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Page numbers of the MPS indicate the chapter first and the page within the chapter second. Appendices are similarly numbered.

FOREWORD

These Minimum Property Standards reference nationally recognized model building codes for concerns relating to health and safety. Locally adopted building codes can be used for the same purpose when they are found acceptable by the HUD Field Office.

These standards establish the acceptability of properties for mortgage insurance, and will further the goal of a decent and a suitable living environment for every American family. These standards will protect the Department's interest by requiring certain features of design and construction which are not normally required by state and local codes. These requirements will insure the durability of the project for the life of the mortgage.

Nicolas P. Retsinas
Assistant Secretary for Housing
- Federal Housing Commissioner

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Introductory Statement

These Minimum Property Standards (MPS) are intended to provide a sound technical basis for the construction of housing under the numerous programs of the Department of Housing and Urban Development. MPS Handbook 4910.1 was originally published for multifamily housing with each page marked MF. The Handbook applies to all types of housing. Chapters 1 thru 6 and Appendices A thru J apply to only multifamily and care-type housing. Appendix K applies to property which is not multifamily or care-type housing. The standards describe those characteristics in a property which will provide present and continuing utility, durability, and economy of maintenance.

The MPS for Housing (4910.1) are intended to be used in all jurisdictions. In areas where the Department has found the local code acceptable, these MPS are to be used in conjunction with the local code. In areas where the Department has not accepted the local building code, these MPS are to be used in conjunction with a nationally recognized model building code designated by the Department.

Finally, in areas where the Department has partially accepted a local building code, the MPS are to be used in conjunction with the local building code plus those portions of a nationally recognized model code designated by the Department.

The requirements contained in this handbook and in the indicated codes define the minimum level of quality acceptable to HUD. Other factors and considerations affect the level of quality of the property. The level of quality will be considered by the Department during the valuation process. Procedures for evaluation of design considerations, project eligibility and valuation analysis are set forth in HUD program handbooks and other applicable Federal and local regulations and standards.

Environmental quality is also a relevant consideration. As a general policy, development of all properties must be consistent with the national program for conservation of energy and other

natural resources, and care must be exercised to avoid air, water, land and noise pollution and other hazards to the environment. Orderly and efficient development responsive to residential needs, preservation of good existing natural surroundings, conservation of fossil fuels, and careful consideration of environmental factors are essential for the furtherance of this policy.

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CHAPTER 1

GENERAL USE

100 APPLICATION

100-1 PROPOSED CONSTRUCTION

General

These Minimum Property Standards apply to buildings and sites designed and used for normal multifamily and care-type occupancy, including both unsubsidized and subsidized insured housing. The requirement of compliance with these standards under specific programs administered by the Department is prescribed in program regulations promulgated by the Department. Generally, these standards regulate the nature and quality of the property within its property lines. However, some standards require certain off-site conditions. See, for example, 204-1, which requires street access to the property.

100-2 HOUSING FOR THE ELDERLY

This Section includes Uniform Federal Accessibility Standards (UFAS) at 24 CFR Part 40, Appendix A and variations, additions and exceptions to the MPS for the above types of housing, when housing is to be for the elderly.

The number of accessible housing units which must be built will be determined on a project-by-project basis in accordance with the requirements of the program under which the project is to be built. Accessible housing units shall also meet all the facility accessibility requirements of UFAS.

100-2.1 Handrails

Handrails for exterior steps not attached to dwellings shall be provided in accordance with UFAS on both sides of a tenant stairway with a flight rise exceeding 24" and width exceeding 4 ft., and on one side when the width is 4 ft. or less.

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100-2.1 HOUSING FOR THE ELDERLY - Continued

100-2.2 Walks

Walks designed for use by tenants shall have maximum gradients of five percent.

100-2.3 Community Social Rooms

Community social rooms are required in housing for the elderly.

100-2.4 Optional Project Facilities

Where the following facilities are provided, they shall comply with the following:

- (a) Occupational or Physical Therapy - Space shall be provided for services and for storage of equipment.
- (b) Dietitian's Office - When a dietitian is to be employed, suitable office space convenient to the kitchen shall be provided.
- (c) First Aid or Health Room - These facilities and any accompanying infirmary shall be designed for observation, minor treatment, or short term care of project residents. When these services are provided, facilities for an attending nurse are

required.

- (d) Nursing Facilities - These facilities for either short-term or long-term care for project residents shall be as follows:
 - (1) If nursing facilities are not provided at the time of construction, residential units may be specially designed for conversion to nursing facilities at a later date.
 - (2) Facilities shall be grouped in a separate wing, floor or auxiliary building.
 - (3) The nursing unit and patient rooms shall comply with requirements of UFAS.

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100-2 HOUSING FOR THE ELDERLY - Continued

- (4) The nursing portion of the project shall be clearly incidental to the purpose of providing housing, and the ratio of nursing beds to living units shall not exceed 1 to 4.
- (e) Medical Facilities - Where a doctor's office with examination and treatment rooms is provided, it shall be designed to serve project residents. Spaces provided for rental to doctors, dentists, oculists, opticians, etc., shall be within the limits of allowable commercial space and located so as not to interfere with the residential space.
- (f) Central Dining - Where mandated by the program requirements, space shall be provided for meals.
- (g) Central Kitchen Facilities - The kitchen shall be arranged and equipped for adequate and efficient: food storage; preparation in proper sequence; serving; dish and utensil cleaning and storage; and refuse storage and removal. In projects consisting of 20 or more living units, the dishwashing activity shall be separated from that of food preparation. All cabinets and equipment provided shall be designed and installed to prevent contamination by insects, rodents, other vermin, splash, dust and overhead leakage.
- (h) Central Bathing Facilities - Such facilities shall be located on the same floor and close to the living units served.

When provided, a central bathroom shall contain:

- (1) Space for dressing and the movement of wheelchairs provided in accordance with the requirements of UFAS, Section 4.

