TECHNICAL INFORMATION SERVICE
Technical Division
National Housing Agency
TPHA Bul.

Technical Bulletin No. 2

# Standards for Temporary War Housing

U.S. Federal Public Housing Authority / Administrator / National Housing Agency

728.1
:336.18
P81ba
no.2
mimeo

Technical Bulletin No. 2 will include previously released parts and appendices of "Standdards for Temporary War Housing." It will also include all revisions, additions, and corrections to these "Standards" necessary from time to time, in the form of supplement and revision sheets, which material heretofore has appeared in part in the Lanham Development Manual.

1/20/43

# BULLETIN NO. 2

# STANDARDS FOR TEMPORARY WAR HOUSING

## CONTENTS

### PARTS

I A - Standards and Standard Plans
B - Utility Selection

II Site Planning
(Including Lawns and Planting)

III Site Engineering

IV Construction

V Plumbing

VI Heating

VII Electrical

VIII Equipment

### APPENDICES

1. Standard Plans Digest

2. Standards for Commercial Facilities

3. Project Facilities

NOTE: Additions and changes necessary from time to time will be issued as supplements or revisions to the above appropriate Parts and Appendices

NHA
FPHA

CIRCULAR
2-15-44

TO: All Holders of Bulletin No. 2

SUBJECT: Part I, "Standard Plans" of Bulletin No. 2

Attached is Part I, "Standard Plans" of Bulletin No. 2, "Standards for Temporary War Housing", revised as of February 1, 1944, which supersedes Part I dated October 1942.

This revised issue has been prepared to clarify the types of standard plans available, to set forth the series of plans currently authorized, to note those discontinued, and to incorporate various information and instructions relating to the standard plans and their use which have been issued separately.

Supplement No. 1, "Proposed Alterations to Existing Dormitory Buildings, Series WD-1 and WD-2 to Provide Additional Laundry and Storage Facilities" dated August 1, 1943 and Supplement No. 2, "Proposed Alterations to Existing Management and Maintenance Buildings, Series WD-1, to Facilitate Handling Mail", dated November 11, 1943, continue in effect and should be retained and attached to this issue of Part I.

for W. P. SEAVER
Assistant Commissioner
for Development

22159

STANDARDS FOR TEMPORARY WAR HOUSING

BULLETIN NO. 2, PART I

STANDARD PLANS

CONTENTS


| | Page |
|---|---|
| General Purpose | 1 |
| Types of Plans | |
| Diagrammatic plans | 1 |
| Working drawings | 1 |
| Revisions to Standard Plans | 2 |
| Standard Plans Available | |
| Cover sheets | 2 |
| Dormitory units | 2 |
| Family dwelling units | 2 |
| Project facility buildings | 3 |
| Use of Standard Plans | |
| General requirements | 4 |
| Preliminary investigation and determinations | 5 |
| Modifications in working drawings | 5 |
| Other working drawings | 6 |
| Changes requiring Central Office approval | 6 |
| Assignments and Distribution of Units | |
| War housing programs | 6 |
| Dormitory projects | 6 |
| Family dwelling projects | 7 |
| Standard Buildings | |
| Correlation of standard plans and assignments for dormitory projects | 7 |
| Correlation of standard plans and assignments for family dwelling projects | 8 |
| Specifications | |
| Specification for war dormitories | 8 |
| Temporary housing specification | 8 |
| Changes in specifications | 8 |


(continued)

BULLETIN NO. 2, PART I

CONTENTS (continued)


Page

Information and Instructions on Cafeteria and Kitchen Equipment
- Seating capacity..... 8
- Kitchen equipment and plumbing layouts..... 9
- Service lines..... 9
- Responsibilities of geenral contractors..... 9
- Responsibilities of kitchen equipment contractors..... 9

Information and Instruction on Refreshment Counters
- Layout.....10
- Responsibilities of general contractor.....10

Alterations to Standard Buildings
- Additional laundry and storage facilities, Series WD-1, 2.....10
- Improved facilities for mail rooms, Series WD-1, 2.....10

Discontinued Standard Plans.....10

Supplements
- Proposed Alterations to Existing Dormitory Buildings, Series WD-1 and WD-2 to Provide Additional Laundry and Storage Facilities..... Supplement No. 1
- Proposed Alterations to Existing Management and Maintenance Buildings, Series WD-1, to Facilitate Handling Mail..... Supplement No. 2



