142
B	116	212	256	339	24,592	29,696	39,324
Total Additional Cost Before Overhead and Profit:					$	$	$
Accessible Dwelling Units					30,856	43,250	59,466
Common Facilities					9,780	9,780	9,780
Site					51,560	51,560	51,560
Total Additional Cost with Overhead and Profit:					$	$	$
Accessible Dwelling Units					33,016	46,278	63,629
Common Facilities					10,465	10,465	10,465
Dwelling Units and Common Facilities					43,481	56,742	74,093
Site					55,169	55,169	55,169
Total Buildings and Site ($)					98,650	111,911	129,262
Cost Increase (% of Original Cost):					%	%	%
Accessible Dwelling Units					0.41	0.57	0.79
Common Facilities					10.52	10.52	10.52
Dwelling Units and Common Facilities					0.53	0.69	0.90
Site					8.25	8.25	8.25
Buildings and Site					1.11	1.26	1.46
Total Project (% of Original Cost):					0.75	0.85	0.98

ADDITIONAL SITE COST SUMMARY

Item	Description	Qty.	Unit	$/Unit	$/Add	$/Deduct
Dwelling Units						
1	Fill	239	CY	12.50	2,988	
2A	Paving (walks)	352	SF	2.18	1,203	
2B	Paving (walks)	24	SF	2.18		52
3A	Steps	36	LF	4.20	151	
3B	Steps	340	LF	4.20		1,428
4	Handrails	647	LF	38.00	24,586	
5	Retaining Walls	338	face SF	4.75	1,606	
	Subtotal				30,534	1,480
	Net Total ($)				29,054	
Community Facilities						
1A	Walk Paving	3,026	SF	2.18	6,597	
1B	Walk Paving	516	SF	2.18		1,125
2	Handrails	342	LF	38.00	12,996	
3	Retaining Walls	850	face SF	4.75	4,038	
	Subtotal				23,631	1,125
	Net Total ($)				22,506	
Dwelling Units and Common Facilities						
Net Total					51,560	

CY = Cubic Yard SF = Square Feet LF = Lineal Feet

CASE STUDY VI: SANTA MARGARITA CONDOMINIUMS, ORANGE COUNTY, CA.



VI.A SANTA MARGARITA
SITE PLAN

250 FEET 100 30 0

VI. SANTA MARGARITA

1. Project

This project is called Brisa del Lago II, Santa Margarita Condominiums in Orange County, California. It is representative of South California projects. The developer is the Baywood Development Group of Newport Beach, CA. The architect are Kermit Dorius and Associates.

The project is part of the Rancho Santa Margarita Planned Community. The program is small luxury condominium units in two-story buildings, with integral or detached garages and central recreation facilities.

1.1 Basic Statistics

The gross site area is 10.48 acres. There are 150 condominium units at a density of 14.31 units/acre. The building coverage (including garages) is 2.72 acres out of 10.48 acres, equalling 26.0%. Out of 150 units, there are 60 ground floor units.

2. Existing Site Plan Analysis

2.1 Site Concept

Plan VI.A illustrates the basic configuration of the site and building development. The site is roughly 1,000 feet by 550 feet. It is a typically "improved" parcel in a large Planned Residential Development. Streets, utilities and building sites were prepared as part of a large master plan. This site, in common with others, was created by "benching" formerly sloping land into an almost level "table-top", with a cut bank on the high side and a fill bank on the low side.

It originally sloped about 40 feet in about 1,100 feet or 3.6% (from about level 59 to 19); cutting and filling re-formed the site into a level terrace sloping only about 10 feet in the same distance (or just under 0.1%). About 1.63 acres are slope easements, leaving a net area of 8.55 acres for development.

This portion of the site is intensively utilized for one-level "flats" of several configurations: flats over "tuck-under" garages, flats over flats, flats with mezzanines over. Units are organized into 5- and 10-plex buildings, with attached garages at the front and individual fenced gardens at the rear for ground floor units. A compact double-loaded loop street runs around the site.

2.2 Building Layout

There are sixteen two-story buildings. Seven are standard 10-plex buildings with 4 ground floor units and 6 second level units. Seven are two pairs of attached 5-plexes - half of the standard building with variations, 4 ground floor units and 6 above. Two buildings are single 5-plexes with two ground floor units and three above. Altogether, there are 60 ground floor units. A breakdown is provided in Table VI.1 below:

Table VI.1 Existing Distribution of Ground Floor Units

Building #	Bldg. Type	Unit Types	No. of Units	No. of GF Units
1	5-plex	C-E	5	2
2	10-plex	A-E	10	4
3	10-plex	A-E	10	4
4	10-plex	A-E	10	4
5	2/5-plex	C-E	10	4
6	5-plex	C-E	5	2
7	2/5-plex	C-E	10	4
8	2/5-plex	C-E	10	4
9	2/5-plex	C-E	10	4
10	10-plex	A-E	10	4
11	10-plex	A-E	10	4
12	2/5-plex	C-E	10	4
13	10-plex	A-E	10	4
14	2/5-plex	C-E	10	4
15	10-plex	A-E	10	4
16	2/5-plex	C-E	10	4
Totals			150	60

The buildings are closely arranged (25' minimum between buildings) over the entire developable area within the mandatory setbacks. They make a fairly regular row facing out and over the abutting streets and a park, and a tight cluster in the center of the site around the recreation facilities.

There are five unit types:

- Unit A*, 1-bed/1-bath, 841 SF
- Unit B, 1-bed/mezzanine/1-bath, 918 SF
- Unit C, 2-bed/2-bath, 950 SF
- Unit D*, 2-bed/2-bath, 1,024 SF
- Unit E, 2-bed/mezzanine/2-bath, 1,188 SF

* Ground floor units

The common facilities consist of:

- A small recreation building with pool, deck and spa
- An adjoining toddler area, and
- A tot-lot area.

2.3 Circulation

A 36 foot street enters from the southeast corner and makes a loop with carports, garages, and open parking along the street or around separate automobile courts. 150 garages (including 30 2-car garages) are attached to the housing; 92 additional garages are detached; 44 are carports. There are 61 open parking spaces and six open accessible spaces. Altogether, there are 353 parking spaces or 2.35 spaces/unit (346 are required by local zoning regulations).

Carports and garages are 10'×19' clear; open stalls are 9.5'×19'. The six accessible spaces are 14'×19'.

An intensive network of pedestrian circulation is provided. This includes 5 foot sidewalks, 4 foot concrete aprons to the attached garages, 4 foot walks to unit entrances and running through the narrow landscaped area between the central buildings to the recreation facilities.

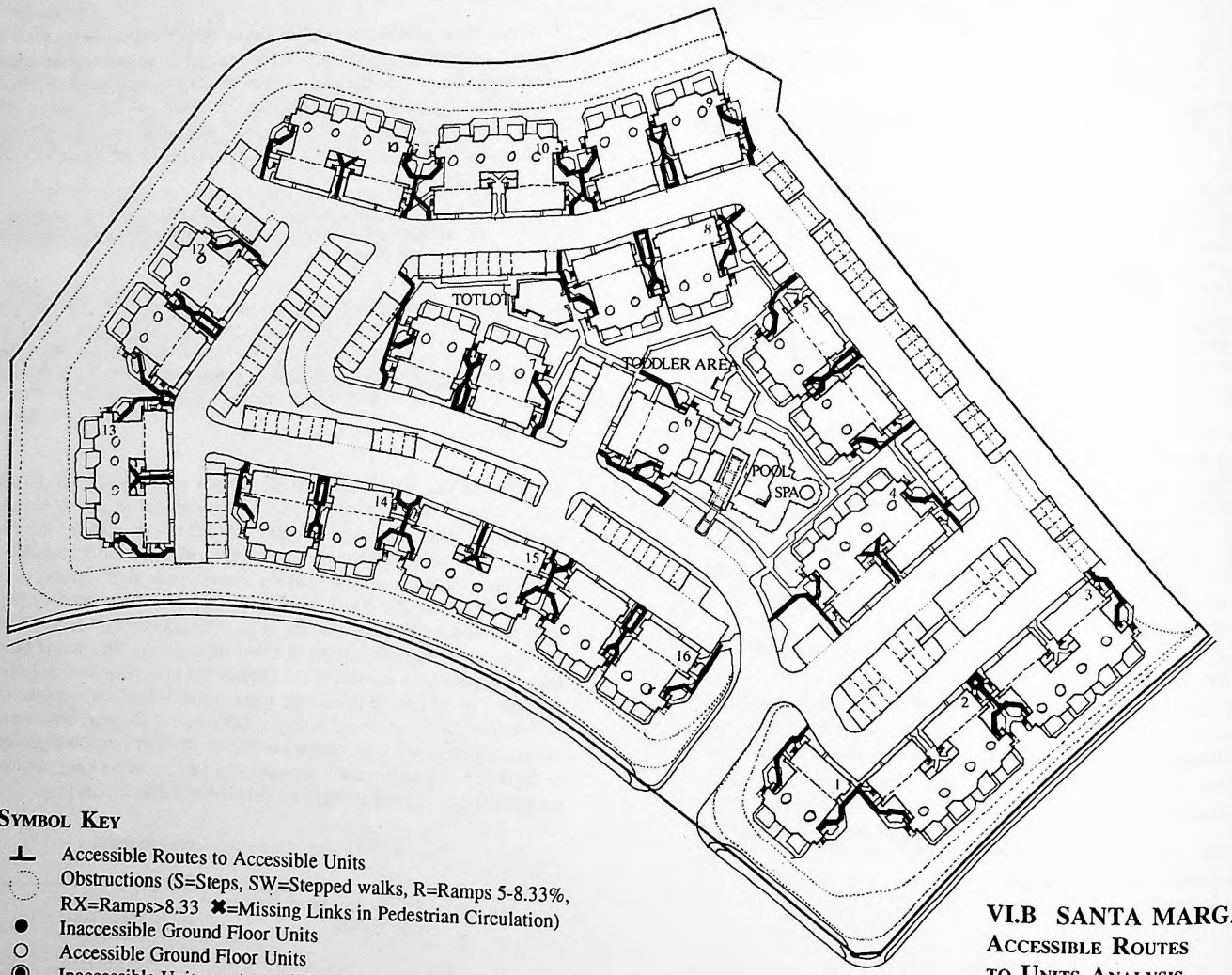
2.4 Parking

As noted in the project description, the site plan provides 353 parking spaces which is 2.35 spaces/unit. Six of these spaces are accessible spaces requires by local codes. From paragraph **3.2** of this section, *Number of Accessible Ground Floor Units*, 60 units are required to be accessible. The *Guidelines* require accessible parking spaces equal to 2% of the covered (accessible) units (2%×60= 2 spaces). In addition, the *Guidelines* require sufficient accessible visitor parking to pro vide access to grade level dwelling units and accessible parking at common facilities. This would mean at least one space, as a minimum, for visitors and one space at each common facility. The number of accessible spaces provided (6), exceeds the minimum except the *Guidelines* require "a full range of choices" which would, therefore, necessitate 2 accessible parking spaces in the attached garages, 2 in the detached garages and 2 in carports as well as the parking provided in the open spaces. These changes are detailed in Table VI.2 below:

Table VI.2 Design Changes for Accessible Parking

Location	Redesign	Change/Add
Throughout Site	Extend carport/garage structure	
	Add 20'×4'×6	480 SF (square feet)

VI.B EXISTING ACCESSIBLE ROUTES (DWELLING UNITS)



SYMBOL KEY

- ⊥ Accessible Routes to Accessible Units
- Obstructions (S=Steps, SW=Stepped walks, R=Ramps 5-8.33%, RX=Ramps>8.33 ✖=Missing Links in Pedestrian Circulation)
- ● Inaccessible Ground Floor Units
- ○ Accessible Ground Floor Units
- ◉ Inaccessible Units on Accessible Routes

VI.B SANTA MARGARITA
ACCESSIBLE ROUTES TO UNITS ANALYSIS

250 FEET 100 50 0

2.5 Open Space

The tightly configured plan relies upon narrow, linked spaces, penetrated by walks and heavily landscaped. The larger areas are concentrated at the center cluster, and on the perimeter strips of land which are largely taken by slope easements. There are many small garden plots which separate walks to the individual entrances, and are planted with shrubs and ground covers.

3. Existing Accessible Routes (Dwelling Units)

3.1 Analysis for Accessible Building Entrances on Accessible Routes

Plan VI.B is an analysis of the existing site plan. It shows the accessible routes from arrival points (in this case the curb line of the nearest parking) along the walks to the concrete pad at the front door of each ground floor unit. It should also be noted that all ground floor units (Units A and D) have a direct service entrance from the back of their individual garages.

In computing an accessible route, the difference in finished floor elevations (FFEs) of ground floor unit entries and the outer edge of the concrete entrance apron is assumed to be 0.1 foot (1/2" from the finished unit floor to the concrete apron outside the entrance door plus a 3/4" slope to the outer edge of the apron). A 1/2" differential at the main dwelling unit entry door is allowed, under the *Guidlines*, when the outside landing (apron) is made of impervious material, in this case concrete.

Streets have minimum grades ranging from 0.5 to 2.0%. Building pads are set 0.6 to 1.8 feet above adjoining street grades. Ground floor units are positioned behind the garages. Unit front doors are approached by 45 to 50 foot long walks beside or between the garages and running through landscaped gardens.

There are no steps along the walks. Like the streets, grades are minimal ranging from 0.5 to 3.5%.

3.2 Number of Accessible Ground Floor Units

Plan VI.B diagrams the accessible routes from the parking to each front entrance of a ground floor unit. There are no obstructions; none of the walks have steps or slopes in access of 5%. All 60 ground floor units are accessible.

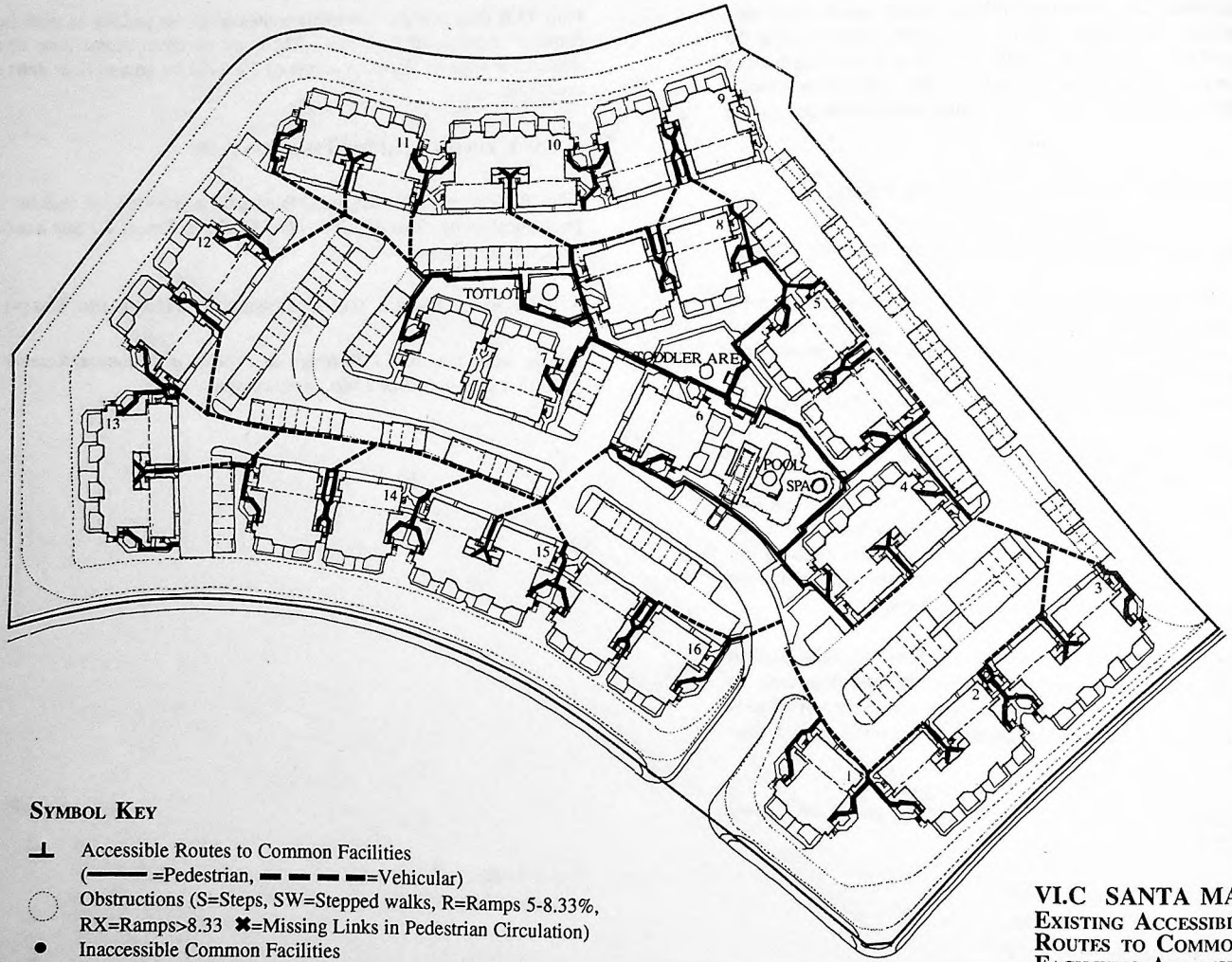
4. Site Impracticality Test Analysis

Since 100% accessibility to ground floor units is provided, the tests for Site Impracticality, by either ***4.1 Individual Building Test*** or ***4.2 Site Analysis Test,*** are superfluous.

5. Proposed Design for Accessibility (Dwelling Units)

For the same reason, ***5.1 Redesign to Provide a Minimum Number of Accessible Ground Floor Units,*** is unnecessary.

VI.C EXISTING ACCESSIBLE ROUTES (COMMON FACILITIES)



SYMBOL KEY

- ⊥ Accessible Routes to Common Facilities (——— =Pedestrian, - - - - =Vehicular)
- ◌ Obstructions (S=Steps, SW=Stepped walks, R=Ramps 5-8.33%, RX=Ramps>8.33 ✖=Missing Links in Pedestrian Circulation)
- ● Inaccessible Common Facilities
- ○ Accessible Common Facilities

VI.C SANTA MARGARITA
EXISTING ACCESSIBLE ROUTES TO COMMON FACILITIES ANALYSIS

250 FEET 100 50 0

6. Existing Accessible Routes (Common Facilities)

6.1 Analysis for Accessible Routes to Common Facilities

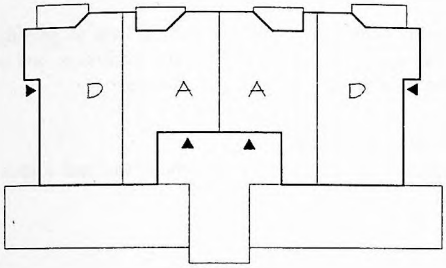
Plan VI.C diagrams the accessible routes from each ground floor unit to the common facilities. Again, no obstructions to free movement throughout the site are identified. (Streets are curbed with necessary accessible curb ramps).

There are no steps or slopes greater than 5%. The pool and spa area is fenced and gated. All common facilities are accessible.

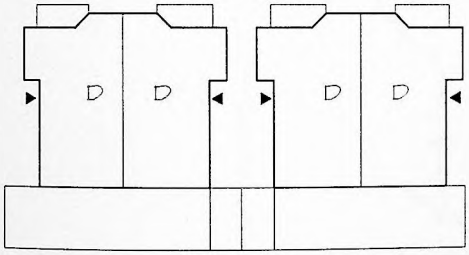
7. Proposed Design for Accessibility (Common Facilities)

Since there are no limits to free movement throughout the site, ***7.1 Redesign to Provide Accessible Access to and Use of Common Facilities*** is unnecessary.

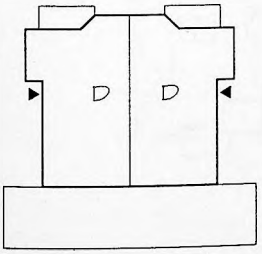
VI. SANTA MARGARITA BUILDING TYPES



TYPE I



TYPE II



TYPE III

Building Description

The project site comprises 16 two-story buildings of three types: seven Type I units; seven Type II units and two Type III units.

Building Type I: (10-plex)

Mirrored A and D units with a center court that leads to the grade-level A units and stairs to second-story A units and units over the ganged garages. Lower and upper D units are entered from the side.

Building Type II: (pair of 5-plexes)

A pair of mirrored side-by-side D units. A center court provides access to the center pair of lower and upper units and the units over the garages. The side pair of upper and lower D units is entered from the side.

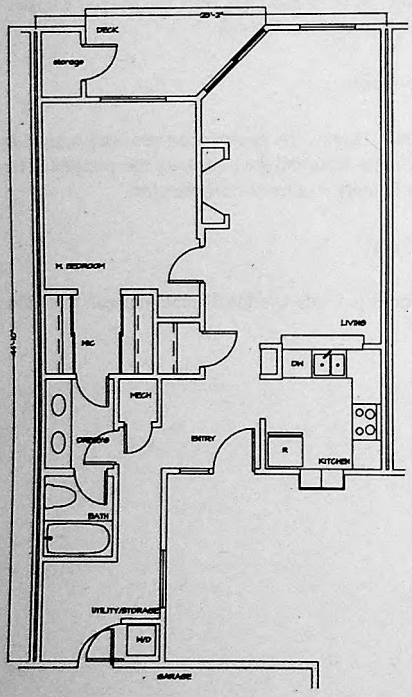
Building Type III: (single 5-plex)

A single two-story pair of mirrored side-by-side D units entered from the side.

VI. SANTA MARGARITA UNIT A

Original Unit Plan

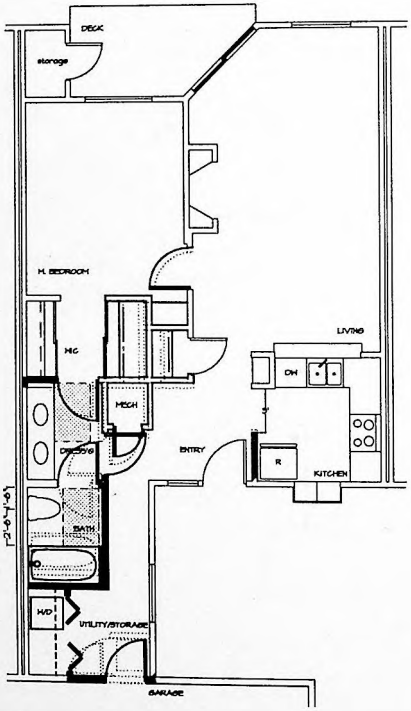
The 841 sq. ft. one bedroom A unit is accessed directly from its garage and the center courtyard. It's compartmentalized master bath and dressing area serves also as a formal powder room.



FHA

Minor changes include the lengthening of the master bath to provide a 30"×48" clear space, the swinging out of the master bath door and one dressing room door, and the relocation of the washer/dryer.

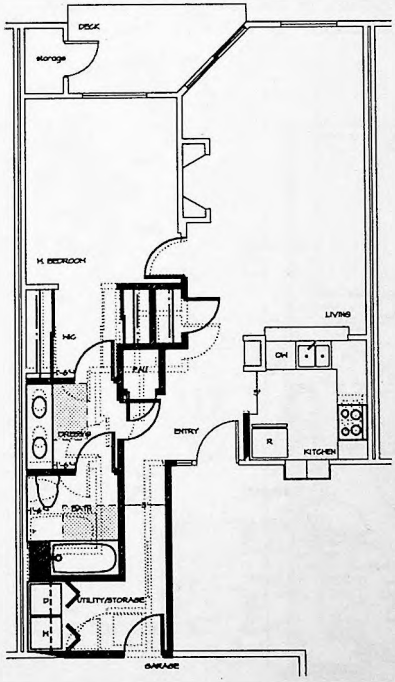
- 2'-10" doors at bedrooms and baths
- Wall reinforcement for fixed grab bar at tub/shower and foldaway grab bar at toilet.



ANSI

The need to provide blocking for a 42" fixed grab bar at the toilet and an 18" clear space at doors necessitates an increase in the size of the bath and resulting 25 sq. ft. enlargement of the utility corridor. A separate washer and dryer is required in lieu of a vertically combined unit.

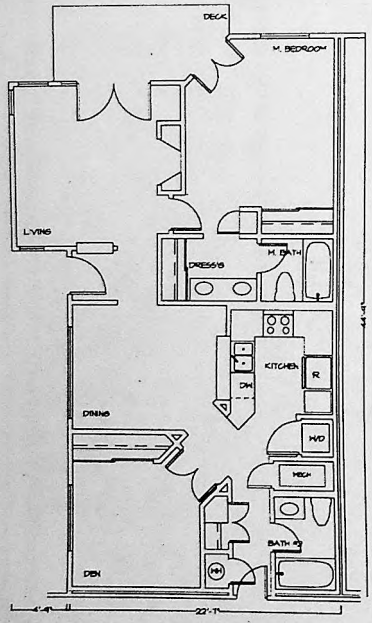
- 2'-10" doors at bedrooms and baths
- Wall reinforcement for fixed grab bar at tub/shower and toilet.
- Removable bath vanity cabinet.
- 18" side clearance next to latch on pull side of doors.
- Adjustable 30" sink counter and 30" work surface in kitchen.



VI. SANTA MARGARITA UNIT D

Original Unit

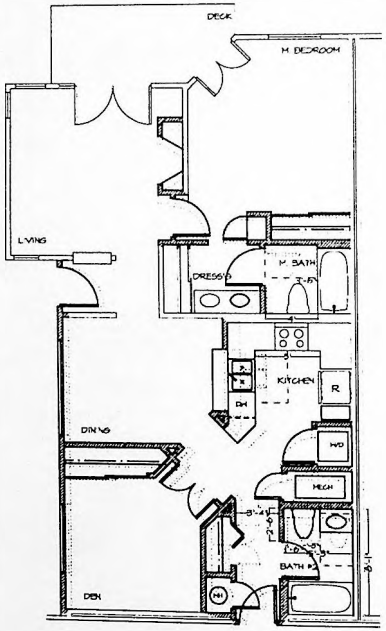
The one bedroom with den 1,024 sq.ft. D unit is entered from its side between separate living and dining spaces. Entrance to the attached garage is at the unit's rear.



FHA Option A

Plan modifications include the lengthening of the master bath to provide a 30"×48" clear space, the widening of Bath #2 to provide 18" from the toilet centerline to the adjacent wall and 15" to the adjacent 30" lavatory, the widening of the garage access corridor to provide a minimum 2'-10" door and the widening of the "U" shaped kitchen to 5'-0". These changes require that the exterior wall be moved approximately 9" to keep the den and the dining room the same size.

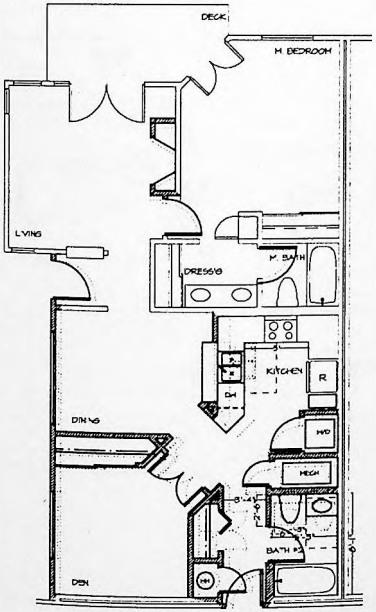
- 2'-10" doors at bedrooms and baths
- Wall reinforcement for fixed grab bar at tub/shower and foldaway grab bar at toilet.
- 5'-0" between counters at "U" shaped kitchen.



FHA Option B

Toilet and lavatory in Bath #2 are switched to provide 30"×48" clear floor space. Bath #1 can remain as originally designed except for the need of a 2'-10" door. Other changes are similar to those described in Option A.

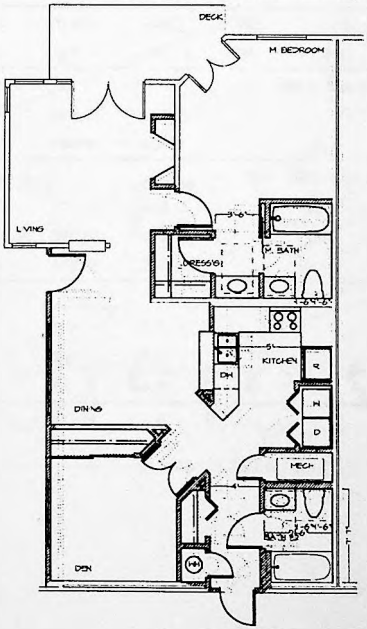
- 2'-10" doors at bedrooms and baths
- Wall reinforcement for fixed grab bar at tub/shower and toilet in Bath #2 and at tub/shower and foldaway grab bar in Master Bath.
- Removable bath vanity cabinet in Bath #2.
- 5'-0" between counters at "U" shaped kitchen.
- back hallway widened to accomodate 2'-10" door.



ANSI

Requirements for sidewall grab bar reinforcement, 18" dimensions from wall and lavatory to centerline of toilet and 18" clear space next to latch on pull side of doors suggest the use of a pocket door at the master bath. The 4'-10" rear hallway required by an out-swinging bath door necessitate moving the exterior wall out 18". The use of a pocket door could lessen this distance to 9".

- 2'-10" doors at bedrooms and baths
- Wall reinforcement for fixed grab bar at tub/shower and toilet.
- Removable bath vanity cabinet.
- 18" side clearance next to latch on pull side of doors.
- Adjustable min. 30" sink and 30" countertop
- 5'-0" between counters at "U" shaped kitchen.



CASE STUDY VI — (SANTA MARGARITA) COST SUMMARIES

ORIGINAL PROJECT COSTS

Dwelling Unit Cost ($)	6,826,943
Sitework Cost ($)	1,267,860
Total Dwelling Unit and Site Cost ($)	8,094,803
Project Cost ($)	12,122,170

ADDITIONAL SITE, DWELLING UNIT AND COMMON FACILITIES COSTS

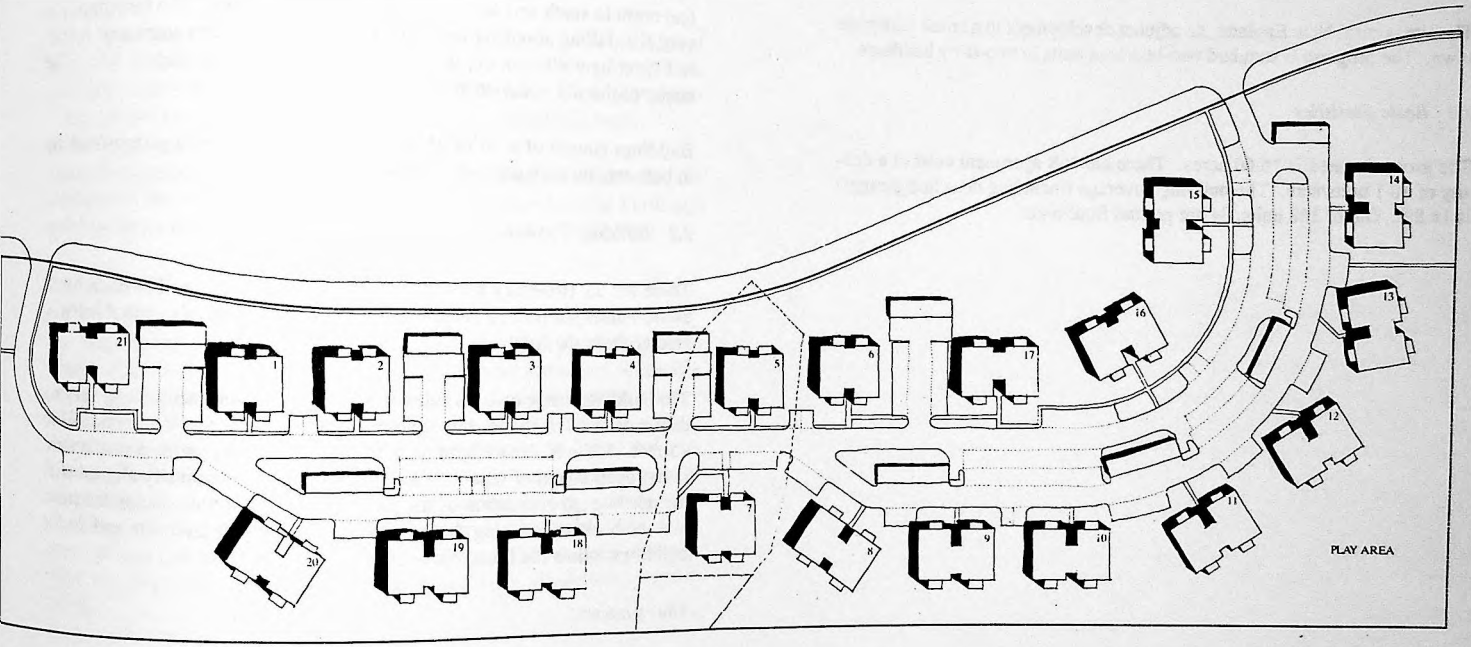
		Additional Cost Per Unit			Additional Cost Per Unit x No. of Units		
Unit Type	# of Accessible Units	FHA-A $	FHA-B $	ANSI $	FHA-A $	FHA-B $	ANSI $
A	14	146	146*	588	2,044	2,044*	8,232
D	46	375	300	797	17,250	13,800	36,662
Total Additional Cost Before Overhead and Profit:					$	$	$
Accessible Dwelling Units					19,294	15,844	44,894
Site					9,600	9,600	9,600
Total Additional Cost with Overhead and Profit:					$	$	$
Accessible Dwelling Units					21,866	17,956	50,879
Site					10,880	10,880	10,880
Total Buildings and Site ($)					32,746	28,836	61,759
Cost Increase (% of Original Cost):					%	%	%
Accessible Dwelling Units					0.32	0.26	0.75
Site					0.86	0.86	0.86
Buildings and Site					0.40	0.36	0.76
Total Project (% of Original Cost):					0.27	0.24	0.51

* FHA-A Unit Cost Used Because There Is No FHA-B Unit Alternate

ADDITIONAL SITE COST SUMMARY

Item	Description	Qty.	Unit	$/Unit	$/Add	$/Deduct
Dwelling Units						
1	Garages/ Carports	480	SF	20.00	9,600	
	Net Total				9,600	

SF = Square Feet



VII.A WINDSONG
SITE PLAN

250 FEET 100 50 0

VII. WINDSONG PLACE

1. Project

Windsong Place, located in Amherst, in the extreme west of New York State, is a garden apartment project. The developer is the BMW Development Corporation; the architects are Carmine • Silvestri Architects, PC.

The site is rural New England, an adjunct development to a small collegiate town. The program is standard two-bedroom units in two-story buildings.

1.1 Basic Statistics

The gross site area is 16.60 acres. There are 168 apartment units at a density of 10.1 units/acre. The building coverage (including detached garages) is 16.8%. Out of 168 units, 84 are ground floor units.

2. Existing Site Analysis

2.1 Site Concept

Plan VII.A illustrates the basic configuration of the site and building development. The site is long and narrow, paralleling a public street, about 1,650 feet north to south and 400 to 660 feet wide west to east. The topography is very flat, falling about six feet from 699 at the property's southwest corner to 693 at its northwest corner, or about 0.4% along its steepest side. The center of the site is shown as a wetland of just over one acre.

Buildings consist of a series of separate blocks, some with garages/parking in between, on both sides of a single loop street.

2.2 Building Layout

There are 21 two-story buildings, 7 Type A and 14 Type B. Each has 8 units, 4 units per floor, 2 front and 2 back on either side of a central hallway entered from the front.

The buildings range on both sides of a single loop street, set back by varying distances of 20 to 55 feet and separated from each other by a minimum 42 to 45 feet. Most of the wetland area has been filled to provide a continuous, rather open layout of repetitive free-standing blocks, typically aligned with the north-south orientation of the property - the front units facing the street and the back units facing the property lines. Only at the south end do the buildings follow the broad curve of the loop street.

Unit sizes are:

- Building Type A contains 2-bed/1-bath units, each ±870 sq. ft.
- Building Type B contains 2-bed/1½-bath units, each ±1,100 sq. ft.

There are no common facilities, except an unimproved playground area at the southeast corner.

2.3 *Circulation*

The street is typically 24 feet wide with a 5 foot sidewalk on one side. The walk is continuous, except where interrupted by head-in parking (where the walk is diverted around the front of the cars), accessible parking bays (typically in twos, opposite the open areas between pairs of buildings), and driveways to small garage/parking courts. The majority of the street and parking layout is uncurbed.

Head-in parking (9'×20') and garages (12'×20') are provided on both sides of the main access street, paralleling it, and in courts at right angles between the eastern row of buildings. Total parking is 338 spaces (2 per unit equals 336). 50 spaces are in garages. 17 are accessible, typically in twos.

Individual walks to the front entrance of each building are 4 feet wide. In addition to the sidewalks, walk connections are shown to the north and south property lines and along the property's entire east street frontage.

2.4 *Parking*

As noted in the project descriptions, the site plan provides 338 parking spaces which is just over 2 spaces/unit. 17 of these spaces are accessible spaces required by local codes. From paragraph **3.2** of this section, *Number of Accessible Ground Floor Units*, 84 units are required to be accessible. The *Guidelines* require accessible parking spaces equal to 2% of the covered (accessible) units (2%×84=2 spaces). In addition, the *Guidelines* require sufficient accessible visitor parking to provide access to grade level dwelling units and accessible parking at common facilities. This would mean at least one space, as a minimum, for visitors. The number of accessible spaces provided, 17, therefore, far exceeds the *Guidelines'* requirements.

2.5 *Open Space*

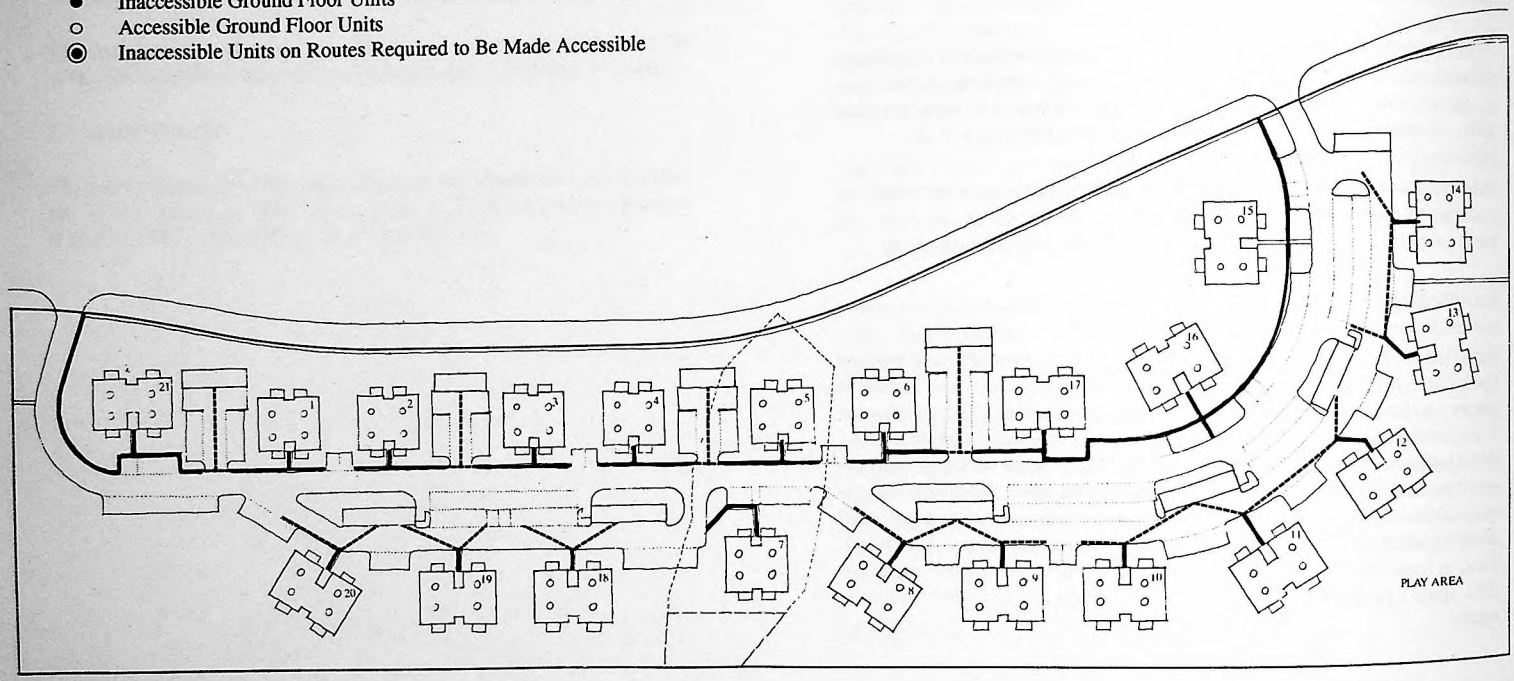
The arrangement of separate buildings on either side of a street results in a plan in which the open space is residual or "left over". The low density allows for more generous building setbacks than most.

Total "green space" is 10.79 acres out of 16.60, or about 65%.