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100-2 HOUSING FOR THE ELDERLY - Continued

- (2) Adequate lavatories and compartmented water closets. Enclosure of water closets is not required when the water closet is within a room used by only one bather. Designs in which a bather must enter the public corridor to reach a water closet are not acceptable.

100-2.5 Bedrooms

- a. Beds shall be accessible from two sides and one end.
- b. Combined living-sleeping space shall be of sufficient size to accommodate the living and sleeping functions as conveniently as separate living and sleeping areas.

100-2.6 Bathrooms

- a. Bathtubs shall be provided with grab bars as specified in Section 4.26 of the UFAS.
- b. A stall shower, when installed, shall meet the requirements of the UFAS Section 4.21, Shower Stalls.
- c. Tub or shower bottom surfaces shall be slip resistant.
- d. Grab bars and shower seats shall be installed to sustain a dead weight of 250 pounds for 5 minutes and comply with UFAS.

100-2.7 Halls and Corridors

- a. Minimum clear widths of public halls and corridors shall be 5'-0".
- b. Handrails complying with UFAS shall be provided on at least one side of all tenant corridors, except in living units.

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100-2 HOUSING FOR THE ELDERLY - Continued

100-2.8 Stairs

The maximum riser height for stairs is 7".

100-2.9 Elevators

- a. Elevators complying with UFAS shall be provided in buildings of three or more stories; or two stories if any accessible living unit is located on a floor which does not have all common facilities.
- b. At least one elevator car in each building shall be suitable for handling ambulance stretchers and have a minimum capacity of 2500 lbs. and minimum size as required for service elevator under 614-1.

100-2.10 Emergency Lighting

Emergency lighting shall be provided for every public space, corridor, stairway, elevator and other means of egress. The lighting shall provide a minimum of 1 footcandle measured at the floor.

100-2.11 Flame Spread

The flame spread rating of walls and ceiling shall not exceed 75.

100-2.12 Wall Finishes

Abrasive wall finishes such as a sand finish shall not be used.

100-2.13 Floors

- a. Floors shall be slip-resistant.
- b. Adjacent dissimilar materials shall be flush with each other to provide an unbroken surface. Thresholds and Expansion Joint covers shall be flush with the floor.

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100-2 HOUSING FOR THE ELDERLY - Continued

100-2.14 Heat Loss Calculations

The inside design temperature shall not be less than 75 F in all habitable rooms and corridors when the outside temperature is at design level. Lower inside design temperatures may be used for storage rooms, work rooms, offices and other similar spaces.

100-2.15 Hot Water and Steam Heating Systems

Heating systems serving 10 or more living units shall be supplied by not less than two properly parallel connected boilers. The minimum net capacity of each boiler shall be 70% of the total connected load when two boilers are used and 35% when three boilers are used. When four or more boilers are used, the total capacity of all boilers shall not be less than the total connected load, and each boiler shall have the same net capacity. When the property contains nursing facilities, 1 1/2 beds shall be considered the equivalent of one living unit for purposes of this requirement.

100-2.16 Hot and cold water shall be supplied to all plumbing fixtures except water closets, urinals, bedpan washers, and drinking fountains, each of which will be supplied with cold water only.

100-2.17 Automatic temperature limit controls shall be provided so that hot water for showers will not exceed 110 F.

100-2.18 The quantity of hot water for personal use and the capacity of the domestic hot water heating equipment system shall be in compliance with the design criteria of ASHRAE Systems Handbook, 1980, Chapter "Service Water Heating."

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100-2 HOUSING FOR THE ELDERLY - Continued

100-2.19 Night Light

A convenience outlet for receiving a night light shall be provided approximately 2 ft. above the floor between the bed location and the bathroom.

100-2.20 Emergency Call Systems

In projects containing 20 or more living units, each bathroom and one bed location in each living unit shall be furnished with one of the following emergency call systems: an emergency call system which registers a call

(annunciator and alarm) at one or more central supervised locations, an intercommunicating telephone system connected to a switchboard which is monitored 24 hrs a day, or an emergency call system which sounds an alarm (not the fire alarm) in the immediate corridor and automatically actuates a visual signal in the corridor at the living unit entrance.

100-3 REQUIREMENTS FOR ACCESSIBILITY TO PHYSICALLY DISABLED PEOPLE

All multifamily dwellings covered by the Fair Housing Amendments Act of 1988, for first occupancy after March 13, 1991 must be designed and constructed to have at least one building entrance on an accessible route and shall be designed and constructed in such a manner that:

- 100-3.1 The public and common use areas are readily accessible to and usable by disabled persons;
- 100-3.2 All the doors designed to allow passage into and within all premises are sufficiently wide to allow passage by disabled persons in wheelchairs; and
- 100-3.3 All premises within covered multifamily dwelling units contain the following features of adaptable design:
 - a. An accessible route into and through the covered dwelling unit;

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100-3 REQUIREMENTS FOR ACCESSIBILITY TO PHYSICALLY DISABLED PEOPLE - Continued

- 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 around the toilet, tub shower, stall and shower seat, where such facilities are provided; and
 - d. Usable kitchens and bathrooms such that an individual in a wheelchair can maneuver about the space.
- 100-3.4 One method of compliance with these requirements is satisfactory compliance with the Fair Housing Accessibility Guidelines 24 CFR Ch.I, Subch. A. App. II and III.

100-3.5 For multifamily dwelling covered by this section see 24 CFR 100.201.

100-4 REQUIREMENTS FOR CARE TYPE FACILITIES

100-4.1 Construction

Care Type Facilities shall comply with requirements of The Guidelines for Construction and Equipment of Hospitals and Medical Facilities as published by the AIA press, 1987 edition.

100-4.2 Housing Units and Patient Rooms

At least 50 percent of living units, patient rooms or bedrooms and associated facilities shall comply with the requirements of UFAS.