NATIONAL HOUSING AGENCY

FEDERAL PUBLIC HOUSING AUTHORITY

February 15, 1944



22159

# STANDARD PLANS

## General Purpose

War housing, intended for use during the emergency only, is based upon standards adequate to provide for the continued health, safety, and efficiency of war workers. The standards for such housing, although formulated as minimum standards, were accepted by the War Production Board as maximum standards; therefore, they may not be raised except with the prior approval of the Central Office Development Branch (issued only after WPB approval has been obtained). In specific instances, where compelling circumstances or material shortages dictate, essentials required by the standards may have to be reduced or omitted; the established standards, however, shall not be lowered except after approval of the Central Office Development Branch.

Standard plans have been prepared in accordance with the accepted standards to shorten the planning period of projects, to facilitate granting of priority ratings, and to permit consolidated procurement of furniture and equipment. Standard plans, as issued by the Central Office, must be used by Regional Offices, since:

1. Standard plans conform with policies and requirements of the War Production Board

2. Critical material lists for standard building elements are approved by the War Production Board

3. Furniture and equipment, supplied through consolidated procurement, is designed to correlate with the space provisions of the standard plans.

## Types of Plans

Two types of standard plans are issued by the Central Office for the use of regional offices:

1. Diagrammatic plans. These plans shall be followed by local architects in the preparation of working drawings.

2. Working drawings. These plans shall be used as part of the bidding and contract documents with changes by the regional offices (without prior Central Office approval) only as necessary to adopt plans to climatic conditions, to adjust plans to grade and soil conditions, including design or redesign of foundations, and to include alternate or optional variations in construction.

(Cont'd)

1/ This Part supersedes Part 1, "Standards and Standard Plans" dated October 1942. Part IB "Utility Selection" dated 3-43 should be retained.

Revisions to Standard Plans

Changes or additional details may be issued by the Central Office subsequent to the initial distribution of a standard plan series. Instructions to regional offices concerning such modifications are issued in the form of typewritten "REVISIONS" suitable for blueprinting, each numbered and dated.

Minor revisions that can be indicated by regional offices on the standard drawings in their possession are explained by specific written instructions or detail drawings, suitable for blueprinting, issued with the "REVISION."

General revisions are made to the original drawings of the Central Office which are then reissued with the written "REVISION" describing the changes made.

It is essential that regional offices keep their sets of standard drawings up to date with all "REVISIONS" issued.

Standard Plans Available

The cover sheets for the various series of standard plans indicate all drawings issued and serve as indices to the plans currently available or voided. They also set forth information concerning revisions issued and provide space for additional notations, It is important that regional offices keep the cover sheets up to date with information issued.

Plans for dormitory units, single or double room, are available as follows:

| Plan Series | Story Height | Wings per Service Unit | Type of Wing * | Type of Constr. | Form of Issue | Initial Issue |
|---|---|---|---|---|---|---|
| WD-1 | 1,2 | 2,3** | S,D | F-C | Tracings | 6-11-42 |
| WD-2 | 1,2 | 2,3** | S,D | M | Lithopr. | 11-18-42 |
| WD-3 | 1 | *** | S-D | F-C,M | Bluepr. | 3-13-43 |

* Single room and double room wings are interchangeable.
** Three wings are permissible for one-story only.
*** Building contains both dormitory rooms and service facilities.

Legend

C - Conventional
D - Double Room Wing
F - Frame
M - Masonry
S - Single Room Wing
S-D - Single and Double Room Wing

(Cont'd)

Plans for family dwelling units, 1- to 3-bedroom inclusive, are available in the following plan series:

| Plan Series | Story Height | Type of Constr. | Form of Issue | Initial Issue |
|---|---|---|---|---|
| WDU-10 | 1 | D,F-C,M,SP,P,PG | Lithoprint | 8-10-43 |
| WA-20 | 2 | F-C,M,SP,P,PG | Lithoprint | 8-10-43 |

Legend

C - Conventional
D - Demountable
F - Frame
M - Masonry
P - Panel prefabrication (4' and 2' panels)
PG - Post and girder
SP - Sectionalized panel

Note: Standard building plans indicating assembly of dwelling units into buildings of various lengths are included in the standard drawings for Series WDU-10 and WA-20 to facilitate the preparation of project bidding documents and provide the normal distribution of dwelling units (25% one-bedroom, 50% two-bedroom, and 25% three-bedroom units).