VII.B EXISTING ACCESSIBLE ROUTES (DWELLING UNITS)

Symbol Key

- ⊥ Accessible Routes to Accessible Units
- ◌ Obstructions (S=Steps, SW=Stepped walks, R=Ramps 5-8.33%, RX=Ramps>8.33 ✖=Missing Links in Pedestrain Circulation)
- ● Inaccessible Ground Floor Units
- ○ Accessible Ground Floor Units
- ◉ Inaccessible Units on Routes Required to Be Made Accessible



VII.B WINDSONG
Accessible Routes to Units Analysis

250 FEET 100 50 0

3. Existing Accessible Routes (Dwelling Units)

3.1 Analysis for Accessible Building Entrances on Accessible Routes

Plan VII.B is an analysis of the existing site plan. It shows the accessible routes from arrival points (in this case the sidewalk along the street or the edge of parking elsewhere) to the concrete apron at the front entrance to each building. Aprons are 8'-4" wide x 13'-8" long (Building A) and 15'-8" long (Building B).

In computing an accessible route, the difference in finished floor elevations (FFEs) of ground floor unit entries and the outer edge of the concrete entrance apron is assumed to be 0.6 foot (1/2" from the finished unit floor to the concrete apron outside the entrance door plus a $5^3/4"(\pm 3\%)$ slope to the outer edge of the apron). A 1/2" differential at the main dwelling unit entry door is allowed, under the Guidlines, when the outside landing (apron) is made of impervious material, in this case concrete.

The site's flatness results in minimum grades for streets and walks, with frequent catch basins to intercept runoff and convey it to a swale along the west side of the property, draining to a storm water detention area at the northwest corner. Four of the 21 buildings are set at 698.5 and the rest at 698.0.

There are no steps and no other noted obstructions to a clear accessway to building entrances.

3.2 Number of Accessible Ground Floor Units

Plan VII.B diagrams the accessible routes from the parking to each building entrance. None of the walks have steps or slopes in excess of 5%. All walks to units, in fact, are 3.3% or less. All 84 ground floor units are accessible.

4. Site Impracticality Test Analysis

Since 100% accessibility to ground floor units is provided, the tests for Site Impracticality, by either ***4.1 Individual Building Test*** or ***4.2 Site Analysis Test*** are superfluous.

5. Proposed Design for Accessibility (Dwelling Units)

For the same reason, ***5.1 Redesign to Provide Minimum Number of Accessible Ground Floor Units*** is unnecessary.

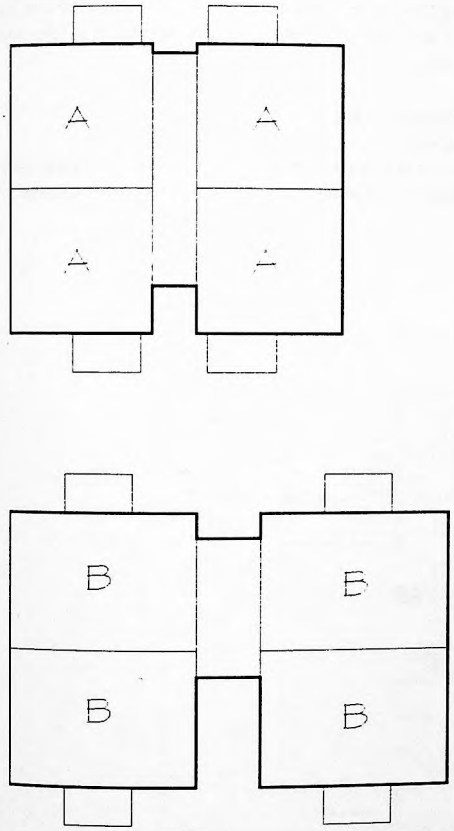
6. Existing Accessible Routes (Common Facilities)

Since there are essentially no public or common use areas, consideration of ***6.1 Analysis of Accessible Routes to Common Facilities*** is not applicable. (The playground area is undeveloped; there is no pedestrian or other access shown to it, although the level grades pose no problem for accessibility).

7. Proposed Design for Accessibility (Common Facilities)

7.1 Redesign to Provide Accessible Access to and Use of Common Facilities is unnecessary as there is no common facility.

VII. WINDSONG PLACE BUILDING TYPES



TYPICAL BUILDINGS KEY PLAN

Building Description

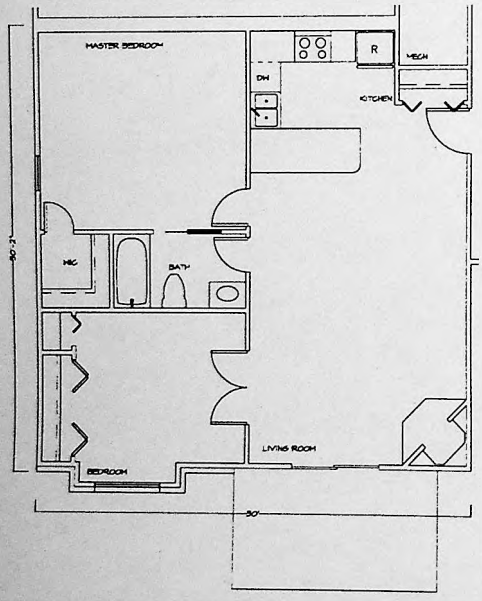
The 21 two-story buildings on the site are similar in that they comprise two pairs of units on each of two floors separated by an entrance hall and stairway leading to the second floor. There are seven buildings that contain type A units and 14 that contain type B.

- A units - 2 bedrooms and one bath (870 sq. ft.)
- B units - 2 bedrooms, one bath, powder room (1,100 sq. ft.)

VII. WINDSONG PLACE UNIT A

Original Unit Plan

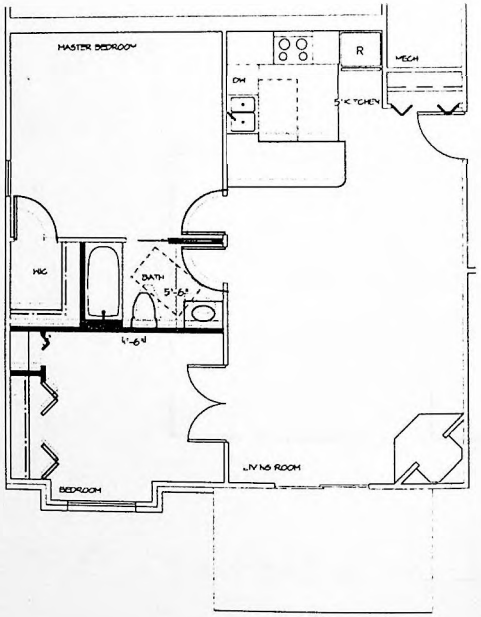
The 870 sq. ft. two-bedroom unit is compactly organized without corridors. The master bedroom and the secondary bedroom are separated by a closet and bath to increase privacy. The secondary bedroom opens up to the living room by means of a pair of french doors to allow it to become a study/den and to help the living room appear more spacious.



FHA

The kitchen is enlarged to provide 5 feet between "U" shaped counters. The bath depth is enlarged to 5'-6" to permit a frontal approach to the toilet from the master bedroom.

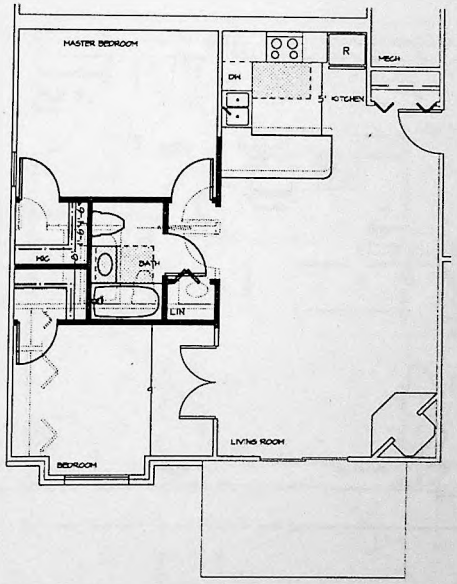
- 2'-10" doors at bedrooms and bath.
- Removable bath vanity cabinet.
- Wall reinforcement at tub/shower and for foldaway grab bar at toilet.
- Kitchen sink shifted to provide 20"×48" clear floor space centered on the sink.



ANSI

Significant plan changes are necessary to locate the toilet adjacent to the wall to allow blocking for the required 3'-6" grab bar. Changes provide for a small vestibule and linen closet at the bath entry, desirable from a privacy standpoint. Secondary bedroom closets are relocated. Room proportion changes but size is increased 5%. Master bedroom size is reduced from 13'-4"×14'-0" to 11'-6"×14'-0", but this is just slightly less than the size of the master bedroom in the larger unit B (12'-1"×14'-0").

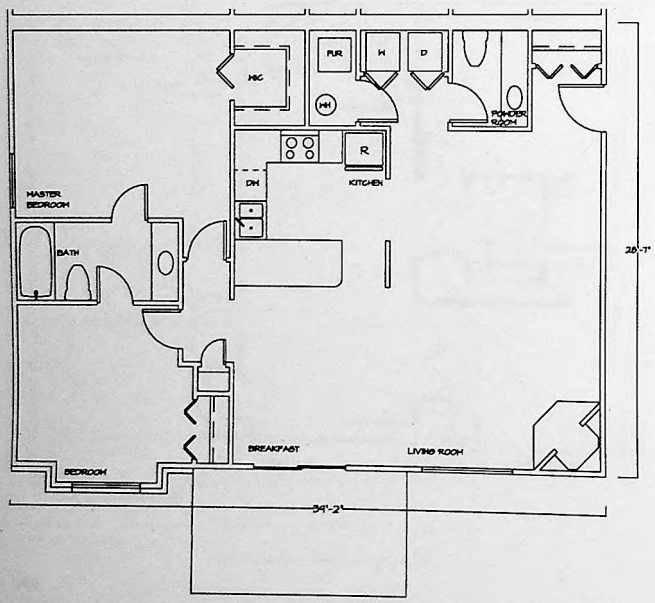
- 2'-10" doors at bedrooms, bath and walk-in-closet.
- 1'-6" side clearance next to latch on pull side of doors.
- Wall reinforcement at tub/shower and 42" grab bar at toilet.
- Adjustable 30" sink counter and 30" work surface in kichen.
- Removable bath vanity cabinet.



VII. WINDSONG PLACE UNIT B

Original Unit Plan

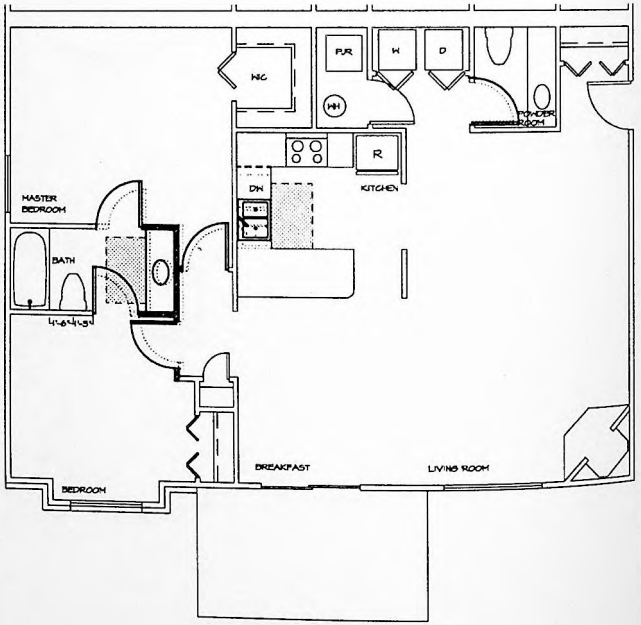
The 1100 sq. ft. two bedroom/bath with powder room unit locates the kitchen strategically in the center of the unit and at the corner of a large square "great room" space.



FHA

Minimal changes include: the widening of the bedroom access corridor to accept a larger door; master bedroom/bath door swings out to provide 30"×48" clear space. It is not necessary to provide clear space for both bathroom doors.

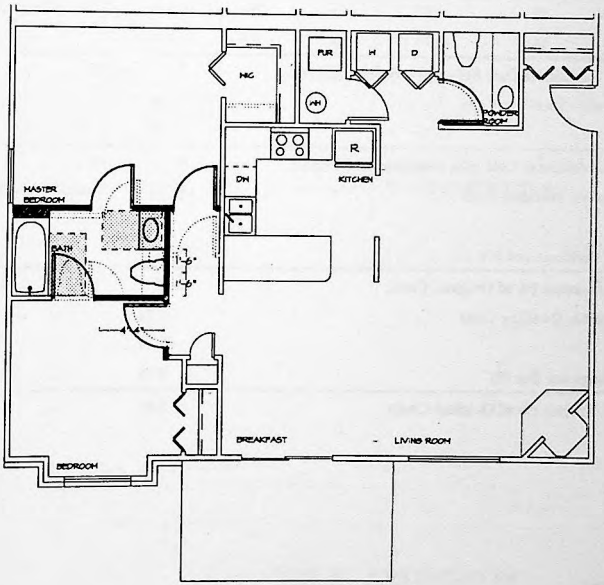
- 2'-10" doors at bedrooms, baths and powder rooms.
- Wall reinforcement at tub/shower and for foldaway grab bar at toilet.
- Kitchen sink shifted to provide 30"×48" clear floor space centerd on sink.



ANSI

Bath width increased to 5'-6" to allow 1'-6" from wall and vanity cabinet to centerline of toilet. Master bedroom and bath doors relocated to provide 18" side clearance. Toilet relocated next to lavatory.

- 2'-10" doors at bedrooms, baths, powder room and walk-in closets.
- Wall reinforcement at tub/shower and for 42" grab at bathroom toilet.
- 1'-6" side clearance next to latch on pull side of doors.
- Adjustable 30" sink counter and 30" work surface in kitchen.
- Removable vanity cabinet at bath.



CASE STUDY VII — WINDSONG COST SUMMARIES

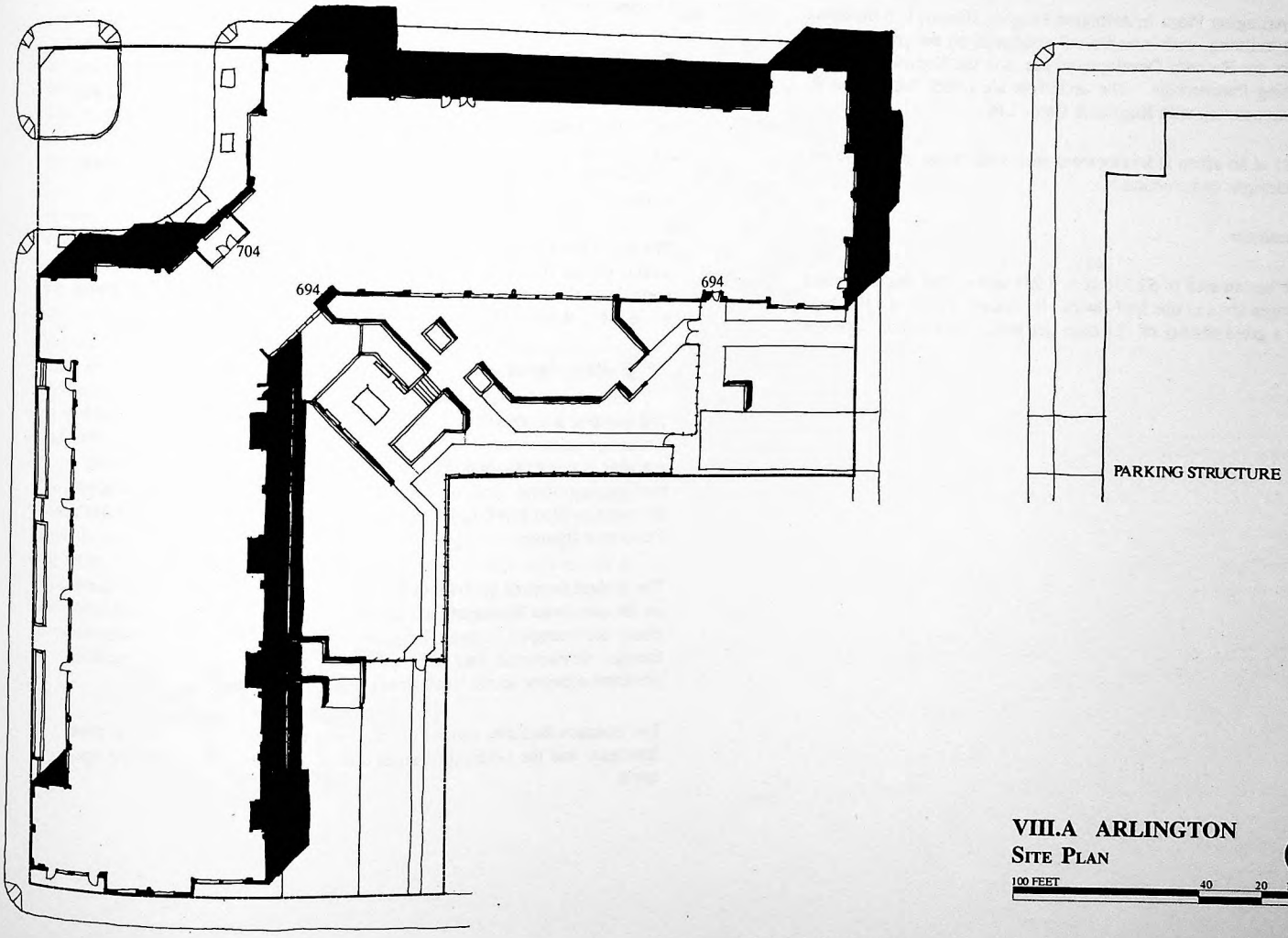
ORIGINAL PROJECT COSTS

Buildings Cost ($)	6,869,000
Dwelling Units and Common Facilities	
Sitework Cost ($)	1,130,000
Total Buildings and Site Cost ($)	7,999,000
Project Cost ($)	10,985,000

ADDITIONAL SITE, DWELLING UNIT AND COMMON FACILITIES COSTS

		Additional Cost Per Unit			Additional Cost Per Unit x No. of Units		
Unit Type	# of Access-ible Units	FHA-A $	FHA-B $	ANSI $	FHA-A $	FHA-B $	ANSI $
A	28	163	NA	260	4,564	-	7,280
B	56	197	NA	289	11,032	-	16,184
Total Additional Cost Before Overhead and Profit:					$	$	$
Accessible Dwelling Units					15,596	-	23,464
Site					0	-	0
Total Additional Cost with Overhead and Profit:					$	$	$
Accessible Dwelling Units					16,532	-	24,872
Site					0	-	0
Total Buildings and Site ($)					16,532	-	24,872
Cost Increase (% of Original Cost):					%	%	%
Accessible Dwelling Units					0.24	-	0.36
Site					0.00	-	0.00
Buildings and Site ($)					0.21	-	0.31
Total Project (% of Original Cost):					0.15	-	0.23

CASE STUDY VIII: ARLINGTON PLAZA, ARLINGTON HEIGHTS, IL.



VIII.A ARLINGTON
SITE PLAN

VIII: ARLINGTON PLAZA

1. Project

This project, Arlington Plaza in Arlington Heights, Illinois, is a medium-rise apartment building, with mixed retail/residential on the ground floor. The developers are Rescorp Development Inc. and the National Corporation for Housing Partnerships. The architects are Lobel Schlossman & Hackl Inc. in association with Kupritz & Caron Ltd.

The site is part of an urban redevelopment area, with "inner city" densities and mid-rise elevator construction.

1.1 Basic Statistics

The gross site has an area of 52,736 sf or 1.211 acres. The single elevator building averages six and one half floors. It contains a total of 147 apartment units at a gross density of 121 units per acre. The building coverage is 50.0%.

2. Existing Site Analysis

2.1 Site Concept

Plan VIII. illustrates the basic configuration of the site and building development. The site is one of two parcels developed concurrently, identified as "Site Two". It is the L-shaped portion of a square block about 265'×265', with an outparcel about 132'×132' in the southeast quadrant, partly occupied by an existing one-story building. ("Site One" on a block immediately to the southeast has a high-rise apartment building of eleven stories).

The site is flat to slightly sloping, falling about 11 feet from ±704 to ±693 west to east on its north street frontage, and about 4 feet from ±704 to ±700 north to south on its west street frontage. Corresponding sidewalk grades range 3-6% along the north frontage and about 2% on the west.

2.2 Building layout

The building is L-shaped to fit the L-shaped site, with two wings served by a common main entrance and vestibule at the northwest corner. The northern wing is seven stories and the western wing is six stories. The building's roofline is uniform, and the extra floor is obtained by inserting a lower floor at elevation 694 below the main floor at 704 in the north wing along the steeper frontage.

The ground floors of both wings have retail commercial and service spaces on the two street frontages, and apartments facing the interior. All other floors are occuped entirely by apartments and support areas accessed through elevators; in fact, the split level arrangement of the entrances presumes elevator access to all floors.

The common facilities consist of the retail commercial uses on the street frontages, and the landscaped areas outside described as part of the open space.

2.3 *Circulation*

The building's main entrance, at the northwest corner of the site, has a tight turnaround and passenger drop-off area at ±703 leading directly to the main vestibule. From the vestibule, elevators access all floors. Secondary rear entrances at ±693 access the lower floor of the north wing from pedestrian areas entered through gates from both east and south streets and fenced for privacy and security. Through the pedestrian area, there are 8 foot main walks and 4 foot secondary walks.

2.4 *Parking*

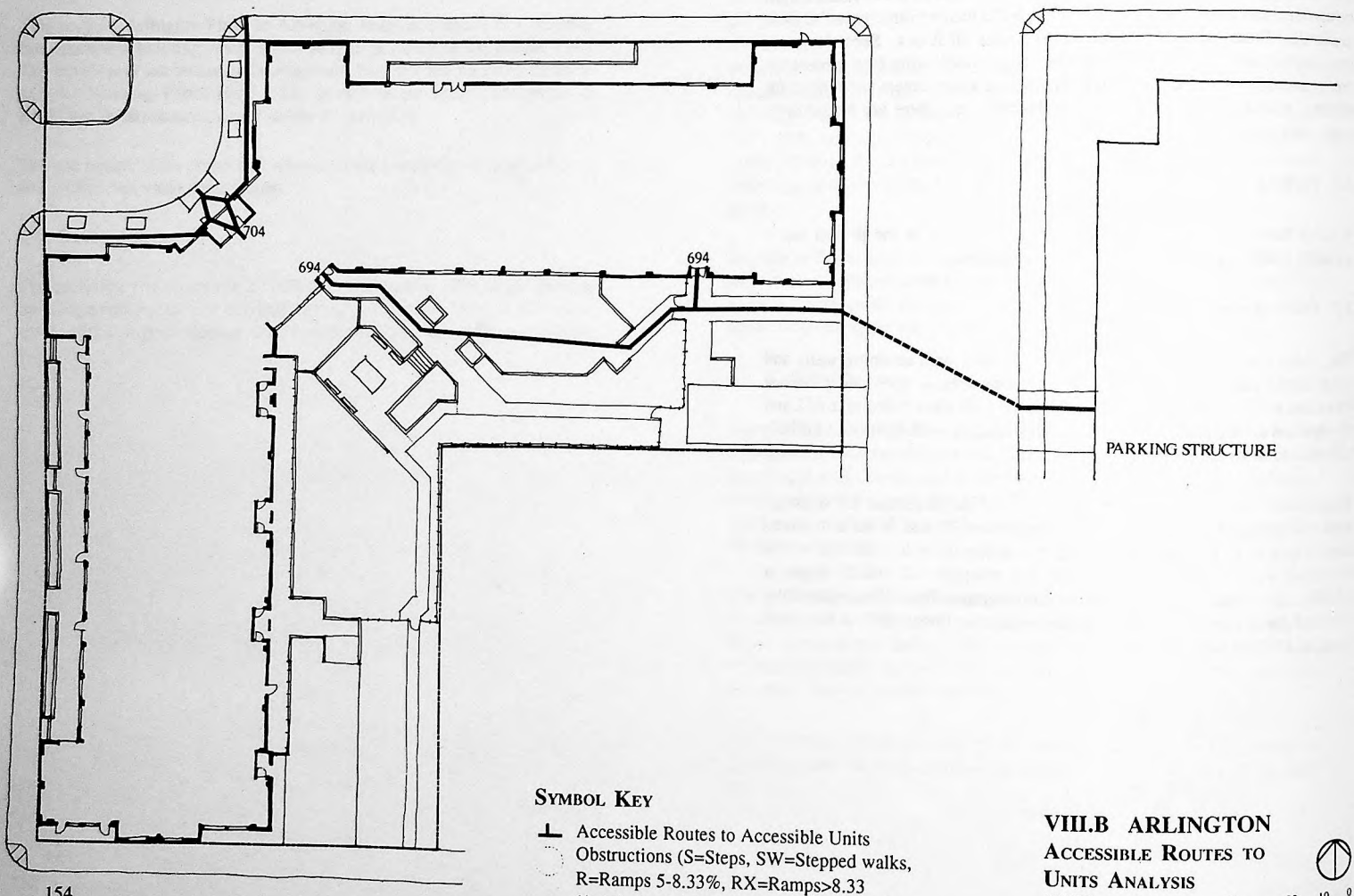
A third block between Sites One and Two, and not in the project has a separate parking garage serving both developments.

2.5 *Open Space*

The walks run through heavily landscaped areas, with retaining walls and grass banks for enclosure and screening. One area is open and paved at elevation ±693. There is a bowl-shaped lawn with a low point of ± 692 and an elevated sitting place at ±697 on a diagonal axis with the main vestibule and visible from the elevator lobby.

Throughout the site, grades are at or close to the minimum for drainage with two exceptions: a portion of the north sidewalk next to the turnaround area slopes at ±5.8% and, at the rear, the sitting place is 3 feet above the adjoining walks and entered by steps or a ramped walk which slopes at ±7.0%. The retail and service spaces on the ground floor along each street frontage have level areas abutting the respective floors, 694 in the north wing and 702 in the west.

VIII.B EXISTING ACCESSIBLE ROUTES (DWELLING UNITS)



SYMBOL KEY

⊥ Accessible Routes to Accessible Units

Obstructions (S=Steps, SW=Stepped walks, R=Ramps 5-8.33%, RX=Ramps>8.33

✖=Missing Links in Pedestrian Circulation)

VIII.B ARLINGTON

ACCESSIBLE ROUTES TO UNITS ANALYSIS

100 FEET 40 20 10 0

3. Existing Accessible Routes (Dwelling Units)

3.1 Analysis for Accessible Building Entrances on Accessible Blocks

Plan VIII.B is an analysis of the existing site plan. It shows the primary accessible route at the building's main entrance, and a secondary accessible route to two rear entrances. The former enters at finished floor elevation (FFE) 704 and the latter one floor below at FFE 694.

None of the walks or pedestrian areas exceed 8.33%. Only one stretch of sidewalk, ±55 feet long on the north side outside the property, exceeds 5%. Curb ramps are provided at all street intersections and curb cuts are provided for driveways. A broad curb ramp is integrated into the special paving at the building's main entrance and passenger drop-off.

Elevator Buildings. At least one accessible entrance is required on each accessible route. This building has two sets of entrances: one at the front and two at the rear. The front and primary entrance within the property lines is fully accessible. The north sidewalk, outside the property has a portion of sidewalk exceeding 5%. A more direct alternative route from the parking garage to the easterly rear entrance serving Floor Level 694 is available and fully accessible.

Both rear entrances can be reached from either the east or south street. The easterly approach is favored by having an 8 foot level walk and being the direct route from the parking garage. The southerly approach is about the same distance but has a 4 foot walk and a 40 feet long sloping section at ±7%. In any event, only one accessible route to the entrances is required which is met by the front entrance or by the eastern alternative at the rear.

3.2 Number of Accessible Units

All 147 apartment units are accessible by elevator, reached from the building's main entrance with a passenger drop-off area.

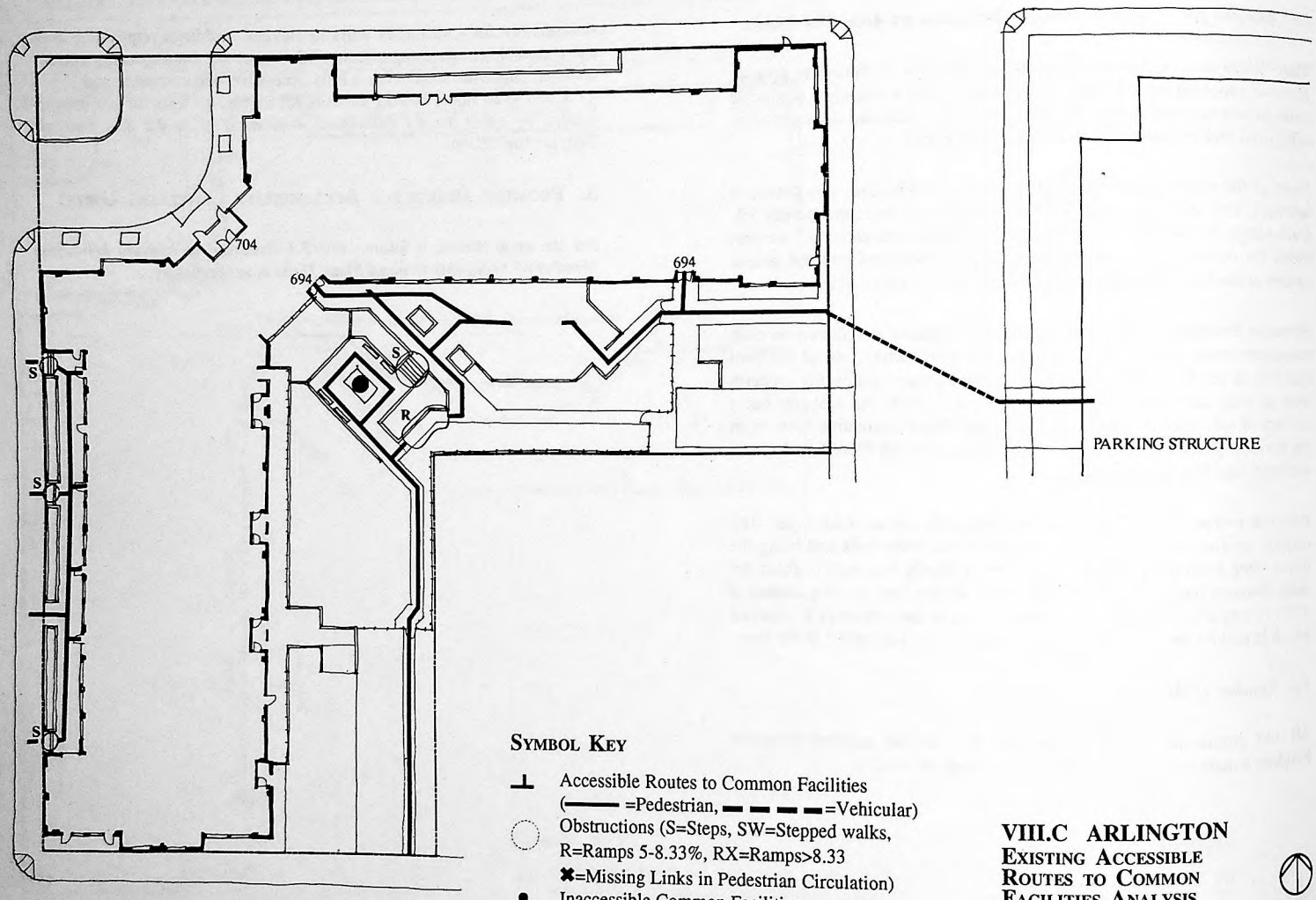
4. Site Impracticality Test Analysis

Accessibility for multifamily units in elevator buildings requires at least one accessible entrance **regardless** of terrain or site impracticality considerations. Since the project has a fully accessible main entrance and elevator access to all floors making all units accessible, the tests for site impracticality, by either the ***4.1 Individual Building Test*** or ***4.2 Site Analysis Test***, are superfluous.

5. Provided Design for Accessibility (Dwelling Units)

For the same reason, it follows that ***5.1 Redesign to Provide Minimum Number of Accessible Ground Floor Units*** is unneccessary.

VIII.C EXISTING ACCESSIBLE ROUTES (COMMON FACILITIES)



SYMBOL KEY

- Accessible Routes to Common Facilities (——— =Pedestrian, - - - - =Vehicular)
- Obstructions (S=Steps, SW=Stepped walks, R=Ramps 5-8.33%, RX=Ramps>8.33 ✖=Missing Links in Pedestrian Circulation)
- ● Inaccessible Common Facilities
- ○ Accessible Common Facilities

VIII.C ARLINGTON
EXISTING ACCESSIBLE ROUTES TO COMMON FACILITIES ANALYSIS

100 FEET 40 20 10 0

6. Existing Accessible Routes (Common Facilities)

6.1 Analysis for Accessible Routes to Common Facilities

Plan VIII.C diagrams the accessible routes from the building entrances to the common facilities. As noted, common use areas (besides the building's lobbies) consist of the retail/service uses fronting the streets and the garden areas at the rear. The former have level walks along each frontage, 8 feet wide on the west side and 7 feet wide on the north side, separated from the sloping sidewalk by a narrow planted strip, 5 feet wide on the west and 6 feet wide on the north. On the west side, there are four ways between the planters to the front walk: three have steps up and down and one meets the back of the sidewalk and is barrier-free. On the north side, there is one barrier-free entry from the sidewalk.

At the rear, the only steps are up to the sitting place and a ramped walk alternative is provided with an average slope of ±7%.

7. Proposed Design for Accessibility (Common Facilities)

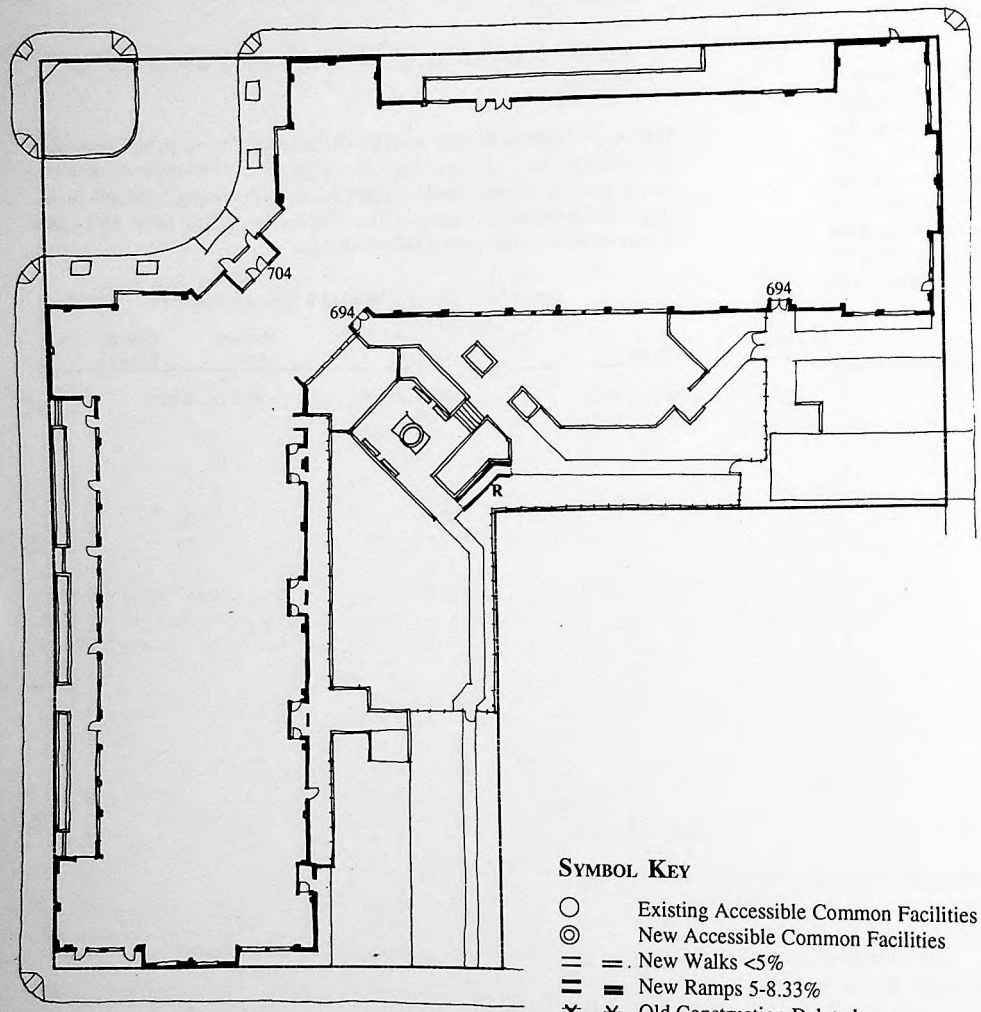
7.1 Redesign to Provide Acceptable Access to and Use of Common Facilities

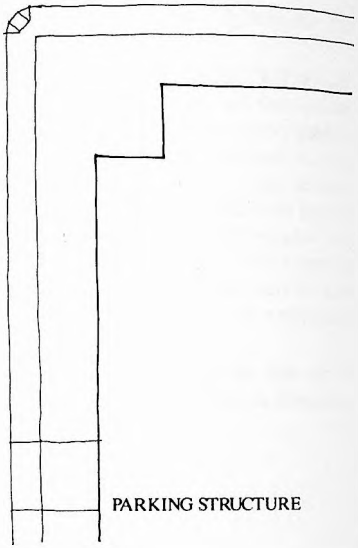
This project fulfills all requirements for accessibility to public entrances and common areas, except in one case at the rear. Movement through the garden areas at the rear would be facilitated by providing handrails in the area of ramped walk in excess of 5%. This is detailed in Table VIII.1 and shown on **Plan VIII.D** on the following page:

Table VIII.1 Design Changes for Common Facilities

Location	Redesign	Change Add	Change Deduct
Garden Areas	Add handrails	80LF (linear foot)	

VIII.D PROPOSED DESIGN FOR ACCESSIBILITY (COMMON FACILITIES)





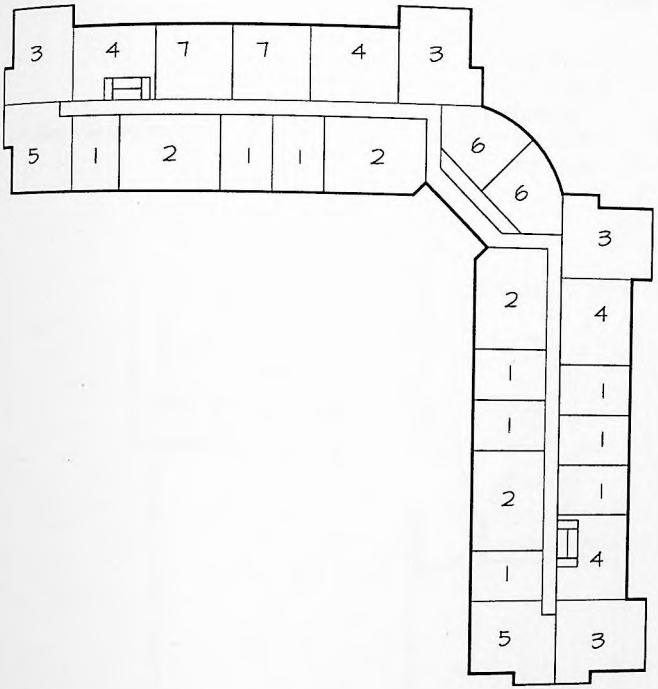
SYMBOL KEY

- ○ Existing Accessible Common Facilities
- ◎ New Accessible Common Facilities
- = = New Walks <5%
- = = New Ramps 5-8.33%
- ✕ ✕ Old Construction Deleted
- ▬ Major Mew Retaining Walls

VIII.D ARLINGTON
REDESIGN FOR ACCESSIBLE COMMON FACILITIES

100 FEET 40 20 10 0

VIII. ARLINGTON PLAZA: BUILDING DESCRIPTION



Building Description

This mid-rise luxury apartment block consists of six stories of apartments in one wing and seven in the other, one story of retail shops, the main lobby and a basement level under one wing that contains mechanical rooms, laundry and storage space and access to a rear landscaped plaza.

A typical floor comprises seven different unit types:

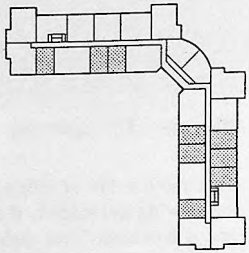
1. One bedroom, one bath	650 sq. ft.
2. Two bedrooms, two baths	980 sq. ft.
3. Two bedrooms, den, two baths	1070 sq. ft.
4. Two bedrooms, one bath	770 sq. ft.
5. One bedroom, one bath, dining	840 sq. ft.
6. Studio, one bath	690 sq. ft.
7. Two bedrooms, two baths	900 sq. ft.

The individual unit plans derive their layout, in large part, from the overall building form and the architect's desire to articulate the ends of each wing and the center "knuckle", which connects the two wings and which locates the building entry.

VIII. ARLINGTON PLAZA UNIT 1

Original Unit Plan

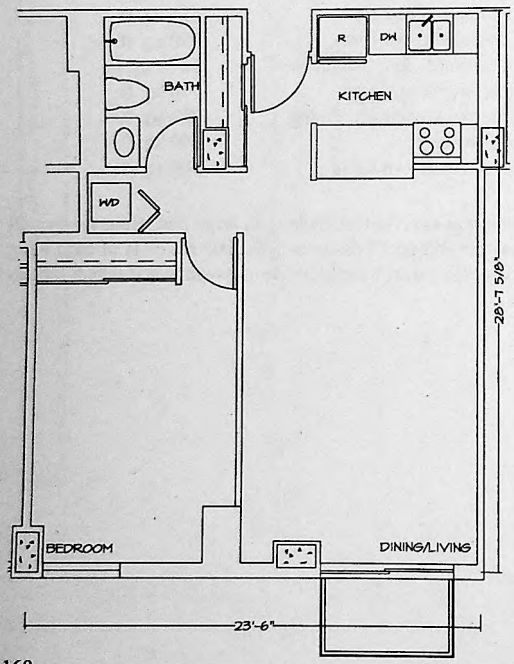
The 650 sq.ft. one bedroom plans occurs at nine locations throughout both tower wings.