100-5 REHABILITATION CONSTRUCTION

Rehabilitation construction includes the following categories: (1) all repairs to or replacement of present elements of an existing building, such as windows, stairs, flooring, or wiring; (2) rearrangement of rooms by the relocation of partitions or by the installation of

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100-5 REHABILITATION CONSTRUCTION - Continued

new bathrooms and kitchens; or (3) the general replacement of the interior of a building. This may or may not include changes to structural elements such as floor systems, columns or load bearing interior or exterior walls. Rehabilitation construction shall comply with the standards for new construction and with the provisions of the program handbook for the particular program. New construction on cleared or vacant land or additions to an existing building which enlarge the floor area or height of the building shall meet the standards for new construction.

101 VARIATIONS TO STANDARDS

101-1 NEW MATERIALS AND TECHNOLOGIES

These standards are intended to encourage the use of new or innovative technologies, methods and materials. See Subchapter 613 of this handbook. Alternatives and non-conventional or innovative methods and materials shall be equivalent to these standards in the areas of quality, durability, economy of maintenance, operation and usability.

101-2 SPECIAL CONDITIONS

Certain conditions in the geographic area or on the site may justify modification of specific standards, or make compliance with the standards impracticable or impossible. In these cases, variations in accordance with procedures given in 101-3 may be permitted.

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101-3 VARIATION PROCEDURES

101-3.1 Variations from the requirements of any standard with which the Department requires compliance shall be made in the following ways:

- a. For a particular design or construction proposed to be used on a non-repetitive basis for a specific case or project, the decision is the responsibility of the Field Office. Headquarters concurrence is not required.
- b. Where a variation is intended to be on a repetitive basis, a recommendation for a Local Acceptable Standard, substantiating data, and background information shall be submitted by the Field Office to the Headquarters Office responsible for the Minimum Property Standards.

101-3.2 Variations which require individual analysis and decision in each instance are not considered as repetitive variations even though one particular standard is repeatedly the subject of variation. Such variations are covered by the subject of Section 101-3.1a.

102 LOCAL CODES AND REGULATIONS

102-1 CODES AS STANDARDS

Acceptability of new construction for insurance or for utilization in other programs administered by the Department requires, among other things, compliance with minimum health and safety criteria. The Minimum Property Standards for Housing consist of the standards contained in and referenced by this handbook and the codes and standards with which compliance is required by 24 CFR 200.925 and .926. The relevant portions of 24 CFR 200.925 and .926 are reproduced in Appendix I and K of this handbook.

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102-1.1 COMPLIANCE WITH CODES

The Department of Housing and Urban Development does not assume responsibility for enforcing or determining compliance with local codes and regulations or for making interpretations regarding their application for purposes of the local government. However, if compliance with the provisions of a local code is required in accordance with 24 CFR 200.925 or .926, then the Department is responsible for determining compliance and issuing interpretations for the Department's purposes.

103 REFERENCED STANDARDS

These standards must be used in conjunction with the information or requirements listed in Appendices A through I, which are incorporated herein by reference. Compliance with these standards and the requirements in the appendices does not obviate the need for compliance with any other applicable Federal, State or local requirements.

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CHAPTER 2

GENERAL ACCEPTABILITY CRITERIA

200	GENERAL
	These general acceptability criteria apply to existing as well as new construction.
201	REAL ESTATE ENTITY
	The project site shall comprise a single plot, except that two or more parcels separated by other parcels or a street or streets may be acceptable provided the resulting parcels comprise a readily marketable real estate entity. In either case, the property shall be sufficiently grouped to assure that convenient and efficient management during operation can be expected.
202	SERVICES AND FACILITIES
202-1	TRESPASS
	The property shall be so designed that it can be used and maintained without trespass upon adjoining properties.
202-2	UTILITIES

Utilities and other facilities shall be independent for the property, without dependence upon other properties.

203 SITE CONDITIONS

HAZARDS

The property shall be free of those hazards which may adversely affect the health and safety of the occupants or the structural soundness of the improvements or which may impair the customary use and enjoyment of the property. These hazards include toxic chemicals, radioactive materials, other pollution, hazardous activities, subsidence, flood, erosion, expansive or compressible soils, inadequate drainage outfall, landslides or mudflows, and deposition of suspended solids or others located on or off site. Projects with potentially significant hazards may be acceptable if any such hazards are effectively mitigated.

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203 SITE CONDITIONS - Continued

203-2 UNFORESEEN CONDITIONS

When special conditions exist or arise during construction which were unforeseen and which necessitate precautionary measures, the HUD Field Office may require such corrective work as may be necessary to meet the special conditions. Special conditions include rock formations, unstable soil, high groundwater level and springs.

204 ACCESS

204-1 STREETS

Each property shall be provided with vehicular access by an abutting public or private street. Private streets shall be protected by a permanent easement.

204-2 ACCESS TO THE BUILDING AND THE NONDWELLING FACILITIES

204-2.1 Each building shall have safe and convenient pedestrian access from project parking areas.

204-2.2 Each building shall have convenient access for service and, when necessary, for delivery of fuel.

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306	GRADING DESIGN ----- 3-4

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CHAPTER 3

SITE DESIGN

300 GENERAL

300-1 DESIGN

A site design shall be provided which includes all site facilities necessary to create a safe, functional, convenient, healthful, durable and energy efficient living environment for residents. The site design shall include an arrangement of the site facilities which accomplishes these purposes.

301 THE PROPOSED SITE

301-1 TOPOGRAPHY

In the design of a site, the effect of topographic conditions on the costs of development and operation shall be considered when locating various uses on the

land. Land uses shall be combined with site conditions in a manner which assures a functional and economical maintainable development and in a manner which permits correction of potential hazards.

301-2 GROUND WATER

Buildings, structures, streets, paved areas and utilities shall be located on the site in areas of the least ground water hazard.

302 LAND USE

302-1 GENERAL

Site conditions shall be considered in land use planning for multifamily housing.

302-2 NOISE CONTROL

Through the use of site design techniques such as building location and orientation, window placement and the use of barriers, predictable undesirable site noise shall be moderated to meet the requirements of 24 CFR Part 51, Environmental Criteria and Standards.