Plans for project facility buildings are available in the following plan series:

| Series | Type | Story Height | Construction |
|---|---|---|---|
| WD-1 | Dormitory | 1 | Frame, conventional |
| TDU | Family dwelling | 1 | Optional |
| CF-1 | Family dwelling | 1 | Optional |

For detailed requirements relative to selection of plans for project facility buildings for specific projects, refer to Bulletin No. 2, Appendix 2, "Commercial Facilities" and Appendix 3, "Project Facilities."

Series WD-1 includes drawings for project facility buildings arranged in groups of various sizes buildings. The buildings within each group are designated by name and number which indicate the function of the building and the average size of project which it is designed normally to serve. These buildings include space for administration (management and maintenance), tenant (morale) activities, cafeterias, and infirmaries.

Diagrammatic plans for all indoor facilities for dormitory populations ranging from 50 to 2400 persons indicate functional arrangements of the various plan elements to be provided and maximum permissible gross areas.

(Cont'd)

Working drawings are available for certain sizes of project facility buildings. These shall be used as issued when the buildings are appropriate in size for the project under development.

Series TDU includes drawings for community buildings and child service buildings designated by numbers which are used for identification only. Each of the community buildings contains space for administration, (management and maintenance) tenant activities, and health services; two of the smaller buildings include special wings for child care.

Diagrammatic plans for community buildings for projects of 50 to 1600 units and child service buildings for 51 to 155 children indicate functional arrangements of the various elements to be provided and maximum permissible gross areas.

Working drawings for child service building number 133 (86 to 120 children) are available. These shall be used as issued when a building of this size is appropriate for the project under development.

Series CF-1 includes drawings for store groups. These groups include space for foods, drugs and variety merchandise including fountain and lunch area, barber and beauty shop, pickup depot (dry cleaning, laundry, tailoring and shoe repair) and necessary service facilities.

Diagrammatic plans for store groups are of three sizes, small, medium, and large, for projects of 250-400, 500-800, and 1000 to 1500 units, respectively. For detailed suggestions as to the use of these plans, refer to Bulletin No. 2, Appendix 2, "Commercial Facilities."

Use of Standard Plans

Since standard plans and specifications prepared for regional distribution and use cannot contain all of the information necessary for specific project contract documents, certain investigations, determinations, additional drawings and modifications in the standard plans and specifications will be necessary for each project.

(Cont'd)

Preliminary investigations and determinations which must be made by regional offices include:

1. Site surveys, including preparation of property line, topographic and utility maps.
2. Subsurface soil investigations.
3. Choice of one or two-story buildings.
4. Selection of frame or masonry construction (Manual Chapters 3470 and 3502).
5. Determination of heating design temperature zone.
6. Determination of appropriate fuels for space heating, domestic water heating, cooking, steam, generation, etc., and appropriate method of refrigeration.
7. Requirements for storm sash and necessity for protection of pipes and traps from freezing.
8. Requirements for air raid protection.
9. Determination of electric current characteristics of the system which will serve the project.
10. Extent to which off-site project facilities may meet project needs. (Manual, Chapter 3403).
11. System available for collection and disposal of trash and garbage.

Modifications in working drawings of buildings or of details from diagrammatic drawings which must be made by regional offices include:

1. Adjustment of plans to climatic, grade and soil conditions, including design or redesign of foundations.
2. Where excessive distance from the second floor to finished grade (due to hilly sites) tends to increase hazards from fire, additional means of egress from the second floor shall be provided.
3. Selection of permissible variations in construction indicated on the drawings.
4. Development of building plans assembling dwelling units types, where unusual conditions prevent the use of standard building plan assemblies.
5. In localities subject to earthquake, modification or revision of working drawings to provide for construction designed to resist shock.
6. In localities subject to hurricane, modification or revision of working drawings, to provide for construction designed to resist winds.
7. Revision of titles on standard working drawings to suit specific projects.
8. Omission of incinerator rooms and incinerators on dormitory projects, if some other satisfactory disposal system can be utilized.