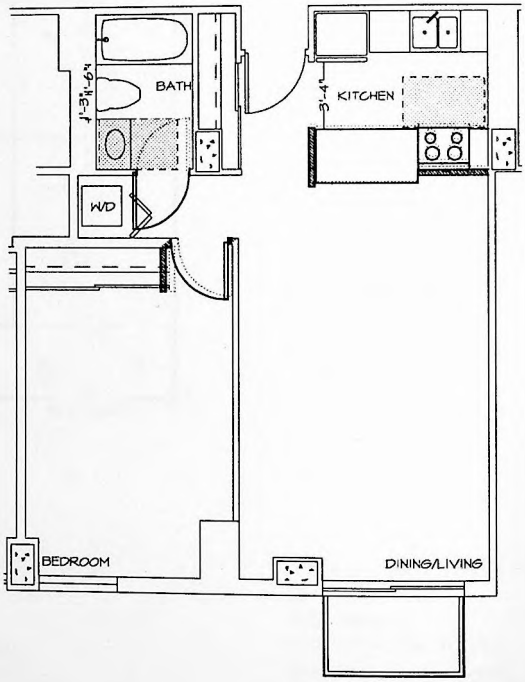


FHA

Very minor revisions include the outswinging of the bath door to accomodate a 30"×48" clear floor space.

- 2'-10" doors at bedrooms and bath.
- 40" between kitchen counter and refrigerator.
- Removable bath vanity cabinet.
- Wall reinforcement for fixed grab bars at tub/shower and foldaway toilet grab bar.

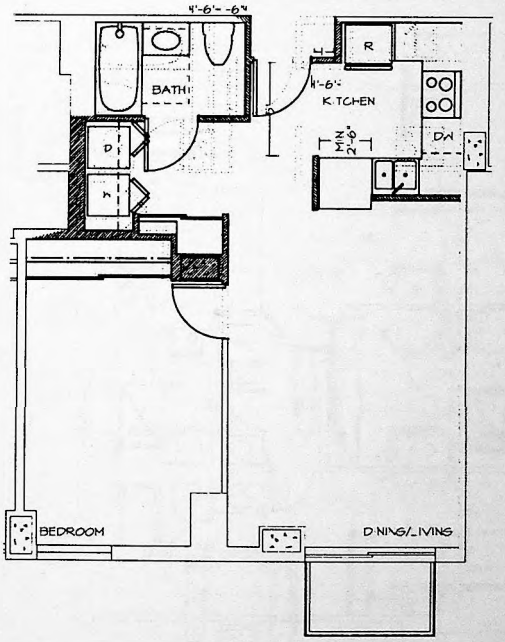




ANSI

Kitchen reconfigured to a "U" shape to allow 5'-0" clear space in front of entry door and adjacent 18" side clearance next to latch on pull side of door. Bath revised to provide for grab bar blocking. Bedroom entry rotated to allow separate washer/dryer. Bath door swings out to provide 30"×48" clear space.

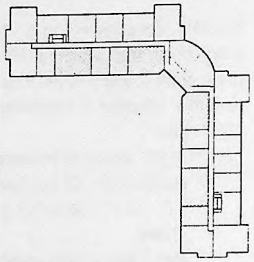
- 2'-10" doors at bedroom and bath.
- Adjustable 30" kitchen sink counter and 30" work surface.
- 12" next to latch on push side of entrance door with both latch and closer.
- Removable bath vanity cabinet.
- Wall reinforcement for fixed grab bar at tub/shower and toilet.

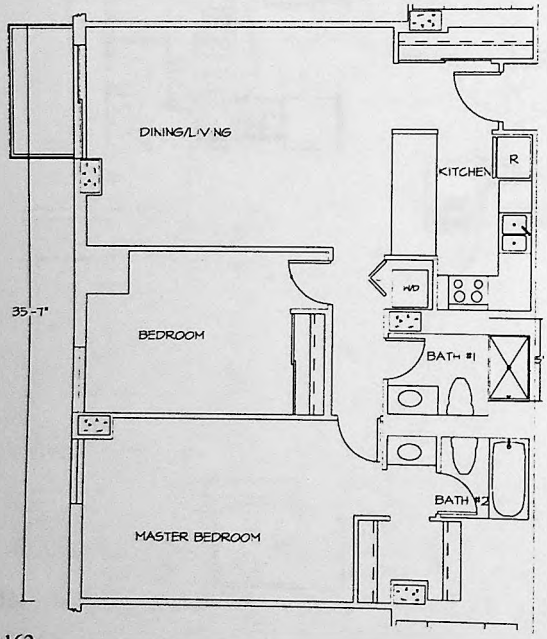


VIII. ARLINGTON PLAZA UNIT 2

Original Unit Plan

The 980 sq. ft. two bedroom unit occurs at four locations on a typical tower plan.

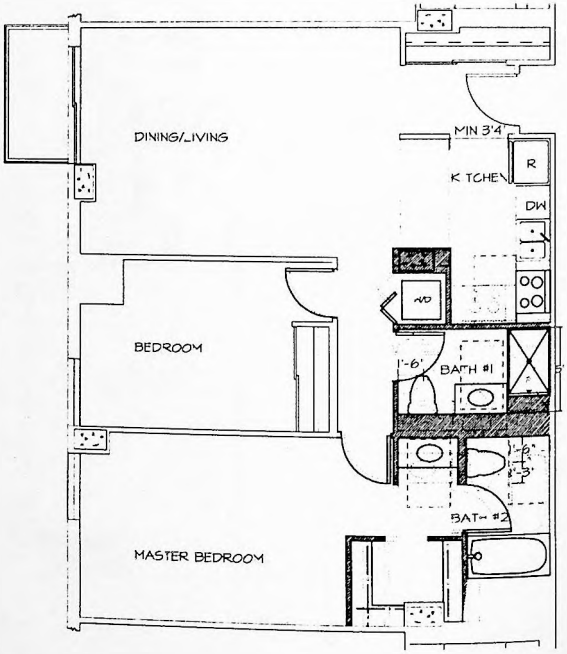




FHA Option A

Plumbing chase and center column shifted to provide 30"x48" clear floor area in Bath #2. "U" shaped kitchen modified to galley type to avoid five foot turning radius requirement.

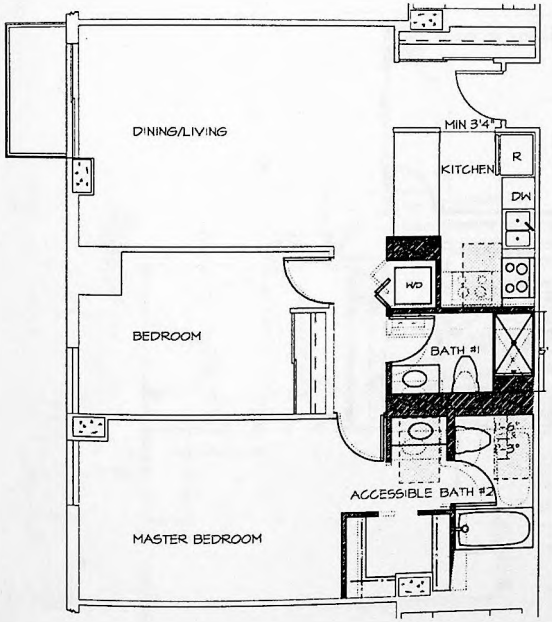
- Removable vanity cabinets at both baths.
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bars at tub/shower and toilet in Bath #2 and at tub/shower and foldaway toilet grab bar in Bath #1.



FHA Option B

Revisions similar to Option A except that Bath #1 does not have to be accessible.

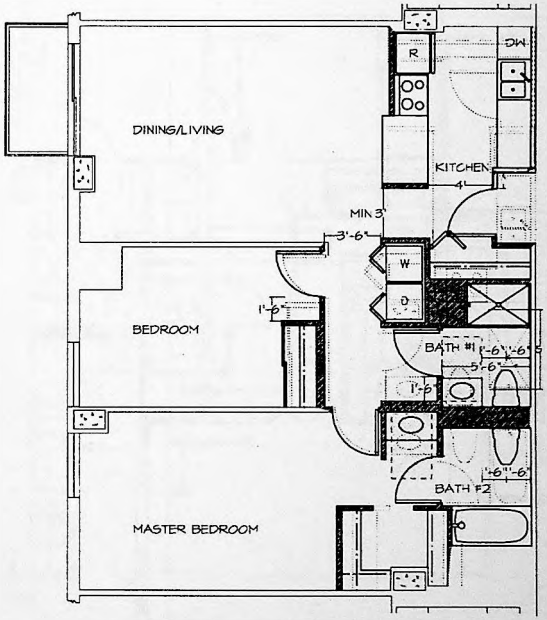
- Removable vanity cabinet at Bath #2.
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bars at tub/shower and toilet in Bath #2 and tub/shower and foldaway toilet grab bar in Bath #1.



ANSI

Entry closet/kitchen switched to allow space for separate washer/dryer combination. Corridor widened to allow for 2'-10" door and frame at master bedroom entrance. Plan shows both baths accessible. If only one is required, modify Bath #1 as shown leaving Bath #2 configured as in original plan.

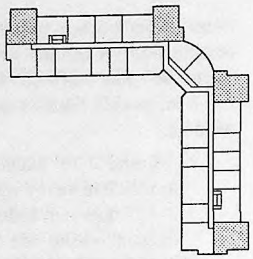
- Adjustable 30" kitchen sink counter and 30" work surface.
- Removable vanity cabinets at both baths.
- 2'-10" doors at bedrooms and baths. 1'-6" side clearance next to latch on swing side of doors.
- 4' width at latch side approach to front door.
- 12" next to latch on push side of door with both latch and closer.
- Wall reinforcement for fixed grab bars at tub/showers and toilets.

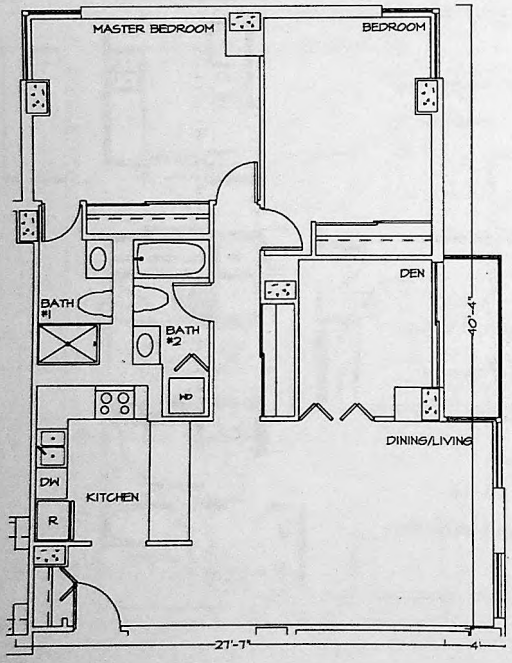


VIII. ARLINGTON PLAZA UNIT 3

Original Unit Plan

The 1070 sq. ft. two bedroom with den unit occurs at four locations at the exterior corners of a typical tower floor.

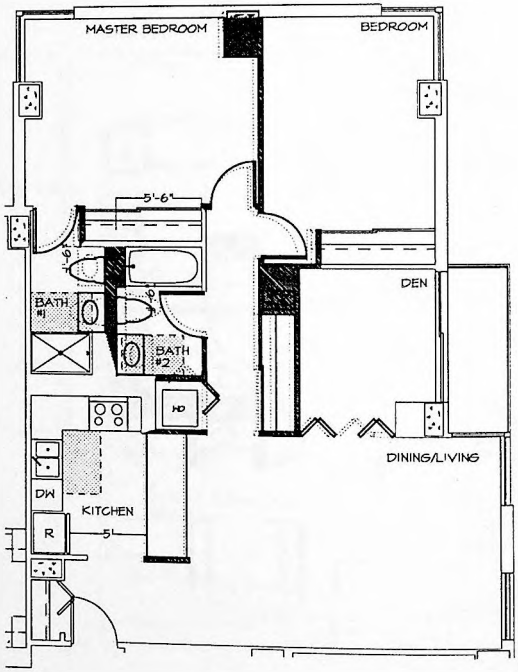




FHA Option A

Revisions include the widening of the bedroom corridor to allow 2'-10" door and frame at master bedroom, increased depth of Bath #2 to 5'-6" required for a front approach at the toilet and the switching of the vanity and toilet at Bath #1 to allow for a 30"×48" clear floor space beside the shower and a front approach to the sink.

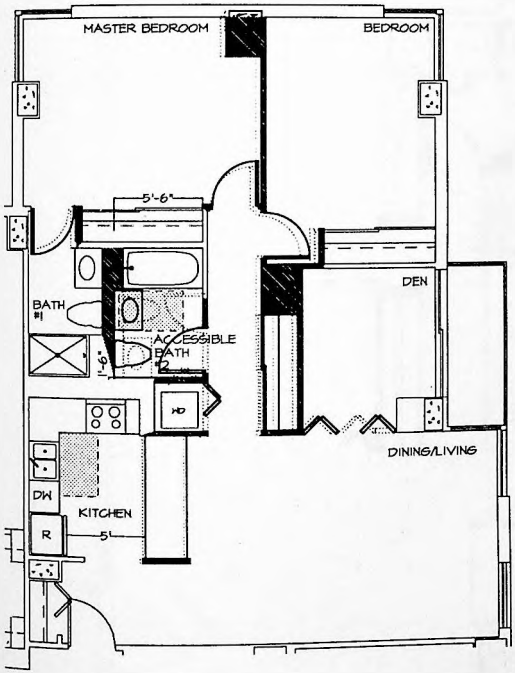
- Removable vanity cabinets at both baths.
- Wall reinforcement for fixed grab bars at tub/showers and foldaway toilet grab bars.
- 2'-10" doors at bedrooms and baths.
- 5'0" space between counter and refrigerator at "U" shaped kitchen.



FHA Option B

Revisions similar to Option A. Bath #1 remains as originally configured as only Bath #2 has to be accessible. Toilet and vanity switched in Bath #2 to provide 30"×48" clear floor space next to tub/shower.

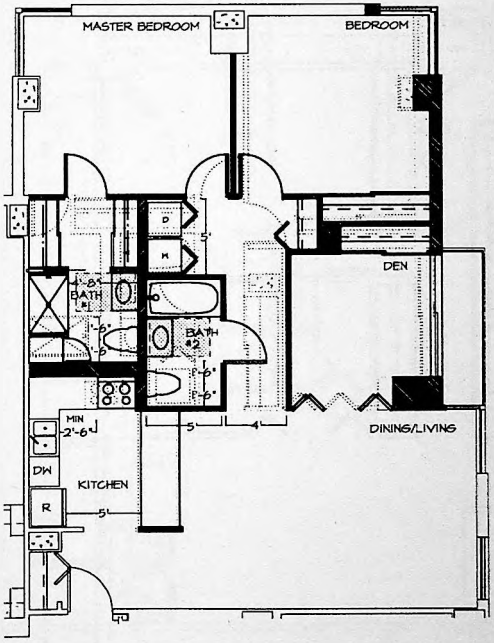
- Wall reinforcement for fixed grab bars at tub./shower and toilet in Bath #2 and at shower and foldaway toilet grab bar in Bath #1.
- 2'-10" doors at bedrooms and baths.



ANSI

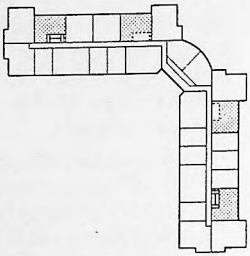
Significant plan revisions include reconfiguring Baths #1 and #2 and offsetting bedroom corridor to provide separate washer/dryer. Outswinging door at Bath #2 and pocket door at Bath #1 required to accommodate 30"×48" clear floor area. Exterior wall extended at den/bedroom to maintain approximate room size.

- Removable vanity cabinet at both baths.
- 2'-10" doors at bedrooms and baths.
- 18" side clearance next to latch on pull side of doors.
- Wall reinforcement for 42" fixed grab bars both baths.
- 4' bedroom corridor required by outswinging door.
- Adjustable 30" kitchen sink counter and 30" work surface.

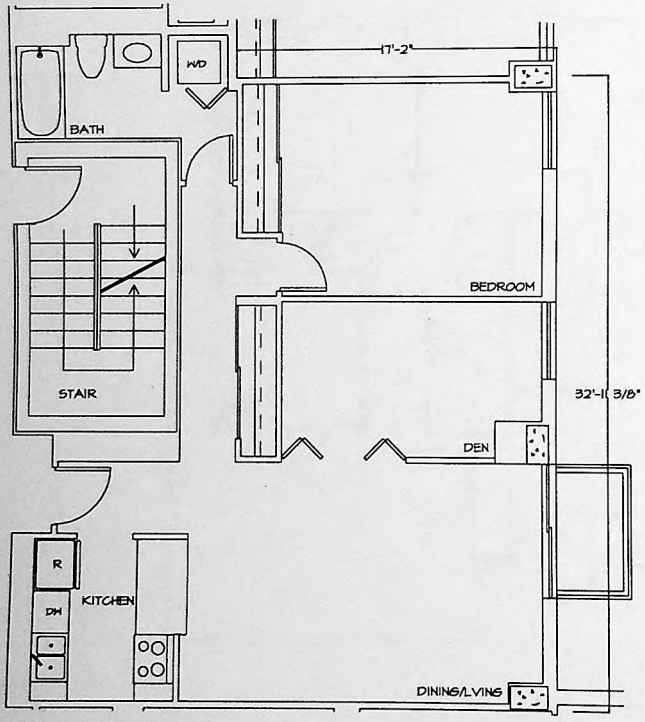


VIII. ARLINGTON PLAZA UNIT 4

Original Unit Plan



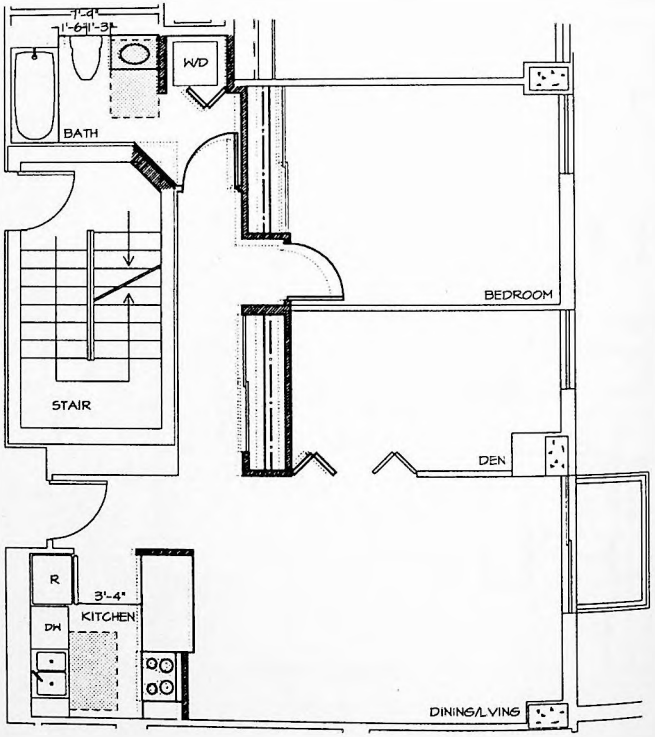
The 770 sq. ft. one bedroom with den unit occurs at four locations on a typical tower floor.



FHA

The kitchen is shifted slightly to provide the minimum 40" between refrigerator and counter. The bedroom corridor is widened to provide for 2'-10" bath door and frame. The stair landing is angled (maintaining minimum landing depth) to provide easier access to bathroom.

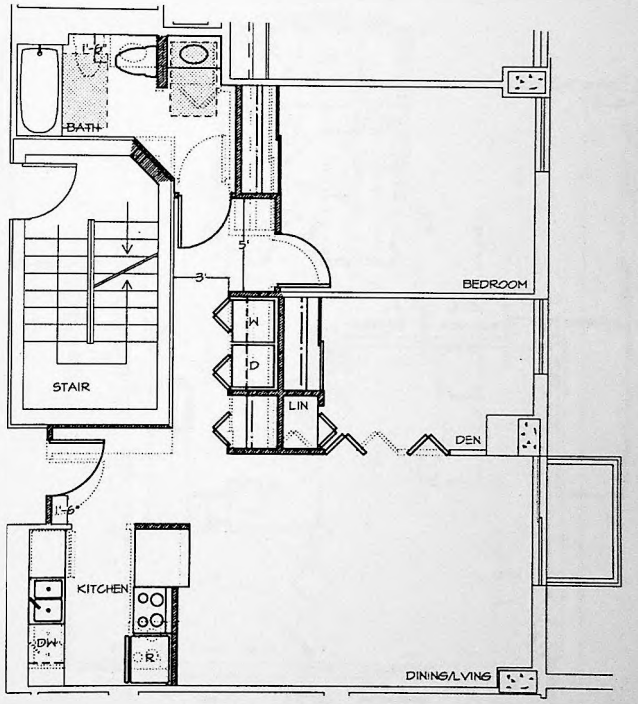
- Removable vanity cabinet.
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bars at tub/shower and foldaway toilet grab bar.



ANSI

Kitchen rearranged to provide for adjustable sink and counter. Den reduced from 8'×14' to 8'×11.5' to allow for relocated closets and separate washer/dryer.

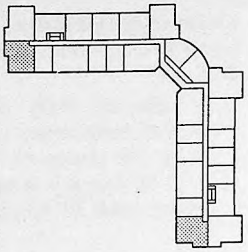
- Removable vanity cabinet at bath.
- Wall reinforcement for fixed grab bars at tub/shower and toilet.
- 18" side clearance next to latch on pull side of doors.
- 2'-10" door at bath and bedrooms.
- Adjustable 30" kitchen sink counter and 30" work surface.

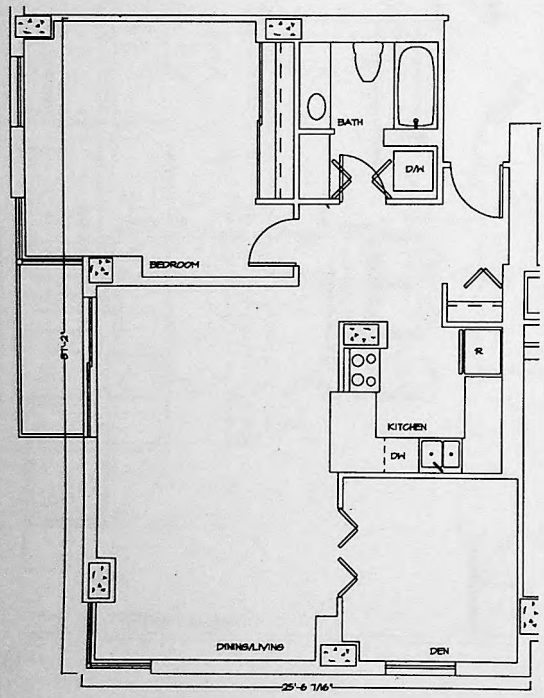


VIII. ARLINGTON PLAZA UNIT 5

Original Unit Plan

The 840 sq. ft. one bedroom with den unit occurs at two locations at either end of a typical tower wing.

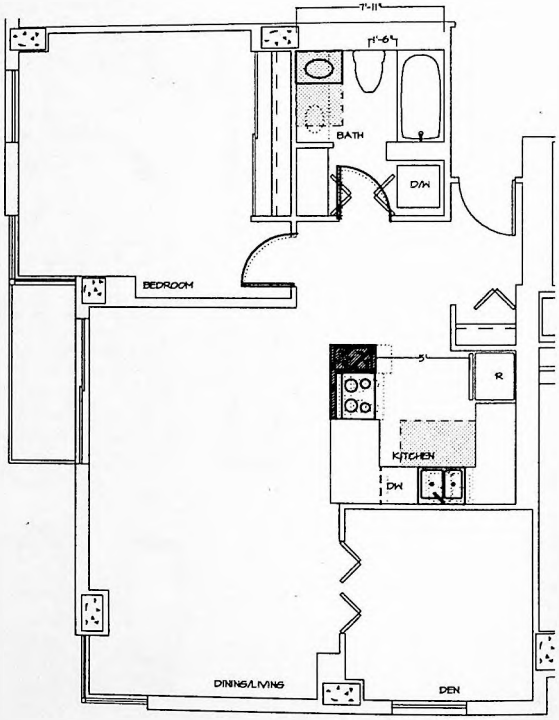




FHA

Minor revisions to kitchen and bath.

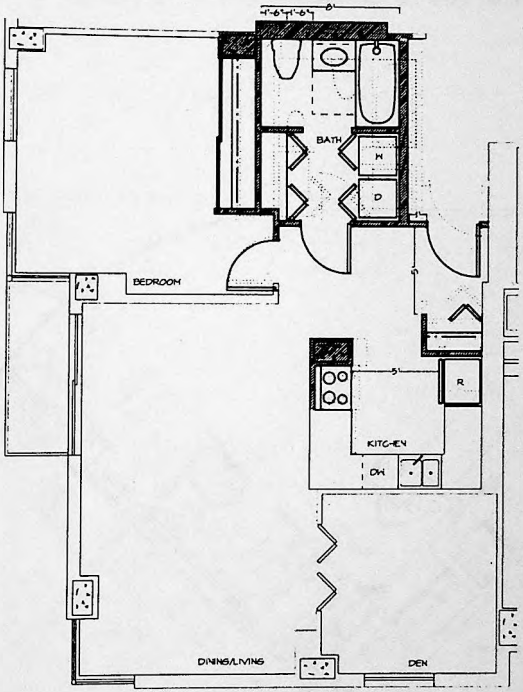
- 5'-0" separation of refrigerator and counter at "U" shaped kitchen.
- Removable bath vanity cabinet to accommodate 30"×48" clear space.
- 2'-10" doors at bedroom and bath.
- Wall reinforcement for fixed grab bars at tub/shower and foldaway grab bar at toilet.



ANSI

Bath area enlarged to accommodate separate washer/dryer. Outswinging door required.

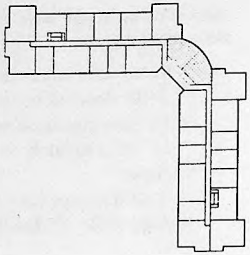
- Removable bath vanity cabinet.
- 2'-10" doors at bedroom and bath.
- 18" side clearance next to latch on pull side of doors.
- 12" next to latch on push side of entrance door with both latch and closer.
- Wall reinforcement for fixed grab bars at tub/shower and toilet.
- Adjustable 30" kitchen sink counter and 30" work surface.



VIII. ARLINGTON PLAZA UNIT 6

Original Unit Plan

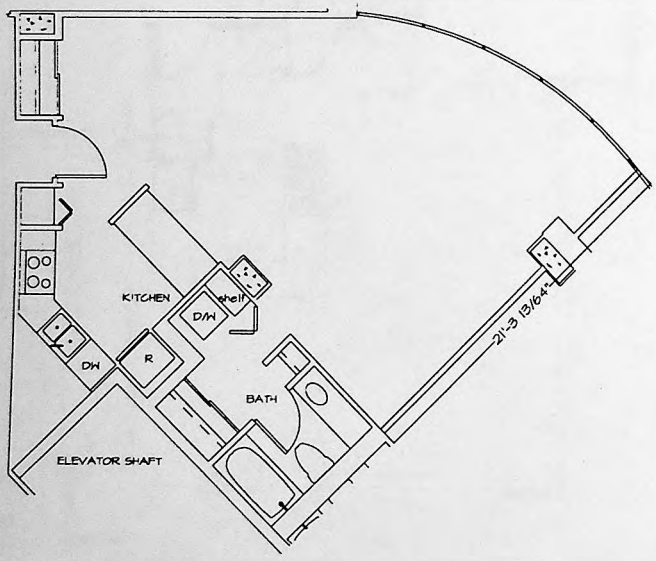
The 690 sq. ft. efficiency unit occurs at the center of the tower wings to the rear of the elevator core.

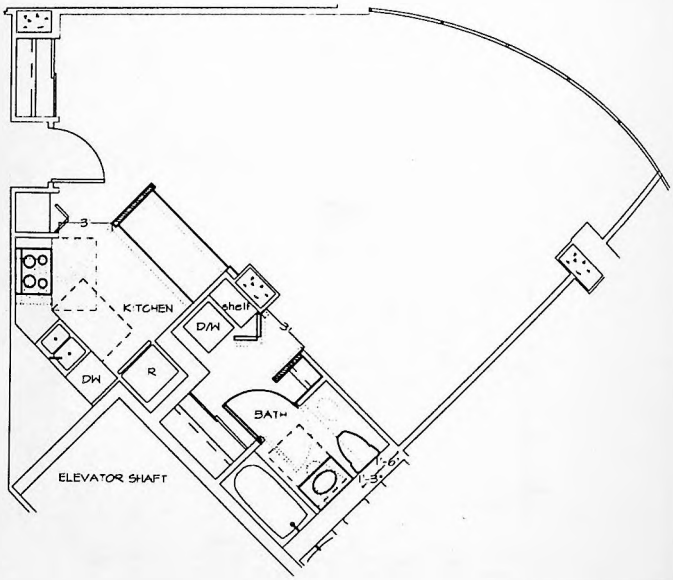


FHA

Lavatory and toilet to be switched to allow front approach to the lavatory and to avoid the increased depth required for a front approach at the toilet. Bath door to be outswing so as not to obstruct the 30"×48" clear space.

- 2'-10" doors at bathrooms.
- 3'-0" minimum entry width at kitchen.
- Removable vanity cabinet at bath.
- Wall reinforcement for fixed grab bars at tub/shower and toilet.

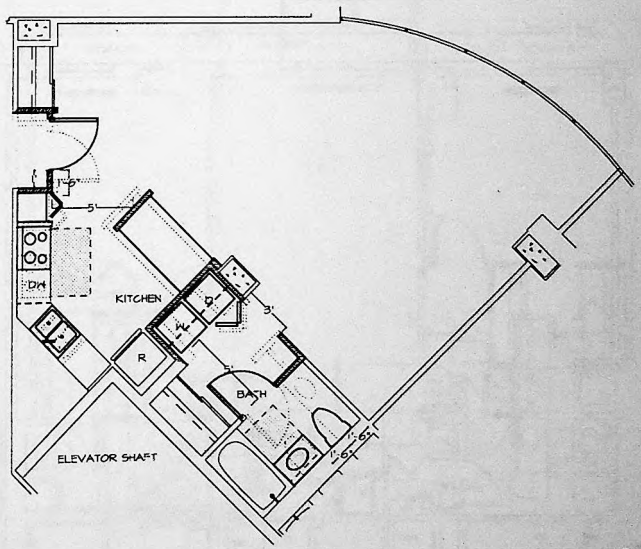




ANSI

Kitchen rearranged to provide adjustable sink and work surface counter and 5'-0" clear space at apartment entry. Washer/dryer area modified to provide separate appliances.

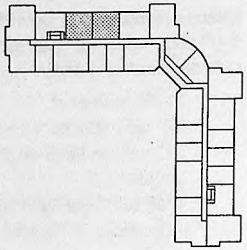
- 2'-10" bath door.
- 18" side clearance next to latch on pull side of doors.
- 12" next to latch on push side of entrance door with both a latch and a closer.
- Wall reinforcement for fixed grab bars at tub./shower and toilet.
- Adjustable 30" kitchen sink counter and 30" work surface.

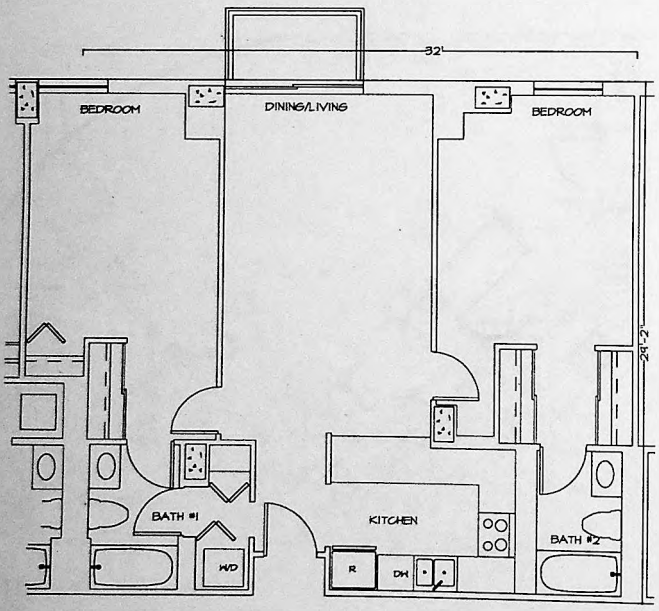


VIII. ARLINGTON PLAZA UNIT 7

Original Unit Plan

The 900 sq. ft. two bedroom unit occurs at two adjacent locations in the center of one of the tower's two wings.

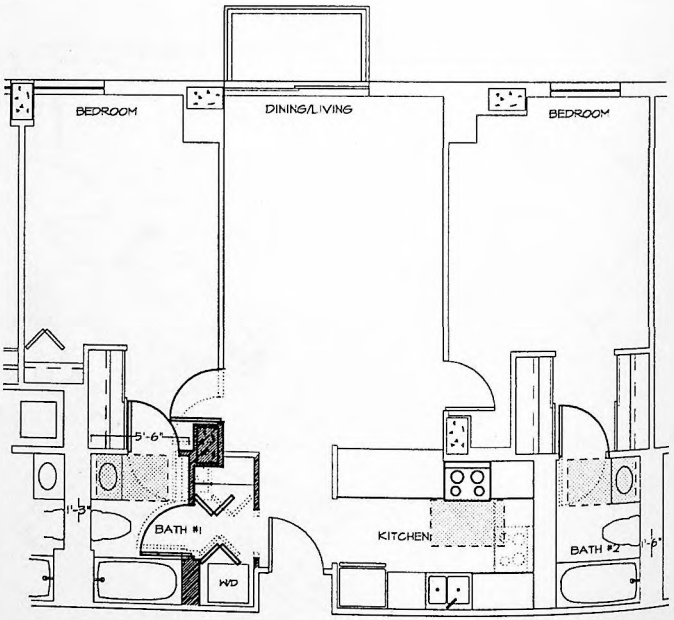




FHA Option A

Revisions include the slight relocation of one column, the change from a "U" shaped kitchen to a galley configuration to avoid the 5'-0" turning radius requirement and the use of outswinging bathroom doors in lieu of inswinging doors to provide 30"×48" clear space in both baths.

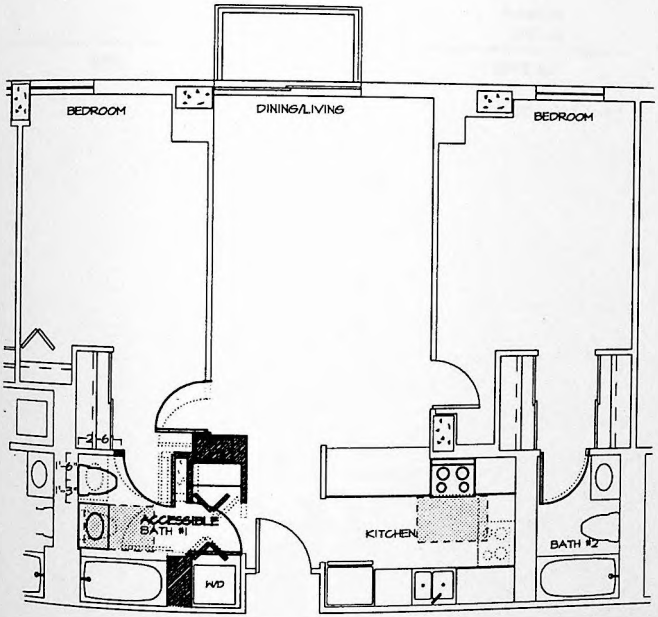
- 2'-10" doors at bedrooms and baths.
- Removable vanity cabinets at baths.
- 40" minimum space between kitchen counter and refrigerator.
- Wall reinforcement for fixed grab bars at tub/showers and foldaway grab bars at toilets.



FHA Option B

Revisions similar to Option A except for switch of toilet and lavatory fixtures in Bath #1 to provide for 30"×48" clear floor space next to tub/shower. Bath #2 can remain as originally designed as only Bath #1 has to be accessible.

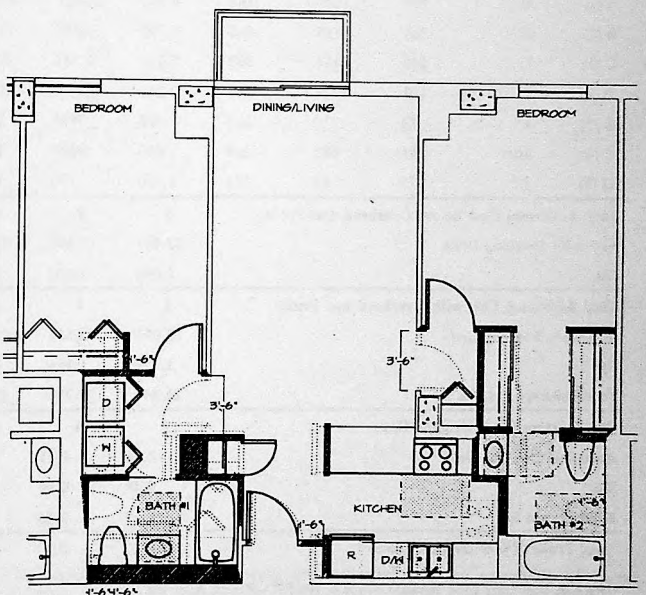
- 2'-10" doors at bedrooms and baths.
- Wall reinforcement for fixed grab bars at tub./shower and toilet in Bath #1 and at tub/shower and foldaway grab bar in Bath #2.
- Removable vanity cabinet at Bath #1.



ANSI

Kitchen similar to Option A and B. Both baths rearranged to provide blocking for fixed 42" grab bars. Pocket door required at Bath #1 and #2 as 18" not available at swing side of door. Separate washer/dryer provided.

- 2'-10" doors at bedrooms and baths.
- Removable vanity cabinet at both baths.
- 18" side clearance next to latch on pull side of doors.
- Adjustable 30" kitchen sink counter and 30" work surface.
- Wall reinforcement for fixed grab bars at tub/shower and toilets.
- 12" next to latch on push side of entrance door with both latch and closer.