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303 LOTS, YARDS AND BUILDING SETBACK DISTANCE

303-1 GENERAL

The length and height of each building wall, the location of the main entrance as it relates to the dwellings and to window walls of nearby dwellings and the location or windows in all habitable rooms shall be considered in establishing yard depth.

303-2 BUILDING PARKING SETBACK DISTANCE

Buildings with grade level or low windows shall be set back from parking areas and shall be arranged to prevent direct or concentrated discharge of automobile exhausts into any window.

304 PARKING AREAS

Adequate parking space shall be provided for residents, guests and service vehicles. Where practical, additional parking space shall be planned and reserved for future use.

305 WALKS

Walks shall be provided for safe convenient access to all dwellings and for safe pedestrian circulation throughout the development between facilities and locations where a significant need for pedestrian access can be anticipated.

306

GRADING DESIGN

Site grading design shall accomplish the following:

- a. Allow drainage of surface water away from buildings and off-site;
- b. Minimize earth settlement problems;
- c. Avoid concentrating runoff onto neighboring properties where erosion or other damage would be caused;
- d. Minimize erosion;
- e. Minimize potential earth movement problems which might adversely affect completed construction.

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CHAPTER 4

BUILDING DESIGN

400	GENERAL
400-1	BUILDING DESIGN
	Building design shall provide for ease of circulation and housekeeping, visual and auditory privacy, accident protection, accessory services and economy in maintenance and use of space.
401	SPACE PLANNING
401-1	NON-RESIDENTIAL SPACES
	Management and maintenance space shall be provided commensurate with the number of living units served. Also, space shall be provided for necessary staff where social services are provided.
401-2	BATHS
401-2.1	Every living unit shall be provided with a water closet, lavatory and a bathtub or shower.
401-2.2	Shower compartment floors and walls shall be finished

with a wear resistant and non-absorbent surface to a height of not less than 6 ft. above the floor.

402 ACCESS AND CIRCULATION

402-1 DOORS AND OPENINGS

402-1.1 Living Unit Doors

Living unit entrance doors shall be side-hinged doors not less than 3 ft. in width and 6 ft. 8 in. in height.

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402-1.1 Living Unit Doors - Continued

402-1.2 Locking devices at doors and windows shall be as follows:

- a. Each exterior doorway and each doorway leading to garage areas, common hallways, terraces, balconies, or other areas affording easy access to the premises shall be protected by a door which, if not a sliding door, shall be equipped with a deadlock using either an interlocking vertical bolt and striker, a minimum of 1.2 in. throw dead bolt or a minimum 1/2 in. throw self-locking dead latch. Locks shall not require the use of a key for operation from the inside.
- b. All sliding doors, first floor and basement windows and windows opening onto stairways, fire escapes, porches, terraces, balconies or other areas affording easy access to the premises shall be equipped with a locking device. A sliding door used as a main or service entrance shall be equipped with a keyed locking device.

402-2 HANDRAILS AND RAILINGS

Required railings shall have a minimum height of 36 in. and balusters shall be designed to prevent the passage of a spherical object having a diameter of 6 in.

402-3 ELEVATORS

402-3.1 Service Required

- a. Elevators shall be provided in buildings of:
 - (1) Five or more stories;
 - (2) Four stories where deemed necessary by the HUD Field Office to satisfy market

considerations;

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402.3-2 Service or Combination Elevators

In elevator type buildings, at least one of the elevators shall have a minimum capacity of 2500 lbs and minimum size as required for service elevators under 614-1.

403 VENTILATION

403-1 CRAWL AND ATTIC SPACE

403-1.1 Crawl Space

a. The space between the bottom of the floor joists and the earth under any building (except such space as is occupied by a basement or cellar) shall be provided with a sufficient number of ventilating openings through foundation walls or exterior walls to ensure ample ventilation. Such openings shall be covered with a corrosion-resistant wire mesh with a mesh size not greater than 1/2 in. nor less than 1/4 in. in any dimension. The minimum net area of ventilating openings shall not be less than 1 sq. ft. for each 150 sq. ft. of crawl space area.

403-1.1 Crawl Space - Continued

One ventilating opening shall be within 3 ft. of each corner of each building where such openings are required.

Exceptions:

- (1) Ventilation openings may be vented to the interior of buildings where warranted by climatic conditions; and
- (2) The total area of ventilation openings may be reduced to 1/1500 of the under floor area where the ground surface is treated with an acceptable vapor retarder material, and one such ventilation opening is within 3 ft. of each corner of said building. The vents may have operable louvers.

- b. The under floor grade shall be cleaned of all vegetation and organic material.

403-1.2

Attic Space

- a. Cross ventilation shall be provided for each separate space. Ventilation openings shall be protected against the entrance of rain and snow.
- b. The ratio of the total net free ventilation area to the area of ceiling shall be not less than 1/150, except that the ratio may be 1/300 if:
 - (1) A vapor retarder having a transmission rate not exceeding one perm is installed on the warm side of the ceiling;
 - (2) Between 25 and 50 percent of the required ventilating area is provided by vents located in the eaves or cornices with the balance of the required ventilation provided by ventilators located at least 3'-0" above the vents in the eaves or cornices; or
 - (3) The attic space is accessible and suitable for future habitable rooms or walled-off storage spaces have at least 50% of the required ventilating area located in the upper part of the ventilated spaces as near the high point of the roof as practicable and above the probable level of any future ceiling.

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CHAPTER 5

MATERIALS

500 GENERAL

500-1 MATERIALS

Materials installed shall be of such kind and quality to ensure that the dwelling will provide acceptable durability, economy of maintenance and adequate resistance to weather, moisture, corrosion and fire. The local HUD Field Office may request evidence of a material's compliance with the requirements of the structure's plans and specifications and these MPS. Product labels are considered acceptable evidence.