(Cont'd)

Other working drawings, which must be prepared by regional offices, include:

1. Site plan and details, including soil conservation planting and yard details as clothes line hooks, posts, and location of coal boxes.
2. Foundation plans, as required, including location of vents and access doors under wood floors.
3. Entrance steps, platforms, coal boxes, wood storage and garbage screens.
4. Utility plans and details.
5. Site improvement plans and details, including streets, walks, and grading.
6. Project facility building plans, based on diagrammatic plans, when working drawings are not available. For Series WD-1 buildings, working drawings, shall follow, in general, the design and construction indicated by the latest revised working drawings issued for a similar type building of the nearest size. For Series TDU buildings, materials and methods of construction should conform to those predominating in the projects and should be governed by the same specifications.

Changes requiring prior Central Office approval, include:

1. Change in function of building.
2. Change in size or arrangement of spaces.
3. Change in placement of equipment (cafeteria kitchens must not be reversed).
4. Change which results in increased use of critical materials.

Note: Any proposed changes from standard plans such as are listed above, must be submitted to the Central Office Development Branch in sketch form, together with a written explanation of the reasons for such a change, before working drawings are prepared.

Assignments and Distribution of Units

War housing programs specify the number of dormitory accommodations for single person and the number of family dwellings for families of two or more. (Manual, Section 3400:2)

In dormitory projects the number of single and double rooms shall be approximately equal.

(Cont'd)

In family dwelling projects the distribution of units by size shall normally be as follows:

25% 1-bedroom units
50% 2-bedroom units
25% 3-bedroom units

Standard Buildings

Correlation of Standard Plans and Assignments for Dormitory Projects.

In development of projects regional offices shall use standard dormitory wings wherever possible, since they assure maximum efficiency of heating plants and service units. To meet assignments of less than 100 units, standard plans Series WD-3 are recommended. For larger assignments Series WD-1 and Series WD-2 are commonly used.

Length of standard dormitory wings shall be modified as necessary to provide the exact number of units assigned. Experience has shown that it is not feasible to increase the length of dormitory wings. Necessary modifications, therefore, shall be by reduction in length only. Such reductions must be by multiples as indicated below:

1. Series WD-1. Length of single room wings may be reduced in multiples of 16 feet. The fractional proportions for subtracting from the critical material lists are 1/9 for one-story and 1/8 for two-story wings for each 16 ft.

   Length of double room wings may be reduced in multiples of 12 feet. Critical material lists should be adjusted by subtracting 1/8 for each 12 feet.

2. Series WD-2. Length of single room wings may be decreased in multiples of 8 feet. The fractional proportion for subtracting from critical material lists are 1/18 for one-story and 1/16 for two-story wings for each 8 feet.

   Length of double room wings may be reduced in multiples of 12 feet. Critical material lists should be adjusted by subtracting 1/8 for each 12 feet.

Central service unit. When wings are shortened, (thereby reducing the occupancy) plumbing fixtures should be reduced in number, to save critical materials and to maintain the normal ratio of persons to fixtures.

(Cont'd)

1/ These pages 7 and 8 supersede the corresponding pages 7 and 8, dated 2-15-44. The table at the bottom of page 8 has been revised because the use of standard cafeteria plans Nos. 1000A and 2100 has been discontinued.

Correlation of Standard Plans and Assignments for Family Dwelling Projects.

In development of projects the exact number of units assigned must be built. Since the use of standard building plans indicating assembly of dwelling units into buildings of various lengths may not, in all cases, produce the required number of units, other dwelling unit assembly plans may be developed. In general the fewest possible number of building assembly types should be used on a project.

Specifications

The "Specification for War Dormitories" is available for use in preparation of bidding documents for dormitory projects planned with standard plans, Series WD.

The "Temporary Housing Specification" is available for use in preparation of bidding documents for family dwelling projects planned with standard plans, Series WDU-10 and WA-20.

Changes in the specifications may be made only as necessary to meet the special requirements of a specific project. Architect-Engineers must be so directed and cautioned to avoid changes without adequate justification. All proposed changes must conform to WPB regulations, availability of materials, and approved material lists. Prior Central Office Development Branch approval must be obtained for all except minor changes.