CASE STUDY VIII — ARLINGTON COST SUMMARIES

ORIGINAL PROJECT COSTS

Dwelling Units Cost ($)	8,902,200
Sitework Cost ($)	234,800
Total Buildings and Site Cost ($)	9,137,000
Project Cost ($)	11,766,000

ADDITIONAL SITE, DWELLING UNIT AND COMMON FACILITIES COSTS

Unit Type	# of Accessible Units	Additional Cost Per Unit FHA-A $	FHA-B $	ANSI $	Additional Cost Per Unit x No. of Units FHA-A $	FHA-B $	ANSI $
A (1)	51	102	102*	563	5,202	5,202*	28,713
B (2)	22	305	166	516	6,710	3,652	11,352
C (3)	21	249	188	992	5,229	3,948	20,832
D (4)	22	102	102*	509	2,244	2,244*	11,198
E (5)	11	72	72*	317	792	792*	3,487
F (6)	10	68	68*	264	680	680*	2,640
G (7)	10	175	87	511	1,750	870	5,110
Total Additional Cost Before Overhead and Profit:					$	$	$
Accessible Dwelling Units					22,607	17,388	83,332
Site					1,040	1,040	1,040
Total Additional Cost with Overhead and Profit:					$	$	$
Accessible Dwelling Units					25,094	22,584	92,499
Site					1,154	1,154	1,154
Total Buildings and Site ($)					26,248	23,738	93,653
Cost Increase (% of Original Cost):					%	%	%
Accessible Dwelling Units					0.28	0.25	1.04
Site					0.49	0.49	0.49
Buildings and Site					0.29	0.26	1.02
Total Project (% of Original Cost):					0.22	0.20	0.80

* FHA-A Unit Cost Used Because There Is No FHA-B Unit Alternate

ADDITIONAL SITE COST SUMMARY

Item	Description	Qty.	Unit	$/Unit	$/Add	$/Deduct
Dwelling Units						
1	Handrail Mounted on Wall	40	LF	26.00	1,040	
	Net Total				1,040	

LF = Lineal Feet

APPENDIX

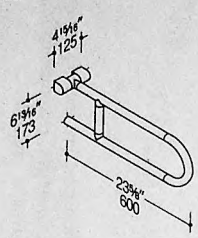
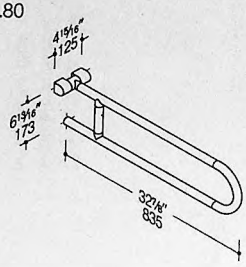
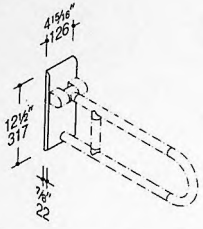
Contents

Wall and Floor-Mounted Grab Bars

Adaptable Housing - Marketable Housing for Everyone:
(Produced for U.S. Department of Housing and Urban Development by Barrier Free Environments Inc., 1987)
Examples of Removable Vanity Cabinets and Adjustable Kitchen Counters

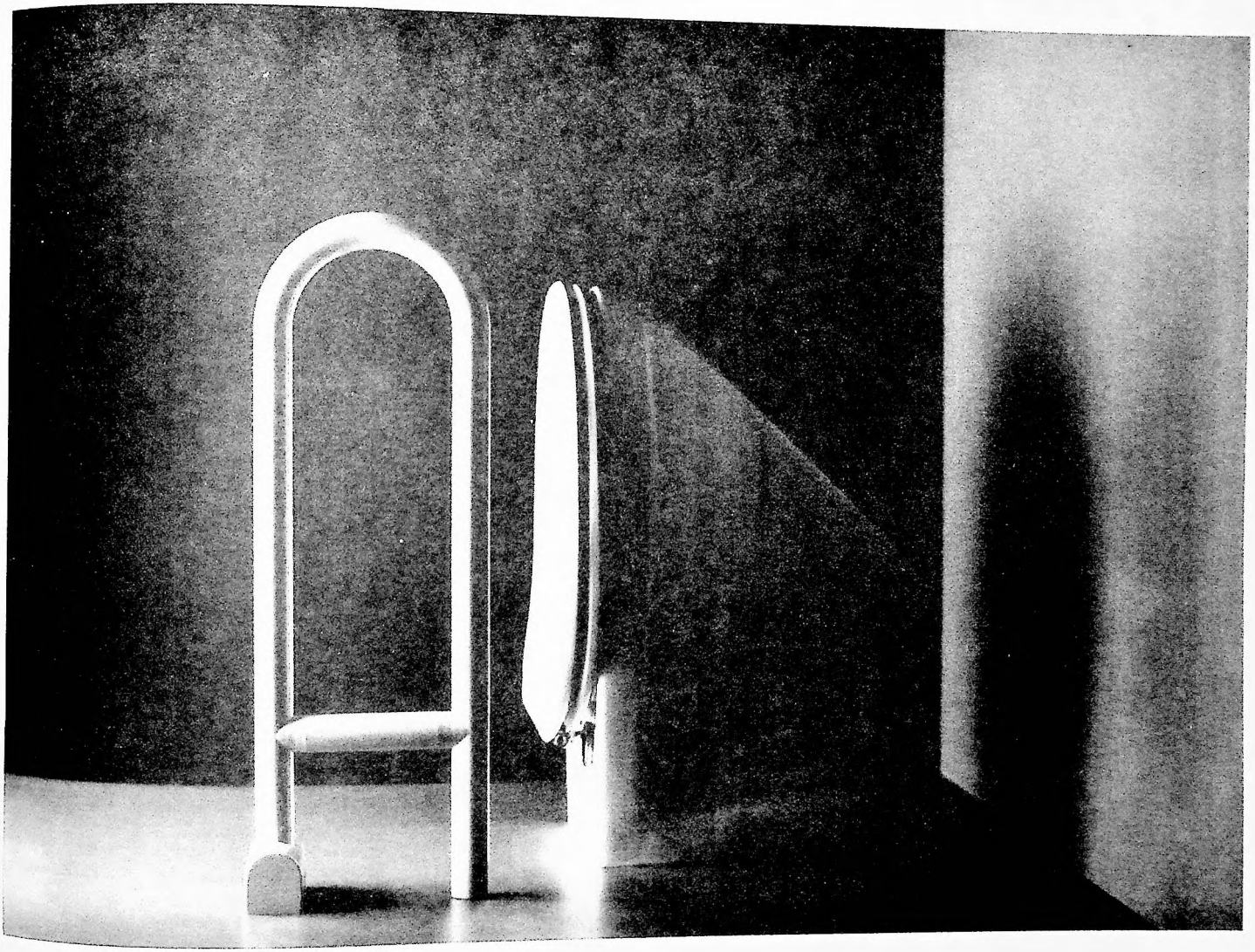
Fair Housing Accessibility Guidelines

The products listed in the report are included only as examples of some available products. No endorsement, recommendation, or evaluation of these products or their use is given or implied.

Item Number	Specification	
33.3081.60 	HEWI Support with Fold-Up Feature[1] Nylon (Ultramid); diameter 33 mm (1 5/16"); with corrosion resistant steel insert; spring assisted up and down movement; locked in the up position by turning left or right; adequate wall blocking required; supplied with screw inserts and socket head bolts Ordering Information Item Number: Color: Instructions should be followed for proper installation	
33.3081.80 	HEWI Support with Fold-Up Feature[1] Nylon (Ultramid); diameter 33 mm (1 5/16"); with corrosion resistant steel insert; spring assisted up and down movement; locked in the up position by turning left or right; adequate wall blocking required; supplied with screw inserts and socket head bolts Ordering Information Item Number: Color: Instructions should be followed for proper installation	
33.3081 WPN 	HEWI Wall Protection Base Nylon coated, corrosion resistant steel plate with nylon cover cap; 317 mm x 126 mm (12 1/2" x 4 15/36"), 22 mm (7/8") thick; for mounting of HEWI supports with fold-up feature 33.3081…; adequate wall blocking required; fastening hardware for wood included Ordering Information Item Number: Color: Instructions should be followed for proper installation	

NOTE: Inch measurements are approximate; mm (Millimeter) are exact.

[1] Custom sizes available



Elcoma
Metal Fabricating Ltd.

1 1/4" FLIP UP GRAB BAR

TECHNICAL DATA

CONSTRUCTION

TUBING is either 18 gauge type 304 1 1/4" O.D. stainless with exposed surfaces in polished satin finish or 18 gauge steel with various finishes. Mandrel bending process maintains uniform bar diameter.
WALL BRACKET is die cast zinc coated with various finishes. Concealed locking mechanism attached to wall plate holds bar in horizontal or vertical position.

STRENGTH

Swing up grab bar is only as strong as the wall and anchors to which it is attached. Grab bar must be securely fastened to wall to withstand the load it is intended to support. Designed and tested to withstand 300 lbs. of downward pull.

OPERATION

Grab bar is manually lowered to horizontal support position and raised for departure. An automatic locking system enables the user to lock the Flip up in either the horizontal or retracted vertical position, allowing safe and simple access.

INSTALLATION

Secure to the wall where adequate in-wall backing exists. Use wall plate as a template to locate mounting holes. Drill holes and set anchors as appropriate. Mount grab bar and secure mounting screws. If in doubt, we suggest installation by a qualified tradesman.

GUIDE SPECIFICATION

Flip Up grab bar shall be fabricated of type 304 (18-8)stainless steel with exposed surfaces in polished satin finish or steel with various finishes.

OPTIONAL WALL BRACKET

Allows for 45 degree mounting of Flip Up grab bar.

CONSTRUCTION

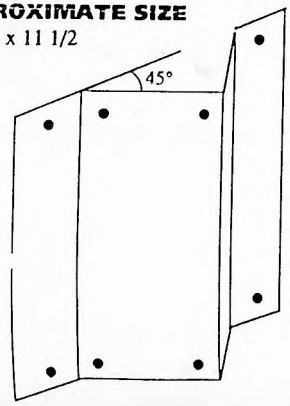
- 12 gauge steel
- 3/8" mounting holes

FINISH

- Powder coated white

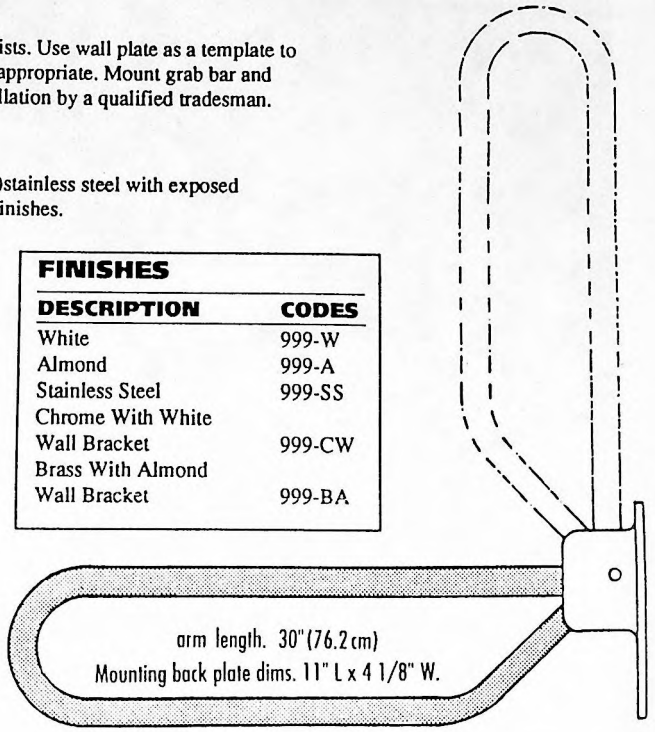
APPROXIMATE SIZE

-11 1/2 x 11 1/2



FINISHES

DESCRIPTION	CODES
White	999-W
Almond	999-A
Stainless Steel	999-SS
Chrome With White Wall Bracket	999-CW
Brass With Almond Wall Bracket	999-BA

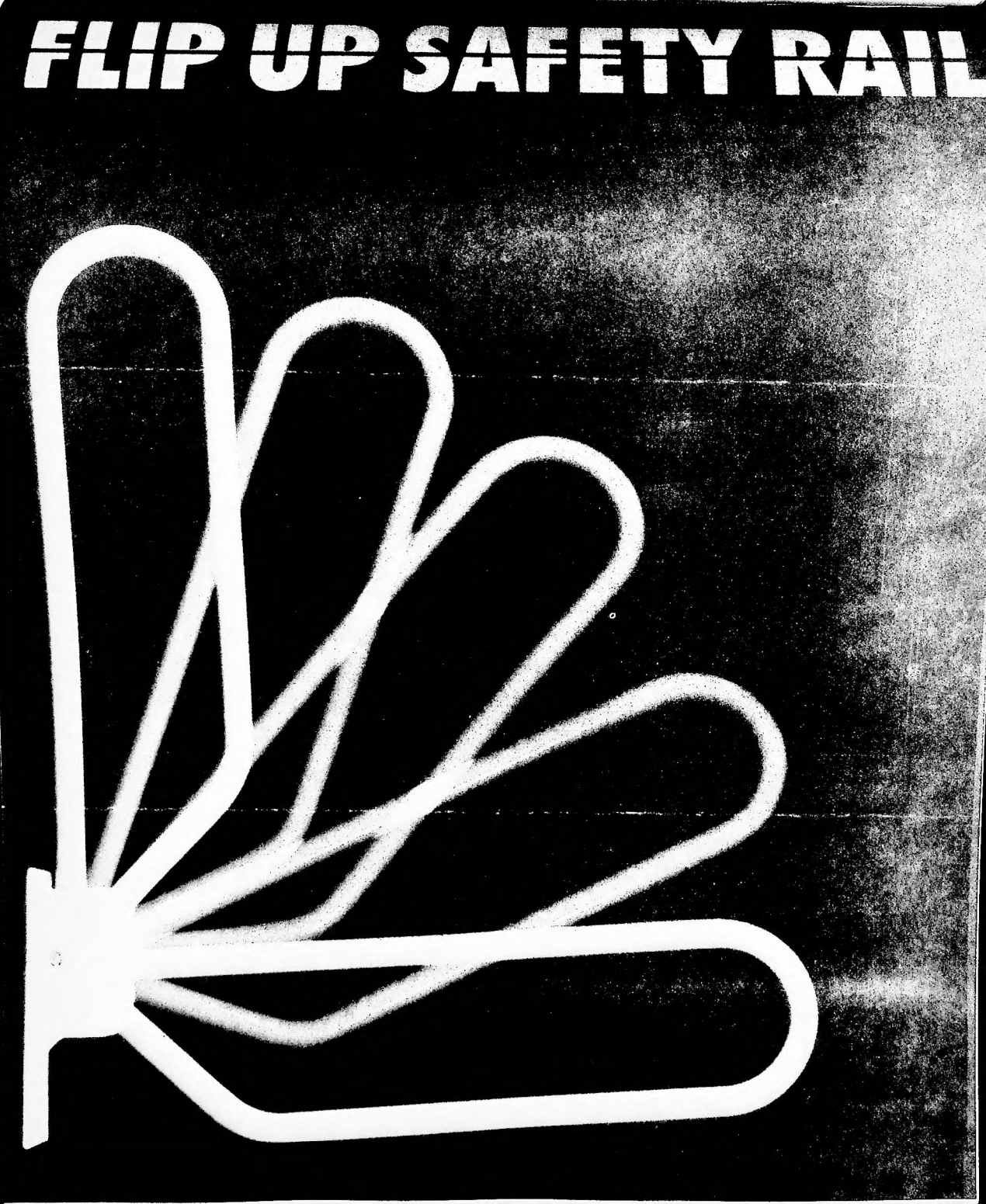


These units are highly recommended by barrier-free design experts because they provide the optimum approach path for wheelchair users. Consult applicable codes for specific requirements.

The manufacturer reserves the right to make changes in design and material without formal notice and without incurring obligation.

Canada - 878 William St., Midland, Ont., L4R 4P4, Canada • Tel: (705) 526-9363 Fax: (705) 526-7555
United States - 1929-36th Street N.E., Canton, Ohio 44705 • Tel: (216) 588-8844 Fax: (216) 588-9647 Toll Free 1-800-352-6625

FLIP UP SAFETY RAIL



Costs for Providing Removable Cabinets and Adjustable Height Counters

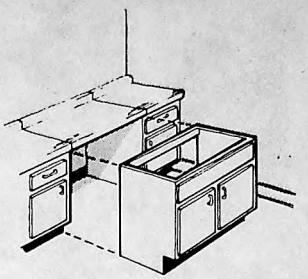
To develop cost estimates, two local suppliers of cabinets and counters in Raleigh, North Carolina, and a large manufacturer of stock cabinets were asked to review the methods for providing removable base cabinets and adjustable height counters. One of the local suppliers was a custom cabinet shop and the other was a supplier of several lines of manufactured kitchen and vanity cabinets and counters.

For a basic price comparison, each was asked to quote a price for a standard 30 inch base cabinet from their line so that these costs could be compared with the costs for each of the methods for adaptable cabinetry. The lowest price for the standard base cabinet was $128.00 from the custom cabinet shop. One line of manufactured cabinets had a 30 inch base cabinet that was quoted at $178.06, and the other line had a quote of $230.00. These prices are typical of cabinets of average quality; lower priced cabinets are available as are other cabinet lines that are much more expensive.

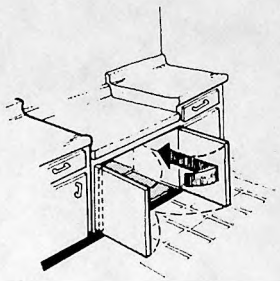
The cabinet suppliers and the manufacturer provided information on what it would cost to produce each of the methods for removable base cabinets. This information was provided as a percentage increase above the cost of a standard cabinet that they sold. Each estimate gives an indication of what it may cost to purchase adaptable cabinets and adjustable height counters at this time.

Cost Comparisons for Removable Base Cabinets

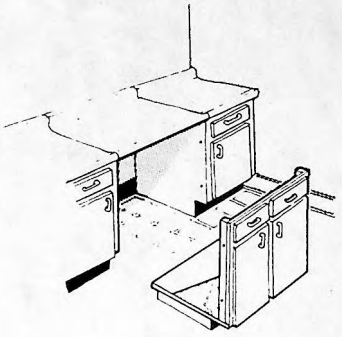
For the first method, **removable standard base cabinet**, the increased cost ranged from no additional cost for the custom cabinet shop to a 10% increase for the manufactured cabinet line. The custom cabinet supplier said that there was no additional cost if the cabinet was ordered without a back, with cut down sides and with bracing.



The second method, **base cabinet with self-storing, folding doors**, was more expensive to build. As a custom made cabinet it would cost 81% more than the standard custom made base cabinet. This cabinet in the manufactured line of cabinets was estimated to cost 75% more than their standard base cabinet.



The third method, **removable cabinet front and floor**, was also slightly more expensive when supplied by the custom cabinet shop than when supplied by the large cabinet manufacturer. The price for the custom cabinet was 14% more than the price for the standard custom base cabinet. The price for this type of cabinet in the manufactured line was 10% more than the standard manufactured base cabinet.

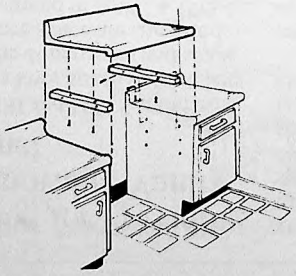


Cost Comparisons for Adjustable Height Counters

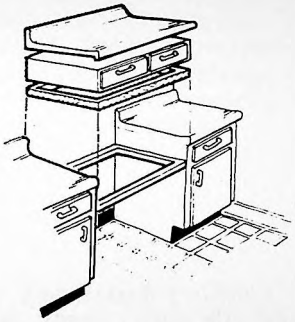
The custom cabinet shop and the local supplier of manufactured cabinets provided cost information on the three methods for providing adjustable height counters. The cost for a standard 30 inch section of laminate covered counter including installation was $40.00 from the custom cabinet shop and $67.50 from the other supplier.

Only the custom cabinet shop provided cost estimates for all three methods of adjusting the counter height. The other kitchen cabinet supplier said that while they could do each of the methods in their shop, it would be difficult for them to estimate the costs for each method until several of the counters were built. Initially, charges for fabricating each method would be made on a materials plus labor rate with labor charges of $25.00 per hour.

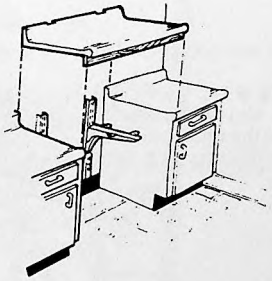
For the first method, **movable wood support strips**, there was a 112% ($85.00 vs. $40.00) increase in cost over the standard 30 inch section of counter provided by the custom cabinet shop. This increase covered the screw inserts, mounting screws, installation of the hardware in the cabinetry and counter, and a 30 inch section of counter with finished ends.



For the second method, **fixed support frame and spacers**, there was a 50% ($60.00 vs. $40.00) increase in cost compared to the standard counter. The cost included the mounting frame, installation of the frame onto the cabinet, mounting hardware and the 30 inch section of counter with finished ends. The cost of a removable 5 inch drawer unit to raise the counter to 36 inches was estimated at an additional $65.00. Optional spacers were $10.00 each.



The third method, **wall-mounted adjustable brackets**, was 137% ($95.00 vs. $40.00) more expensive than the standard counter. The cost covered the special commercial shelf standards and brackets, installation of the standards onto studs, mounting hardware for the wall and for the counter, and a 30 inch section of counter with finished ends.



Source Adaptable Housing

Method for Providing a Removable Vanity Cabinet

The ANSI and UFAS standards require a knee space under a lavatory. The dimensions and shape of the knee space are specified and illustrated in ANSI 4.19.2.1 and UFAS 4.19.2.

Knee spaces are particularly important in bathrooms which are generally small and have little maneuvering space. The knee space under the lavatory provides clearance for turns as well as space for a close approach to the lavatory by people using wheelchairs.

Standard wall-hung or countertop lavatories can be used in accessible bathrooms as long as the knee space is provided so that seated people do not have to twist and reach to use the lavatory. If vanity cabinets are installed under countertop lavatories, they must be removable to reveal the knee space when needed.

Unlike kitchen sinks, the ANSI and UFAS adaptable specifications for lavatories do not require adjustable height lavatories. In some facilities adjustable height lavatories may be preferred and they can be easily provided by using a countertop lavatory and one of the methods shown earlier in

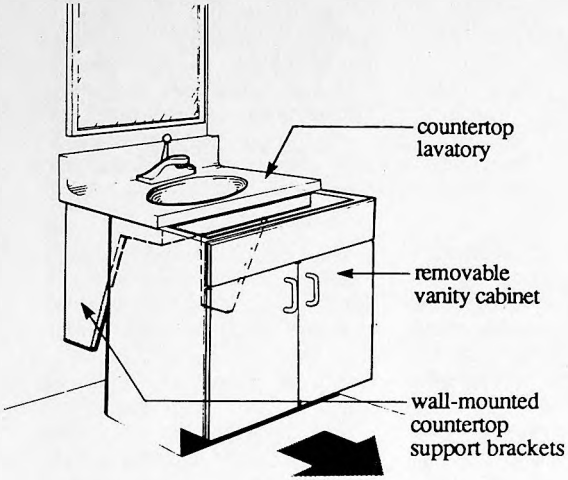


Figure 47.
Removing Vanity Cabinet to Expose Knee Space

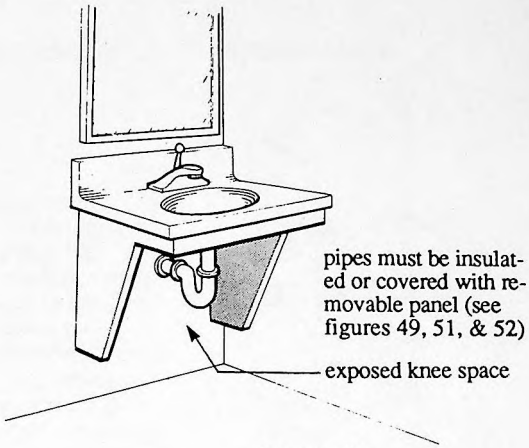


Figure 48.
Exposed Knee Space Under Bracket-supported, Countertop Lavatory

this chapter for adjustable height kitchen counter segments (see page 30).

When a removable vanity cabinet is used, the countertop and lavatory can be supported by concealed, wall-mounted brackets that fit inside the cabinet. These brackets are hidden when the base cabinet is in place. (Figure 47) When the cabinet is removed, the brackets which support the lavatory and countertop are exposed. (Figure 48) The brackets can also support a panel that covers the water pipes and drain. (Figures 49& 50)

The plumbing below the lavatory must be covered to prevent burns and abrasions. This can be done by using removable insulation to cover the hot water pipe and the drain (figure 51), or by adding a fixed, one piece cover (figure 52). For countertop lavatories, an appearance and protection panel similar to that used in the kitchen is useful and attractive. (Figure 49)

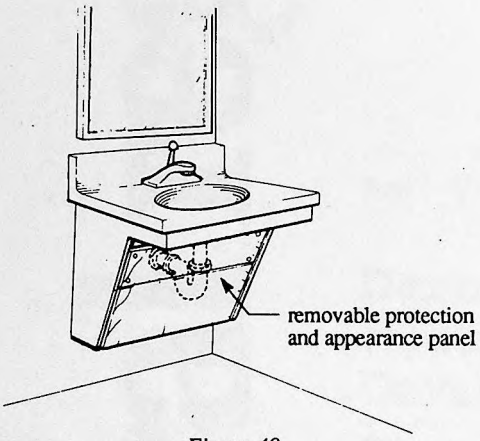


Figure 49.
Countertop Lavatory with Wall Brackets and Appearance and Protection Panel

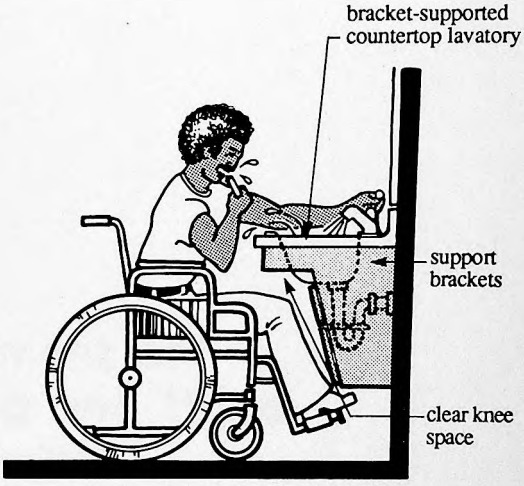


Figure 50.
ANSI and UFAS Required Clear Knee Space at Lavatories

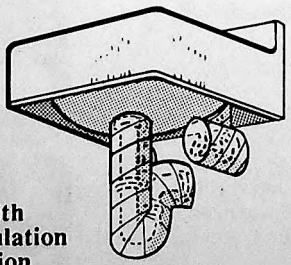


Figure 51.
Lavatory with Removable Insulation Pipe Protection

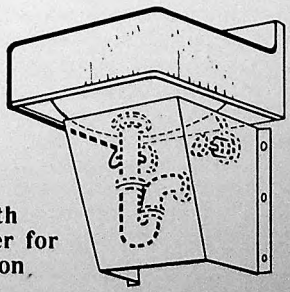


Figure 52.
Lavatory with Removable Cover for Pipe Protection

federal register

Wednesday
March 6, 1991

Part VI

Department of Housing and Urban Development

Office of the Assistant Secretary for Fair Housing and Equal Opportunity

24 CFR Chapter I

Final Fair Housing Accessibility Guidelines

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT

Office of the Assistant Secretary for Fair Housing and Equal Opportunity

24 CFR Ch. I

[Docket No. N-91-2011; FR 2665-N-06]

Final Fair Housing Accessibility Guidelines

AGENCY: Office of the Assistant Secretary for Fair Housing and Equal Opportunity, HUD.

ACTION: Notice of Final Fair Housing Accessibility Guidelines.

SUMMARY: This document presents guidelines adopted by the Department of Housing and Urban Development to provide builders and developers with technical guidance on how to comply with the specific accessibility requirements of the Fair Housing Amendments Act of 1988. Issuance of this document follows consideration of public comment received on proposed accessibility guidelines published in the **Federal Register** on June 15, 1990. The guidelines presented in this document are intended to provide technical guidance only, and are not mandatory. The guidelines will be codified in the 1991 edition of the Code of Federal Regulations as Appendix II to the Fair Housing regulations (24 CFR Ch. I, Subch. A, App. II). The preamble to the guidelines will be codified in the 1991 edition of the Code of Federal Regulations as Appendix III to the Fair Housing regulations (24 CFR Ch. I, Subch. A, App. III).

EFFECTIVE DATE: March 6, 1991.

FOR FURTHER INFORMATION CONTACT: Merle Morrow, Office of HUD Program Compliance, room 5204, Department of Housing and Urban Development, 451 Seventh Street, SW., Washington, DC. 20410-0500, telephone (202) 708-2618 (voice) or (202) 708-0015 (TDD). (These are not toll-free numbers.)

SUPPLEMENTARY INFORMATION:

I. Adoption of Final Guidelines

The Department of Housing and Urban Development (Department) is adopting as its Fair Housing Accessibility Guidelines, the design and construction guidelines set forth in this notice (Guidelines). Issuance of this document follows consideration of public comments received in response to an advance notice of intention to develop and publish Fair Housing Accessibility Guidelines, published in the **Federal Register** on August 2, 1989 (54 FR 31856), and in response to proposed accessibility guidelines published in the **Federal Register** on June 15, 1990 (55 FR 24730).

The Department is adopting as final Guidelines, the guidelines designated as Option One in the proposed guidelines published on June 15, 1990, with modifications to certain of the Option One design specifications. In developing the final Guidelines, the Department was cognizant of the need to provide technical guidance that appropriately implements the specific accessibility requirements of the Fair Housing Amendments Act of 1988, while avoiding design specifications that would impose an unreasonable burden on builders, and significantly increase the cost of new multifamily construction. The Department believes that the final Guidelines adopted by this notice (1) are consistent with the level of accessibility envisioned by Congress; (2) simplify compliance with the Fair Housing Amendments Act by providing guidance concerning what constitutes acceptable compliance with the Act; and (3) maintain the affordability of new multifamily construction by specifying reasonable design and construction methods.

The Option One design specifications substantially revised in the final Guidelines include the following:

(1) Site impracticality. The final Guidelines provide that covered multifamily dwellings with elevators shall be designed and constructed to provide at least one accessible entrance on an accessible route regardless of terrain or unusual characteristics of the site. Every dwelling unit on a floor served by an elevator must be on an accessible route, and must be made accessible in accordance with the Act's requirements for covered dwelling units.

For covered multifamily dwellings without elevators, the final Guidelines provide two alternative tests for determining site impracticality due to terrain. The first test is an individual building test which involves a two-step process: measurement of the slope of the undisturbed site between the planned entrance and all vehicular or pedestrian arrival points; and measurement of the slope of the planned finished grade between the entrance and all vehicular or pedestrian arrival points. The second test is a site analysis test which involves an analysis of the existing natural terrain (before grading) by topographic survey with 2 foot contour intervals, with slope determination made between each successive contour interval.

A site with a single building (without an elevator), having a common entrance for all units, may be analyzed only under the first test—the individual building test. All other sites, including a site with a single building having multiple entrances serving either individual dwelling units or clusters of dwelling units, may be analyzed either under the first test or the second test. For sites for which either test is applicable (that is, all sites other than a site with a single nonelevator building having a common entrance for all units), the final Guidelines provide that regardless of which test is utilized by a builder or developer, at least 20% of the total ground floor units in nonelevator buildings, on any site, must comply with the Act's accessibility requirements.

(2) An accessible route into and through covered dwelling units. The final Guidelines distinguish between (i) single-story dwelling units, and (ii) multistory dwelling units in elevator buildings, and provide guidance on designing an accessible entrance into and through each of these two types of dwelling units.

(a) Single-story dwelling units. For single-story dwelling units, the final Guidelines specify the same design specification as presented in the proposed Option One guidelines, except that design features within the single-story dwelling units, such as a loft or a sunken living room, are exempt from the access specifications, subject to certain requirements. Lofts are exempt provided that all other space within the units is on an accessible route. Sunken or raised functional areas, such as a sunken living room, are also exempt from access specifications, provided that such areas do not interrupt the accessible route through the remainder of the unit. However, split-level entries or areas will need ramps or other means of providing an accessible route.

(b) Multistory dwelling units in buildings with elevators. For multistory dwelling units in buildings with elevators, the final Guidelines specify that only the story served by the building elevator must comply with the accessible features for dwelling units required by the Fair Housing Act. The other stories of the multistory dwelling units are exempt from access specifications, provided that the story of the unit that is served by the building elevator (1) is the primary entry to the unit; (2) complies with Requirements 2 through 7 with respect to the rooms located on the entry/accessible level; and (3) contains a bathroom or powder room which complies with Requirement 7.

(c) Thresholds at patio, deck or balcony doors. The final Guidelines provide that exterior deck, patio, or balcony surfaces should be not more

than ½ inch below the floor level of the interior of the dwelling unit, unless they are constructed of impervious materials such as concrete, brick or flagstone, in which case the surface should be no more than 4 inches below the floor level of the interior dwelling units, unless the local building code requires a lower drop. This provision and the following provision were included in order to minimize the possibility of interior water damage when exterior surfaces are constructed of impervious materials.

(d) Outside surface at entry door. The final Guidelines also provide that at the primary entry door to dwelling units with direct exterior access, outside landing surfaces constructed of impervious materials such as concrete, brick, or flagstone should be no more than ½ inch below the interior of the dwelling unit. The Guidelines further provide that the finished surface of this area, located immediately outside the entry door, may be sloped for drainage, but the sloping may be no more than ⅛ inch per foot.

(3) Usable bathrooms. The final Guidelines provide two alternative sets of specifications for making bathrooms accessible in accordance with the Act's requirements. The Act requires that an accessible or "usable" bathroom is one which provides sufficient space for an individual in a wheelchair to maneuver about. The two sets of specifications provide different approaches as to how compliance with this maneuvering space requirement may be achieved. The final Guidelines for usable bathrooms also provide that the usable bathroom specifications (either set of specifications) are applicable to powder rooms (i.e., a room with only a toilet and a sink) when the powder room is the only toilet facility on the accessible level of a covered multistory dwelling unit.

The details about, and the reasons for these modifications, and additional minor technical modifications made to certain design specifications of the Option One guidelines, are discussed more fully in the section-by-section analysis which appear later in this preamble.

Principal features of the Option One guidelines that were not changed in the final Guidelines include the following:

(1) Accessible entrance and an accessible route. The Option One guidelines for these two requirements remain unchanged in the final Guidelines.

(2) Accessible and usable public and common use areas. The Option One guidelines for public and common use areas remain unchanged in the final Guidelines.

(3) Door within individual dwelling units. The final Guidelines recommend that doors intended for user passage within individual dwelling units have a clear opening of at least 32 inches nominal width when the door is open 90 degrees.

(4) Doors to public and common use areas. The final Guidelines continued to provide that on accessible routes in public and common use areas, and for primary entry doors to covered units doors that comply with ANSI 4.13 meet the Act's requirement for "usable" doors.

(4) Thresholds at exterior doors. Subject to the exceptions for thresholds and changes in level at exterior areas constructed of impervious materials, the final Guidelines continue to specify that thresholds at exterior doors, including sliding door tracks, be no higher than ¾ inch.

(5) Reinforced walls for grab bars. The final Guidelines for bathroom wall reinforcement remains essentially unchanged from the Option One guidelines. The only change made to these guidelines has been to subject powder rooms to the reinforced wall requirement when the powder room is the only toilet facility on the accessible floor of a covered multistory dwelling unit.

The text of the final Guidelines follows the Preamble, which includes a discussion of the public comments received on the proposed guidelines, and the section-by-section analysis referenced above.

The design specification presented in the Fair Housing Accessibility Guidelines provide technical guidance to builders and developers in complying with the specific accessibility requirements of the Fair Housing Amendments Act of 1988. The Guidelines are intended to provide a safe harbor for compliance with the accessibility requirements of the Fair Housing Amendments Act, as implemented by 24 CFR 100.205 of the Department's Fair Housing regulations. The Guidelines are not mandatory. Additionally, the Guidelines do not prescribe specific requirements which must be met, and which, if not met, would constitute unlawful discrimination under the Fair Housing Amendments Act. Builders and developers may choose to depart from the Guidelines, and seek alternate ways to demonstrate that they have met the requirements of the Fair Housing Act.

II. Statutory and Regulatory Background

Title VIII of the Civil Rights Act of 1968 makes it unlawful to discriminate in any aspect relating to the sale, rental or financing of dwellings, or in the provision of brokerage services or facilities in connection with the sale or rental of a dwelling, because of race, color, religion, sex or national origin. The Fair Housing Amendments Act of 1988 (Pub. L. 100–430, approved September 13, 1988) (Fair Housing Act or the Act) expanded coverage of title VIII (42 U.S.C. 3601–3620) to prohibit discriminatory housing practices based on handicap and familial status. As amended, section 804(f)(3)(C) of the Act provides that unlawful discrimination includes a failure to design and construct covered multifamily dwellings for first occupancy after March 13, 1991 (30 months after the date of enactment in accordance with certain accessibility requirements. The Act defines "covered multifamily dwellings" as "(a) buildings consisting of 4 or more units if such buildings have one or more elevators; and (b) ground floor units in other buildings consisting of 4 or more units" (42 U.S.C. 3604).

The Act makes it unlawful to fail to design and construct covered multifamily dwellings so that:

(1) Public use and common use portions of the dwellings are readily accessible to and usable by persons with handicaps;

(2) All doors within such dwellings which are designed to allow passage into and within the premises are sufficiently wide to allow passage by persons in wheelchairs; and

(3) All premises within such dwellings contain the following features of adaptive design:

(a) An accessible route into and through the dwelling;

(b) Light switches, electrical outlets, thermostats, and other environmental controls in accessible locations.

(c) Reinforcements in bathroom walls to allow later installation of grab bars; and

(d) Usable kitchens and bathrooms such that an individual in a wheelchair can maneuver about the space.

The Act provides that compliance with (1) the appropriate requirements of the American National Standard for Buildings and Facilities—Providing Accessibility and Usability for Physically Handicapped People (commonly cited as "ANSI A117.1"), or (2) with the laws of a State or unit of general local government, that has incorporated into such laws the accessibility requirements of the Act, shall be deemed to satisfy the accessibility requirements of the Act. (See section 804(f)(4) and (5)(A).) The Act also provides that the Secretary of the Department of Housing and Urban

Development shall provide technical assistance to States and units of local government and other persons to implement the accessibility requirements of the Act. (See section 804(f)(5)(C).)

Congress believed that the accessibility provisions of the Act would (1) facilitate the ability of persons with handicaps to enjoy full use of their homes without imposing unreasonable requirements on homebuilders, landlords and non-handicapped tenants; (2) be essential for equal access and to avoid future *de facto* exclusion of persons with handicaps; and (3) be easy to incorporate in housing design and construction. Congress predicted that compliance with these minimal accessibility design and construction standards would eliminate many of the barriers which discriminate against persons with disabilities in their attempts to obtain equal housing opportunities. (See H.R. Rep. No. 711, 100th Cong. 2d Sess. 27–28 (1988) ("House Report").)

The Fair Housing Act became effective on March 12, 1989. The Department implemented the Act by a final rule published January 23, 1989 (54 FR 3232), and which became effective on March 12, 1989. Section 100.205 of that rule incorporates the Act's design and construction requirements, including the requirement that multifamily dwellings for first occupancy after March 13, 1991 be designed and constructed in accordance with the Act's accessibility requirements. The final rule clarified which multifamily dwellings are subject to the Act's requirements. Section 100.205 provides, in paragraph (a), that covered multifamily dwellings shall be deemed to be designed and constructed for first occupancy on or before March 13, 1991, if they are occupied by that date, or if the last building permit or renewal thereof for the covered multifamily dwellings is issued by a State, County or local government on or before January 13, 1990. The Department selected the date of January 13, 1990 because it is fourteen months before March 13, 1991. Based on data contained in the Marshall Valuation Service, the Department found that fourteen months represented a reasonable median construction time for multifamily housing projects of all sizes. The Department chose the issuance of a building permit as the appropriate point in the building process because such permits are issued in writing by governmental authorities. The issuance of a building permit has the advantage of being a clear and objective standard. In addition, any project that actually achieves first occupancy before March 13, 1991 will be judged to have met this standard even if the last building permit or renewal thereof was issued after January 13, 1990 (55 FR 3251).

Section 110.205 of the final rule also incorporates the Act's provisions that compliance with the appropriate requirements of ANSI A117.1, or with State or local laws that have incorporated the Act's accessibility requirements, suffices to satisfy the accessibility requirements of the Act as codified in § 100.205. In the preamble to the final rule, the Department stated that it would provide more specific guidance on the Act's accessibility requirements in a notice of proposed guidelines that would provide a reasonable period for public comment on the guidelines.

III. Proposed Accessibility Guidelines

On August 2, 1989, the Department published in the **Federal Register** an advance notice of intention to develop and publish Fair Housing Accessibility Guidelines (54 FR 31856). The purpose of this document was to solicit early comment from the public concerning the content of the Accessibility Guidelines, and to outline the Department's procedures for their development. To the extent practicable, the Department considered all public comments submitted in response to the August 2, 1989 advance notice in its preparation of the proposed accessibility guidelines.

On June 15, 1990, the Department published proposed Fair Housing Accessibility guidelines (55 FR 24370). The proposed guidelines presented, and requested public comment on, three options for accessible design:

(1) Option one (Option One) provided guidelines developed by the Department with the assistance of the Southern Building Code Congress International (SBCCI), and incorporated suggestions received in response to the August 2, 1989 advance notice;

(2) Option two (Option Two) offered guidelines developed by the National Association of Home Builders (NAHB) and the National Coordinating Council on Spinal Cord Injuries (NCCSCI); and

(3) Option three (Option Three) offered "adaptable accommodations" guidelines, an approach that provides for identification of certain features in dwelling units that could be made accessible to people with handicaps on a case-by-case basis.

In the June 15, 1990 notice of proposed guidelines, the Department recognized that projects then being designed, in advance of publication of the final Guidelines may not become available for occupancy until after March 13, 1991. The Department advised that efforts to comply with the proposed guidelines, Option One, in the design of projects which would be completed before issuance of the final Guidelines, would be considered as evidence of compliance with the Act in connection with the Department's investigation of any complaints. Following publication of the June 15, 1990 notice, the Department received a number of inquiries concerning whether certain design and construction activities in connection with projects likely to be completed before issuance of final Guidelines would be considered by the Department to be in compliance with the Act.

In order to resolve these questions, the Department, on August 1, 1990, published in the **Federal Register** a supplementary notice to the proposed guidelines (55 FR 31191). In the supplementary notice, the Department advised that it only would consider efforts to comply with the proposed guidelines, Option One, as evidence of compliance with the Act. The Department stated that evidence of compliance with the Option One guidelines, under the circumstances described in the supplementary notice, would be a basis for determination that there is no reasonable cause to believe that a discriminatory housing practice under section 804(f)(3) has occurred, or is about to occur in connection with the investigation of complaints filed with the Department relating to covered multifamily dwellings. The circumstances described in the August 1, 1990 supplementary notice that the Department found would be in compliance with the Act, were limited to:

(1) Any covered multifamily dwellings which are designed in accordance with the Option One guidelines, and for which construction is completed before publication of the final Fair Housing Accessibility Guidelines; and

(2) Any covered multifamily dwellings which have been designed in accordance with the Option One guidelines, but for which construction is not completed by the date of publication of the final Guidelines provided:

(a) Construction begins before the final Guidelines are published; or

(b) A building permit is issued less than 60 days after the final Guidelines are published.

On September 7, 1990, the Department published for public comment a Preliminary Regulatory Impact Analysis on the Department's assessment of the economic impact of the Guidelines, as implemented by each of the three design options then under consideration (55 FR 37072–37129).

IV. Public Comments and Commenters

The proposed guidelines provided a 90-day period for the submission of comments by the public, ending September 13, 1990. The Department received 562 timely comments. In addition, a substantial number of comments were received by the Department after the September 13, 1990 deadline. Although those comments were not timely filed, they were reviewed to assure that any major issues raised had been adequately addressed in comments that were received by the deadline. Each of the timely comments was read, and a list of all significant issues raised by those comments was compiled. All these issues were considered in the development of the final Guidelines.