507 THERMAL AND MOISTURE PROTECTION

507-1 BUILDING INSULATION

Materials used for insulation shall be of proven effectiveness and adequate durability so as to ensure that required design specifications concerning heat transmission, sound control and fire rating are attained. Insulation in contact with the ground shall be installed so as not to be adversely affected by soil, vermin and water.

507-2 CAULKING AND JOINT SEALANTS

Materials used for caulking and sealants shall be suitable for the use intended, and shall be compatible with the materials to which they are applied and with any finish that may be applied over them.

508 DOORS, WINDOWS, GLAZING PANELS

508-1 PERFORMANCE TESTING

All windows and sliding glass doors shall be tested for air infiltration, water penetration and physical loading as set forth in Appendix D. The test unit shall be either the largest size marketed by the manufacturer or the size designated in the referenced standard. All windows and sliding glass doors shall meet or exceed the minimum performance levels set forth in Appendix D.

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508-2 METAL DOORS AND FRAMES

508-2.1 Steel Doors

- a. Each interior and exterior steel door shall bear the manufacturer's certification that the product complies with the applicable standard.
- b. Each steel sliding glass door unit shall bear a label that identifies the manufacturer, certifies compliance with the tests required in Appendix D, identifies the certifying organization, and states the maximum size of the unit tested.

508-2.2 Aluminum Doors

Each aluminum sliding glass door and aluminum storm door shall bear the label of an independent inspection agency. The label shall identify the manufacturer by name or symbol, and shall certify compliance with the applicable

standard.

508-3 WOOD DOORS

508-3.1 Materials

- a. Doors may be complete manufactured units or stock doors and frames. Job-built wood frames may be used.
- b. Entrance doors shall be of exterior type as defined in the applicable referenced standard and not less than 1-3/4 in. thick. Service doors (where temperature is near the same on both sides) may be 1-3/8 in. thick. Exterior door frames shall be treated against decay.
- c. Interior hinged doors shall be not less than 1-3/8 in. thick. Closet doors may be 1-1/8 in thick, provided that warp does not exceed 1/4 in.

508-4 METAL WINDOWS

508-4.1 General

Where metal windows or sliding glass doors are used in areas subject to a winter design temperature of 100 degree F or lower, insulating frames shall be provided. These

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windows or doors shall comply with AAMA 1503.1-88, Condensation Resistance of Windows, Doors and Glazed Wall Sections. Where wood is to be used as the insulator, it shall be treated with a water repellent preservative. Storm sash are acceptable to serve this purpose if a thermal separation is provided between the prime and the storm window, where both window frames are metal.

508-4.2 Steel Windows

Steel windows shall bear a label that identifies the manufacturer, certifies compliance with the tests required in Section 508-1, identifies the certifying organization, and states the maximum size of the unit tested.

508-4.3 Aluminum Windows

Aluminum windows shall bear the label of an independent inspection agency. The label shall identify the manufacturer by name or symbol, and shall certify compliance with the applicable standard.

508-5 WOOD WINDOWS

508-5.1 Operating Wood Windows

Operating windows shall be manufactured units consisting of the frame, sill, sash, weatherstripping and operating hardware. Job site assembled windows composed of frames and sashes made by different manufacturers are not acceptable.

Each operating wood window unit shall bear the label of an independent inspection agency. The label shall identify the manufacturer by name or symbol and shall certify compliance with the applicable standard.

508-5.2 Fixed Sash Windows

Fixed sash windows such as picture windows and bay windows, may be manufactured, job-built or job assembled units.

508-6 HARDWARE

508-6.1 Hardware shall comply with Section 402-1.2. Locks shall meet or exceed the performance criteria of ANSI A156.2-89 for the series and grades as follows:

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- a. Building entrance doors serving more than two families, series 4000, grade 1.
- b. Living unit entrance doors and building entrance doors serving one or two families, series 4000, grade 2.
- c. Doors within living units, series 4000, grade 3.

The performance criteria are contained in Sections 7, 8, and 9 of ANSI A156.2-89. Evidence of conformance shall be provided to the HUD Field Office upon request.

Three butt hinges shall be used on all exterior doors.

508-6.2 Labeling

Locks shall be labeled as complying with the performance criteria of the applicable series and grade of ANSI A156.2-89. This information shall appear on the lock, in the installation instructions or on the packing box.

509 FINISH MATERIALS

509-1 EXTERIOR WALL FINISHES

- a. Each bundle of shingles or shakes shall bear a label identifying its grade and species, and certifying compliance with the applicable commercial standard.
- b. Each panel or package of hardboard shall bear a label identifying the specific type of hardboard and the manufacturer, and certifying compliance with the applicable standard.
- c. Hardboard products shall be manufactured in accordance with the standards listed in Appendix C. Other hardboard products are considered special products and may be used in accordance with the procedures set forth in Paragraph 513.

509-2 FINISH FLOORING, RIGID

- a. Each bundle or package of wood flooring shall bear a label identifying grade and species.
- b. Ceramic tile shall be identified as required by the applicable referenced standard.

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509-3 FINISHED FLOORING, RESILIENT

The thickness of resilient flooring may be less than required by the referenced standards in Appendix C, but no less than the thickness shown in Table 5-9.1.

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TABLE 5-9.1

MINIMUM RESILIENT FLOORING THICKNESS (Links to 49101c05.pdf)

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509-4 CARPETS AND MATS

Carpet cushions shall comply with the requirements of UM 72-80. Carpets shall comply with the requirements of UM 44C-78.

509-5 PAINTING

509-5.1 Lead Content

No paint shall contain more than 0.06 percent lead by weight calculated as lead metal in the total nonvolatile content of liquid paints or in the dried film of paint already applied.

509-5.2 Suitability

If a paint to be used on exterior surfaces is not inherently mold resistant, a suitable fungicide shall be included in the formulation.

513 SPECIAL CONSTRUCTION MATERIALS

513-1 DEFINITION

Special or alternate construction materials and products are those which are new or are not covered by specific requirements in these standards or in the referenced standards in Appendices C, E & F.