Information and Instructions on Cafeterias and Kitchen Equipment

Approximate number of seats available in the standard cafeterias and the dormitory population size which each normally accommodates is as follows:

| Cafeteria Plan No. | Approximate Range of Populations | Approximate No. of Seats |
|---|---|---|
| 75 | 50 - 250 | 28 |
| 125 | 251 - 400 | 46 |
| 175 | 401 - 700 | 78 |
| 250 | 701 - 900 | 100 |
| 400 | 901 - 1350 | 150 |
| 650 | 1351 - 1800 | 200 |
| * 1000A | | |
| 1500 | 1801 - 3600 | 400 |
| * 2100 | | |

* NOTE: The use of standard cafeteria plans Nos. 1000A and 2100 has been discontinued.

(Cont'd)

Kitchen equipment and plumbing layouts are available for all sizes of standard cafeterias, each layout being applicable to two sizes of cafeterias. The applicable layout must be incorporated in the working drawings whether such drawings are "standard plans" or locally prepared, since the layouts have been prepared in accordance with specifications and space requirements of kitchen equipment purchased by the Central Office. To avoid special priorities and equipment, cafeteria plans must not be reversed.

Service lines (electricity, water, steam, supply, etc.,) shall be run overhead if kitchen floors are laid directly on grade. Service lines which must be under the floor may be installed, prior to completion of dimensional roughing plan by the kitchen equipment contractor, from the standard plumbing layouts furnished with the kitchen equipment layout by the Central Office, since adjustments to suit individual pieces of equipment may be made above floor line when equipment connections are made.

Responsibilities of the general contractor include:

1. All necessary connections to equipment, such as gas, steam, hot or cold water, waste and electricity.
2. Connections to all electrically operated equipment and motor protective devices. Where the latter are not integral with the frame of the equipment, the protective devices shall be mounted ADJACENT to the equipment.
3. Furnishing and installation of all faucets, valves, traps, and fittings in accordance with FPHA "Specification for War Dormitories."

Responsibilities of the kitchen equipment contractor include:

1. Furnishing and placement of the numbered pieces of equipment shown on standard layouts, including complete walk-in type refrigerators.
2. Furnishing of electrically operated equipment with proper disconnecting protective devices to satisfy load requirements.
3. Provisions of tail pieces only of waste outlets.
4. Furnishing and installation of all electrical work (lights, switches, etc.) up to the junction box for all walk-in refrigerators.
5. Furnishing of dimensional roughing plan showing plumbing, electricity, steam or gas, as required for the equipment.
6. Furnishing of services of a capable superintendent to direct the installation of equipment.

(Cont'd)

Information and Instructions on Refreshment Counters

Refreshment counter layouts and related plumbing layouts are available for use in connection with tenant (morale) activity buildings Nos. 250, 400, 650, 1000A, 1500 and 2100. The applicable layout must be incorporated in the working drawings whether such plans are "standard plans" or plans locally prepared.

Responsibilities of the General Contractor. The general construction contract for the building should include the counters, back bars, display cases and all necessary plumbing and electrical work and connections. Soda fountain units, including carbonators and compressors, will be furnished by the Government through Central Office Procurement, and ice cream cabinets will be furnished by a selected ice cream vendor. These shall be set in place, and connected ready for use, by the general contractor who shall adjust his work to suit the units being supplied.

Alterations to Standard Buildings

To guide regional directors in making certain alterations which they determine necessary in buildings constructed according to standard plans, the Central Office issues data and drawings in the form of supplements to this bulletin. To date, the following supplements have been issued:

1. Supplement No. 1, August 1, 1943, Additional Laundry and Storage Facilities, Dormitory Buildings, Series WD-1 and WD-2.
2. Supplement No. 2, November 11, 1943, Alterations to Management and Maintenance Buildings, Series WD-1, to Facilitate Handling Mail.

Discontinued Standard Plans

Series DD-2.-Standard drawings for two-story frame dormitory buildings for war workers, which comprise central service units with two or four connected dormitory wings. Initially issued 6-22-42.

Series DDU-1.-Standard diagrammatic plans for detached, demountable, post and panel family dwelling units of 2- or 3-bedrooms, equipped with cooking, toilet, bathing, and heating facilities. Initially issued 8-6-42 (blueprints only).