Of the 562 comments received, approximately 200 were from disability advocacy organizations, or units of State or local government concerned with disability issues. Sixty-eight (68) additional commenters identified themselves as members of the disability community; 61 commenters identified themselves as individuals who work with members of the disability community (e.g., vocational or physical therapists or counselors), or who have family members with disabilities; and 96 commenters were members of the building industry, including architects, developers, designers, design consultants, manufacturers of home building products, and rental managers. Approximately 292 commenters supported Option One without any recommendation for change An additional 155 commenters supported Option One, but recommended changes to certain Option One design standards. Twenty-six (26) commenters supported Option Two, and 10 commenters supported Option Three. The remaining commenters submitted questions, comments and recommendations for changes on certain design features of one or more of the three options, but expressed no preference for any particular option, or, alternatively, recommended final guidelines that combine features from two or all three of the options.

The Commenters

The commenters included several national, State and local organizations and agencies, private firms, and individuals that have been involved in the development of State and local accessibility codes. These commenters offered valuable information, including copies of State and local accessibility codes, on accesibility design standards. These commenters included: the Southern Building Code Congress International (SBCCI); the U.S. Architectural and Transportation Barriers Compliances Board (ATBCB); the Building Officials & Code Administrators International, Inc. (BOCA); the State of Washington Building Code Council; the Seattle Department of Construction and Land Use; the Barrier-free Subcode Committee of the New Jersey Uniform Construction Code Advisory Board; the Department of Community Planning, Housing and Department of Arlington County, Virginia; the City of Atlanta Department of Community Development, Bureau of Buildings; and members of the Department of Architecture, the State of University of New York at Buffalo. In addition to the foregoing organizations, a number of the commenters from the building industry submitted detailed comments on the proposed guidelines.

The commenters also included a number of disability organizations, several of which prepared detailed comments on the proposed guidelines. The comments of two disability organizations also were submitted as concurring comments by many individuals and other disability advocacy organizations. These two organizations are the Disability Rights Education & Defense Fund, and the Consortium for Citizens with Disabilities (CCD). The CCD represents the following organizations: the Association for Education and Rehabilitation of the Blind and Visually Impaired, Association for Retarded Citizens of the United States, International Association of Psychological Rehabilitation Facilities, National Alliance for the Mentally Ill, National Association of Protection and Advocacy Systems, National Association of Developmental Disabilities Councils, National Association of State Mental Health Program Directors, National Council of Community Mental Health Centers, National Head Injury Foundation, National Mental Health Association, United Cerebral Palsy Associations, Inc. Both the Disability Rights Education and Defense Fund and the CCD were strongly supportive of Option One.

A coalition of 20 organizations (Coalition), representing both the building industry and the disability community, also submitted detailed comments on the proposed guidelines. The members of the Coalition include: American Institute of Architects, American Paralysis Association, American Resort and Residential Development Association, American Society of Landscape Architects, Apartment and Office Building Association, Association of Home Appliance Manufacturers, Bridge Housing Corporation, Marriott Corporation, Mortgage Bankers Association, National Apartment Association, National Assisted Housing Management Association, National Association of Home Builders (NAHB), National Association of Realtors, National Association of Senior Living Industries, National Conference of States on Building Codes and Standards, National Coordinating Council on Spinal Cord Injury (NCCSCI), National Leased Housing Association, National Multi Housing Council, National Organization on Disability, and the Paralyzed Veterans of America.

The commenters also included U.S. Representatives Don Edwards, Barney Frank and Hamilton Fish, Jr., who advised that they were the primary sponsors of the Fair Housing Act, and who expressed their support of Option One.

Comments on the Three Options

In addition to specific issues and questions raised about the design standards recommended by the proposed guidelines, a number of commenters simply submitted comments on their overall opinion of one or more of the options. Following is a summary of the opinions typically expressed on each of the options.

Option One. The Option One guidelines drew a strong reaction from commenters. Supporters stated that the Option One guidelines provided a faithful and clearly stated interpretation of the Act's intent. Opponents of Option One stated that its design standards would increase housing costs significantly—for everyone. Several commenters who supported some features of Option One were concerned that adoption of Option One in its entirety would escalate housing costs. Another frequent criticism was that Option One's design guidelines were to complex and cumbersome.

Option Two. Supporters of Option Two state that this option presented a reasonable compromise between Option One and Option Three. Supporters stated that the Option Two guidelines provided more design flexibility than the Option One guidelines, and that this flexibility would allow builders to deliver the required accessibility features at a lower cost. Opponents of Option Two stated that this option allowed builders to circumvent the Act's intent with respect to several essential accessibility features.

Option Three. Supporters of Option Three stated that Option Three presented the best method of achieving the accessibility objectives of the Act, at the lowest possible cost. Supporters stated that Option Three would contain housing costs, because design adaptation only would be made to those units which actually would be occupied by a disabled resident, and the adaptation would be tailored to the specific accessibility needs of the individual tenant. Opponents of Option Three stated that this option, with its "add-on" approach to accessibilty, was contrary to the Act's intent, which, the commenter claimed, mandates accessible features at the time of construction.

Comments on the Costs of Implementation

In addition to the comments on the specific features of the three design options, one of the issues most widely commented upon was the cost of compliance with the Act's accessibility requirements, as implemented by the Guidelines. Several commenters disputed the Department's estimate of the cost of compliance, as presented in the Initial Regulatory Flexibility Analysis, published with the proposed guidelines on June 15, 1990 (55 FR 24384–24385), and in the Preliminary Regulatory Impact Analysis published on September 7, 1990 (55 FR 37072–37129). The Department's response to these comments is discussed in the Final Regulatory Impact Analysis, which is available for public inspection during regular business hours in the Office of the Rules Docket Clerk, room 10276, Department of Housing and Urban Development, 451 Seventh Street, SW., Washington, DC 20410–0500.

V. Discussion of Principal Public Comment Issues, and Section-by-Section Analysis of the Final Guidelines.

The following presents a discussion of the principal issues raised by the commenters, and the Department's response to each issue. This discussion includes a section-by-section analysis of the final Guidelines that addresses many of the specific concerns raised by the commenter, and highlights the differences between the proposed Option One guidelines and the final Guidelines. Comments related to issues outside the purview of the Guidelines, but related to the Act (e.g., enforcement procedures, statutory effective date), are discussed in the final section of the preamble under the preamble heading "Discussion of Comments on Related Fair Housing Issues".

1. Discussion of General Comments on the Guidelines

ANSI Standard

Comment. Many commenters expressed their support for the ANSI Standard as the basis for the Act's Guidelines, because ANSI is a familiar and accepted accessibility standard.

Response. In developing the proposed and final Guidelines, the Department was cognizant of the need for uniformity, and of the widespread application of the ANSI Standard. The original ANSI A117.1, adopted in 1961, formed the technical basis for the first accessibility standards adopted by the Federal Government, and most State governments. The 1980 edition of that standard was based on research funded by the Department, and became the basis for the Uniform Federal Accessibility Standards (UFAS), published in the **Federal Register** on August 4, 1984 (47 FR 33862). The 1980 edition also was generally accepted by the private sector, and was recommended for use in State and local building codes by the Council of American Building Officials. Additionally, Congress, in the Fair Housing Act, specifically referenced the ANSI Standard, thereby encouraging utilization of the ANSI Standard as guidance for compliance with the Act's accessibility requirements. Accordingly, in using the ANSI Standard as a reference point for the Fair Housing Act Accessibility Guidelines, the Department is issuing Guidelines based on existing and familiar design standards, and is promoting uniformity between Federal accessibility standards, and those commonly used in the private sector. However, the ANSI Standard and the final Guidelines have differing purposes and goals, and they are by no means identical. The purpose of the Guidelines is to describe minimum standards of compliance with the specific accessibility requirements of the Act.

Comment. Two commenters suggested that the Department adopt the ANSI Standard as the guidelines for the Fair Housing Act's accessibility requirements, and not issue new guidelines.

Response. The Department has incorporated in the Guidelines those technical provisions of the ANSI Standard that are consistent with the Act's accessibility requirements. However, with respect to certain of the Act's requirements, the applicable ANSI provisions impose more stringent design standards than required by the Act. (In the preamble to the proposed rule (55 FR 3251), and again in the preamble to the proposed guidelines (55 FR 24370), the Department advised that a dwelling unit that complies fully with the ANSI Standard goes beyond what is required by the Fair Housing Act.) The Department has developed Guidelines for those requirements of the Act where departures from ANSI were appropriate.

Comment. A few commenters questioned whether the Department would revise the Guidelines to correspond to ANSI's periodic update of its standard.

Response. The ANSI Standard is reviewed at five-year intervals. As the ANSI Standard is revised in the future, the Department intends to review each version, and, if appropriate to make revisions to the Guidelines in accordance with any revisions made to the ANSI Standard. Modifications of the Guidelines, whether or not reflective of changes to the ANSI Standard, will be subject to notice and prior public comment.

Comment. A few commenters requested that the Department republish the ANSI Standard in its entirety in the final Guidelines.

Response. The American National Standards Institute (ANSI) is a private, national organization, and is not connected with the Federal Government. The Department received permission from ANSI to print the ANSI Standard in its entirety, as the time of publication of the proposed guidelines (55 FR 24404–24487), specifically for the purpose of assisting readers of the proposed guidelines in developing timely comments. In the preamble to the proposed guidelines, the Department stated that since it was printing the entire ANSI Standard, as an appendix to the proposed guidelines, the final notice of the Accessibility Guidelines would not include the complete text of the ANSI Standard (55 FR 24371). Copies of the ANSI Standard may be purchased from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

Comment. Another commenter requested that the Department confirm that any ANSI provision not cited in the final Guidelines is not necessary for compliance with the Act.

Response. In the proposed guidelines, the Department stated that: "Where the guidelines rely on sections of the ANSI Standard, the ANSI sections are cited. * * * For those guidelines that differ from the ANSI Standard, recommended specifications are provided" (55 FR 24385). The final Guidelines include this statement, and further state that the ANSI sections not cited in the Guidelines have been determined by the

Department not to be necessary for compliance with the Act's requirements.

Bias Toward Wheelchair Users

Comment. Two commenters stated that the proposed guidelines were biased toward wheelchair users, and that the Department has erroneously assumed that the elderly and the physically disabled have similar needs. The commenters stated that the physical problems suffered by the elderly often involve arthritic and back problems, which make bending and stooping difficult.

Response. The proposed guidelines, and the final Guidelines, reflect the accessibility requirements contained in the Fair Housing Act. These requirements largely are directed toward individuals with mobility impairments, particularly those who require mobility aids, such as wheelchairs, walkers, or crutches. In two of the Act's accessibility requirements, specific reference is made to wheelchair users. The emphasis of the law and the Guidelines on design and construction standards that are compatible with the needs of wheelchair users is realistic because the requirements for wheelchair access (e.g., wider doorways) are met more easily at the construction stage. (See House Report at 27.) Individuals with nonmobility impairments more easily can be accommodated by later nonstructural adaptations to dwelling units. The Fair Housing Act and the Fair Housing regulations assure the right of these individuals to make such later adaptations. (See section 804(f)(3)(A) of the Act and 24 CFR 100.203 of the regulations. See also discussion of adaptations made to units in this preamble under the heading "Costs of Adaptation" in the section entitled "Discussion of Comments on Related Fair Housing Issues".)

Compliance Problems Due to Lack of Accessibility Guidelines

Comment. A number of commenters from the building industry attributed difficulty in meeting the Act's March 13, 1991 compliance deadline, in part, to the lack of accessibility guidelines. The commenters complained about the time that it has taken the Department to publish proposed guidelines, and the additional time it has taken to publish final Guidelines.

Response. The Department acknowledges that the development and issuance of final Fair Housing Accessibility Guidelines has been a time-consuming process. However, the building industry has not been without guidance on compliance with the Act's accessibility requirements. The Fair Housing Act identifies the ANSI Standard as providing design standards that would achieve compliance with the Act's accessibility requirements. Additionally, in the preamble to both the proposed and final Fair Housing rule, and in the text of §100.205, the Department provided examples of how certain of the Act's accessibility requirements may be met. (See 53 FR 45004–45005, 54 FR 3249–3252 (24 CFR Ch. I, Subch. A, App. I, at 583–586 (1990)), 24 CFR 100.205.)

The delay in publication of the final Guidelines has resulted, in part, because of the Department's pledge, at the time of publication of the final Fair Housing regulations, that the public would be provided an opportunity to comment on the Guidelines (54 FR 3251, 24 CFR Ch. I, Subch. A, at 585–586 (1990)). The delay in publication of the final Guidelines also is attributable in part to the Department's effort to develop Guidelines that would (1) ensure that persons with disabilities are afforded the degree of accessibility provided for in the Fair Housing Act, and (2) avoid the imposition of unreasonable requirements on builders.

Comment. Two commenters requested that interim accessibility guidelines should be adopted for projects "caught in the middle", i.e. those projects started before publication of the final Guidelines.

Response. The preamble to the June 15, 1990 proposed guidelines and the August 1, 1990 supplementary notice directly addressed this issue. In both documents, the Department recognized that projects being designed in advance of publication of the Guidelines may not become available for occupancy until after March 13, 1991. The Department advised that efforts to comply with the Option One guidelines, in the design of projects that would be completed before issuance of the final Guidelines, would be considered as evidence of compliance with the Act in connection with the Department's investigation of any complaints. The August 1, 1990 supplementary notice restated the Department's position on compliance with the Act's requirements prior to publication of the final Guidelines, and addressed what "evidence of compliance" will mean in a complaint situation.

Conflict with Historic Preservation Design Codes

Comment. Two commenters expressed concern about a possible conflict between the Act's accessibility requirements and local historic preservation codes (including compatible design requirements). The commenters stated that their particular concerns are: (1) The conversion of warehouse and commercial space to dwelling units; and (2) new housing construction on vacant lots in historically designated neighborhoods.

Response. Existing facilities that are converted to dwelling units are not subject to the Act's accessibility requirements. Additionally, alteration, rehabilitation or repair of covered multifamily dwellings are not subject to the Act's accessibility requirements. The Act's accessibility requirements only apply to new construction. With respect to new construction in neighborhoods subject to historic codes, the Department believes that the Act's accessibility requirements should not conflict with, or preclude building designs compatible with historic preservation codes.

Conflict with Local Accessibility Codes

Comment. Several commenters inquired about the appropriate course of action to follow when confronted with a conflict between the Act's accessibility requirements and local accessibility requirements.

Response. Section 100.205(i) of the Fair Housing regulations implements section 804(f)(8) of the Act, which provides that the Act's accessibility requirements do not supplant or replace State or local laws that impose higher accessibility standards (53 FR 45005). For accessibility standards, as for other code requirements, the governing principle to follow when Federal and State (or local) codes differ is that the more stringent requirement applies.

This principle is equally applicable when multifamily dwellings are subject to more than one Federal law requiring accessibility for persons with physical disabilities. For example, a multifamily dwelling may be subject both to the Fair Housing Amendments Act and to section 504 of the Rehabilitation Act of 1973. Section 504 requires that 5% of units in a covered multifamily dwelling be fully accessible—thus imposing a stricter accessibility standard for those units than would be imposed by the Fair Housing Act. However, compliance only with the section 504 requirements would not satisfy the requirements of the Fair Housing Act. The remaining units in the covered multifamily dwelling would be required to meet the specific accessibility requirements of the Fair Housing Act.

Comment. One commenter, the Seattle Department of Construction and Land Use, presented an example of how a local accessibility code that is more

stringent with respect to some accessibility provisions may interact with the Act's accessibility requirements, where they are more stringent with respect to other provisions. The commenter pointed out that the State of Washington is very hilly, and that the State of Washington's accessibility code requires accessible buildings on sites that would be deemed impractical under the Option One guidelines. The commenter stated that the State of Washington's accessibility code may require installation of a ramp, and that the ramp may then create an accessible entrance for the ground floor, making it subject to the Act's accessibility requirements. The commenter asked that, since the project was not initially subject to the Act's requirements, whether the creation of an accessible ground floor in accordance with the State code provisions would require all units on the ground floor to be made accessible in accordance with the Fair Housing Act. (The State of Washington's accessibility code would require only a percentage of the units to be accessible.)

Response. The answer to the commenter's question is that a nonelevator building with an accessible entrance on an accessible route is required to have the ground floor units designed and constructed in compliance with the Act's accessibility requirements. This response is consistent with the principle that the stricter accessibility requirement applies.

Design Guidelines for Environmental Illness

Comment. Twenty-three (23) commenters advised the Department that many individuals are disabled because of severe allergic reactions to cerrtain chemicals used in construction, and in construction materials. These commenters requested that the Department develop guidelines for constructing or renovating housing that are sensitive to the problems of individuals who suffer from these allergic reactions (commonly referred to as environmental illnesses). These commenters further advised that, as of February 1988, the Social Security Administration lists as a disability "Environmental Illness" (P.O.M.S. Manual No. 24515.065).

Response. The Guidelines developed by the Department are limited to providing guidance relating to the specific accessibility requirements of the Fair Housing Act. As discussed above, under the preamble heading "Bias Toward Wheelchair Users," the Act's requirements primarily are directed to providing housing that is accessible to individuals with mobility impairments. There is no statutory authority for the Department to create the type of design and construction standards suggested by the commenters.

Design Guidelines for the Hearing and Visually-Impaired

Comment. Several commenters stated that the proposed guidelines failed to provide design features for people with hearing and visual impairments. These commenters stated that visual and auditory design features must be included in the final Guidelines.

Response. As noted in the response to the preceding comment, the Department is limited to providing Guidlines for the specific accessibility requirements of the Act. The Act does not require fully accessible individual dwelling units. For individual dwelling units, the Act requires the following: Doors sufficiently wide to allow passage by handicapped persons in wheelchairs; accessible route into and through the dwelling unit; light switches; electrical outlets, thermostats, and other environmental controls in accessible locations; reinforcements in bathroom walls to allow later installation of grab bars; and usable kitchens and bathrooms such that an individual in a wheelchair can maneuver about the space. To specify visual and auditory design features for individual dwelling units would be to recommend standards beyond those necessary for compliance with the Act. Such features were among those identified in Congressional statements discussing modifications that would be made by occupants.

The Act, however, requires public and common use portions of covered multifamily dwellings to be "readily accessible to and usable by handicapped persons." The more comprehensive accessibility requirement for public and common use areas of dwellings necessitates a more comprehensive accessibility standard for these areas. Accordingly, for public and common use areas, the final Guidelines recommend compliance with the appropriate provisions of the ANSI Standard. The ANSI Standard for public and common use areas specifies certain design features to accommodate people with hearing and visual impairments.

Guidelines as Minimum Requirements

Comment. A number of commenters requested that the Department categorize the final Guidelines as minimum requirements, and not as performance standards, because "recommended" guidelines are less effective in achieving the objectives of the Act. Another commenter noted that a safe harbor provision becomes a *de facto* minimum requirement, and that it should therefore be referred to as a minimum requirement.

Response. The Department has not categorized the final Guidelines as either performance standards or minimum requirements. The minimum accessibility requirements are contained in the Act. The Guidelines adopted by the Department provide one way in which a builder or developer may achieve compliance with the Act's accessibility requirements. There are other ways to achieve compliance with the Act's accessibility requirements, as for example, full compliance with ANSI A117.1. Given this fact, it would be inappropriate on the part of the Department to constrain designers by presenting the Fair Housing Accessibility Guidelines as minimum requirements. Builders and developers should be free to use any reasonable design that obtains a result consistent with the Act's requirements. Accordingly, the design specifications presented in the final Guidelines are appropriately referred to as "recommended guidelines".

It is true, however, that compliance with the Fair Housing Accessibility Guidelines will provide builders with a safe harbor. Evidence of compliance with the Fair Housing Accessibility Guidelines adopted by this notice shall be a basis for a determination that there is no reasonable cause to believe that a discriminatory housing practice under section 804(f)(3) has occurred or is about to occur in connection with the investigation of complaints filed with the Department relating to covered multifamily dwellings.

National Accessibility.Code

Comment. Several commenters stated that there are too many accessibility codes—ANSI, UFAS, and State and local accessibility codes. These commenters requested that the Department work with the individual States to arrive at one national uniform set of accessibility guidelines.

Response. There is no statutory authority to establish one nationally uniform set of accessibility standards. The Department is in agreement with the commenters' basic theme that increased uniformity in accessibility standards is desirable. In furtherance of this objective, the Department has relied upon the ANSI Standard as the design basis for the Fair Housing Accessibility Guidelines. The Department notes that the ANSI Standard also serves as the design basis for the Uniform Federal

Accessibility Standards (UFAS), the Minimum Guidelines and Requirements for Accessible Design (MGRAD) issued by the U.S. Architectural and Transportation Barriers Compliance Board, and many State and local government accessibility codes.

One Set of Design Standards

Comment. A number of commenters objected to the fact that the proposed guidelines included more than one set of design standards. The commenters stated that the final Guidelines should present only one set of design standards so as not to weaken the Act's accessibility requirements.

Response. The inclusion of options for accessibility design in the proposed guidelines was both to encourage a maximum range of public comment, and to illustrate that there may be several ways to achieve compliance with the Act's accessibility requirements. Congress made clear that compliance with the Act's accessibility standards did not require adherence to a single set of design specifications. In section 804(f)(4) of the Act, the Congress stated that compliance with the appropriate requirements of the ANSI Standard suffices to satisfy the accessibility requirements of the Act. In House Report No. 711, the Congress further stated as follows:

> However this section (section 804(f)(4)) is not intended to require that designers follow this standard exclusively, for there may be other local or State standards with which compliance is required or there may be other creative methods of meeting these standards. (House Report at 27)

Similarly, the Department's Guidelines are not the exclusive standard for compliance with the Act's accessibility requirements. Since the Department's Guidelines are a safe harbor, and not minimum requirements, builders and developers may follow alternative standards that achieve compliance with the Act's accessibility requirements. This policy is consistent with the intent of Congress, which was to encourage creativity and flexibility in meeting the requirements of the Act.

Reliance on Preamble to Guidelines

Comment. One commenter asked whether the explanatory information in the background section of the final Guidelines may be relied upon, and deemed to have the same force and effect as the Guidelines themselves.

Response. The Fair Housing Accessibility Guidelines are—as the name indicates—only guidelines, not regulations or minimum requirements. The Guidelines consist of recommended design specifications for compliance with the specific accessibility requirements of the Fair Housing Act. The final Guidelines provide builders with a safe harbor that, short of specifying all of the provisions of the ANSI Standard, illustrate acceptable methods of compliance with the Act. To the extent that the preamble to the Guidelines provide clarification on certain provisions of the Guidelines, or illustrates additional acceptable methods of compliance with the Act's requirements, the preamble may be relied upon as additional guidance. As noted in the "Summary" portion of this document, the preamble to the Guidelines will be codified in the 1991 edition of the Code of Federal Regulations as Appendix III to the Fair Housing regulations (24 CFR Ch. I, Subch. A, App. III.).

"User Friendly" Guidelines

Comment. A number of commenters criticized the proposed guidelines for being too complicated, too ambiguous, and for requiring reference to a number of different sources. These commenters requested that the final Guidelines be clear, concise and "user friendly". One commenter requested that the final Guidelines use terms that conform to terms used by each of the three major building code organizations: the Building Officials and Code Administrators International, Inc. (BOCA); the International Conference of Building Officials (ICBO), and the Southern Building Code Congress International (SBCCI).

Response. The Department recognizes that the Accessibility Guidelines include several highly technical provisions. In drafting the final Guidelines, the Department has made every effort to explain these provisions as clearly as possible, to use technical and building terms consistent with the terms used by the major building code organizations, to define terms clearly, and to provide additional explanatory information on certain of the provisions of the Guidelines.

2. Section-by-Section Analysis of Final Guidelines

The following presents a section-by-section analysis of the final Guidelines. The text of the final Guidelines is organized into five sections. The first four sections of the Guidelines provide background and explanatory information on the Guidelines. Section 1, the Introduction, describes the purpose, scope and organization of the Guidelines. Section 2 defines relevant terms used. Section 3 reprints the text of 24 CFR 100.205, which implements the Fair Housing Act's accessibility requirements, and Section 4 describes the application of the Guidelines. Section 5, the final section, presents the design specifications recommended by the Department for meeting the Act's accessibility requirements, as codified in 24 CFR 100.205. Section 5 is subdivided into seven areas, to address each of the seven areas of accessible design required by the Act.

The following section-by-section analysis discusses the comments received on each of the sections of the proposed Option One Guidelines, and the Department's response to these comments. Where no discussion of comments is provided under a section heading, no comments were received on this section.

Section 1. Introduction

Section 1, the Introduction, describes the purpose, scope and organization of the Fair Housing Accessibility Guidelines. This section also clarifies that the accessibility guidelines apply only to the design and construction requirements of 24 CFR 100.205, and do not relieve persons participating in a federal or federally-assisted program or activity from other requirements, such as those required by section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794), or the Architectural Barriers Act of 1968 (42 U.S.C. 4151–4157). (The design provisions for those laws are found at 24 CFR Part 8 and 24 CFR Part 40, respectively.) Additionally, section 1 explains that only those sections of the ANSI Standard cited in the Guidelines are required for compliance with the accessibility requirements of the Fair Housing Act. Revisions to section 1 reflect the Department's response to the request of several commenters for further clarification on the purpose and scope of the Guidelines.

Section 2. Definitions

This section incorporates appropriate definitions from § 100.201 of the Department's Fair Housing regulations, and provides additional definitions for terms used in the Guidelines. A number of comments were received on the definitions. Clarifications were made to certain definitions, and additional terms were defined. New terms defined in the final Guidelines include: *adaptable, assistive device, ground floor, loft, multistory dwelling unit, single-story dwelling unit,* and *story.* The inclusion of new definitions reflects the comments received, and also reflects new terms introduced by changes to certain of the Option One design specifications. In several instances, the clarifications of existing definitions, or the new terms

defined, were derived from definitions of certain terms used by one or more of the major building code organizations. Comments on specific definitions are discussed either below or in that portion of the preamble under the particular section heading of the Guidelines in which these terms appear.

Accessible

Comment. A number of commenters stated that the Department used the terms "accessible" and "adaptable" interchangeably, and requested clarification of the meaning of each. The commenters noted that, under several State building codes, these terms denote different standards for compliance. The commenters requested that if the Department intends these two terms to have the same meaning, this should be clearly stated in the final Guidelines, and, if the terms have different meanings, "adaptable" should also be defined.

Response. The Department's use of the terms "adaptable" and "accessible" in the preamble to the proposed guidelines generally reflected Congress' use of the terms in the text of the Act, and in the House and Senate conference reports. However, to respond to commenters' concerns about the distinctions between these terms, the Department has included a definition of "adaptable dwelling units" to clarify the meaning of this term, within the context of the Fair Housing Act. In the final Guidelines, "adaptable dwelling units", when used with respect to covered multifamily dwellings, means dwelling units that include features of adaptable design specified in 24 CFR 100.205(c)(2)–(3).

The Fair Housing Act refers to design features that include both the minimal "accessibility" features required to be built into the unit, and the "adaptable" feature of reinforcement for bathroom walls for the future installation of grab bars. Accordingly, under the Fair Housing Act, an "adaptable dwelling unit" is one that meets the minimal accessibility requirements specified in the Act (i.e., usable doors, an accessible route, accessible environmental controls, and usable kitchens and bathrooms) and the "adaptable" structural feature of reinforced bathroom walls for later installation of grab bars.

Assistive Device

Comment. Several commenters requested that we define the phrase "assistive device."

Response. "Assistive device" means an aid, tool, or instrument used by a person with disabilities to assist in activities of daily living. Examples of assistive devices include tongs, knob turners, and oven rack pusher/pullers. A definition for "assistive device" has been included in the final Guidelines.

Bathroom

In response to the concern of several commenters, the Department has revised the definition of "bathroom" in the final Guidelines to clarify that a bathroom includes a "compartmented" bathroom. A compartmented bathroom is one in which the bathroom fixtures are distributed among interconnected rooms. The fact that bathroom facilities may be located in interconnecting rooms does not exempt this type of bathroom from the Act's accessibility requirements. This clarification, and minor editorial changes, were the only revisions made to the definition of "bathroom". Other comments on this term were as follows:

Comment. Several commenters requested that the Department reconsider its definition of "bathroom", to include powder rooms, i.e., rooms with only a toilet and sink. These commenters stated that persons with disabilities should have access to all bathrooms in their homes, not only full bathrooms. One commenter believed that, unless bathroom was redefined to include single- or two-fixture facilities, some developers will remove a bathtub or shower from a proposed second full bathroom to avoid having to make the second bathroom accessible. The commenter suggested that bathroom be redefined to include any room containing at least two of the possible bathroom fixtures (toilet, sink, bathtub or shower).

Response. In defining "bathroom" to include a water closet (toilet), lavatory (sink), and bathtub or shower, the Department has followed standard dictionary usage, as well as Congressional intent. Congressional statements emphasized that the Act's accessibility requirements were expected to have a minimal effect on the size and design of dwelling units. In a full-size bathroom, this can be achieved. To specify space for wheelchair maneuvering in a powder room would, in most cases, require enlarging the room significantly. However, a powder room would be subject to the Act's accessibility requirements if the powder room is the only toilet facility on the accessible level of a covered multistory dwelling unit. Additionally, it should be noted that doors to powder rooms (regardless of the location of the powder room), like all doors within dwelling units, are required by the Act to be wide enough for wheelchair passage. Some powder rooms may, in fact, be usable by persons in wheelchairs.

Comment. One commenter requested that the final Guidelines provide that a three-quarters bathroom (water closet, lavatory and shower) would not be subject to the accessibility requirements—specifically, the requirement for grab bar reinforcement.

Response. The Fair Housing Act requires reinforcements in bathroom walls to allow for later installation of grab bars at toilet, bathtub or shower, if provided. Accordingly, the Fair Housing regulations specifically require reinforcement in bathroom walls to allow later installation of grab bars around the shower, where showers are provided. (See 24 CFR 100.205(c)(3)(iii).)

Building

Comment. One commenter suggested that the Department use the term "structure" in lieu of "building". The commenter stated that, in the building industry, "building" is defined by exterior walls and fire walls, and that an apartment structure of four units could be subdivided into two separate buildings of two units each by inexpensive construction of a firewall. The commenter suggested that the final definition of "building" include the following language: "For the purpose of the Act, firewall separation does not define buildings."

Response. The term "building" is the term used in the Fair Housing Act. The Department uses this term in the Guidelines to be consistent with the Act. With respect to the comment on firewall separation, the Department believes that, within the context of the Fair Housing Act, the more appropriate place for the language on firewall separation is in the definition of "covered multifamily dwellings". Since many building codes in fact define "building" by exterior walls and firewalls, a definition of "building" in the Fair Housing Accessibility Guidelines that explicitly excludes firewalls as a means of identifying a building would place the Guidelines in conflict with local building codes. Accordingly, to avoid this conflict, the Department has clarified the definition of "covered multifamily dwelling" (which is discussed below) to address the issue of firewall separation.

Covered Multifamily Dwellings

The Department has revised the definition of "covered multifamily dwellings" to clarify that dwelling units within a single structure separated by firewalls do not, for purposes of these Guidelines, constitute separate buildings.

A number of questions and comments were received on what should, or should not, be considered a covered multifamily dwelling. Several of these comments requested clarification concerning "ground floor dwelling units". These comments generally concluded with a request that the Department define "ground floor" and "ground floor unit". The Department has included a definition of "ground floor" in the final Guidelines. The Department believes that this definition is sufficiently clear to identify ground floor units, and that therefore a separate definition for "ground floor unit" is unnecessary. Specific questions concerning ground floor units are discussed below under the heading "Ground Floor". Comments on other covered multifamily dwellings are as follows:

Comment. (Garden apartments) One commenter requested that the Department clarify whether single family attached dwelling units with all living space on one level (i.e. garden units) fall within the definition of covered multifamily dwellings.

Response. The Fair Housing Act and its regulations clearly define "covered multifamily dwellings" as buildings consisting of four or more dwelling units, if such buildings have one or more elevators, and ground floor dwelling units in other buildings consisting of four or more dwelling units. Garden apartments located in an elevator building of four or more units are subject to the Act's requirements. If the garden apartment is on the ground floor of a nonelevator building consisting of four or more apartments, and if all living space is on one level, then the apartment is subject to the Act's requirements (unless the building is exempt on the basis of site impracticality).

Comment. (Townhouses) Several commenters requested clarification concerning whether townhouses are covered multifamily dwellings.

Response. In the preamble to the Fair Housing regulations, the Department addressed this issue. Using an example of a single structure consisting of five two-story townhouses, the Department stated that such a structure is *not* a covered multifamily dwelling if the building does not have an elevator, because the entire dwelling unit is not on the ground floor. Thus, the first floor of a two-story townhouse in the example is not a ground floor unit, because the entire unit is not on the ground floor. In contrast, a structure consisting of five single-story townhouses would be a covered multifamily dwelling. (See 54 FR 3244; 24 CFR Ch. I, Subch. A, App. I at 575–576 (1990).)

Comment. (Units with basements) One commenter asked whether a unit that contains a basement, which provides additional living space, would be viewed as a townhouse, and therefore exempt from the Act's accessibility requirements. The commenter stated that basements are generally designed with the top of the basement, including the basement entrance, above finished grade, and that basement space cannot be made accessible without installation of an elevator or a lengthy ramp.

Response. If the basement is part of the finished living space of a dwelling unit, then the dwelling unit will be treated as a multistory unit, and application of the Act's accessibility requirements will be determined as provided in the Guidelines for Requirement 4. If the basement space is unfinished, then it would not be considered part of the living space of the unit, and the basement would not be subject to the Act's requirements. Attic space would be treated in the same manner.

Dwelling Unit

"Dwelling unit" is defined as a single unit of residence for a household of one or more persons. The definition provides a list of examples of dwelling units in order to clarify the types of units that may be covered by the Fair Housing Act. The examples include condominiums and apartment units in apartment buildings. Several commenters submitted questions on condominiums, and one commenter requested clarification on whether vacation time-sharing units are subject to the Act's requirements. Their specific comments are as follows:

Comment. (Condominiums) A few commenters requested that condominiums be excluded from covered dwelling units because condominiums are comparable to single family homes. The commenter stated that condominiums do not compete in the rental market, but compete in the sale market with single family homes, which are exempt from the Act's requirements.

Response. The Fair Housing Act requires all covered multifamily dwellings for first occupancy after March 13, 1991 to be designed and constructed in accordance with the Act's accessibility requirements. The Act does not distinguish between dwelling units in covered multifamily dwellings that are for sale, and dwelling units that are for rent. Condominium units in covered multifamily dwellings must comply with the Act's accessibility requirements.

Comment. (Custom-designed condominium units) Two commenters stated that purchasers of condominium units often request their units to be custom designed. The commenters questioned whether custom-designed units must comply with the Act's accessibility requirements. Another commenter stated that the Department should exempt from compliance those condominium units which are pre-sold, but not yet constructed, and for which owners have expressly requested designs that are incompatible with the Act's accessibility requirements.

Response. The fact that a condominium unit is sold before the completion of construction does not exempt a developer from compliance with the Act's accessibility requirements. The Act imposes affirmative duties on builders and developers to design and construct covered multifamily dwellings for first occupancy after March 13, 1991 in accordance with the Act's accessibility requirements. These requirements are mandatory for covered multifamily dwellings for first occupancy after March 13, 1991, regardless of the ownership status of covered individual dwelling units. Thus, to the extent that the pre-sale *or* post-sale construction included features that are covered by the Act (such as framing for doors in pre-sale "shell" construction), they should be built accordingly.

Comment. (Vacation timeshare units) One commenter questioned whether vacation timeshare units were subject to the Act's requirements. The commenter stated that a timeshare unit may be owned by 2 to 51 individuals, each of whom owns, or has the right to use, the unit for a proportionate period of time equal to his or her ownership.

Response. Vacation timeshare units are subject to the Act's accessibility requirements, when the units are otherwise subject to the accessibility requirements. "Dwelling" is defined in 24 CFR 100.20 as "any building, structure, or portion thereof which is occupied as, or designed or intended for occupancy as, a residence by one or more families, and any vacant land which is offered for sale or lease for the construction or location thereon of any such building, structure or portion thereof". The preamble to the final Fair Housing rule states that the definition of "dwelling" is "broad enough to cover each of the types of dwellings enumerated in the proposed rule: mobile home parks, trailer courts, condominiums, cooperatives, *and time-*

sharing properties." (Emphasis added.) (See 54 FR 3238, 24 CFR Ch. I, Subch. A, App. I, at 567 (1990).) Accordingly, the fact of vacation timeshare ownership of units in a building does not affect whether the structure is subject to the Act's accessibility requirements.

Entrance

Comment. One commenter requested clarification on whether "entrance" refers to an entry door to a dwelling unit, or an entry door to the building.

Response. As used in the Guidelines, "entrance" refers to an exerior entry door. The definition of "entrance" has been revised in the final Guidelines to clarify this point, and the term "entry" is used instead of "entrance" when referring to the entry into a unit when it is interior to the building.

Ground Floor

As noted above, under the discussion of covered multifamily dwellings, several commenters requested clarification concerning "ground floor" and "ground floor dwelling unit". In response to these comments, the Department has included a definition for "ground floor" in the final Guidelines. The Department has incorporated the definition of "ground floor" found in the Fair Housing regulations (24 CFR 100.201), and has expanded this definition to address specific concerns related to implementation of the Guidelines. In the final Guidelines, "ground floor" is defined as follows:

"Ground floor" means a floor of a building with a building entrance on an accessible route. A building may have one or more ground floors. Where the first floor containing dwelling units in a building is above grade, all units on that floor must be served by a building entrance on an accessible route. This floor will be considered to be a ground floor.

Specific comments concerning ground floor units are as follows:

Comment. (Nonresidential ground floor units) Two commenters advised that, in many urban areas, buildings are constructed without an elevator and with no dwelling units on the ground floor. The ground floor contains either parking, retail shops, restaurants or offices. To bring these buildings into compliance with the Act, one of the commenters recommended that the Department adopt a proposal under consideration by the International Conference of Building Officials (ICBO). The commenter stated that the proposal provides that, in buildings with ground floors occupied by parking and other nonresidential uses, the lowest story containing residential units is considered the ground floor. Another commenter recommended that a building should be exempt from compliance with the Act's requirements if the ground floor is occupied by a non-residential use (including parking). The commenter stated that if an elevator is to be provided to serve the upper residential floors, then the elevator should also serve the ground floor, and access be provided to all the dwelling units.

Response. The Department believes that the definition of "ground floor unit" incorporated in the final Guidelines addresses the concerns of the commenters.

Comment. (More than one ground floor) One commenter requested guidance on treatment of nonelevator garden apartments (i.e., apartment buildings that generally are built on slopes and contain two stories in the front of the building and three stories in the back). The commenter stated that these buildings arguably may be said to have two ground floors. The commenter requested that the Department clarify that, if a building has more than one ground floor, the developer must make one ground floor accessible—but not both—and the developer may choose which floor to make accessible. Another commenter suggested that, in a garden-type apartment building, the floor served by the primary entrance, and which is located at the parking lot level, is the floor which must be made accessible.

Response. In the preamble to the final Fair Housing rule, the Department addressed the issue of buildings with more than one ground floor. (See 54 3244, 24 CFR Ch. I, Subch. A, App. I at 576 (1990).) The Department stated that if a covered building has more than one floor with a building entrance on an accessible route, then the units on each floor with an accessible building entrance must satisfy the Act's accessibility requirements. (See the discussion of townhouses in nonelevator buildings above.)

Handicap

Comment. Several commenters requested that the Department avoid use of the terms "handicap" and "handicapped persons", and replace them with the terms "disability" and "persons with disabilities".

Response. "Handicap" and "handicapped persons" are the terms used by the Fair Housing Act. These terms are used in Guidelines and regulations to be consistent with the statute.

Principle of Reasonableness and Cost

Comment. Four commenters noted that, in the preamble to the proposed guidelines, the Department indicated that the Fair Housing Accessibility Guidelines were limited by a "principle of reasonableness and cost". The commenters requested that the Department define this phrase.

Response. In the preamble to the proposed guidelines, the Department stated in relevant part as follows: "These guidelines are intended to provide a safe harbor for compliance with respect to those issues they cover. * * * Where the ANSI Standard is not applicable, the language of the statute itself is the safest guide. The degree of scoping, accessibility, and the like are of course limited by a principle of reasonableness and cost." (55 FR 24371)

In House Report No. 711, the accessibility requirements of the Fair Housing Act were referred to by the Congress as "modest" (House Report at 25), "minimal" and "basic features of adaptability" (House Report at 25). In developing the Fair Housing Accessibility Guidelines, the Department was attentive to the fact that Congress viewed the Act's accessibility requirements as reasonable, and that the Guidelines for these requirements should conform to this "reasonableness" principle—that is, that the Guidelines should provide the level of reasonable accessibility envisioned by Congress, while maintaining the affordability of new multifamily construction. The Department believes that the final Guidelines conform to this principle of reasonableness and cost.

Slope

Comment. One commenter, the Building Officials & Code Administrators International, Inc. (BOCA), requested clarification of the term, "slope". The commenter stated the definition indicates that slope is calculated based on the distance and elevation between two points. The commenter stated that this is adequate when there is a uniform and reasonably consistent change in elevation between point (i.e., one point is at the top of a hill and the other is at the bottom), but the definition does not adequately address land where a valley, gorge, or swale occurs between two points. The commenter stated that the definition also does not adequately address conditions where there is an abrupt change in the rate of slope between the points (i.e. a sharp drop off within a short distance, with the remaining distance being flat or sloped much more gradually).

Response. Slope is measured from ground level at the entrance to all arrival points within 50 feet, and is

considered impractical only when it exceeds 10 percent between the entrance and all these points. Since multifamily dwellings typically have an arrival point fairly close to the building, a significant change such as a sharp drop would likely result in an impractical slope. Minor variations, such as a swale, if more than 5 percent, would be easily graded or ramped; a gorge would be bridged or filled, in any event, if it was on an entrance route.