513-2 USAGE

Special or alternate materials and products may be used as prescribed in Section 101-1 and in HUD Handbook 4950.1 Technical Suitability of Products Program, Technical and Processing Procedures.

513-3 REQUIREMENTS FOR ACCEPTANCE

Special or alternate materials and products will be accepted for use in multifamily structures in accordance with the procedures set forth in HUD Handbook 4950.1.

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CHAPTER 6

CONSTRUCTION

600 GENERAL

All work shall be performed in a workmanlike manner and in accordance with good usage and accepted practices. All materials shall be made and installed so they perform in accordance with their intended purposes.

602 SITE

602-1 SITE UTILITIES - UNDERGROUND UTILITIES

602-1.1 Underground piping and related items shall be protected from corrosion. Underground mechanical and electrical systems shall be protectively coated to minimize corrosion where soil conditions warrant. Where applicable, sacrificial anodes may be used.

602-1.2 Sacrificial anodes may be used where soil resistivity does not exceed 15,000 ohm - centimeters. Otherwise, an impressed current system of corrosion prevention shall be used.

602-2 ROADS AND WALKS

602-2.1 GENERAL

Surfaces and base courses for roads, streets, parking areas and walks shall be durable materials. Their construction shall be in conformance with generally accepted local design practices.

602-2.2 Drainage

Adequate surface and underground drainage systems shall serve all paving and improvements so as to ensure continuing stable soil support for these improvements.

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603 CONCRETE

603-1 INTERIOR CONCRETE SLABS-ON-GROUND

603-1.1 General

Slabs shall be designed and constructed in accordance with ACI 302.1R-80, Guide for Concrete Floor and Slab Construction, and as may be necessary to prevent slab damage due to potential soil movements.

603-1.2 Vapor retarders and base course shall be provided for all interior concrete slabs to which a finish flooring is applied. In arid regions where irrigation and heavy sprinkling is not done, and where no drainage or soil problem exists on the site, vapor retarders may be omitted with the consent of the HUD Field Office. Base course may omitted when asphalt tile, rubber tile, vinyl tile, terrazzo and ceramic tile are used as finish flooring, except that base course shall be used when capillarity of subsoil is such that liquid rise from ground water table will permit water to reach the bottom of the slab.

Note: Acceptable base course materials are gravel, slag, crushed rock, sand, cinders and certain types of earth when approved by the local HUD Field Office. See ASTM C-33-90, Table 2. Base course material shall be clean, washed and free from deleterious substances, consistent with ASTM C-33, with 100% of the material passing a 1" sieve and less than 2% passing a #4 sieve.

603-2 EXTERIOR CONCRETE SLABS-ON-GROUND

Slabs shall be designed and constructed in accordance with ACI 302.1R-80, Guide for Concrete Floor and Slab Construction, and as may be necessary to prevent slab damage due to potential soil movements.

606 WOOD

606-1 TERMITE PROTECTION

606-1.1 A chemical barrier must be provided for structures built in those areas where termites are determined by the HUD Field Office to be a hazard. A physical barrier will also satisfy this requirement where the hazard is presented by subterranean termites only.

606-1.2 Soil treatment and pressure treated lumber are chemical barriers.

606-2 DECAY PROTECTION

606-2.1 Protection Against Damage by Decay

Where required by the HUD Field Office, protection against damage by decay shall be provided.

606-3 WOOD CONSTRUCTION

The 1991 Edition of the National Design Specification for Wood Construction shall be used, including the 1991 supplement.

607 THERMAL AND MOISTURE PROTECTION

607-1 ENERGY REQUIREMENTS

607-1.1 Energy Efficiency

All buildings shall be constructed in compliance with the requirements of the CABO Model Energy Code, 1992 Edition except Sections 101.3.1, 101.3.2, 101.3.3 and 502.1.2, but including the Appendix. The values to be used for the table contained in Section 302.1 of the Model Energy Code are to be those for the area in which the building is to be constructed. Information concerning heating and cooling degree days for particular locations shall be obtained from the ASHRAE Handbook of Fundamentals; ASHRAE Heating Cooling Load Calculations Manual; the NAHB-RF Insulation Manual for Homes and Apartments; local utilities; or the National Climatic Data Center Manuals are available from NAHB-RF, or NAIMA.

Other sources of heating degree day and summer cooling data may be used, if acceptable to the HUD Field Office.

607-1.2 Thermal Mass

In addition to the energy criteria set forth in Section 607-1.1, the design of a property may take into consideration the thermal mass of building components. However, thermal mass may be considered only to the extent that the developer or other interested party can

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607-1.2 Continued

provide the HUD Field Office with empirical evidence that quantifies the effect of thermal mass with respect to the specific geographical location in question and with

respect to the specific type of construction in question. When the quantifiable effects of thermal mass are considered, the building must provide a level of energy efficiency equal to or exceeding that otherwise required by these MPS.

607-2 FLASHING

General

- a. Flashing shall have a service life at least equal to that of the assemblies into which it is built.
- b. Alternate products or systems of bitumen-impregnated plastic or elastomeric materials may be used for flashing if they are installed in accordance with the manufacturer's recommendations and are acceptable to the HUD Field Office. Counter flashing is considered exposed flashing and shall be constructed of sheet metal.
- c. All openings between wood or metal and masonry shall be caulked with a non-hardening caulking compound.

607-3 GUTTERS AND DOWNSPOUTS

607-3.1 Gutters

- a. Gutters shall be provided when either of the following conditions are present:
 - (1) Soil is of such a nature that excessive erosion or expansion will occur or,
 - (2) Roof overhangs are less than 12 inches in width for one story structures or less than 24 inches in width for two story structures.
- b. When gutters are omitted, a diverter or other suitable means shall be provided to prevent water from roofs or valleys from draining on uncovered entrance platforms or steps.

607-3.1 Continued

- c. A gutter having approximately the same cross section as the downspouts shall be used for spacings of up to 40 ft. between downspouts. For each additional 20 ft. of gutter, the gutter width shall be increased by 1 inch.