Series DDU-2.-Standard diagrammatic plans for detached, demountable frame family dwelling units of 2- or 3-bedrooms equipped with cooking, toilet, bathing and heating facilities. Initially issued 8-6-42 (blueprints only).

(Cont'd)

Series WA-1.-Standard working drawings for one-story frame apartment buildings providing shelter for couples, and comprising a central service unit (containing heating plant, laundry, and other service) with two apartment wings. Each apartment is one room with toilet, shower, and light housekeeping facilities. Initially issued 6-12-42.

Series WD-1 BG.-Standard working drawings for an alternate method (Box Girder) of constructing frame dormitory wings and two-wing service units of the WD-1 Series. Initially issued 1-18-43.

Series WD-1 MODULAR.-Standard working drawings for an alternate method of constructing sectionalized frame dormitory wings of the WD-1 Series. Initially issued 6-13-42 (blueprints only).

Series TDU-1.-Standard working drawings for one-story family dwellings of 0-BR, 1-BR, 2-BR and 3-BR row houses for conventional or sectionalized panel frame construction. Each unit is equipped with cooking, toilet, bathing and heating facilities. Initially issued 10-22-42.

Series TDU-1 BG.-Standard working drawings for an alternate method (Box Girder) of frame construction of the TDU-1 Series. Initially issued 1-18-43.

Series TDU-1 M.-Standard working drawings for masonry construction of the TDU-1 Series. Initially issued 3-16-43.

Series TDU-2.-Standard working drawings for two-story family dwellings of 0-BR, 1-BR, 2-BR and 3-BR row apartments for conventional or sectionalized panel frame construction. Each unit is equipped with cooking, toilet and bathing facilities. Heating facilities may be either individual or group. Initially issued 10-22-42.

Series TDU-2 BG.-Standard working drawings for an alternate method (Box Girder) of frame construction of the TDU-2 Series. Initially issued 1-18-43.

Series TDU-2 M.-Standard working drawings for masonry construction of the TDU-2 Series. Initially issued 3-16-43.

Series TDU-3.-Standard working drawings for one-story family dwellings of 0-BR, 1-BR, 2-BR and 3-BR row houses for masonry construction. Each unit is equipped with cooking, toilet, bathing and heating facilities. Initially issued 10-19-42.

Series TDU-3 BG.-Standard working drawings for an alternate method (Box Girder) of frame construction of the TDU-3 Series. Initially issued 1-18-43.

NHA
FPHA
August 1 1943

SUPPLEMENT No. 1
Bulletin No. 2
Part IA

SUBJECT: Proposed Alterations to Existing Dormitory Buildings, Series WD-1 and WD-2, to Provide Additional Laundry and Storage Facilities.

The attached diagrammatic plans have been prepared to assist regional directors who find it necessary to provide additional laundry facilities and storage space in existing dormitory buildings.

A. Laundry Facilities

These plans indicate the following facilities:

1. Laundry trays: one or two additional double trays, depending on (a) the number of units served; and (b) the extent of the need.