Usable Door

Comment. One commenter stated that a clear definition of "usable door" is required.

Response. The Guidelines for Requirement 3 (usable doors) fully describe what is meant by "usable door" within the meaning of the Act.

Section 3. Fair Housing Act Design and Construction Requirements

This section reprints § 100.205 (Design and Construction Requirements) from the Department's final rule implementing the Fair Housing Act. A reprint of § 100.205 was included to provide easy reference to (1) the Act's accessibility requirements, as codified by § 100.205; and (2) the additional examples of methods of compliance with the Act's requirements that are presented in this regulation.

Section 4. Application of the Guidelines

This section states that the design specifications that comprise the final Guidelines apply to all "covered multifamily dwellings" as defined in Section 2 of the Guidelines. Section 4 also clarifies that the Guidelines, are "recommended" for designing dwellings that comply with the requirements of the Fair Housing Amendments Act of 1988.

Under the discussion of Section 4 in the proposed guidelines, the Department requested comment on the Act's application to dwelling units with design features such as a loft or sunken living room (55 FR 24377). A number of comments were received on this issue. Since the Act's application to units with such features is relevant within the context of an accessible route into and through a dwelling unit, the comments and the Department's response to these comments are discussed in section 5, under the subheading, "Guidelines for Requirement 4".

Section 5. Guidelines

The Guidelines contained in this Section 5 are organized to follow the sequence of requirements as they are presented in the Fair Housing Act and in the regulation implementing these requirements, 24 CFR 100.205. There are Guidelines for seven requirements: (1) An accessible entrance on an accessible route; (2) accessible and usable public common use areas; (3) doors usable by a person in a wheelchair; (4) accessible route into and through the covered dwelling unit; (5) light switches, electrical outlets and environmental controls in accessible locations; (6) bathroom walls reinforced for grab bars; and (7) usable kitchens and bathrooms.

For each of these seven requirements, the Department adopted the corresponding Option One guidelines, but changes were made to certain of the Option One design specifications. The following discussion describes the Guidelines for each of the seven requirements, and highlights the changes that have been made.

Guidelines for Requirement 1

The Guidelines for Requirement 1 present guidance on designing an accessible entrance on an accessible route, as required by § 100.205(a), and on determining when an accessible entrance is impractical because of terrain or unusual characteristics of the site.

The Department has adopted the Option One guidelines for Requirement 1, with substantial changes to the specifications for determining site impracticality. These changes, and the guidelines that remain unchanged for Requirement 1 are discussed below.

Site Impracticality Determinations. The Guidelines for Requirement 1 begin by presenting criteria for determining when terrain or unusual site characteristics would make an accessible entrance impractical. Section 100.205(a) recognizes that certain sites may have characteristics that make it impractical to provide an accessible route to a multifamily dwelling. This section states that all covered multifamily dwellings shall be designed and constructed to have at least one building entrance on an accessible route unless it is impractical to do so because of the terrain or unusual characteristics of the site.

Comments. The Department received many comments on the site impracticality specifications presented in the proposed guidelines (55 FR 24377–24378). The majority of the members of the disability community who commented on this issue supported the Option One guidelines, and recommended no change. However, other commenters, including a few disability organizations, members of the building industry, State and local government agencies involved in the development and enforcement of accessibility codes, and some of the major building code organizations, criticized one or more aspects of the Option One and Option Two guidelines for Requirement 1. Specific comments are noted below.

A few commenters suggested that the 10% slope criterion was too low, and easily will be met by a project site having a hilly terrain which could (and typically would) be made more level. These commenters recommended a higher slope criterion ranging anywhere from 12% to 30%. Other commenters stated that the slope criterion for the planned finished grade should not exceed 8.33%. The Congressional sponsors of the Act (U.S. Representatives Edwards, Fish, and Frank) stated that a limited exemption for slopes greater than 10% "was not contemplated by the Act"; but that they believed the Department has the discretion to develop such an exemption if it is "carefully crafted and narrowly tailored".

Several commenters stated that any evaluation of the undisturbed site should be done only on the percentage of land that is buildable. Several commenters stated that the final Guidelines should not require an evaluation of the undisturbed site between the planned entrance and the arrival points—that the only evaluation of the undisturbed site should be the initial threshold slope analysis.

There were a number of questions on arrival points, and requests that these points be more clearly defined. Several commenters presented specific examples of possible problems with the use of arrival points, as specified in the Option One guidelines. A few commenters stated that the individual building analysis should involve a measurement between the entrance and only one designated vehicular or pedestrian arrival point.

Other commenters stated that single buildings on a site should be subject to the same analysis as multiple buildings on a site.

A number of commenters criticized the Option One site impracticality analysis as being too cumbersome and confusing. A number of commenters objected to Option Two's requirement that covered multifamily dwellings with elevators must comply with the Act's accessibility requirements, regardless of site conditions or terrain.

Response. Following careful consideration of these comments, the Department has revised significantly the procedure for determining site impracticality, and its application to covered multifamily dwellings.

For covered multifamily dwellings with elevators, the final Guidelines would not exempt these dwellings from the Act's accessibility requirements. The final Guidelines provide that covered multifamily dwellings with elevators shall be designed and constructed to provide at least one accessible entrance on an accessible route regardless of terrain or unusual characteristics of the site. Every dwelling unit on a floor served by an elevator must be on an accessible route, and must be made accessible in accordance with the Act's requirements for covered dwelling units. The Department has excluded elevator buildings from any exemption from the Act's accessibility requirements because the Department believes that the type of site work that is performed in connection with the construction of a high rise elevator building generally results in a finished grade that would make the building accessible. The Department also notes that the majority of elevator buildings are designed with a primary building entrance and a passenger drop-off area which are easily made accessible to individuals with handicaps. Additionally, many elevator buildings have large, relatively level areas adjacent to the building entrances, which are normally provided for moving vans. These factors lead the Department to conclude that site impracticality considerations should not apply to multifamily elevator buildings.

For covered multifamily dwellings without elevators, the final Guidelines provide two alternative tests for determining site impracticality due to terrain. The first test is an individual building test which involves a two-step process: measurement of the slope of the undisturbed site between the planned entrance and all vehicular or pedestrian arrival points; and measurement of the slope of the planned finished grade between the entrance and all vehicular or pedestrian arrival points. The second test is a site analysis test which involves an analysis of the topography of the existing natural terrain.

A site with a single building, having a common entrance for all units, may be analyzed only under the first test—the individual building test.

All other sites, including a site with a single building having multiple entrances serving either individual dwelling units or clusters of dwelling units, may be analyzed either under the first test or the second test. For these sites for which either test is applicable, the final Guidelines provide that regardless of which test is utilized by a builder or developer, at least 20% of the total ground floor units in nonelevator buildings, on any site, must comply with the Act's accessibility requirements.

The distinctive features of the two tests for determining site impracticality due to terrain, for nonelevator multifamily dwellings, are as follows:

1. *The individual building test.*

a. This test is applicable to all sites.

b. This test eliminates the slope analysis of the entire undisturbed site that was applicable only to multiple building sites, and, concomitantly, the table that specifies the minimum percentage of adaptable units required for every multiple building site. The only analysis for site impracticality will be the individual building analysis. This analysis will be applied to each building regardless of the number of buildings on the site.

c. The individual building analysis has been modified to provide for measurement of the slopes between the planned entrance and all vehicular or pedestrian arrival points within 50 feet of the planned entrance. The analysis further provides that if there are no vehicular or pedestrian arrival points within 50 feet of the planned entrance, then measurement will be made of the slope between the planned entrance and the closest vehicular or pedestrian arrival point. Additionally, the final Guidelines clarify how to measure the slope between the planned entrance and an arrival point.

d. The individual building analysis retains the evaluation of both the undisturbed site and the planned finished grade. Buildings would be exempt only if the slopes of both the original undisturbed site and the planned finished grade exceed 10 percent (1) as measured between the planned entrance and all vehicular or pedestrian arrival points within 50 feet of the planned entrance; or (2) if there are no vehicular or pedestrian arrival points within that 50 foot area, as measured between the planned entrance and the closest vehicular or pedestrian arrival point.

2. *The site analysis test.*

a. This test is only applicable to sites with multiple buildings, or to sites with a single building with multiple entrances.

b. This test involves an analysis of the existing natural terrain (before grading) of the buildable area of the site by topographic survey with 2 foot contour intervals, with slope determination made between each successive contour interval. The accuracy of the slope analysis is to be certified by a professional licensed engineer, landscape architect, architect or surveyor.

c. This test provides that the minimum number of ground floor units to be made accessible on a site must equal the percentage of the total buildable area (excluding floodplains, wetlands, or other restricted use areas) of the undisturbed site that has an existing natural grade of less than 10% slope.

The Department believes that both tests for determining site impracticality due to terrain present enforceable criteria for determining when terrain makes accessibility, as required by the Act, impractical. The Department also believes that by offering a choice of tests, the Department is providing builders and developers with greater flexibility in selecting the approach that is most appropriate, or least burdensome, for their development project, while assuring that accessible units are provided on every site. As noted earlier in this preamble, this policy is consistent with the intent of Congress which was to encourage creativity and flexibility in meeting the Act's requirements, and thus minimize the impact of these requirements on housing affordability.

With respect to determining site impracticality due to unusual characteristics of the site, the test in the final Guidelines is essentially the same as that provided in the Option One guidelines. This test has been modified to limit measurement of the finished grade elevation to that between the entrance and all vehicular or pedestrian arrival points within 50 feet of the planned entrance.

Finally, the final Guidelines for Requirement 1 contemplate that the site tests recommended by the Guidelines will be performed, generally, on "normal" soil. The Department solicits additional public comment only on the issue of the feasibility of the site tests on areas that have difficult soil, such as areas where expansive clay or hard granite is prevalent.

Additional specific comments on the site impracticality determination are as follows:

Comment. One commenter stated that the site impracticality determination seems to suggest that only the most direct path from the pedestrian or vehicular arrival points will be used to evaluate the ability to create an accessible route of travel to the building. The commenter stated that it may be possible to use natural or finished contours of the site to provide an accessible route other than a straight-line route.

Response. To be enforceable, the Guidelines must specify where the line is drawn; otherwise it is not possible to

specify what is "practical". Generally, developers provide relatively direct access from the entrance to the pedestrian and vehicular arrival points. If, in fact, the route as built was accessible, then the building would be expected to have an accessible entrance and otherwise comply with the Act.

Comment. Another commenter stated that the site impracticality determination does not take into account the many building types and unit arrangements. The commenter stated that some buildings have a common entrance with unit entrances off a common corridor, while others have individual, exterior entrances to the units. The commenter stated that if the Department is going to permit exemptions from the Act's requirements caused by terrain, the commenter did not understand why every entrance in a building containing individually-accessed apartments must comply with the Act's requirements, simply because they are in one building.

Response. The final Guidelines recognize (as did the proposed guidelines) the difference in building types. If there is a single entry point serving the entire building (or portions thereof), that entry point is considered the "entrance". If each unit has a separate exterior entrance, then each entrance is to be evaluated for the conditions at that entrance. Thus, a building with four entrances, each serving one of four units, might have only one accessible entrance, depending upon site conditions, or it might have any combination up to four.

Comment. Another commenter stated that the evaluation for unusual characteristics of the site only takes into account floodplains or high hazard coastal areas, and excludes other possible unique and unusual site characteristics.

Response. The provision for unusual characteristics of the site clearly provides that floodplains or high hazard coastal areas are only two examples of unusual site characteristics. The provision states that "unusual site characteristics" includes "sites subject to similar requirements of law or code."

Comment. A number of commenters expressed concern that the site impracticality determination of the Guidelines may conflict with local health, safety, environmental or zoning codes. A principal concern of one of the commenters was that the final Guidelines may require "massive grading" of a site in order to achieve compliance with the Act. The commenter was concerned that such grading may conflict with local laws directed at minimizing environmental damage, or with zoning codes that severely limit substantial fill activities at a site.

Response. The Department believes that the site impracticality determination adopted in these final Guidelines will not conflict with local safety, health, environmental or zoning codes. The final Guidelines provide, as did the proposed guidelines, that the site planning involves consideration of all State and local requirements to which a site is subject, such as "density constraints, tree-save or wetlands ordinances and other factors impacting development choices" (55 FR 24378), and explicitly accept the site plan that results from balancing these and other factors affecting the development. The Guidelines would not require, for example, that a site be graded in violation of a tree-save ordinance. If, however, access is required based on the final site plan, then installation of a ramp for access, rather than grading, could be necessary in some cases so as not to disturb the trees. Where access is required, the method of providing access, whether grading or a ramp, will be decided by the developer, based on local ordinances and codes, and on business or aesthetic factors. It should be noted that these nonmandatory Guidelines do not purport to preempt conflicting State or local laws. However, where a State or local law contradicts a specification in the Guidelines, a builder must seek other reasonable cost-effective means, consistent with local law, to assure the accessibility of his or her units. The accessibility requirements of the Fair Housing Act remain applicable, and State and local laws must be in accord with those requirements.

Additional Design Specifications for Requirement 1. In addition to the site impracticality determinations, the final Guidelines for Requirement 1 specify that an accessible entrance on an accessible route is practical when (1) there is an elevator connecting the parking area with any floor on which dwelling units are located, and (2) an elevated walkway is planned between a building entrance and a vehicular or pedestrian arrival point, and the planned walkway has a slope no greater than 10 percent. The Guidelines also provide that (i) an accessible entrance that complies with ANSI 4.14, and (2) an accessible route that complies with ANSI 4.3, meets with the accessibility requirements of § 100.205(a). Finally, the Guidelines provide that if the slope of the finished grade between covered multifamily dwellings and a public or common use facility exceeds 8.33%, or where other physical barriers, or legal restrictions, outside the control of the owner, prevent the installation of an accessible pedestrian route, an acceptable alternative is to provide access via a vehicular route. (These design specifications are unchanged from the proposed Option One guidelines for Requirement 1.)

Comment. Several comments were received on the additional design specifications for Requirement 1. The majority of commenters supported 8.33% as the slope criterion for the finished grade between covered multifamily dwellings and a public or common use facility. A few commenters stated that vehicular access was not an acceptable alternative to pedestrian access. Other commenters stated that the 10% slope criterion for the planned walkway was inconsistent with accessibility requirements that prohibit ramps from having a slope in excess of 8.33%.

Response. With respect to access via a vehicular route, the Department's expectation is that public and common use facilities generally will be on an accessible pedestrian route. The Department, however, recognizes that there may be situations in which an accessible pedestrian route simply is not practical, because of factors beyond the control of the owner. In those situations, vehicular access may be provided. With respect to the 10% slope criterion for planned elevated walkways, this is the criterion for determining whether it is practical to provide an accessible entrance. If the site is determined to be practical, then the slope of the walkway must be reduced to 8.33%.

Guidelines for Requirement 2

The Guidelines for Requirement 2 present design standards that will make public and common use areas readily accessible to and usable by handicapped persons, as required by § 100.205(c)(1).

The Department has adopted the Option One guidelines for Requirement 2, without change. The Guidelines for Requirement 2 identify components of public and common use areas that should be made accessible, reference the section or sections of the ANSI Standard which apply in each case, and describe the appropriate application of the design specifications. In some cases, the Guidelines for Requirement 2 describe variations from the basic ANSI provision that is referenced.

The basic components of public and common use areas covered by the Guidelines include, for example: accessible route(s); protruding objects; ground and floor surface treatments; parking and passenger loading zones;

curb ramps; ramps; stairs; elevator; platform lifts; drinking fountains and water coolers; toilet rooms and bathing facilities, including water closets, toilet rooms and stalls, urinals, lavatories and mirrors, bathtubs, shower stalls, and sinks; seating, tables or work surfaces; places of assembly; common-use spaces and facilities, including swimming pools, playgrounds, entrances, rental offices, lobbies, elevators, mailbox areas, lounges, halls and corridors and the like; and laundry rooms.

Specific comments on the Guidelines for Requirement 2 are as follows:

Comment. A number of comments were received on the various components listed in the Guidelines for Requirement 2, and the accessibility specifications for these components provided by both options One and Two. A few commenters, including the Granite State Independent Living Foundation, submitted detailed comments on the design standards for the listed components of public and common use areas, and, in many cases, recommended specifications different than those provided by either Option One or Option Two.

Response. Following careful consideration of the comments submitted on the design specifications of Requirement 2, the Department has decided not to adopt any of the commenters' proposals for change. The Department believes that application of the appropriate ANSI provisions to each of the basic components of public and common use areas, in the manner specified on the Option One chart, and with the limitations and modifications noted, remains the best approach to meeting the requirements of § 100.205(c)(1) for accessible and usable public and common use areas, both because Congress clearly intended that the ANSI Standard be used where appropriate, and because it is consistent with the Department's support for uniform standards to the greatest degree possible.

Comment. Other commenters requested that the ANSI provisions applicable to certain components in public and common use areas also should be applied to these components when they are part of individual dwelling units (for example, floor surface treatments, carpeting, and work surfaces).

Response. To require such application in individual dwelling units would exceed the requirements imposed by the Fair Housing Act. The Fair Housing Act does not require individual dwelling units to be fully accessible and usable by individuals with handicaps. For individual dwelling units, the Act limits its requirements to specific features of accessible design.

Comment. A number of commenters indicated confusion concerning when the ANSI standard was applicable to stairs.

Response. Stairs are subject to the ANSI Standard only when they are located along an accessible route not served by an elevator. (Accessibility between the levels served by the stairs or steps would, under such circumstances, be provided by some other means such as a ramp or lift located with the stairs or steps.) For example, a ground floor entry might have three steps up to an elevator lobby, with a ramp located besides the steps. The steps in this case should meet the ANSI specification since they will be used by people with particular disabilities for whom steps are more usable than ramps.

In nonelevator buildings, stairs serving levels above or below the ground floor are not required to meet the ANSI standard, unless they are a part of an accessible route providing access to public or common use areas located on these levels. For example, mailboxes serving a covered multifamily dwelling in a nonelevator building might be located down three steps from the ground floor level, with a ramp located beside the steps. The steps in this case would be required to meet the ANSI specifications.

Comment. Other commenters indicated confusion concerning when handrails are required. A few commenters stated that the installation of handrails limits access to lawn areas.

Response. Handrails are required only on ramps that are on routes required to be accessible. Handrails are not required on any on-grade walks with slopes no greater than 5%. Only on those walks that exceed 5% slope, and that are parts of the required accessible route, would handrails be required. Accordingly, walks from one building containing dwelling units to another, would not be affected even if slopes exceeded 5%, because the Guidelines do not require such walks as part of the accessible route. The Department believes that the benefits provided to persons with mobility-impairments by the installation of handrails on required assessible routes outweigh any limitations on access to lawn areas.

Comment. A number of proposals for revisions were submitted on the final Guidelines for parking and passenger loading zones.

Response. The Department has not adopted any of these proposals. The Department has retained the applicable provisions of the ANSI Standard for parking space. As noted previously in the preamble, the ANSI Standard is a familiar and widely accepted standard. The Department is reluctant to introduce a new or unfamiliar standard, or to specify parking specifications that exceed the minimal accessibility standards of the Act. However, if a local parking code requires greater accessibility features (e.g. wider aisles) with respect to parking and passenger loading zones, the appropriate provisions of the local code would prevail.

Comment. A number of commenters requested that the final Guidelines for parking specify minimum vertical clearance for garage parking. other commenters suggested that the Department adopt ANSI's vertical height requirement at passenger loading zones as the minimal vertical clearance for garage parking.

Response. No national accessibility standards, including UFAS, require particular vertical clearances in parking garages. The Department did not consider it appropriate to exceed commonly accepted standards by including a minimum vertical clearance in the Fair Housing Accessibility Guidelines, in view of the minimal accessibility requirements of the Fair Housing Act.

Comment. Two commenters stated that parking spaces for condominiums is problematic because the parking spaces are typically deeded in ownership to the unit owner at the time of purchase, and it becomes extremely difficult to arrange for the subsequent provision of accessible parking. one of the commenters recommended that the Guidelines specify that a condominium development have two percent accessible visitor parking, and that these visitor accessible spaces be reassigned to residents with disabilities as needed.

Response. Condominiums subject to the requirements of the Act must provide accessible spaces for two percent of covered units. One approach to the particular situation presented by the commenters would be for condominium documents to include a provision that accessible spaces may be reassigned to residents with disabilities, in exchange for nonaccessible spaces that were initially assigned to units that were later purchased by persons with disabilities.

Comment. Several commenters stated that Option One's requirement of "sufficient accessible facilities" of each type of recreational facility is too vague. The commenters preferred option Two's guidelines on recreational facilities,

which provides that a minimum of 25% (or at least one of each type) of recreational facilities must be accessible.

Response. The Department decided to retain its more flexible approach to recreational facilities. The final Guidelines specify that where multiple recreational facilities are provided, accessibility is met under § 100.205(c)(1) if sufficient accessible facilities of each type are provided.

Comment. Several commenters suggested that all recreational facilities should be made accessible.

Response. To specify that all recreational facilities should be accessible would exceed the requirements of the Act. Congress stated that the Act did not require every feature and aspect of covered multifamily housing to be made accessible to individuals with handicaps. (See House Report at 26.)

Comment. Several commenters submitted detailed specifications on how various recreational facilities could be made accessible. These comments were submitted in response to the Department's request, in the proposed guidelines, for more specific guidance on making recreational facilities accessible to persons with handicaps (55 FR 24376). The Department specifically requested information about ways to provide access into pools.

Response. The Department appreciates all suggestions on recommended specifications for recreational facilities, and, in particular, for swimming pools. For the present, the Department has decided not to change the specifications for recreational facilities, including swimming pools, as provided by the Option One guidelines, since there are no generally accepted standards covering such facilities. Thus, access to the pool area of a swimming facility is expected, but not specialized features for access into the pool (e.g., hoists, or ramps into the water).

Comment. Several commenters criticized the chart in the Option One guidelines, stating that it was confusing and difficult to follow.

Response. The chart is adapted from ANSI's Table 2 pertaining to basic components for accessible sites, facilities and buildings. The ANSI chart is familiar to persons in the building industry. Accordingly, the Option One chart (and now part of the final Guidelines), which is a more limited version of ANSI's Table 2, is not a novel approach.

Guidelines for Requirement 3

The Guidelines for Requirement 3 present design standards for providing doors that will be sufficiently wide to allow passage into and within all premises by handicapped persons in wheelchairs (usable doors) as required by § 100.20(c)(2).

The Department has adopted the Option One guidelines for Requirement 3 with minor editorial changes. No changes were made to the design specifications for "usable doors".

The Guidelines provide separate guidance for (1) doors that are part of an accessible route in the public and common use areas of multifamily dwellings, including entry doors to individual dwelling units; and (2) doors within individual dwelling units.

(1) For public and common use areas and entry doors to dwelling units, doors that comply with ANSI 4.13 would meet the requirements of § 100.205(c)(2).

(2) For doors within individual dwelling units, the Department has retained, in the final Guidelines, the design specification that a door with a clear opening of at least 32 inches nominal width when the door is open 90 degrees, as measured between the face of the door and the stop, would meet the requirements of § 100.205(c)(2).

Specific comments on the design specifications presented in the Guidelines for Requirement 3 are as follows:

Minimum Clear Opening

Comment. The issue of minimum clear opening for doors was one of the most widely commented-upon design features of the guidelines. The majority of commenters representing the disability community supported the Option One specification of a minimum clear opening of 32 inches. A few commenters advocated a wider clear opening. U.S. Representatives Edwards, Frank, and Fish expressed their support for the Option One specification on minimum clearance which is consistent with the ANSI Standard.

Commenters from the building industry were almost unanimous in their opposition to a minimum clear opening of 32 inches. Several builders noted that a 32-inch clear opening requires use of 36-inch doors. These commenters stated that a standard 2'10" door (34") provides only a 31¾ inch clear opening. The commenters therefore recommended amending the Guidelines to permit a "nominal" 32 inch clear space, allowing the use of a 2'10" door, which provides a 31¾ inch clear opening. Other commenters stated that, generally, door width should provide a 32-inch clear opening, but that this width can be reduced if sufficient maneuvering space is provided at the door. These commenters supported Option Two's approach, which provided for clear width to be determined by the clear floor space available for maneuvering on both sides of the door, with the minimum width set at 29¼ inches. (See Option 2 chart and accompanying text at 55 FR 24382.)

Response. The Department considered the recommendations for both wider clear openings, and more narrow clear openings, and decided to maintain the design specification proposed in the Option One guidelines (a clear opening of at least 32 inches nominal width). The clear opening of at least 32 inches nominal width has been the accepted standard for accessibility since the issuance of the original ANSI Standard in 1961. While the Department recognizes that it may be possible to maneuver most wheelchairs through a doorway with a slightly more narrow opening, such doors do not permit ready access on the constant-use basis that is the reality of daily living within a home environment. The Department also recognizes that wider doorways may ensure easier passage for wheelchair users. However, by assuring that the minimum 36-inch hallway and 32-inch clear openings are provided, the Department believes that its recommended opening for doors should accommodate most people with disabilities. In the preamble to the proposed guidelines, the Department stated that the clear width provided by a standard 34-inch door would be acceptable under the Guidelines.

Maneuvering Space at Doors

Comment. Several commenters requested that the final Guidelines incorporate minimum maneuvering clearances at doors, as provided by the ANSI Standard. These commenters stated that maneuvering space on the latch side of the door is as important a feature as minimum door width. Other commenters stated that the maneuvering space was necessary to ensure safe egress in cases of emergency.

Response. The Department has carefully considered these comments, and has declined to adopt this approach. The Department believes that, by adhering to the standard 32-inch clear opening, it is possible to forego other accessibility requirements related to doors (e.g. door closing forces, maneuvering clearances, and hardware) without compromising the Congressional directive requiring doors to be "sufficiently wide to allow passage by handicapped persons in wheelchairs." However, as the Department noted in the preamble to the proposed guidelines, approaches to, and

maneuvering spaces at, the exterior side of the entrance door to an individual dwelling unit would be considered part of the public spaces, and therefore would be subject to the appropriate ANSI provisions. (See 55 FR 24380.)

Doors in a Series

Comment. A few commenters expressed concern that the Guidelines did not provide design specification for an entrance that consists of a series of more than one door. The commenters were concerned that, without adequate guidance, a disabled resident or tenant could be trapped between doors.

Response. Doors in a series are not typically part of an individual dwelling unit. Doors in a series generally are used in the entries to buildings, and are therefore part of public spaces. Section 4.13 of the ANSI Standard, which is applicable to doors in public and common use areas, provides design specifications for doors in a series. However, where doors in a series *are* provided as part of a dwelling unit, the Department notes that the requirements of an accessible route into and through the dwelling unit would apply.

Door Hardware

Comment. A few commenters requested that lever hardware be required on doors throughout dwelling units, not only at the entry door to the dwelling unit.

Response. For doors within individual dwelling units, the Fair Housing Act only requires that the doors be sufficiently wide to allow passage by handicapped persons in wheelchairs. Lever hardware is required for entry doors to the building and to individual dwelling units because these doors are part of the public and common use areas, and are, therefore, subject to the ANSI provisions for public and common use areas, which specify lever hardware. Installing lever hardware on doors is the type of adaptation that individual residents can make easily. The ANSI standard also recognizes this point. Under the ANSI Standard, only the entry door into an accessible dwelling unit is required to comply with the requirements for door hardware. (See ANSI section 4.13.9.)

Multiple Usable Entrances

Comment. Several commenters noted that the Guidelines do not provide more than one accessible entrance/exit, and that without a second means of egress, wheelchair users may find themselves in danger in an emergency situation.

Response. As stated previously, the Department is limited to providing Guidelines that are consistent with the accessibility requirements of the Act. The Act requires "an accessible entrance", rather than requiring all entrances to be accessible. However, the requirements for usable doors and an accessible route to exterior spaces such as balconies and decks does respond to this concern.

Guidelines for Requirement 4

The Guidelines for Requirement 4 present design specifications for providing an accessible route into and through the covered dwelling unit, as required by § 100.205(c)(3)(i).

The Department has adopted the Option One guidelines for Requirement 4 with the following changes:

First, the Department has eliminated the specification for maneuvering space if a person in a wheelchair must make a T-turn.

Second, the Department has eliminated the specification for a minimum clear headroom of 80 inches.

Third, and most significantly, the Department has revised the design specifications for "changes in level" within a dwelling unit to include separate design specifications for: (a) single-story dwelling units, including single-story dwelling units with design features such as a loft or a sunken living room; and (b) multistory dwelling units in buildings with elevators.

Fourth, the Department has revised the specifications for changes in level at exterior patios, decks or balconies in certain circumstances, to minimize water damage. For the same reason, the final Guidelines also include separate specifications for changes in level at the primary entry doors of dwelling units in certain circumstances.

Specific comments on the Guidelines for Requirement 4, and the rationale for the changes made, are discussed below.

Minimum Clear Corridor Width

A few commenters from the disability community advocated a minimum clear corridor width of 48 inches. However, the majority of commenters on this issue had no objection to the minimum clear corridor width of 36 inches. The 36-inch minimum clear corridor width, which has been retained, is consistent with the ANSI Standard.

T-turn Maneuvering Space

Comment. Several commenters stated that this design specification was unclear in two respects. First, they stated that it was unclear when it is necessary for a designer to provide space for a T-turn. The commenters stated that it was difficult to envision circumstances where a wheelchair could be pulled into a position traveling forward and then not be capable of backing out. Second, the commenters stated that the two descriptions of the T-turn provided by the Department were contradictory. The commenters stated that the preamble to the proposed guidelines provided one description of the T-turn (55 FR 24380), while Figure 2 of the guideline 4 (55 FR 24392), presented a different description of the T-turn.

Response. The Department has decided to delete the reference to the T-turn dimensions in the Guidelines for Requirement 4. The Guidelines adequately address the accessible route into and through the dwelling unit by the minimum corridor width and door width specifications, given typical apartment layouts. Should a designer find that a unique layout in a particular unit made a T-turn necessary for a wheelchair user, the specifications provided in the ANSI Standard sections referenced for public and common use areas could be used.

Minimum Clear Headroom

Comment. Several commenters from the building industry objected to the specification for a minimum clear headroom of 80 inches. The commenters stated that standard doors provide a height range from 75 to 79 inches, and that an 80-inch specification would considerably increase the cost of each door installed.

Response. The specification for minimum clear headroom of 80 inches was included in the proposed guidelines because it is a specification included in the major accessibility codes. This design specification was not expected to conflict with typical door heights. However, since the principal purpose of the requirement is to restrict obstructions such as overhanging signs in public walkways, the Department has determined that this specification is not needed for accessible routes within individual dwellings units, and has therefore deleted this standard from the final Guidelines for such routes. (The requirement, however, still applies in public and common use spaces.)

Changes in Level within a Dwelling Unit

In the preamble to the proposed guidelines, the Department advised that the Act appears to require that dwelling units with design features such as lofts or with more than one floor in elevator buildings be equipped with internal elevators, chair lifts, or other means of access to the upper levels (55 FR 24377). The Department stated that, although it is not clear that Congress intended this result, the Department's preliminary assessment was that the statute appears

to offer little flexibility in this regard. The Department noted that several commenters, including the NAHB and the NCCSCI, suggested that units with more than one floor in elevator buildings should be required to comply with the Act's accessibility requirements only on the floor that is served by the building elevator. (This was the position taken by Option Two.) The Department solicited comments on this issue, and received a number of responses opposing the Department's interpretation.

Comment. The commenters opposing the Department's interpretation stated that the Department's interpretation would place an undue burden on developers and needlessly increase housing costs for everyone; defeat the purpose of having multilevel units, which is to provide additional space at a lower cost; eliminate multilevel designs which may be desirable to disabled residents (e.g., to provide living accommodations for live-in attendants); and "create a backlash" against the Accessibility Guidelines.

Response. Following careful consideration of these comments, and a reexamination of the Act and its legislative history, the Department has determined that its previous interpretation of the Act's application to units with changes in level (whether lofts, or additional stories in elevator buildings), which would have required installation of chair lifts or internal elevators in such units, runs contrary to the purpose and intent of the Fair Housing Act, which is to place "modest accessibility requirements on covered multifamily dwellings." (See House Report at 25.)

In House Report No. 711, the Congress repeatedly emphasized that the accessibility requirements of the Fair Housing Act were minimal basic requirements of accessibility.

> These modest requirements will be incorporated into the design of new buildings, resulting in features which do not look unusual and will not add significant additional costs. The bill does not require the installation of elevators or 'hospital-like' features, or the renovation of existing units." (House Report at 18)
>
> Accessibility requirements can vary across a wide range. A standard of total accessibility would require that every entrance, doorway, bathroom, parking space, and portion of buildings and grounds be accessible. Many designers and builders have interpreted the term 'accessible' to mean this type of standard. The committee does not intend to impose such a standard. Rather, the committee intends to use a standard of 'adaptable' design, a standard developed in recent years by the building industry and by advocates for handicapped individuals to provide usable housing for handicapped persons without necessarily being significantly different from conventional housing." (House Report at 26)

The Department has determined that a requirement that units with lofts or multiple stories in elevator buildings be equipped with internal elevators, chair lifts, or other means of access to lofts or upper stories would make accessible housing under the Fair Housing Act significantly different from conventional housing, and would be inconsistent with the Act's "modest accessibility requirements". (See House Report at 25.)

The Department also has determined that a requirement that dwelling units with design features, such as sunken living rooms, must provide some means of access, such as ramps or lifts, as submitted in the proposed guidelines (55 FR 24380) is inconsistent with the Act's modest accessibility requirements. Sunken living rooms are not an uncommon design feature. To require a ramp or other means of access to such an area, at the time of construction, would reduce, perhaps significantly, the space provided by the area. The reduced space might interfere with the use and enjoyment of this area by a resident who is not disabled, or whose disability does not require access by means of a ramp or lift. The Department believes that had it maintained in the final Guidelines the access specifications for design features, such as sunken living rooms, as set forth in the proposed guidelines, the final Guidelines would have interfered unduly with a developer's choice of design, or would have eliminated a popular design choice. Accordingly, the final Guidelines provide that access is not required to design features, such as a sunken living room, provided that the area does not have the effect of interrupting the accessible route through the remainder of the unit.

The Department believes that the installation of a ramp or deck in order to make a sunken room accessible is the type of later adaptation that easily can be made by a tenant. The Department, however, does require that design features, such as a split-level entry, which is critical to providing an accessible route into and through the unit, must provide a ramp or other means of access to the accessible route.

In order to comply with the Act's requirement of an accessible route into and through covered dwelling units, the Department has revised the Guidelines for Requirement 4 to provide separate technical guidance for two types of dwelling units: (1) Single-story dwelling units, including single-story dwelling units with design features such as a loft or a sunken living room; and (2) multistory dwelling units in elevator buildings. (Definitions for "single-story dwelling unit," "loft," "multistory dwelling unit" and "story" have been included in section 2 of the final Guidelines.)

"Single-story dwelling unit" is defined as a dwelling unit with all finished living space located on one floor.

"Loft" is defined as an intermediate level between the floor and ceiling of any story, located within a room or rooms of a dwelling.

"Multistory dwelling unit" is defined as a dwelling unit with finished living space located on one floor and the floor or floors immediately above or below it.

"Story" is defined as that portion of a dwelling unit between the upper surface of any floor and the upper surface of the floor next above, or the roof of the unit. Within the context of dwelling units, the terms "story" and "floor" are synonymous.

For single-story dwelling units and multistory dwelling units, the Guidelines for Requirement 4 are as follows:

(1) For single-story dwelling units, the design specifications for changes in level, are the same as proposed in the Option One guidelines. Changes in level within the dwelling unit with heights between ¼ inch and ½ inch are beveled with a slope no greater than 1:2. Changes in level greater than ½ inch (excluding changes in level resulting from design features such as a loft or a sunken living room) must be ramped or must provide other means of access. For example, split-level entries must be ramped or use other means of providing and accessible route into and through the dwelling unit.

For single-story dwelling units with design features such as a loft or a raised or sunken functional area, such as a sunken living room, the Guidelines specify that: (a) access to lofts is not required, provided that all spaces other than the loft are on an accessible route; and (b) design features such as a sunken living room are also exempt from the access specifications, provided that the sunken area does not interrupt the accessible route through the remainder of the unit.

(2) In multistory dwelling units in buildings with elevators, access to the additional story, or stories, is not required, provided that the story of the unit that is served by the building elevator (a) is the primary entry to the unit; (b) complies with Requirements 2 through 7 with respect to the rooms located on the entry/accessible level; and (3) contains a bathroom or powder room which complies with Requirement

7. (As previously noted, multistory units in buildings without elevators are not considered ground floor units, and therefore are exempt.)

The Department believes that the foregoing revisions to the Guidelines for Requirement 4 will provide individuals with handicaps the degree of accessibility intended by the Fair Housing Act, without increasing significantly the cost of multifamily housing.

Comment. Two commenters suggested that the same adaptability requirement that is applied to bathrooms should be applied to dwelling units with more than one story, or with lofts, i.e. that stairs, and the wall along the stairs, contain the appropriate reinforcement to provide for later installation of a wheelchair lift by a disabled resident, if so desired.

Response. The only blocking or wall reinforcement required by the Fair Housing Act is the reinforcement in bathroom walls for later installation of grab bars. As noted earlier in this preamble, the Fair Housing Act does not actually require that features in covered units be "adaptable", except for bathrooms. The adaptable feature is the reinforcement in bathroom walls which allows later installation of grab bars. Accordingly, the Department believes that a specification for reinforcement of the walls along stairs would exceed the Act's requirements, because the necessary reinforcement could vary by type of lift chosen, and more appropriately would be specified and installed as part of the installation of the lift.

Thresholds at Exterior Doors/ Thresholds to Balconies or Decks

Comment. A number of commenters from the building industry objected to the provision of the Option One guidelines that specified that an exterior deck, balcony, patio, or similar surface may be no more than ¾ inch below the adjacent threshold. Several commenters stated that, in many situations, this height is unworkable for balconies and decks because of waterproofing and safety concerns. This was a particular concern among commenters from the South Florida building industry, who stated that the ¾" height is ineffective for upper floors of high rise buildings in a coastal environment and invites water control problems. Others noted that the suggestion of a wooden decking insert, or the specification of a ¾ inch maximum change in level, in general, might conflict with fire codes.

Response. In response to these concerns, and mindful that Congress did not intend the accessibility requirements of the Act to override the need to protect the physical integrity of multifamily housing, the Department has included two additional provisions for changes in level at thresholds leading to certain exterior surfaces, as a protective measure against possible water damage. The final Guidelines provide that exterior deck, patio or balcony surfaces should be no more than ½ inch below the floor level of the interior of the dwelling unit, unless they are constructed of impervious material such as concrete, brick or flagstone. In such case, the surface should be no more than 4 inches below the floor level of the interior dwelling unit, unless the local code requires a lower drop. Additionally, the final Guidelines provide that at the primary entry doors to dwelling units with direct exterior access, outside landing surfaces constructed of impervious materials such as concrete, brick, or flagstone should be no more than ½ inch below the floor level of the interior of the dwelling unit. The Guidelines further provide that the finished surface of this area, located immediately outside the entry door, may be sloped for drainage, but the sloping may be no more than ⅛ inch per foot.

In response to commenters' concern that the Guidelines for an accessible route to balconies and decks may conflict with certain building codes that require higher thresholds, or balconies or decks lower than the ¾ inch specified by the Guidelines, the Department notes that the Guidelines are "recommended" design specifications, not building code "requirements". Accordingly, the Guidelines cannot preempt State or local law. However, the builder confronted with local requirements that thwart the particular means of providing accessibility suggested by the Guidelines is under a duty to take reasonable steps to provide for accessibility by other means consistent with local law constraints and considerations of cost-effectiveness, in order to provide dwelling units that meet the specific accessibility requirements of the Fair Housing Act.

Guidelines for Requirement 5

The Guidelines for Requirement 5 present design specifications for providing dwelling units that contain light switches, electrical outlets, thermostats, and other environmental controls in accessible locations, as required by § 100.205(c)(2)(ii).

The Department has adopted the Option One guidelines for Requirement 5 with minor technical changes. The final Guidelines clarify that to be in an accessible location within the meaning of the Act, the maximum height for an environmental control, for which reach is over an obstruction, is 44 inches for forward approach (as was proposed in the Option One guidelines), or 46 inches for side approach, provided that the obstruction is no more than 24 inches in depth. The inclusion of this additional specification for side approach is consistent with the comparable provisions in the ANSI standard.

Specific comments on the Guidelines for Requirement 5 are as follows:

Comments. Three comments stated that lowered thermostats could pose a safety hazard for children. However, the majority of comments requested clarification as to what is meant by "other environmental controls". Several commenters from the disability community requested that circuit breakers be categorized as environmental controls. Other commenters asked whether light and fan switches on range hoods fall within the category of light switches and environmental controls.

Response. With regard to concerns about lowered thermostats, the Act specifically identifies "thermostats" as one of the controls that must be in accessible locations, and the mounting heights specified in the Guidelines are necessary for an accessible location. The only other environmental controls covered by the Guidelines for Requirement 5 would be heating, air conditioning or ventilation controls (e.g., ceiling fan controls). The Department interprets the Act's requirement of placing environmental controls in accessible locations as referring to those environmental controls that are used by residents or tenants on a daily or regular basis. Circuit breakers do not fall into this category, and therefore are not subject to accessible location specifications. Light and fan switches on range hoods are appliance controls and therefore are not covered by the Act.