- d. Strainers shall be installed at the head of the downspout when the downspout is connected to an underground drain.
- e. Details of any built-in gutters shall be submitted to the HUD Field Office for acceptance.

607-3.2 Scuppers

- a. Scuppers shall be installed at the outfall end of a valley for special roof designs, such as "butterfly" roofs.
- b. Scuppers shall be installed for overflow of all roofs enclosed by parapet walls, except when the construction of the roof and the type of roof covering used are designed to hold water. Suitable overflow devices shall be used.

607-3.3 Downspouts

Downspouts shall be sized on the basis of 100 square feet of roof surface to 1 square inch of leader. More or less leader area may be required by the HUD Field Office.

608 DOORS, WINDOWS, AND GLAZING

608-1 DOOR PERFORMANCE - GENERAL

Doors shall be durable, installed in good operating condition, free of defects, latch readily and lock securely.

608-2 EXTERIOR DOORS

608-2.1 Weatherstripping

All exterior doors and weatherstripping shall be properly fitted so as to eliminate excessive infiltration of air.

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608-2.2 Miscellaneous

A safety door check shall be provided on all outward opening doors, including storm and screen doors.

608-3 WINDOWS

608-3.1 Installation

Windows shall be installed in accordance with the recommendations of the manufacturer. Operating hardware shall be installed. Windows in buildings of 4 or more

stories in height shall be inside glazed or have sash or ventilators that can be glazed from the inside of the building. All glass and glazing beads shall be replaceable.

608-3.2 Weatherstripping

Windows and weatherstripping shall be properly fitted to eliminate excessive infiltration of dust, snow or rain.

608-3.3 Screens

Screens shall be installed on openable windows in habitable rooms and bathrooms.

608-4 GLAZING

608-4.1 Installation Standards

Glazing shall comply with the applicable requirements identified in Appendix E.

609 FINISH MATERIALS

609-1 FINISH FLOORING, RIGID

The products used shall be installed in accordance with the manufacturer's instructions and/or recommendations.

609-2 RESILIENT FLOORING

Resilient flooring shall be installed over a suitable underlayment and in compliance with the recommendations of the manufacturer.

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609-3 PAINTING

609-3.1 Application

- a. Application of paints, stains, or other coating systems shall be in strict accordance with manufacturer's directions.
- b. Additional coats may be required if the finish surface does not provide coverage or hiding that is acceptable to the HUD Field Office.

609-3.2 Exterior Wood Surfaces

Exterior wood surfaces shall be finished as follows:

- a. Wood Siding, Millwork and Trim

- (1) Knots, resinous wood, and nail holes shall be sealed with a prepared sealer or aluminum paint prior to puttying and priming. Any nail holes or cracks in surfaces to be painted shall be filled with putty.
- (2) A prime coat shall be applied to all surfaces to be painted before or immediately after installation. Primer shall be formulated specifically for application to unfinished wood. Finish coats formulated to serve as primers may be used.
- (3) One of the following finish systems shall be applied. Coverage shall be that which will provide at least the minimum thickness recommended by the manufacturer.
 - (a) Oil paint systems.
 - (b) Latex paint systems.
 - (c) Pigmented stains as per manufacturer's directions.
 - (d) Clear penetrating preservatives or water repellent finishing systems.

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- (4) The top and bottom of exterior wood doors, casement sash, awning sash and the bottom of double hung sash shall receive two coats of paint or sealer.
 - (5) Prior to erection, all edges of vertical siding shall be sealed with a heavy coat of house paint primer, water repellent stain, exterior aluminum house paint or sealer. Wood batten strips shall be backed-primed or sealed.
- b. Wood Shingles, Shakes, Roughsawn Siding.

Two coats of oil stain, pigmented oil stain or an oil shingle paint shall be applied.
 - c. Hardboard and Softwood Plywood Siding.

These sidings shall be finished in accordance with the manufacturer's direction.
 - d. Wood Porch Floors and Decks.

One coat of primer and two coats of floor and deck enamel designed for exterior use shall be applied. Joints between floor and wall shall be caulked.

e. Unfinished Surfaces.

Shingles and board siding of vertical grain cedar, redwood and baldcypress may be left unfinished.

609-3.3 Exterior Concrete Masonry Units or Concrete Brick

a. At least two coats of masonry paint shall be applied.

b. Concrete masonry units or concrete brick, except small areas of foundation walls, shall be painted to provide a water resistant finish.

High density concrete brick or solid split block forming the outer face of double unit walls (veneer, cavity walls, etc.) may be left unpainted when acceptable to the HUD Field Office.

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609-3.4 Exterior Metal

a. Galvanized Steel or Iron

(1) Field painting shall consist of two coats. One coat shall be a primer formulated specifically for galvanized surfaces, and the second coat shall be a finish coat. A finish coat formulated to serve as a primer may be used as the first coat.

b. Steel, Iron or Terne Plate

(1) Steel or iron, except stainless steel, weathering steels, or steel treated with coatings to provide corrosion resistance, shall be painted.

(2) A rust inhibitive primer and a finish coat shall be applied.

609-3.5 Interior Wood Surfaces

a. Millwork and Trim

(1) All mill work and trim, including windows; interior doors; window, door and base trim; paneling and closet shelving and trim shall be

finished by painting or natural finishing.

(2) Painting

If the surface is open grain wood, it shall be filled or sealed to prevent the grain from rising. Surfaces shall be treated with a primer. One or more finish coats shall be applied to provide a smooth surface and good hiding.

(3) Finished Material

Natural finishes include stain-wax, stain followed by one or more coats of varnish, clear coats of varnish with or without wiped paint undercoats or oil and wax finishes.

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b. Wood Floors

(1) If flooring is open grain wood, one coat of filler shall be applied. All excess shall be wiped off.

(2) Flooring shall be finished with:

(a) One or two coats of penetrating sealer and one coat of wax; or

(b) Two coats of varnish and one coat of wax; or

(c) Two coats of polyurethane; or

(d) One or more coats of factory-applied finish.