2. Ironing boards: one to three additional boards depending on the factors referred to under 1, above.

3. Space for one washing machine.

4. Work tables (essential for washing and ironing clothes).

5. One sewing machine (important for mending and minor alterations).

6. Electric outlets: one for each washing machine, iron, and sewing machine; with pilot light for each iron.

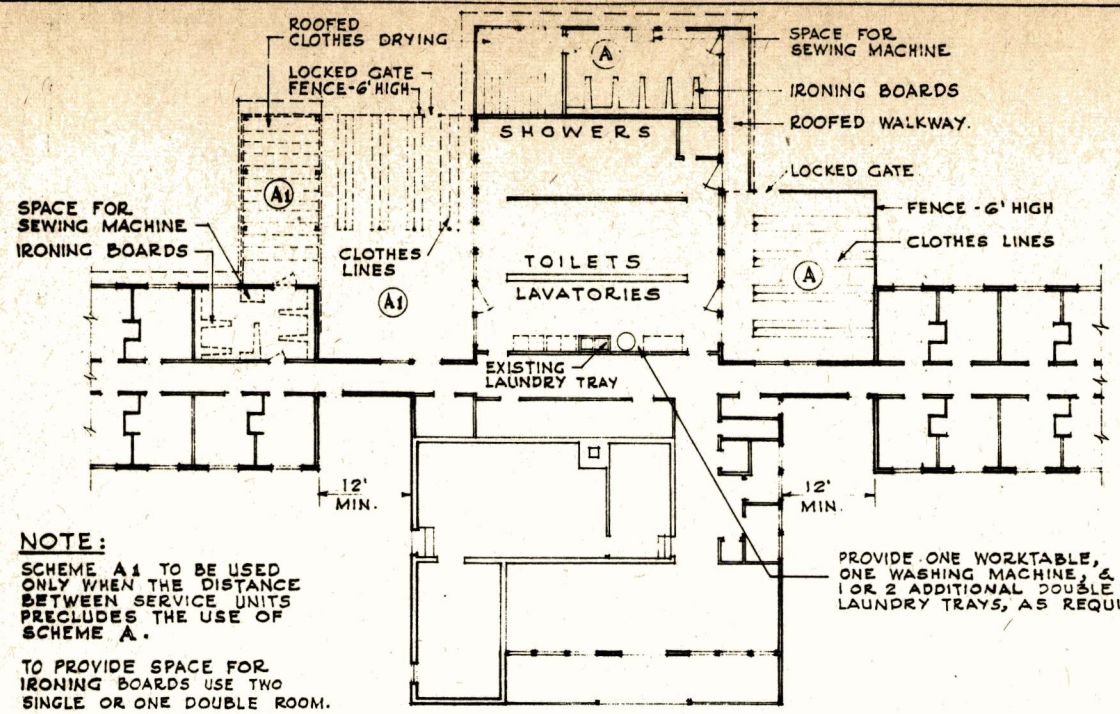
7. Sheltered area for 100' to 200' of clothes line; and fenced out-door drying yard for 200' to 400' of line, varying with the factors referred to under 1, above.

All of the plans provide for installing the additional laundry trays adjacent to existing plumbing lines. Variations consist principally in the provision of space for ironing and sheltered drying area. Structures shall conform to standards for construction and spacing.

For two-story buildings, provide accommodations for washing and ironing on the second floor similar to those provided on the first floor. Double the area of sheltered and open clothes drying spaces. The additional sheltered drying space may be obtained by increasing the size of the shelter provided for the first floor or by constructing a porch over it.

B. Storage Space

Where additional storage space is required in service units, the partitions between the present storage space and corridor may be moved out one foot, decreasing the width of the corridor to six feet.



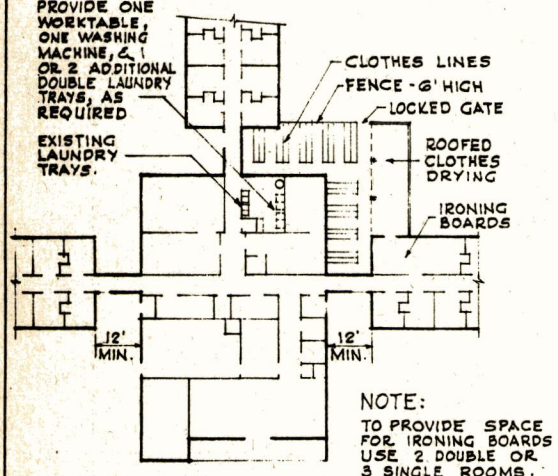

**NOTE:**

SCHEME A1 TO BE USED ONLY WHEN THE DISTANCE BETWEEN SERVICE UNITS PRECLUDES THE USE OF SCHEME A.

TO PROVIDE SPACE FOR IRONING BOARDS USE TWO SINGLE OR ONE DOUBLE ROOM.