Comment. Other commenters asked whether light switches and electrical outlets in the inside corners of kitchen counter areas, and floor outlets are permissible.

Response. Light switches and electrical outlets in the inside corners of kitchen counters, and floor outlets, are permissible, if they are not the only light switches and electrical outlets provided for the area.

Comment. Another commenter pointed out that some electrical outlets that are installed specifically to serve individual appliances, such as refrigerators or microwave ovens, cannot realistically be mounted in an accessible location.

Response. Electrical outlets installed to serve individual appliances, such as refrigerators or built-in microwave ovens, may be mounted in non-accessible locations. These are not the type of electrical outlets which a disabled resident or tenant would need access to on a regular or frequent basis.

Comment. One commenter stated that Figure 3 in the proposed guidelines (Figure 2 in the final Guidelines) specifies a reach requirement more stringent than the ANSI Standard.

Response. The ANSI Standard presents reach ranges for both forward and side approaches for two situations: (1) unobstructed; and (2) over an obstruction. The proposed guidelines specified only the heights for forward reach, because those heights also are usable in side approach. The diagram in Figure 2 (formerly Figure 3) showing forward reach is identical to that of Figure 5 in the ANSI Standard. The ANSI Standard also includes a figure (Figure 6) for side reach that permits higher placement. The reach range for forward approach was the only one referenced in the proposed guidelines for use in the dwelling unit, because it was considered simpler and easier to use a single specification that would work in all situations. The reach range for forward approach has been retained in the final Guidelines for situations where there is no built-in obstruction in order to assure usability when the unit was furnished. However, the final Guidelines have added the specification for side reach over a built-in obstruction that is consistent with the ANSI requirement, and that permits placement two inches higher than forward reach.

Guidelines for Requirement 6

The Guidelines for Requirement 6 present design standards for installation of reinforcement in bathroom walls to allow for later installation of grab bars around the toilet, tub, shower stall and shower seat where such facilities are provided, as required by § 100.205(c)(3)(iii).

The Department adopted the Option One guidelines for Requirement 6 with two modifications. First, the final Guidelines provide that a powder room is subject to the requirement for reinforced walls for grab bars when the powder room is the only toilet facility located on the accessible level of a covered multistory dwelling unit. Second, the final Guidelines further clarify that reinforced bathroom walls will meet the accessibility requirement of § 100.205(c)(3)(iii), if reinforced areas are provided at least at those points where grab bars will be mounted.

Specific comments on this guideline were as follows:

Comment. A number of commenters requested that the Department specify the dimensions for grab bar reinforcement, and suggested that grab bar reinforcing material run horizontally throughout the entire length of the space given for grab bars, as provided by the ANSI Standard. These commenters stated that if this type of reinforcement was required, residents could locate more easily the studs for future grab bar installation, and have flexibility in the placement of grab bars for optimal use, and safety in bathrooms. One commenter noted that many grab bars are of such a length that they require an intermediate fastener, but the proposed standard does not permit intermediate fastening. Two commenters recommended that the final Guidelines follow ANSI and UFAS Standards for requirements for mounting grab bars. One commenter recommended the installation of panels of plywood behind bathroom walls because this would provide greater flexibility in the installation of grab bars.

Response. The illustrations of grab bar wall reinforcement accompanying the Guidelines for Requirement 6 are intended only to show where reinforcement for grab bars is needed. The illustrations are not intended to prescribe how the reinforcing should be provided, or that the bathtub or shower is required to be surrounded by three walls of reinforcement. The additional language added to the Guidelines is to clarify that the Act's accessibility requirement for grab bar reinforcement is met if reinforced areas are provided, at a minimum, at those points where grab bars will be mounted. The Department recognizes that reinforcing for grab bars may be accomplished in a variety of ways, such as by providing plywood panels in the areas illustrated, or by installing vertical reinforcement (in the form of double studs, for example) at the points noted on the figures accompanying the Guidelines.

Comment. Several commenters stated that the final Guidelines should incorporate Option Two's specification of reinforcement for shower seats when shower stalls are provided.

Response. The Fair Housing Act only requires reinforcement for later installation of grab bars. The Act does not cover reinforcement for shower seats; rather, it mentions shower seats (if provided) as an area where grab bar reinforcement would be needed. However, as will be discussed more fully in the following section concerning the Guidelines for Requirement 7 (Usable Bathrooms), reinforcement for shower seats would provide adaptability to increase usability of shower stalls, and is a design option available to builders and developers in designing "usable" bathrooms.

Comment. One commenter recommended that the final Guidelines incorporate Option Two's specification that prefabricated tub/shower enclosures would have to be fabricated with reinforcement for grab bar enclosures.

Response. The Department did not incorporate this specification in the final Guidelines. The Department believes that it is inappropriate to specify product design. A builder should have the flexibility to choose how reinforcement for grab bars will be provided.

Comment. Two commenters stated that half-baths should also contain grab-bar reinforcements.

Response. Half-baths are not considered "bathrooms", as this term is commonly used, and, therefore are not subject to the bathroom wall reinforcement requirement, unless a half-bath facility is the only restroom facility on the accessible level of a covered multistory dwelling unit.

Comment. One commenter requested that the final Guidelines incorporate language clearly to specify that the builder's responsibility is limited solely to wall reinforcement, and later installation is the responsibility of the resident or tenant.

Response. It is unnecessary to incorporate the suggested language in the final Guidelines. The Guidelines for Requirement 6 are solely directed to reinforcement. No guidelines are provided for the actual installation of grab bars. Accordingly, there should be no confusion on this issue.

Guidelines for Requirement 7

The Guidelines for Requirement 7 present design specifications for providing usable kitchens and bathrooms such that an individual in a wheelchair can maneuver about the space, as required by § 100.205(c)(3)(iv).

For usable kitchens, the Department adopted the Option One guidelines with one change. The Department has eliminated the specification that controls for ranges and cooktops be placed so that reaching across burners is not required.

For usable bathrooms, the final Guidelines provide two alternative sets of design specifications. The Fair Housing Act requires that an accessible or "usable" bathroom is one which provides sufficient space for an

individual in a wheelchair to maneuver about. The two sets of specifications provide different approaches as to how compliance with this maneuvering space requirement may be accomplished. The first set of specifications also includes size dimensions for shower stalls, but only when a shower stall is the only bathing facility provided in a dwelling unit. Additionally, either set of specifications is applicable to powder rooms, when a powder room is the only restroom facility on the accessible level of a covered multistory dwelling unit.

With the exception of the inclusion of shower stall dimensions, the first set of "usable bathroom" specifications remain the same as the Option One guidelines for usable bathrooms. The second set of "usable bathroom" specifications provide somewhat greater accessibility than the first set, but would be applicable only to one bathroom in a dwelling unit that has two or more bathrooms. The second set of specifications include clear space specifications for bathrooms with in-swinging doors and for bathrooms with outswinging doors. This second set of specifications also provides that toilets must be located in a manner that permits a grab bar to be installed on one side of the fixture, and provides specifications on the installation of vanities and lavatories.

To meet the Act's requirements for usable bathrooms, the final Guidelines provide that (1) in a dwelling unit with a single bathroom, either set of specifications may be used; and (2) in a dwelling unit with more than one bathroom, all bathrooms in the unit must comply with the first set of specifications, or, alternatively, at least one bathroom must comply with the second set of specifications, and all other bathrooms must be on an accessible route, and must have a usable entry door in accordance with the guidelines for Requirements 3 and 4. However, in multistory dwelling units, only those bathrooms on the accessible level are subject to the Act's requirements for usable bathrooms. Where a powder room is the only restroom facility provided on the accessible level of a multistory dwelling unit, the powder room must meet either the first set of specifications or the second set of specifications. All bathrooms and powder rooms that are subject to Requirement 7, must have reinforcements for grab bars as provided in the Guideline for Requirement 6.

In developing the final Guidelines for the usable bathroom requirement, the Department recognized that the Option One guidelines for usable bathrooms presented the minimum specifications necessary to meet the Act's requirements. Accordingly, the Department believes that it is appropriate to provide a second set of specifications which provide somewhat different accessibility accommodations than the Option One guidelines. The Department believes that by offering two sets of specifications for usable bathrooms, the Department is providing builders and developers with more development choices in designing dwelling units that contain more than one bathroom; and it is providing individuals and families with more housing options. Builders and developers may design all bathrooms to meet the minimal specifications of the first set of specifications, or they may design only one bathroom to meet the somewhat greater accessibility specifications of the second set. Regardless of which set of usable bathroom specifications is selected by a builder or developer, all doors to bathrooms and powder rooms must meet the minimum door width specifications of Requirement 3.

The following presents a discussion of the specific comments received on usable kitchens and usable bathrooms.

Controls for Ranges and Cooktops

Comment. A few commenters stated that the Department lacks authority under the Fair Housing Act to impose design standards on appliances. The commenter stated that standards that specify certain design features for appliances in individual dwelling units exceed the scope of the Department's statutory authority. Other commenters objected to front range controls as a safety hazard for children. Commenters from the disability community were strongly supportive of this design specification.

Response. With respect to usable kitchens, the Act solely requires that kitchens have sufficient space such that an individual in a wheelchair can maneuver about. Accordingly, a specification that controls for ranges and cooktops be placed so that they can be used without reaching across burners is not consistent with the Act's requirement for usable kitchens.

In the proposed guidelines, the Option One guidelines for usable kitchens specified that controls should be located so as to be usable without reaching across burners. As the preamble to the proposed guidelines noted, many standard styles of ranges and cooktops meeting this specification (other than those with front controls) are available on the market. However, in reviewing the entire rulemaking history on the design and constructions requirements, the Department has concluded that the requirements of the Fair Housing Act did not cover any appliance controls. Accordingly, this specification was not included in the final Guidelines.

Maneuvering Space, Adjustable Cabinetry, Fixtures and Plumbing

Comment. A number of commenters from the disability community stated that it was important that the Guidelines for both kitchens and bathrooms specify a five-foot turning radius; adjustable cabinetry, fixtures and plumbing; and fixture controls that comply with the appropriate provisions of the ANSI Standard.

Response. The legislative history of the Fair Housing Act clearly indicates that Congress did not envision usable kitchens and bathrooms to be designed in accordance with the specifications suggested by the commenters. In House Report No. 711, the Congress stated as follows:

> The fourth feature is that kitchens and bathrooms be usable such that an individual in a wheelchair can maneuver about the space. This provision is carefully worded to provide a living environment usable by all. Design of standard sized kitchens and bathrooms can be done in such a way as to assure usability by persons with disabilities without necessarily increasing the size of space. The Committee intends that such space be usable by handicapped persons, but this does not necessarily require that a turning radius be provided in every situation. This provision also does not require that fixtures, cabinetry or plumbing be of such design as to be adjustable. (House Report at 27)

Accordingly, the Department is unable to adopt any of the proposals suggested by the commenters. The Act's requirement for usable kitchens and bathrooms only specifies maneuverability for wheelchair users, and this maneuverability does not require the specification advocated by the commenters. (See previous discussion of this issue in the preamble to the proposed Fair Housing regulations at 53 FR 45005.)

Comment. Two commenters requested clarification concerning what is meant by "sufficient maneuvering space". One of the commenters recommended that this term be defined to include "such space as shall permit a person in a wheelchair to use the features and appliances of a room without having to leave the room to obtain an approach to an appliance, work surface, or cabinet".

Response. The Guidelines for Requirement 7 (usable kitchens and bathrooms) describe what constitutes sufficient maneuvering space in the

kitchen and the bathroom. Additionally, the preamble to the proposed guidelines explicitly states that sufficient maneuvering space for kitchens does not require a wheelchair turning radius (55 FR 24381). As noted in response to the preceding comment, a wheelchair turning radius also is not required for either usable kitchens or usable bathrooms. The Guidelines for usable bathroom state that sufficient maneuvering space is provided within the bathroom for a person using a wheelchair or other assistive device to enter and close the door, use the fixtures, reopen the door and exit. This specification was not changed in the final Guidelines.

Kitchen Work Surfaces

Comment. One commenter stated that "Element 12" in the chart accompanying the Guidelines for Requirement 2 (public and common use areas) seems to require a portion of the kitchen counters to be accessible since they are work surfaces. This commenter stated that if this interpretation is correct then it should be made clear in the Guidelines.

Response. The commenter's interpretation is not correct. The chart accompanying the Guidelines for Requirement 2 is only applicable to the public and common use areas, not to individual dwelling units.

Showers

Comments. Several commenters requested that the final Guidelines provide dimensions on the appropriate width and height of showers and shower doors. Another commenter asked whether showers were required to comply with dimensions specified by the ANSI Standard.

Response. The final Guidelines for usable bathrooms (the first set of specifications) specify size dimensions for shower stalls in only one situation—when the shower stall is the only bathing facility provided in a covered dwelling unit. The Department believes that, where a shower stall is the only bathing facility provided, size specification for the shower stall is consistent with the Act's requirement for usable bathrooms. However, if a shower stall is not the only bathing facility provided in the dwelling unit, then the only specification for showers, appropriate under the Act, concerns reinforced walls in showers. (The titles under the illustrations (figures) related to showers in the final Guidelines for Requirement 6 have been revised to make it clear that the figures are specifying only the different areas required to be reinforced in showers of different sizes, not the required sizes of the shower stalls.)

In-swinging Bathroom Doors

Comment. One commenter stated that in-swinging bathroom doors generally are problematic, unless the bathroom is unusually large. The commenter noted that an in-swinging door makes it extremely difficult to enter and exit. The commenter recommended that in-swinging doors be prohibited unless there is sufficient internal bathroom space, exclusive of the swing of the door, which allows either a five foot turning radius or two mutually exclusive 30" x 48" wheelchair spaces. Another commenter stated that in-swinging bathroom doors create a serious obstacle for the wheelchair user.

Response. The Department declines to prohibit in-swinging bathroom doors. Adjusting an in-swinging door to swing out is the type of later adaptation that can be made fairly easily by a resident or tenant. Once a minimum door width is provided, a tenant who finds a bathroom not readily usable can have the door rehung as an outswinging door. Note, however, that the second set of guidelines for usable bathrooms specifies clear space for bathrooms with in-swinging doors.

Bathroom Design Illustrations

Comment. A number of commenters from the disability community stated that two of the six bathroom drawings in the preamble to the proposed guidelines (numbers 4 and 6 at 55 FR 24374–24375) did not allow for a parallel approach to the tub. These commenters requested that these drawings be removed from the final Guidelines. Other commenters stated that the Department's bathroom design illustrations at 55 FR 24374–24375 are not consistent with the Figure 8 bathroom design illustrations at 55 FR 24401.

Response. While a parallel approach to the tub would provide somewhat greater accessibility, the Department believes that to indicate, through the Guidelines, that a parallel approach to the tub is necessary to meet the Act's requirements, exceeds the Fair Housing Act's minimal design expectations for bathrooms. Accordingly, the first set of specifications for usable bathrooms does not specify a parallel approach to the tub. However, the second set of specifications provides for a clear access aisle adjacent to the tub that would permit a parallel approach to the tub. Either method would meet the Act's requirements. With respect to the comments on the bathroom design illustrations, these illustrations have been revised to make the clear floor space requirements more readily understood. The illustrations are adapted from ANSI A117.1.

Number of Accessible Bathrooms

Comment. A number of comments were received on how many bathrooms in a dwelling unit should be subject to the Act's "usable" bathroom requirement. Many commenters recommended that all full bathrooms be made accessible. Other commenters recommended that only one full bathroom be required to be made accessible. A few commenters recommended that half-baths/powder rooms also be subject to the Act's requirement.

Response. In House Report No. 711, the Congress distinguished between "total accessibility" and the level of accessibility required by the Fair Housing Act. The report referred to standards requiring every aspect or portion of buildings to be totally accessible, and pointed out that this was not the level of accessibility required by the Act. The final Guidelines for bathrooms are consistent with the Act's usable bathroom requirement, and provide the level of accessibility intended by Congress. As discussed previously in this preamble, the final Guidelines for usable bathrooms provide two sets of specifications. The second set of specifications provides somewhat greater accessibility than the first set of specifications. In view of this fact, the final Guidelines provide that in a dwelling unit with a single bathroom, the bathroom may be designed in accordance with either set of specifications—the first set or the second set. However, in a dwelling unit with more than one bathroom, all bathrooms in the unit must comply with the first set of specifications, or a minimum of one bathroom must comply with the second set of specifications, and all other bathrooms must be on an accessible route, and must have a usable entry door in accordance with the guidelines for Requirements 3 and 4. Additionally, the final Guidelines provide that a powder room must comply with the Act's usable bathroom requirements when the powder room is the only restroom facility provided on the accessible level of a multistory dwelling unit.

3. Discussion of Comments on Related Fair Housing Issues Compliance Deadline

Section 100.205 of the Fair Housing regulations incorporates the Act's design and construction requirements, including the requirement that

multifamily dwellings for first occupancy after March 13, 1991 be designed and constructed in accordance with the Act's accessibility requirements. Section 100.205(a) provides that covered multifamily dwellings shall be deemed to be designed and constructed for first occupancy on or before March 13, 1991 (and, therefore, exempt from Act's accessibility requirements), if they are occupied by that date, or if the last building permit or renewal thereof for the covered multifamily dwellings is issued by a State, County, or local government on or before January 13, 1990.

Comment. The Department received a number of comments on the March 13, 1991 compliance deadline, and on methods of achieving compliance. Many commenters objected to the March 13, 1991 compliance deadline on the basis that this deadline was unreasonable. Several commenters from the building industry stated that, in many cases, design plans for buildings now under construction were submitted over two years ago, and it would be very expensive to make changes to buildings near completion. Other commenters stated that it is unreasonable to impose additional requirements on a substantially completed project that unexpectedly has been delayed for occupancy beyond the March 13, 1991 effective date.

Response. Section 804(f)(3)(C) of the Fair Housing Act states that the design and construction standards will be applied to covered multifamily dwelling units for first occupancy after the date that is 30 months after the date of enactment of the Fair Housing Amendments Act. The Fair Housing Act was enacted on September 13, 1988. The date that is 30 months from that date is March 13, 1991. Accordingly, the inclusion of a March 13, 1991 compliance date in § 100.205 is a codification of the Act's compliance deadline. The Department has no authority to change that date. Only Congress may extend the March 13, 1991 deadline.

The Department, however, has been attentive to the concerns of the building industry, and has addressed these concerns, to the extent that it could, in prior published documents. In the preamble to the final Fair Housing rule, the Department addressed the objections of the building industry to the Department's reliance on "actual occupancy" as the sole basis for determining "first occupancy". (See 54 FR 3251; 24 CFR Ch. I, Subch. A, App. I at 585 (1990)). Commenters to the proposed Fair Housing rule, like the commenters to the proposed guidelines, argued that coverage of the design and construction requirements must be determinable at the beginning of planning and development, and that projects delayed by unplanned and uncontrollable events (labor strikes, Acts of God, etc.) should not be subject to the Act.

In order to accommodate the "legitimate concerns on the part of the building industry" the Department expanded § 100.205 of the final rule to provide that covered multifamily dwellings would be deemed to be for first occupancy if the last building permit or renewal thereof was issued on or before January 13, 1990. A date of fourteen months before the March 13, 1991 deadline was selected because the median construction time for multifamily housing projects of all sizes was determined to be fourteen months, based on data provided by the Marshall Valuation Service.

More recently, the Department addressed similar concerns of the building industry in the preamble to the proposed accessibility guidelines. In the June 15, 1990 publication, the Department recognized that projects designed in advance of the publication of the final Guidelines, may not become available for first occupancy until after March 13, 1991. To provide some guidance, the Department stated in the June 15, 1990 notice that compliance with the Option One guidelines would be considered as evidence of compliance with the Act, in projects designed before the issuance of the final Guidelines. The Department restated its position on this issue in a supplementary notice published in the Federal Register on August 1, 1990 (55 FR 31161). The specific circumstances under which the Department would consider compliance with the Option One guidelines as compliance with the accessibility requirements of the Act were more fully addressed in the August 1, 1990 notice.

Comment. A number of commenters requested extending the date of issuance of the last building permit from January 13, 1990 to some other date, such as June 15, 1990, the date of publication of the proposed guidelines; August 1, 1990, the date of publication of the supplementary notice; or today's date, the date publication of the final Guidelines.

Response. The date of January 13, 1990 was not randomly selected by the Department. This date was selected because it was fourteen months before the compliance deadline of March 13, 1991. As previously noted in this preamble, fourteen months was found to represent a reasonable median construction time for multifamily housing projects of all sizes, based on data contained in the Marshall Valuation Service. Builders have been on notice since January 23, 1989—the publication date of the final Fair Housing rule, that undertaking construction after January 13, 1990 without adequate attention to accessibility considerations would be at the builder's risk.

Comment. One commenter requested that the applicable building permit be the "primary" building permit for a particular building. Other commenters inquired about the status of building permits that are issued in stages, or about small modifications to building plans during construction which necessitate a reissued building permit.

Response. Following publication of the proposed Fair Housing regulation, and the many comments received at that time from the building industry expressing concern that "actual occupancy" was the only standard for determining "first occupancy", the Department gave careful consideration to the steps and stages involved in the building process. On the basis of this study, the Department determined that an appropriate standard to determine "first occupancy", other than actual occupancy, would be issuance of the last building permit on or before January 13, 1990. This additional standard was added to the final Fair Housing Act regulation. The Department believes that, aside from actual occupancy, issuance of the last building permit remains the appropriate standard.

Compliance Determinations by State and Local Jurisdictions

Comment. A few commenters questioned the role of States and units of local government in determining compliance with the Act's accessibility requirements. The commenters noted that (1) § 100.205(g) encourages States and units of general local government to include, in their existing procedures for the review and approval of newly constructed covered multifamily dwellings, determinations as to whether the design and construction of such dwellings are consistent with the Act's accessibility requirements; but (2) § 100.205(h) provides that determinations of compliance or noncompliance by a State or a unit of general local government are not conclusive in enforcement proceedings under the Fair Housing Act. These commenters stated that, unless determinations of compliance or

noncompliance by a State or unit of general local government are deemed to be conclusive, local jurisdictions will be discouraged from performing compliance reviews because they will not be able to provide a building permit applicant with a sense of finality that proposed design plans are in compliance with the Act.

Response. Sections 100.205 (g) and (h) of the Fair Housing regulations implement sections 804(f)(5) (B) and (C), and section 804(f)(6)(b) of the Fair Housing Act. The language of §§ 100.205 (g) and (h) is taken directly from these statutory provisions. The Congress, not the Department, made the decision that determinations of compliance or noncompliance with the Act by a State or unit of general local government shall not be conclusive in enforcement proceedings. The Department, however, agrees with the position taken in the statute. The Department believes that it would be inappropriate to accord particular "weight" to determinations made by a wide variety of State and local government agencies involving a new civil rights law, without first having the benefit of some experience reviewing the accuracy of the determinations made by State and local authorities under the Fair Housing Act.

Comment. Two commenters stated that local building departments, especially those in smaller urban areas and in rural areas, do not have the manpower or expert knowledge to assure a proper determination of compliance, particularly in "close call" situations. The commenters recommended that liability for any infractions exclude local building departments unless the Department is willing to provide qualified personnel from its local field office to attend staff reviews of every building permit request.

Response. The Department is reluctant to assume that State and local jurisdictions, by performing compliance reviews, will subject themselves to liability under the Fair Housing Act, particularly in light of section 804(f)(5)(C) of the Act, which encourages States and localities to make reviews for compliance with the statute; and the implicit recognition, under Section 804(f)(6)(B), that these reviews may not be correct.

Comment. With reference to a violation of the Act's requirements, several commenters questioned how violations of the Act would be determined, and what the penalty would be for a violation. The commenters asked whether a builder would be cited, and fined, for each violation per building, or for each violation per unit.

Response. If it is determined that a violation of the Act has occurred, a Federal District Court or an administrative law judge (ALJ) has the authority to award actual damages, including damages for humiliation and emotional distress; punitive damages (in court) or civil penalties (in ALJ proceedings); injunctive relief; attorneys fees (except to the United States); and any other equitable relief that may be considered appropriate. Whether a violation will be found for each violation per building, for each violation per unit, or on any other basis, is properly left to the courts and the ALJs.

Enforcement Mechanisms

In the proposed guidelines, the Department solicited public comment on effective enforcement mechanisms (55 FR 24383–24384). Specifically, the Department requested comment on the effectiveness of: annual surveys to assess the number of projects developed with accessible buildings; recordkeeping requirements; and a "second opinion" by an independent, licensed architect or engineer on the site impracticality issue. The Department stated that comments on these proposals would be considered in connection with forthcoming amendments to the Fair Housing regulation.

The Department appreciates all comments submitted on the proposed enforcement mechanisms, and the suggestions offered on other possible enforcement mechanisms, such as a preconstruction review process, certification by a licensed architect, engineer or other building professional that a project is in compliance with the Act, and certification of local accessibility codes by the Department. All these comments will be considered in connection with future amendments to the Fair Housing Act regulation.

First Occupancy

Comment. A number of commenters requested clarification of the determination of "first occupancy" after March 13, 1991. A few commenters referred to the Act's first occupancy requirement as that of "ready for occupancy" by March 13, 1991.

Response. The phrase "ready for occupancy" does not correctly describe the standard contained in the Fair Housing Act. The Act states that covered multifamily dwellings subject to the Act's accessibility requirements are those that are "for first occupancy" after March 13, 1991. The standard, "first occupancy," is based on actual occupancy of the covered multifamily dwelling, or on issuance of the last building permit, or building permit renewal, on or before January 13, 1990. Where an individual is relying on a claim that a building was actually occupied on March 13, 1991, the Department, in making a determination of reasonable cause, will consider each situation on a case-by-case basis. As long as one dwelling unit in a covered multifamily dwelling is occupied, the one occupied dwelling unit is sufficient to meet the requirements for actual occupancy. However, the question of whether the occupancy was in compliance with State and local law (e.g., pursuant to a local occupancy permit, where one is required) will be a crucial factor in determining whether first occupancy has been achieved.

Comment. Several commenters requested clarification of "first occupancy", with respect to projects involving several buildings, or projects with extended build-out terms, such as planned communities with completion dates 5 to 10 years into the future.

Response. "First occupancy" is determined on a building-by-building basis, *not* on a project-by-project basis. For a project that involves several buildings, one building in the project could be built without reference to the accessibility requirements, while a building constructed next door might have to comply with the Act's requirements. The fact that one or more buildings in a multiple building project were occupied on March 13, 1991 will not be sufficient to afford an exemption from the Act's requirements for other buildings in the same project that are developed at a later time.

Costs of Adaptation

Comment. A few commenters requested clarification on who incurs the cost of making a unit adaptable for a disabled tenant.

Response. All costs associated with incorporating the new design and construction requirements of the Fair Housing Act are borne by the builder. There are, of course, situations where a tenant may need to make modifications to the dwelling unit which are necessary to make the unit accessible for that person's particular type of disability. The tenant would incur the cost of this type of modification—whether or not the dwelling unit is part of a multifamily dwelling exempt from the Act's accessibility requirements. For dwellings subject to the statute's accessibility requirements, the tenant's costs would be limited to those modifications that were not covered by the Act's design and construction requirements. (For example, the tenant would pay for the cost of purchasing

and installing grab bars.) For dwellings not subject to the accessibility requirements, the tenant would pay the cost of all modifications necessary to meet his or her needs. (Using the grab bar example, the tenant would pay both the cost of buying and installing the grab bars and the costs associated with adding bathroom wall reinforcement.)

Section 100.203 of the Fair Housing regulations provides that discrimination includes a refusal to permit, at the expense of a handicapped person, reasonable modifications of existing premises occupied or to be occupied by that person, if modifications are necessary to afford the person full enjoyment of the premises. In the case of a rental, the landlord may reasonably condition permission for a modification on the renter's agreeing to restore the interior of the unit to the condition that existed before its modification—reasonable wear and tear excepted. This regulatory section provides examples of reasonable modifications that a tenant may make to existing premises. The examples include bathroom wall reinforcement. In House Report No. 711, the Congress provided additional examples of reasonable modifications that could be made to existing premises by persons with disabilities:

> For example, persons who have a hearing disability could install a flashing light in order to 'see' that someone is ringing the doorbell. Elderly individuals with severe arthritis may need to replace the doorknobs with lever handles. A person in a wheelchair may need to install fold-back hinges in order to be able to go through a door or may need to build a ramp to enter the unit. Any modifications protected under this section [section 804(f)(3)(A)] must be reasonable and must be made at the expense of the individual with handicaps. (House Report at 25)

Reasonable Modification

Comment. One commenter requested clarification concerning what is meant by "reasonable modification".

Response. What constitutes "reasonable modification" is discussed to some extent in the preceding section, "Costs of Adaptation", and also was discussed extensively in the preambles to both the proposed and final Fair Housing rules. (See 53 FR 45002–45003, 54 FR 3247–3248; 24 CFR Ch. I, Subch. A, App. I at 580–583 (1990).) Additionally, examples of reasonable modifications are provided in 24 CFR 100.203(c).

Scope of Coverage

Comment. A number of comments were received on the issue of which types of dwelling units should be subject to the Act's accessibility requirements, and the number or percentage of dwelling units that must comply with the Act's requirements.

Response. The Department lacks the authority to adopt any of the proposals recommended by the commenters. The type of multifamily dwelling subject to the Fair Housing Act's accessibility requirements, and the number of individual dwelling units that must be made accessible were established by the Congress, not the Department. The Fair Housing Act defines "covered multifamily dwelling" to mean buildings consisting of four or more units if such buildings have one or more elevators; and ground floor units in other buildings consisting of four or more units." (See Section 804(f)(7) of the Act.) The Fair Housing Act requires that covered multifamily dwellings for first occupancy after March 13, 1991 be designed and constructed in accordance with the Act's accessibility requirements. The Act does not permit only a percentage of units in covered multifamily dwellings to be designed in accordance with the Act's requirements, nor does the Department have the authority so to provide by regulation.

VI. Other Matters

Codification of Guidelines. In order to assure the availability of the Guidelines, and the preamble to the Guidelines, to interested persons in the future, the Department has decided to codify both documents. The Guidelines will be codified in the 1991 edition of the Code of Federal Regulations as appendix II to the Fair Housing regulations (i.e., 24 CFR Ch. I, Subch. A, App. II), and the preamble to the Guidelines will be codified as appendix III (i.e., 24 CFR Ch. I, Subch. A, App. III).

Regulatory Impact Analysis. A Preliminary Impact Analysis was published in the **Federal Register** on September 7, 1990 (55 FR 37072–37129). A Final Regulatory Impact Analysis is available for public inspection during regular business hours in the Office of the Rules Docket Clerk, room 10276, Department of Housing and Urban Development, 451 Seventh Street, SW., Washington, DC 20410–0500.

Environmental Impact. A Finding of No Significant Impact with respect to the environment has been made in accordance with HUD regulations at 24 CFR part 50, which implement section 102(2)(C) of the National Environmental Policy Act of 1969. The Finding of No Significant Impact is available for public inspection during regular business hours in the Office of the Rules Docket Clerk, Office of the General Counsel, Department of Housing and Urban Development, room 10276, 451 Seventh Street, SW., Washington, DC 20410–0500.

Executive Order 12606, The Family. The General Counsel, as the Designated Official under Executive Order No. 12606, The Family, has determined that this notice will likely have a significant beneficial impact on family formation, maintenance or well-being. Housing designed in accordance with the Guidelines will offer more housing choices for families with members who have disabilities. Housing designed in accordance with the Guidelines also may be beneficial to families that do not have members with disabilities. For example, accessible building entrances, as required by the Act and implemented by the Guidelines, may benefit parents with children in strollers, and also allow residents and visitors the convenience of using luggage or shopping carts easily. Additionally, with the aging of the population, and the increase in incidence of disability that accompanies aging, significant numbers of people will be able to remain in units designed in accordance with the Guidelines as the aging process advances. Compliance with these Guidelines may also increase the costs of developing a multifamily building, and, thus, may increase the cost of renting or purchasing homes. Such costs could negatively affect families' ability to obtain housing. However, the Department believes that the benefits provided to families by housing that is in compliance with the Fair Housing Amendments Act outweigh the possible increased costs of housing.

Executive Order 12611, Federalism. The General Counsel, as the Designated Official under section 6(a) of Executive Order No. 12611, Federalism, has determined that this notice does not involve the preemption of State law by Federal statute or regulation and does not have federalism implications. The Guidelines only are recommended design specifications, not legal requirements. Accordingly, the Guidelines do not preempt State or local laws that address the same issues covered by the Guidelines.

Dated: February 27, 1991.

Gordon H. Mansfield,

Assistant Secretary for Fair Housing and Equal Opportunity.

Accordingly, the Department adds the Fair Housing Accessibility Guidelines as Appendix II and the text of the preamble to these final guidelines beginning at the heading "Adoption of Final Guidelines" and ending before "VI. Other Matters" as appendix III to 24 CFR, ch. I, subchapter A to read as follows:

Appendix II to Ch. I, subchapter A—Fair Housing Accessibility Guidelines

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U.S. Department of Housing and Urban Development
Office of Fair Housing and Urban Development

Fair Housing Accessibility Guidelines

Design Guidelines for Accessible/Adaptable Dwellings

Issued by the Department of Housing and Urban Development

NOTE: This is a reprint of the final Fair Housing Accessibility Guidelines published in the Federal Register on March 6, 1991, Vol. 56, No. 44, pages 9472-9515. This reprint incorporates corrections to the final Guidelines which were published in the Federal Register on June 24, 1991.

Contents

Fair Housing Accessibility Guidelines

Section 1. Introduction

Authority

Section 804(f)(5)(C) of the Fair Housing Amendments Act of 1988 directs the Secretary of the Department of Housing and Urban Development to provide technical assistance to States, local governments, and other persons in implementing the accessibility requirements of the Fair Housing Act. These guidelines are issued under this statutory authority.

Purpose

The purpose of these guidelines is to provide technical guidance on designing dwelling units as required by the Fair Housing Amendments Act of 1988 (Fair Housing Act). These guidelines are not mandatory, nor do they prescribe specific requirements which must be met, and which, if not met, would constitute unlawful discrimination under the Fair Housing Act. Builders and developers may choose to depart from these guidelines and seek alternate ways to demonstrate that they have met the requirements of the Fair Housing Act. These guidelines are intended to provide a safe harbor for compliance with the accessibility requirements of the Fair Housing Act.

Scope

These guidelines apply only to the design and construction requirements of 24 CFR 100.205. Compliance with these guidelines do not relieve persons participating in a Federal or Federally-assisted program or activity from other requirements, such as those required by section 504 of the Rehabilitation Act of 1973 (29 U.S.C. 794) and the Architectural Barriers Act of 1968 (42 U.S.C. 4151-4157). Accessible design requirements for Section 504 are found at 24 CFR Part 8. Accessible design requirements for the Architectural Barriers Act are found at 24 CFR Part 40.

Organization of Guidelines

The design guidelines are incorporated in Section 5 of this document. Each guideline cites the appropriate paragraph of HUD's regulation at 24 CFR 100.205; quotes from the regulation to identify the required design features, and states recommended specifications for each design feature.

Generally, these guidelines rely on the American National Standards Institute (ANSI) A117.1-1986, American National Standard for Buildings and Facilities--Providing Accessibility and Usability for Physically Handicapped People (ANSI Standard). Where the guidelines rely on sections of the ANSI Standard, the ANSI sections are cited. Only those sections of the ANSI Standard cited in the guidelines are recommended for compliance with 24 CFR 100.205. For those guidelines that differ from the ANSI Standard, recommended specifications are provided. The texts of cited ANSI sections are not reproduced in the guidelines. The complete text of the 1986 version of the ANSI A117.1 Standard may be purchased from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

Section 2. Definitions

As used in these Guidelines:

"Accessible", when used with respect to the public and common use areas of a building containing covered multifamily dwellings, means that the public or common use areas of the building can be approached, entered, and used by individuals with physical handicaps. The phrase "readily accessible to and usable by" is synonymous with accessible. A public or common use area that complies with the appropriate requirements of ANSI A117.1-1986, a comparable standard or these guidelines is "accessible" within the meaning of this paragraph.

"Accessible route" means a continuous unobstructed path connecting accessible elements and spaces in a building or within a site that can be negotiated by a person with a severe disability using a wheelchair, and that is also safe for and usable by people with other disabilities. Interior accessible routes may include corridors, floors, ramps, elevators and lifts. Exterior accessible routes may include parking access aisles, curb ramps, walks, ramps and lifts. A route that complies with the appropriate requirements of ANSI A117.1-1986, a comparable standard, or Section 5, Requirement 1 of these guidelines is an "accessible route". In the circumstances described in Section 5, Requirements 1 and 2, "accessible route" may include access via a vehicular route.

"Adaptable dwelling units", when used with respect to covered multifamily dwellings, means dwelling units that include the features of adaptable design specified in 24 CFR 100.205(c)(2)-(3).

"ANSI A117.1-1986" means the 1986 edition of the American National Standard for buildings and facilities providing accessibility and usability for physically handicapped people.

"Assistive device" means an aid, tool, or instrument used by a person with disabilities to assist in activities of daily living. Examples of assistive devices include tongs, knob-turners, and oven-rack pusher/pullers.

"Bathroom" means a bathroom which includes a water closet (toilet), lavatory (sink), and bathtub or shower. It does not include single-fixture facilities or those with only a water closet and lavatory. It does include a compartmented bathroom. A

compartmented bathroom is one in which the fixtures are distributed among interconnected rooms. A compartmented bathroom is considered a single unit and is subject to the Act's requirements for bathrooms.

"Building" means a structure, facility or portion thereof that contains or serves one or more dwelling units.

"Building entrance on an accessible route" means an accessible entrance to a building that is connected by an accessible route to public transportation stops, to parking or passenger loading zones, or to public streets or sidewalks, if available. A building entrance that complies with ANSI A117.1-1986 (see Section 5, Requirement 1 of these guidelines) or a comparable standard complies with the requirements of this paragraph.

"Clear" means unobstructed.

"Common use areas" means rooms, spaces or elements inside or outside of a building that are made available for the use of residents of a building or the guests thereof. These areas include hallways, lounges, lobbies, laundry rooms, refuse rooms, mail rooms, recreational areas and passageways among and between buildings. See Section 5, Requirement 2 of these guidelines.

"Controlled substance" means any drug or other substance, or immediate precursor included in the definition in Section 102 of the Controlled Substances Act (21 U.S.C. 802).

"Covered multifamily dwellings" or "covered multifamily dwellings subject to the Fair Housing Amendments" means buildings consisting of four or more dwelling units if such buildings have one or more elevators; and ground floor dwelling units in other buildings consisting of four or more dwelling units. Dwelling units within a single structure separated by firewalls do not constitute separate buildings.

"Dwelling unit" means a single unit of residence for a household of one or more persons. Examples of dwelling units covered by these guidelines include: condominiums; an apartment unit within an apartment building; and other types of dwellings in which sleeping accommodations are provided but toileting or cooking facilities are shared by occupants of more than one room or portion of the dwelling. Examples of the latter include dormitory rooms and sleeping accommodations in shelters intended for occupancy as a residence for homeless persons.

"Entrance" means any exterior access point to a building or portion of a building used by residents for the purpose of entering. For purposes of these guidelines, an "entrance" does not include a door to a loading dock or a door used primarily as a service entrance, even if nonhandicapped residents occasionally use that door to enter.

"Finished grade" means the ground surface of the site after all construction, levelling, grading, and development has been completed.

"Ground floor" means a floor of a building with a building entrance on an accessible route. A building may have one or more ground floors. Where the first floor containing dwelling units in a building is above grade, all units on that floor must be served by a building entrance on an accessible route. This floor will be considered to be a ground floor.

"Handicap" means, with respect to a person, a physical or mental impairment which substantially limits one or more major life activities; a record of such an impairment; or being regarded as having such an impairment. This term does not include current, illegal use of or addiction to a controlled substance. For purposes of these guidelines, an individual shall not be considered to have a handicap solely because that individual is a transvestite.

As used in this definition:

(a) "Physical or mental impairment" includes:
  (1) Any physiological disorder or condition, cosmetic disfigurement, or anatomical loss affecting one or more of the following body systems: Neurological; musculoskeletal; special sense organs; respiratory, including speech organs; cardiovascular; reproductive; digestive; genitourinary; hemic and lymphatic; skin; and endocrine; or
  (2) Any mental or psychological disorder, such as mental retardation, organic brain syndrome, emotional or mental illness, and specific learning disabilities. The term "physical or mental impairment" includes, but is not limited to, such diseases and conditions as orthopedic, visual, speech and hearing impairments, cerebral palsy, autism, epilepsy, muscular dystrophy, multiple sclerosis, cancer, heart disease, diabetes, Human Immunodeficiency Virus infection, mental retardation, emotional illness, drug addiction (other than addiction caused by current, illegal use of a controlled substance) and alcoholism. These guidelines are designed to make units accessible or adaptable for people with physical handicaps.

(b) "Major life activities" means functions such as caring for one's self, performing manual tasks, walking, seeing, hearing, speaking, breathing, learning and working.

(c) "Has a record of such an impairment" means has a history of, or has been misclassified as having, a mental or physical impairment that substantially limits one or more major life activities.

(d) "Is regarded as having an impairment" means:
  (1) Has a physical or mental impairment that does not substantially limit one or more major life activities but that is treated by another person as constituting such a limitation;
  (2) Has a physical or mental impairment that substantially limits one or more major life activities only as a result of the attitudes of others toward such impairment; or
  (3) Has none of the impairments defined in paragraph (a) of this definition but is treated by another person as having such an impairment.

"Loft" means an intermediate level between the floor and ceiling of any story, located within a room or rooms of a dwelling.