609-3.6 Interior Plaster and Gypsum - Walls and Ceilings

a. Plaster surfaces may be painted, covered or left unfinished, except for surfaces of kitchens and baths. If painted, a finished coat shall be applied over a primer-sealer, unless finish coats are of the self-priming type.

b. Gypsum wallboard shall be covered. If painted, one coat of wallboard sealer shall be applied unless finish coats are of the self-sealing type. Two finish coats shall be applied over the sealer. One finish coat, except in kitchen and baths, may be acceptable if good coverage is obtained.

609-3.7 Interior Metal

Non-ferrous metals or wrought iron may be painted or left unfinished. Other metals shall be painted in accordance with 609-3.4.

609-3.8 Interior Concrete Floors

- a. If painted, at least two coats of resin emulsion paint, a solvent rubber paint or a floor and deck enamel shall be applied. If oil paint is used, the surface shall be neutralized before painting.
- b. A coat of wax shall be applied over paint, stain or an integral finish.

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609-4 WALL COVERINGS

Covering material shall be secured to a suitable base in accordance with the manufacturer's directions.

609-5 OTHER FINISHES

609-5.1 General

Other finishes shall be installed in accordance with the manufacturer's directions.

609-5.2 Carpeting and Cushioning

Carpeting and cushioning shall be installed in accordance with the Specifiers Guide for Contract Carpet Installation, published by the Carpet and Rug Institute. The carpet shall be installed over one of the following suitable underlayments:

- a. A finish floor as provided and described in Section 509 and 609;
- b. A troweled concrete floor;
- c. A plywood subfloor. The top ply of plywood shall be at least "C plugged" grade;
- d. A plywood, hardboard or particleboard underlayment over any other subfloor described in this paragraph.
- e. Other materials where they provide a smooth, hard, durable surface.

611 EQUIPMENT

611-1 KITCHEN AND VANITY CABINETS

611-1.1 General

- a. All manufactured factory finished cabinets shall comply with ANSI A161.1-86, Recommended Minimum Construction and Performance for Kitchen and Vanity Cabinets, or with an equivalent standard.

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611-1.1 General - Continued

All cabinets shall bear the label of an independent agency that maintains continuous control over the testing and inspection of the cabinet. The label shall identify the manufacturer's name or symbol and indicate compliance with the applicable standards.

- b. Construction and installation of job and custom built cabinets shall be acceptable to the HUD Field Offices. These cabinets shall be equivalent in quality and construction to cabinets meeting ANSI A161.1-86.

611-1.2 Counter Tops

- a. The top material shall be securely bonded to a reinforced steel core, to 5/8 in. plywood, or to any other equivalent material.
- b. Top material shall be phenolic laminate, vinyl plastic covering, ceramic tile, stainless steel or other material suitable for its intended use. At least a 3 in. back and end splash shall be provided against all abutting vertical surfaces which are not water and grease resistant. When a back splash is omitted, the joints at the juncture of the counter top and vertical surfaces shall be tight and sealed.
- c. All edges, including the sink and any built-in surface units, shall have a non-corrodible metal molding or other suitable edging.

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613 SPECIAL CONSTRUCTION

613-1 FACTORY-PRODUCED (MODULAR OR PANELIZED) HOUSING

613-1.1 Structural Features

HUD Handbook 4950.1, Technical Suitability of Products Program Processing Procedures, describes procedures to be followed in order to obtain acceptance of structural features of housing not covered by the MPS.

613-1.1 Non-Structural Features

These features include methods of construction, systems, sub-systems, components, materials and processes which are not covered by the MPS. See HUD Handbook 4950.1 for procedures to be followed in order to obtain acceptance of non-structural components or materials.

613-2 SWIMMING POOLS

Where semi-private swimming pools are to be built, their design and construction shall comply with ANSI/NSPI 1-91, American National Standard for Public Swimming Pools.

614 ELEVATORS

614-1 MINIMUM SERVICE ELEVATOR SIZE (Minimum for Ambulance Stretchers) See ANSI A17.1.

- Inside car size - 6'-8" wide by 4'-3" deep
- *Door size - 3'-6" wide by 7'-0" high*
- Door type - Single slide
- Capacity - 2500 lbs.

615 MECHANICAL

615-1 SPECIAL PIPING SYSTEM

Gas transmission systems shall be installed to obtain at least the level of safety performance required by 49 CFR, Part 192, entitled "Transportation of Natural or Other Gas by Pipeline." Liquid petroleum pipelines shall conform to 49 CFR, Part 195.

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615-2 WATER SUPPLY SYSTEM

615-2.1 General

Each living unit shall be provided with a continuing and sufficient supply of safe water under adequate pressure and of appropriate quality for all household uses, and one that will not impair the functioning or durability of the plumbing system or attachments.

615-2.2 Source of Water Supply

- a. Whenever feasible, connection shall be made to a publicly owned or publicly controlled water supply system that is adequate to serve the demands of the project.
- b. When a public system is not available, connection shall be made to a community system acceptable to the HUD Field Office and approved by the local health authority. The chemical and bacteriological standards of the health authority shall apply. In the absence of such standards, the maximum contaminant levels of the Environmental Protection Agency shall apply.
- c. Community water supply systems shall comply with HUD Handbook 4940.2.

615-3 SEWAGE DISPOSAL SYSTEM

615-3.1 General

Each living unit shall be provided with a water-carried system adequate to dispose of domestic wastes in a manner which will not create a nuisance or endanger the health of the occupants or the public.

615-3.2 Method of Sewage Disposal

- a. Whenever feasible, connection shall be made to a publicly owned or publicly controlled system that is adequate to serve the needs of the project.

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- b. When a publicly owned or publicly controlled system is not available or connection to or service therefrom is not feasible, connection shall be made to a community system which complies with HUD Handbook 4940.3 Rev.1-1992 and is acceptable to local regulatory bodies. Evidence of approval by such authorities for each completed system shall be submitted to the HUD Field Office.

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