"Multistory dwelling unit" means a dwelling unit with finished living space located on one floor and the floor or floors immediately above or below it.

"Public use areas" means interior or exterior rooms or spaces of a building that are made available to the general public. Public use may be provided at a building that is privately or publicly owned.

"Single-story dwelling unit" means a dwelling unit with all finished living space located on one floor.

"Site" means a parcel of land bounded by a property line or a designated portion of a public right of way.

"Slope" means the relative steepness of the land between two points and is calculated as follows: The distance and elevation between the two points (e.g., an entrance and a passenger loading zone) are determined from a topographical map. The difference in elevation is divided by the distance and that fraction is multiplied by 100 to obtain a percentage slope figure. For example, if a principal entrance is ten feet from a passenger loading zone, and the principal entrance is raised one foot higher than the passenger loading zone, then the slope is $1/10 \times 100 = 10\%$.

"Story" means that portion of a dwelling unit between the upper surface of any floor and the upper surface of the floor next above, or the roof of the unit. Within the context of dwelling units, the terms "story" and "floor" are synonymous.

"Undisturbed site" means the site before any construction, levelling, grading, or development associated with the current project.

"Vehicular or pedestrian arrival points" means public or resident parking areas, public transportation stops, passenger loading zones, and public streets or sidewalks.

"Vehicular route" means a route intended for vehicular traffic, such as a street, driveway or parking lot.

Section 3. Fair Housing Act Design and Construction Requirements

The regulations issued by the Department at 24 CFR 100.205 state:

§ 100.205 Design and construction requirements.

(a) Covered multifamily dwellings for first occupancy after March 13, 1991 shall be designed and constructed to have at least one building entrance on an accessible route unless it is impractical to do so because of the terrain or unusual characteristics of the site. For purposes of this section, a covered multifamily dwelling shall be deemed to be designed and constructed for first occupancy on or before March 13, 1991 if they are occupied by that date or if the last building permit or renewal thereof for the covered multifamily dwellings is issued by a State, County or local government on or before January 13, 1990. The burden of establishing impracticality because of terrain or unusual site characteristics is on the person or persons who designed or constructed the housing facility.

(b) The application of paragraph (a) of this section may be illustrated by the following examples:

Example (1): A real estate developer plans to construct six covered multifamily dwelling units on a site with a hilly terrain. Because of the terrain, it will be necessary to climb a long and steep stairway in order to enter the dwellings. Since there is no practical way to provide an accessible route to any of the dwellings, one need not be provided.

Example (2): A real estate developer plans to construct a building consisting of 10 units of multifamily housing on a waterfront site that floods frequently. Because of this unusual characteristic of the site, the builder plans to construct the building on stilts. It is customary for housing in the geographic area where the site is located to be built on stilts. The housing may lawfully be constructed on the proposed site on stilts even though this means that there will be no practical way to provide an accessible route to the building entrance.

Example (3): A real estate developer plans to construct a multifamily housing facility on a particular site. The developer would like the facility to be built on the site to contain as many units as possible. Because of the configuration and terrain of the site, it is possible to construct a building with 105 units on the site provided the site does not have an accessible route leading to the building entrance. It is also possible to construct a building on the site with an accessible route leading to the building entrance. However, such a building would have no more than 100 dwelling units. The building to be constructed on the site must have a building entrance on an accessible route because it is not impractical to provide such an entrance because of the terrain or unusual characteristics of the site.

(c) All covered multifamily dwellings for first occupancy after March 13, 1991 with a building entrance on an accessible route shall be designed and constructed in such a manner that—

(1) The public and common use areas are readily accessible to and usable by handicapped persons;

(2) All the doors designed to allow passage into and within all premises are sufficiently wide to allow passage by handicapped persons in wheelchairs; and

(3) All premises within covered multifamily dwelling units contain the following features of adaptable design:

(i) An accessible route into and through the covered dwelling unit;

(ii) Light switches, electrical outlets, thermostats, and other environmental controls in accessible locations;

(iii) Reinforcements in bathroom walls to allow later installation of grab bars around the toilet, tub, shower, stall and shower seat, where such facilities are provided; and

(iv) Usable kitchens and bathrooms such that an individual in a wheelchair can maneuver about the space.

(d) The application of paragraph (c) of this section may be illustrated by the following examples:

Example (1): A developer plans to construct a 100 unit condominium apartment building with one elevator. In accordance with paragraph (a), the building has at least one accessible route leading to an accessible entrance. All 100 units are covered multifamily dwelling units and they all must be designed and constructed so that they comply with the accessibility requirements of paragraph (c) of this section.

Example (2): A developer plans to construct 30 garden apartments in a three story building. The building will not have an elevator. The building will have one accessible entrance which will be on the first floor. Since the building does not have an elevator, only the "ground floor" units are covered multifamily units. The "ground floor" is the first floor because that is the floor that has an accessible entrance. All of the dwelling units on the first floor must meet the accessibility requirements of paragraph (c) of this section and must have access to at least one of each type of public or common use area available for residents in the building.

(e) Compliance with the appropriate requirements of ANSI A117.1–1986 suffices to satisfy the requirements of paragraph (c)(3) of this section.

(f) Compliance with a duly enacted law of a State or unit of general local government that includes the requirements of paragraphs (a) and (c) of this section satisfies the requirements of paragraphs (a) and (c) of this section.

(g)(1) It is the policy of HUD to encourage States and units of general local government to include, in their existing procedures for the review and approval of newly constructed covered multifamily dwellings, determinations as to whether the design and construction of such dwellings are consistent with paragraphs (a) and (c) of this section.

(2) A State or unit of general local government may review and approve newly constructed multifamily dwellings for the purpose of making determinations as to whether the requirements of paragraphs (a) and (c) of this section are met.

(h) Determinations of compliance or noncompliance by a State or a unit of general local government under paragraph (f) or (g) of this section are not conclusive in enforcement proceedings under the Fair Housing Amendments Act.

(i) This subpart does not invalidate or limit any law of a State or political subdivision of a State that requires dwellings to be designed and constructed in a manner that affords handicapped persons greater access than is required by this subpart.

Section 4. Application of the Guidelines

The design specifications (guidelines) presented in Section 5 apply to new construction of "covered multifamily dwellings", as defined in Section 2. These guidelines are recommended for designing dwellings that comply with the requirements of the Fair Housing Amendments Act of 1988.

Section 5. Guidelines

Requirement 1. Accessible building entrance on an accessible route.

Under section 100.205(a), covered multifamily dwellings shall be designed and constructed to have at least one building entrance on an accessible route, unless it is impractical to do so because of terrain or unusual characteristics of the site.

Guideline

(1) Building entrance. Each building on a site shall have at least one building entrance on an accessible route unless prohibited by the terrain, as provided in paragraphs (2)(a)(i) or (2)(a)(ii), or unusual characteristics of the site, as provided in paragraph (2)(b). This guideline applies both to a single building on a site and to multiple buildings on a site.

(a) Separate ground floor unit entrances. When a ground floor unit of a building has a separate entrance, each such ground floor unit shall be served by an accessible route, except for any unit where the terrain or unusual characteristics of the site prohibit the provision of an accessible route to the entrance of that unit.

(b) Multiple entrances. Only one entrance is required to be accessible to any one ground floor of a building, except in cases where an individual dwelling unit has a separate exterior entrance, or where the building contains clusters of dwelling units, with each cluster sharing a different exterior entrance. In these cases, more than one entrance may be required to be accessible, as determined by analysis of the site. In every case, the accessible entrance should be on an accessible route to the covered dwelling units it serves.

(2) Site impracticality. Covered multifamily dwellings with elevators shall be designed and constructed to provide at least one accessible entrance on an accessible route, regardless of terrain or unusual characteristics of the site. Covered multifamily dwellings without elevators shall be designed and constructed to provide at least one accessible entrance on an accessible route unless terrain or unusual characteristics of the site are such that the following conditions are found to exist:

(a) Site impracticality due to terrain. There are two alternative tests for determining site impracticality due to terrain: the individual building test provided in paragraph (i), or the site analysis test provided in paragraph (ii). These tests may be used as follows.

A site with a single building having a common entrance for all units may be analyzed only as described in paragraph (i).

All other sites, including a site with a single building having multiple entrances serving either individual dwelling units or clusters of dwelling units, may be analyzed using the methodology in either paragraph (i) or paragraph (ii). For these sites for which either test is applicable, regardless of which test is selected, at least 20% of the total ground floor units in nonelevator buildings, on any site, must comply with the guidelines.

(i) Individual building test. It is impractical to provide an accessible entrance served by an accessible route when the terrain of the site is such that:

(A) the slopes of the undisturbed site measured between the planned entrance and all vehicular or pedestrian arrival points within 50 feet of the planned entrance exceed 10 percent; and

(B) the slopes of the planned finished grade measured between the entrance and all vehicular or pedestrian arrival points within 50 feet of the planned entrance also exceed 10 percent.

If there are no vehicular or pedestrian arrival points within 50 feet of the planned entrance, the slope for the purposes of this paragraph (i) will be measured to the closest vehicular or pedestrian arrival point.

For purposes of these guidelines, vehicular or pedestrian arrival points include public or resident parking areas; public transportation stops; passenger loading zones; and public streets or sidewalks. To determine site impracticality, the slope would be measured at ground level from the point of the planned entrance on a straight line to (i) each vehicular or pedestrian arrival point that is within 50 feet of the planned entrance, or (ii) if there are no vehicular or pedestrian arrival points within that specified area, the vehicular or pedestrian arrival point closest to the planned entrance. In the case of sidewalks, the closest point to the entrance will be where a public sidewalk entering the site intersects with the sidewalk to the entrance. In the case of resident parking areas, the closest point to the planned entrance will be measured from the entry point to the parking area that is located closest to the planned entrance.

(ii) Site analysis test. Alternatively, for a site having multiple buildings, or a site with a single building with multiple entrances, impracticality of providing

an accessible entrance served by an accessible route can be established by the following steps:

(A) The percentage of the total buildable area of the undisturbed site with a natural grade less than 10% slope shall be calculated. The analysis of the existing slope (before grading) shall be done on a topographic survey with two foot (2') contour intervals with slope determination made between each successive interval. The accuracy of the slope analysis shall be certified by a professional licensed engineer, landscape architect, architect or surveyor.

(B) To determine the practicality of providing accessibility to planned multifamily dwellings based on the topography of the existing natural terrain, the minimum percentage of ground floor units to be made accessible should equal the percentage of the total buildable area (not including floodplains, wetlands, or other restricted use areas) of the undisturbed site that has an existing natural grade of less than 10% slope.

(C) In addition to the percentage established in paragraph (B), all ground floor units in a building, or ground floor units served by a particular entrance, shall be made accessible if the entrance to the units is on an accessible route, defined as a walkway with a slope between the planned entrance and a pedestrian or vehicular arrival point that is no greater than 8.33%

(b) Site impracticality due to unusual characteristics. Unusual characteristics include sites located in a federally-designated floodplain or coastal high-hazard area and sites subject to other similar requirements of law or code that the lowest floor or the lowest structural member of the lowest floor must be raised to a specified level at or above the base flood elevation. An accessible route to a building entrance is impractical due to unusual characteristics of the site when:

(i) the unusual site characteristics result in a difference in finished grade elevation exceeding 30 inches and 10 percent measured between an entrance and all vehicular or pedestrian arrival points within 50 feet of the planned entrance; or

(ii) if there are no vehicular or pedestrian arrival points within 50 feet of the planned entrance, the unusual characteristics result in a difference in finished grade elevation exceeding 30 inches and 10 percent measured between an entrance and the closest vehicular or pedestrian arrival point.

(3) Exceptions to site impracticality . Regardless of site considerations described in paragraphs (1) and (2), an accessible entrance on an accessible route is practical when:

(a) There is an elevator connecting the parking area with the dwelling units on a ground floor. (In this case, those dwelling units on the ground floor served by an elevator, and at least one of each type of public and common use areas, would be subject to these guidelines.) However:

(i) Where a building elevator is provided only as a means of creating an accessible route to dwelling units on a ground floor, the building is not considered an elevator building for purposes of these guidelines; hence, only the ground floor dwelling units would be covered.

(ii) If the building elevator is provided as a means of access to dwelling units other than dwelling units on a ground floor, then the building is an elevator building which is a covered multifamily dwelling, and the elevator in that building must provide accessibility to all dwelling units in the building, regardless of the slope of the natural terrain; or

(b) An elevated walkway is planned between a building entrance and a vehicular or pedestrian arrival point and the planned walkway has a slope no greater than 10 percent.

(4) Accessible entrance. An entrance that complies with ANSI 4.14 meets section 100.205(a).

(5) Accessible route. An accessible route that complies with ANSI 4.3 would meet section 100.205(a). If the slope of the finished grade between covered multifamily dwellings and a public or common use facility (including parking) exceeds 8.33%, or where other physical barriers (natural or manmade) or legal restrictions, all of which are outside the control of the owner, prevent the installation of an accessible pedestrian route, an acceptable alternative is to provide access via a vehicular route, so long as necessary site provisions such as parking spaces and curb ramps are provided at the public or common use facility.

Requirement 2. Accessible and usable public and common use areas.

Section 100.205(c)(1) provides that covered multifamily dwellings with a building entrance on an accessible route shall be designed in such a manner that the public and common use areas are readily accessible to and usable by handicapped persons.

Guideline

The following chart identifies the public and common use areas that should be made accessible, cites the appropriate section of the ANSI Standard, and describes the appropriate application of the specifications, including modifications to the referenced Standard.

Basic Components for Accessible and Usable Public and Common Use Areas or Facilities

Accessible element or space	ANSI A117.1 section	Application
1. Accessible route(s)	4.3	Within the boundary of the site: (a) From public transportation stops, accessible parking spaces, accessible passenger loading zones, and public streets or sidewalks to accessible building entrances (subject to site considerations described in section 5). (b) Connecting accessible buildings, facilities, elements and spaces that are on the same site. On-grade walks or paths between separate buildings with covered multifamily dwellings, while not required, should be accessible unless the slope of finish grade exceeds 8.33% at any point along the route. Handrails are not required on these accessible walks. (c) Connecting accessible building or facility entrances with accessible spaces and elements within the building or facility, including adaptable dwelling units. (d) Where site or legal constraints prevent a route accessible to wheelchair users between covered multifamily dwellings and public or common-use facilities elsewhere on the site, an acceptable alternative is the provision of access via a vehicular route so long as there is accessible parking on an accessible route to at least 2% of covered dwelling units, and necessary site provisions such as parking and curb cuts are available at the public or common use facility.
2. Protruding objects	4.4	Accessible routes or maneuvering space including, but not limited to halls, corridors, passageways, or aisles.
3. Ground and floor surface treatments	4.5	Accessible routes, rooms, and spaces, including floors, walks, ramps, stairs, and curb ramps.
4. Parking and passenger-loading zones	4.6	If provided at the site, designated accessible parking at the dwelling unit on request of residents with handicaps, on the same terms and with the full range of choices (e.g., surface parking or garage) that are provided for other residents of the project, with accessible parking on a route accessible to wheelchairs for at least 2% of the covered dwelling units; accessible visitor parking sufficient to provide access to grade-level entrances of covered multifamily dwellings; and accessible parking at facilities (e.g., swimming pools) that serve accessible buildings.
5. Curb ramps	4.7	Accessible routes crossing curbs.
6. Ramps	4.8	Accessible routes with slopes greater than 1:20.
7. Stairs	4.9	Stairs on accessible routes connecting levels not connected by an elevator.
8. Elevator	4.10	If provided.
9. Platform lift	4.11	May be used in lieu of an elevator or ramp under certain conditions.
10. Drinking fountains and water coolers	4.15	Fifty percent of fountains and coolers on each floor, or at least one, if provided in the facility or at the site.
11. Toilet rooms and bathing facilities (including water closets, toilet rooms and stalls, urinals, lavatories and mirrors, bathtubs, shower stalls, and sinks.)	4.22	Where provided in public-use and common-use facilities, at least one of each fixture provided per room.
12. Seating, tables, or work surfaces	4.30	If provided in accessible spaces, at least one of each type provided.
13. Places of assembly	4.31	If provided in the facility or at the site.
14. Common-use spaces and facilities (including swimming pools, playgrounds, entrances, rental offices, lobbies, elevators, mailbox areas, lounges, halls and corridors, and the like.)	4.1 through 4.30	If provided in the facility or at the site: (a) Where multiple recreational facilities (e.g., tennis courts) are provided sufficient accessible facilities of each type to assure equitable opportunity for use by persons with handicaps. (b) Where practical, access to all or a portion of nature trails and jogging paths.
15. Laundry rooms	4.32.6	If provided in the facility or at the site, at least one of each type of appliance provided in each laundry area, except that laundry rooms serving covered multifamily dwellings would not be required to have front-loading washers in order to meet the requirements of § 100.205(c)(1). (Where front loading washers are not provided, management will be expected to provide assistive devices on request if necessary to permit a resident to use a top loading washer.)

Requirement 3. Usable doors.

Section 100.205(c)(2) provides that covered multifamily dwellings with a building entrance on an accessible route shall be designed in such a manner that all the doors designed to allow passage into and within all premises are sufficiently wide to allow passage by handicapped persons in wheelchairs.

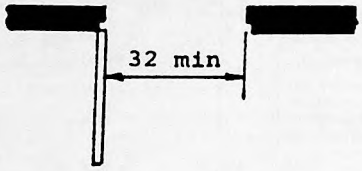
Guideline

Section 100.205(c)(2) would apply to doors that are a part of an accessible route in the public and common use areas of multifamily dwellings and to doors into and within individual dwelling units.

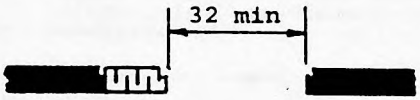
(1) On accessible routes in public and common use areas, and for primary entry doors to covered units, doors that comply with ANSI 4.13 would meet this requirement.

(2) Within individual dwelling units, doors intended for user passage through the unit which have a clear opening of at least 32 inches nominal width when the door is open 90 degrees, measured between the face of the door and the stop, would meet this requirement. (See Fig. 1 (a), (b), and (c).) Openings more than 24 inches in depth are not considered doorways. (See Fig. 1 (d).)

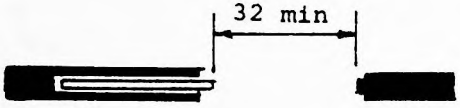
Note:
A 34-inch door, hung in the standard manner, provides an acceptable nominal 32-inch clear opening. This door can be adapted to provide a wider opening by using offset hinges, by removing lower portions of the door stop, or both. Pocket or sliding doors are acceptable doors in covered dwelling units and have the added advantage of not impinging on clear floor space in small rooms. The nominal 32-inch clear opening provided by a standard six-foot sliding patio door assembly is acceptable.



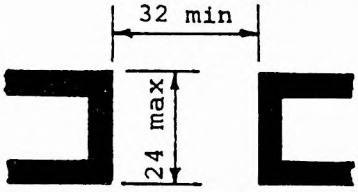
(a) Hinged Door



(b) Folding Door



(c) Sliding Door



(d) Maximum Doorway Depth

Fig. 1 Clear Doorway Width and Depth

Requirement 4. Accessible route into and through the covered dwelling unit.

Section 100.205(c)(3)(i) provides that all covered multifamily dwellings with a building entrance on an accessible route shall be designed and constructed in such a manner that all premises within covered multifamily dwelling units contain an accessible route into and through the covered dwelling unit.

Guideline

Accessible routes into and through dwelling units would meet section 100.205(c)(3)(i) if:

(1) A minimum clear width of 36 inches is provided.

(2) In single-story dwelling units, changes in level within the dwelling unit with heights between 1/4 inch and 1/2 inch are beveled with a slope no greater than 1:2. Except for design features, such as a loft or an area on a different level within a room (e.g., a sunken living room), changes in level greater than 1/2 inch are ramped or have other means of access. Where a single story dwelling unit has special design features, all portions of the single-story unit, except the loft or the sunken or raised area, are on an accessible route; and

(a) In single-story dwelling units with lofts, all spaces other than the loft are on an accessible route.

(b) Design features such as sunken or raised functional areas do not interrupt the accessible route through the remainder of the dwelling unit.

(3) In multistory dwelling units in buildings with elevators, the story of the unit that is served by the building elevator (a) is the primary entry to the unit, (b) complies with Requirements 2 through 7 with respect to the rooms located on the entry/accessible floor; and (c) contains a bathroom or powder room which complies with Requirement 7. (Note: multistory dwelling units in non-elevator buildings are not covered dwelling units because, in such cases, there is no ground floor unit.)

(4) Except as provided in paragraphs (5) and (6) below, thresholds at exterior doors, including sliding door tracks, are no higher than 3/4 inch. Thresholds and changes in level at these locations are beveled with a slope no greater than 1:2.

(5) Exterior deck, patio, or balcony surfaces are no more than 1/2 inch below the floor level of the interior of the dwelling unit, unless they are constructed of impervious material such as concrete, brick or flagstone. In such case, the surface is no more than 4 inches below the floor level of the interior of the dwelling unit, or lower if required by local building code.

(6) At the primary entry door to dwelling units with direct exterior access, outside landing surfaces constructed of impervious materials such as concrete, brick or flagstone, are no more than 1/2 inch below the floor level of the interior of the dwelling unit. The finished surface of this area that is located immediately outside the entry may be sloped, up to 1/8 inch per foot (12 inches), for drainage.

Requirement 5. Light switches, electrical outlets, thermostats and other environmental controls in accessible locations.

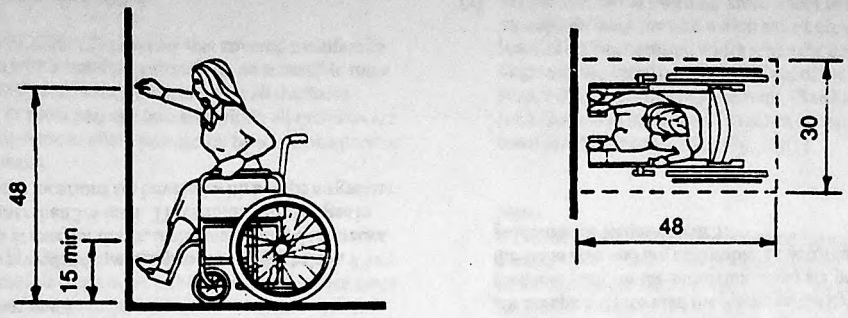
Section 100.205(c)(3)(ii) requires that all covered multifamily dwellings with a building entrance on an accessible route shall be designed and constructed in such a manner that all premises within covered multifamily dwelling units contain light switches, electrical outlets, thermostats, and other environmental controls in accessible locations.

Guideline

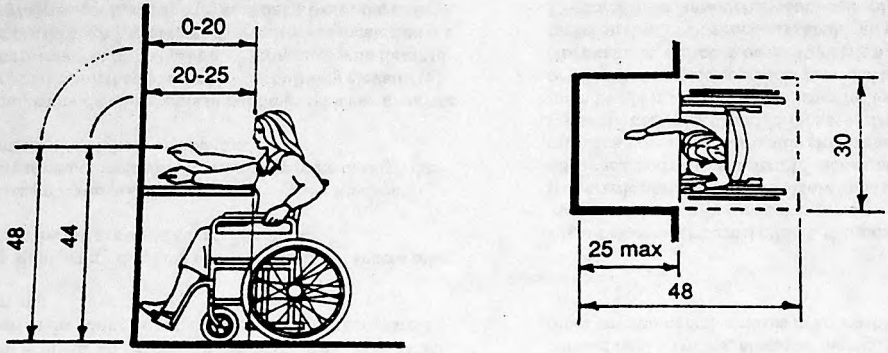
Light switches, electrical outlets, thermostats and other environmental controls would meet section 100.205(c)(3)(ii) if operable parts of the controls are located no higher than 48 inches, and no lower than 15 inches, above the floor. If the reach is over an obstruction (for example, an overhanging shelf) between 20 and 25 inches in depth, the maximum height is reduced to 44 inches for forward approach; or 46 inches for side approach, provided the obstruction (for example, a kitchen base cabinet) is no more than 24 inches in depth. Obstructions should not extend more than 25 inches from the wall beneath a control. (See Fig.2.)

Note

Controls or outlets that do not satisfy these specifications are acceptable provided that comparable controls or outlets (i.e., that perform the same functions) are provided within the same area and are accessible, in accordance with this guideline for Requirement 5.

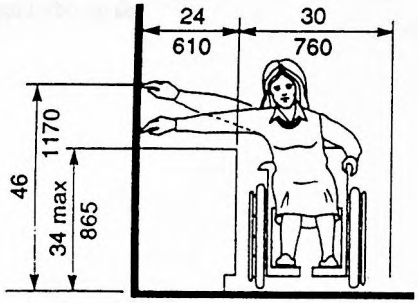


(a) Forward Reach Limit



NOTE: Clear knee space should be as deep as the reach distance.

(b) Maximum Forward Reach
Over an Obstruction



(c) Maximum Side Reach Over Obstruction

Fig. 2 Reach Ranges

Requirement 6. Reinforced walls for grab bars.

Section 100.205(c)(3)(iii) requires that covered multifamily dwellings with a building entrance on an accessible route shall be designed and constructed in such a manner that all premises within covered multifamily dwelling units contain reinforcements in bathroom walls to allow later installation of grab bars around toilet, tub, shower stall and shower seat, where such facilities are provided.

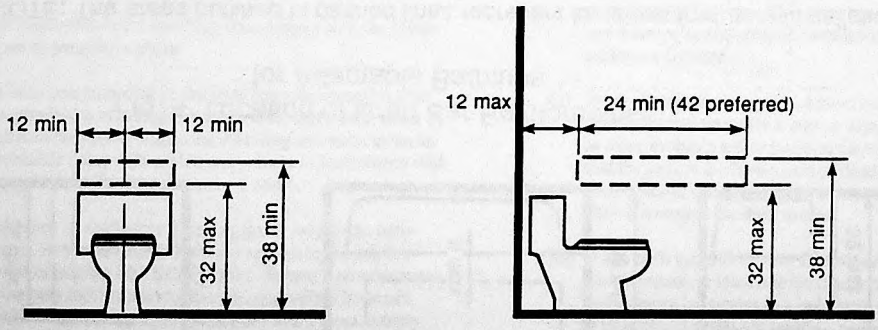
Guideline

Reinforced bathroom walls to allow later installation of grab bars around the toilet, tub, shower stall and shower seat, where such facilities are provided, would meet section 100.205(c)(3)(iii) if reinforced areas are provided at least at those points where grab bars will be mounted. (For example, see Figs. 3, 4 and 5.) Where the toilet is not placed adjacent to a side wall, the bathroom would comply if provision was made for installation of floor mounted, foldaway or similar alternative grab bars. Where the powder room (a room with a toilet and sink) is the only toilet facility located on an accessible level of a multistory dwelling unit, it must comply with this requirement for reinforced walls for grab bars.

Note:

Installation of bathtubs is not limited by the illustrative figures; a tub may have shelves or benches at either end; or a tub may be installed without surrounding walls, if there is provision for alternative mounting of grab bars. For example, a sunken tub placed away from walls could have reinforced areas for installation of floor-mounted grab bars. The same principle applies to shower stalls -- e.g., glass-walled stalls could be planned to allow floor-mounted grab bars to be installed later.

Reinforcement for grab bars may be provided in a variety of ways (for example, by plywood or wood blocking) so long as the necessary reinforcement is placed so as to permit later installation of appropriate grab bars.



Reinforced Areas for Installation of Grab Bars

Fig. 3 Water Closets in Adaptable Bathrooms

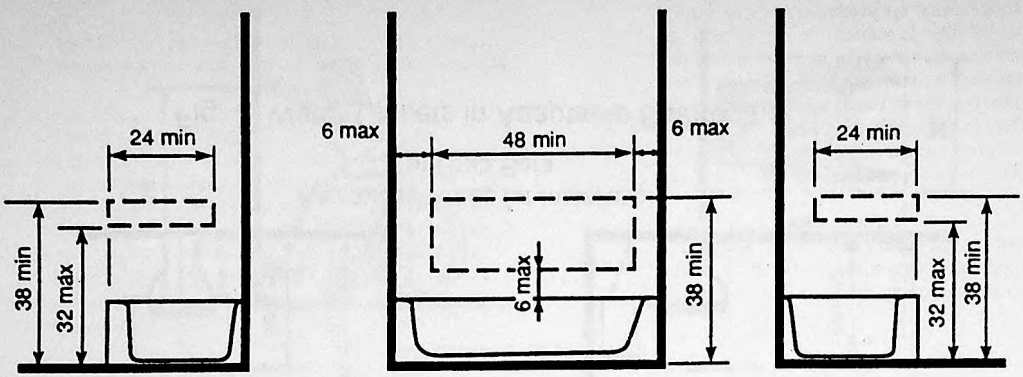


Fig. 4 Location of Grab Bar Reinforcements for Adaptable Bathtubs

NOTE: The areas outlined in dashed lines represent locations for future installation of grab bars for typical fixture configurations.

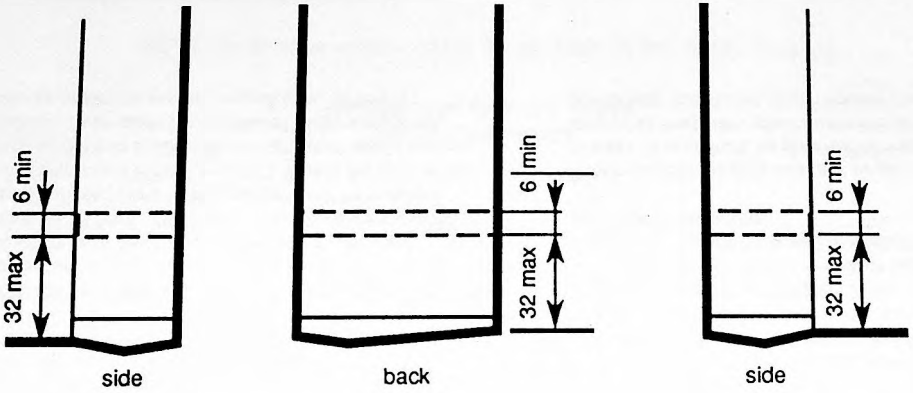


Fig. 5 Location of Grab Bar Reinforcements for Adaptable Showers

NOTE: The areas outlined in dashed lines represent locations for future installation of grab bars.

Requirement 7. Usable kitchens and bathrooms.

Section 100.205(c)(3)(iv) requires that covered multifamily dwellings with a building entrance on an accessible route shall be designed and constructed in such a manner that all premises within covered multifamily dwelling units contain usable kitchens and bathrooms such that an individual in a wheelchair can maneuver about the space.

Guideline

(1) Usable kitchens. Usable kitchens would meet section 100.205(c)(3)(iv) if:

(a) A clear floor space at least 30 inches by 48 inches that allows a parallel approach by a person in a wheelchair is provided at the range or cooktop and sink, and either a parallel or forward approach is provided at oven, dish washer, refrigerator/freezer or trash compactor. (See Fig. 6)

(b) Clearance between counters and all opposing base cabinets, countertops, appliances or walls is at least 40 inches.

(c) In U-shaped kitchens with sink or range or cooktop at the base of the "U", a 60-inch turning radius is provided to allow parallel approach, or base cabinets are removable at that location to allow knee space for a forward approach.

(2) Usable bathrooms. To meet the requirements of section 100.205(c)(3)(iv) either:

All bathrooms in the dwelling unit comply with the provisions of paragraph (a); or

At least one bathroom in the dwelling unit complies with the provisions of paragraph (b), and all other bathrooms and powder rooms within the dwelling unit must be on an accessible route with usable entry doors in accordance with the guidelines for Requirements 3 and 4.

However, in multistory dwelling units, only those bathrooms on the accessible level are subject to the requirements of section 100.205(c)(3)(iv). Where a powder room is the only facility provided on the accessible level of a multistory dwelling unit, the powder room must comply with provisions of paragraph (a) or paragraph (b). Powder rooms that are subject to the requirements of section 100.205(c)(3)(iv) must have reinforcements for grab bars as provided in the guideline for Requirement 6.

(a) Bathrooms that have reinforced walls for grab bars (see Requirement 6) would meet section 100.205(c)(3)(iv) if:

(i) Sufficient maneuvering space is provided within the bathroom for a person using a wheelchair or other mobility aid to enter and close the door, use the fixtures, reopen the door and exit. Doors may swing into the clear floor space provided at any fixture if the maneuvering space is provided. Maneuvering spaces may include any kneespace or toespace available below bathroom fixtures.

(ii) Clear floor space is provided at fixtures as shown in Fig. 7 (a), (b), (c) and (d). Clear floor space at fixtures may overlap.

(iii) If the shower stall is the only bathing facility provided in the covered dwelling unit, the shower stall measures at least 36 inches x 36 inches.

Note:
Cabinets under lavatories are acceptable provided the bathroom has space to allow a parallel approach by a person in a wheelchair; if parallel approach is not possible within the space, any cabinets provided would have to be removable to afford the necessary knee clearance for forward approach.

(b) Bathrooms that have reinforced walls for grab bars (see Requirement 6) would meet section 100.205(c)(3)(iv) if:

(i) Where the door swings into the bathroom, there is a clear space (approximately, 2' 6" by 4'0") within the room to position a wheelchair or other mobility aid clear of the path of the door as it is closed and to permit use of fixtures. This clear space can include any kneespace and toespace available below bathroom fixtures.

(ii) Where the door swings out, a clear space is provided within the bathroom for a person using a wheelchair or other mobility aid to position the wheelchair such that the person is allowed use of fixtures. There also shall be clear space to allow persons using wheelchairs to reopen the door to exit.

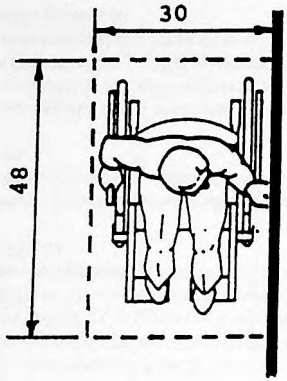
(iii) When both tub and shower fixtures are provided in the bathroom, at least one is made accessible. When two or more lavatories in a bathroom are provided, at least one is made accessible.

(iv) Toilets are located within bathrooms in a manner that permit a grab bar to be installed on one side of the fixture. In locations where toilets are adjacent to walls or bathtubs, the center line of the fixture is a minimum of 1'6" from the obstacle. The other (non-grab bar) sideof the toilet fixture is a minimum of 1'3" from the finished surface of adjoining walls, vanities or from the edge of a lavatory. (See Figure 7(a).)

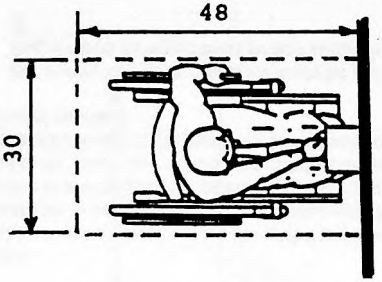
(v) Vanities and lavatories are installed with the centerline of the fixture a minimum of 1'3" horizontally from an adjoining wall or fixture. The top of the fixture rim is a maximum height of 2'10" above the finished floor. If kneespace is provided below the vanity, the bottom of the apron is at least 2'3" above the floor. If provided, full kneespace (for front approach) is at least 1'5" deep. (See Figure 7(c).)

(vi) Bathtubs and tub/showers located in the bathroom provide a clear access aisle adjacent to the lavatory that is at least 2'6" wide and extends for a length of 4'0" (measured from the foot of the bathtub). (See Figure 8.)

(vii) Stall showers in the bathroom may be of any size or configuration. A minimum clear floor space 2'6" wide by 4'0" should be available outside the stall. (See Figure 7(d).) If the shower stall is the only bathing facility provided in the covered dwelling unit, or on the accessible level of a covered multistory unit, and measures a nominal 36 x 36, the shower stall must have reinforcing to allow for installation of an optional wall hung bench seat.

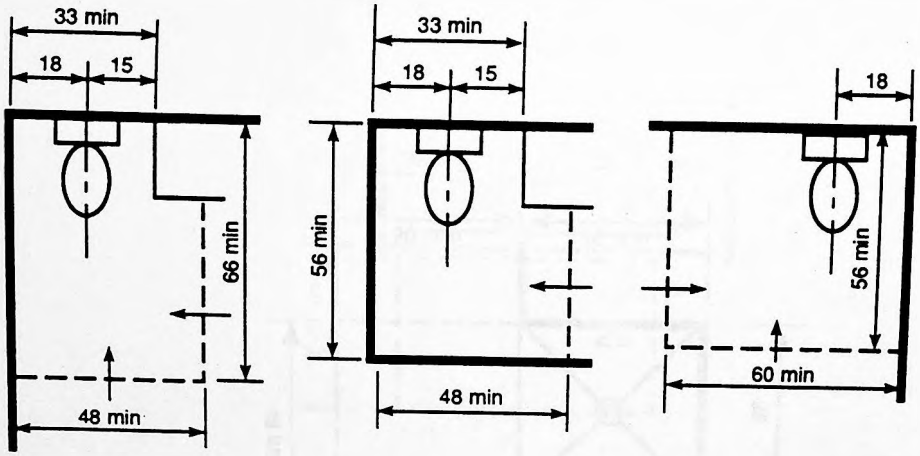


(a) Parallel Approach

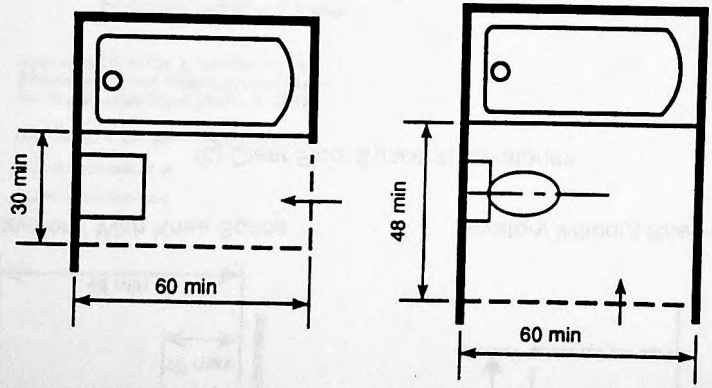


(b) Forward Approach

Fig. 6 Minimum Clear Floor Space for Wheelchairs

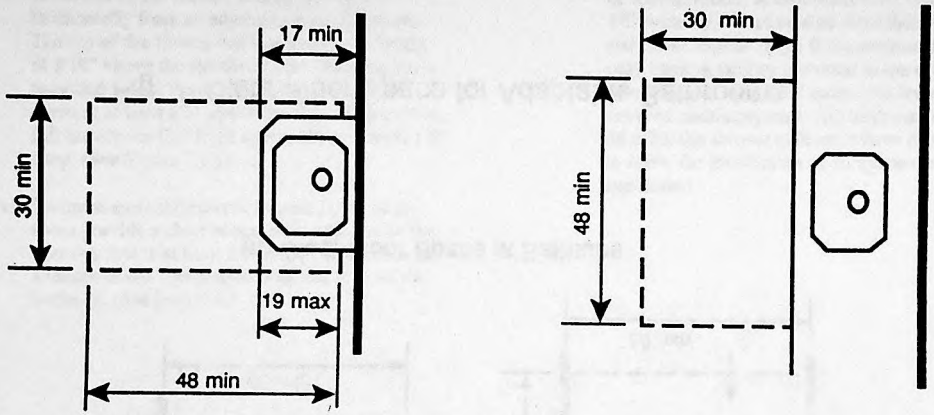


(a) Clear Floor Space for Water Closets



(b) Clear Floor Space at Bathtubs

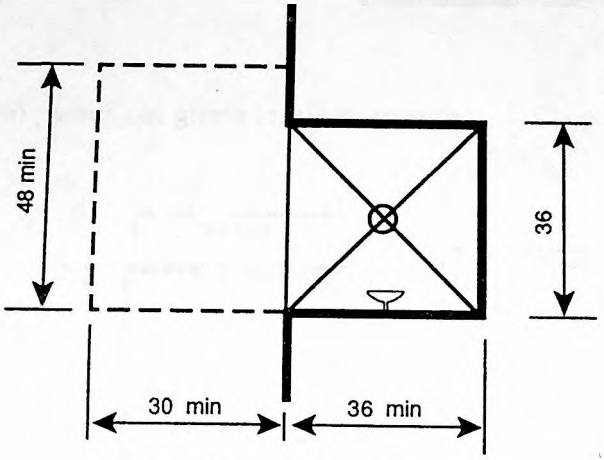
Fig. 7 Clear Floor Space for Adaptable Bathrooms



Lavatory With Knee Space

Lavatory Without Knee Space

(c) Clear Floor Space at Lavatories



(d) Clear Floor Space at Shower

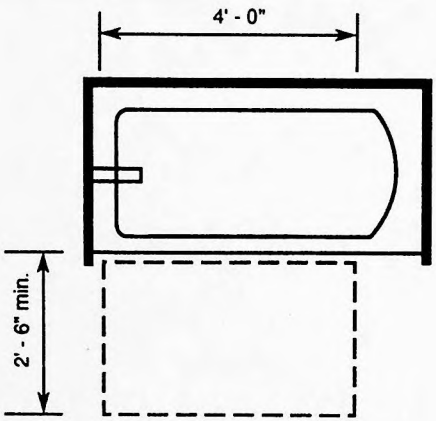


Fig. 8 Alternative Specification – Clear Floor Space at Bathtub

NOTE: Clear floor space beside tub may overlap with clear floor space beneath adjacent fixtures.

Appendix III to Ch. I, Subchapter A—Preamble to Final Housing Accessibility Guidelines (Published March 6, 1991).

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