## SCHEMES A & A1
Two Wing Dormitories

Scale 0 5 10 15 20 25

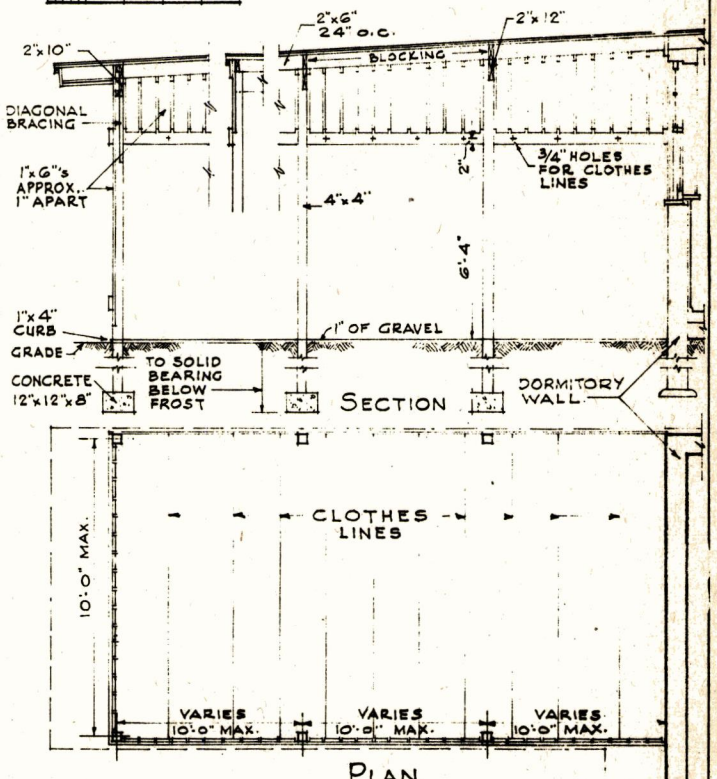



NOTE:

TO PROVIDE SPACE FOR IRONING BOARDS USE 2 DOUBLE OR 3 SINGLE ROOMS.

## SCHEME B
Three Wing Dormitory

Scale 0 10 20 30 40




PLAN

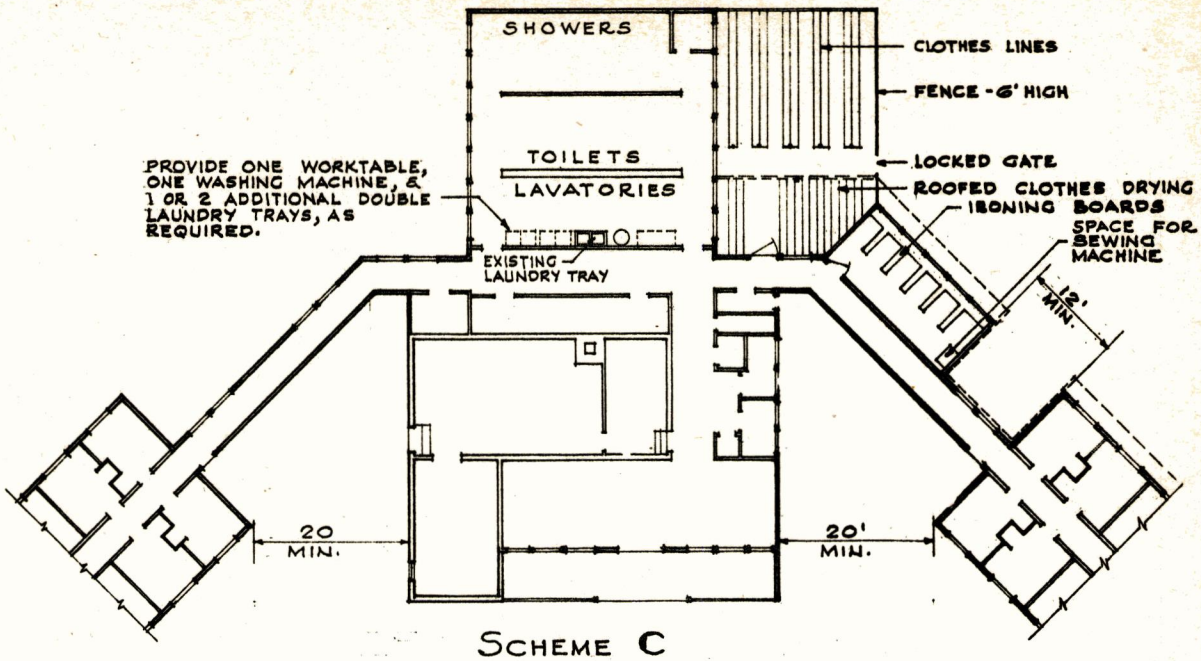
TYPICAL DETAIL OF ROOFED DRYING AREA

Scale 0 2 4 6 8

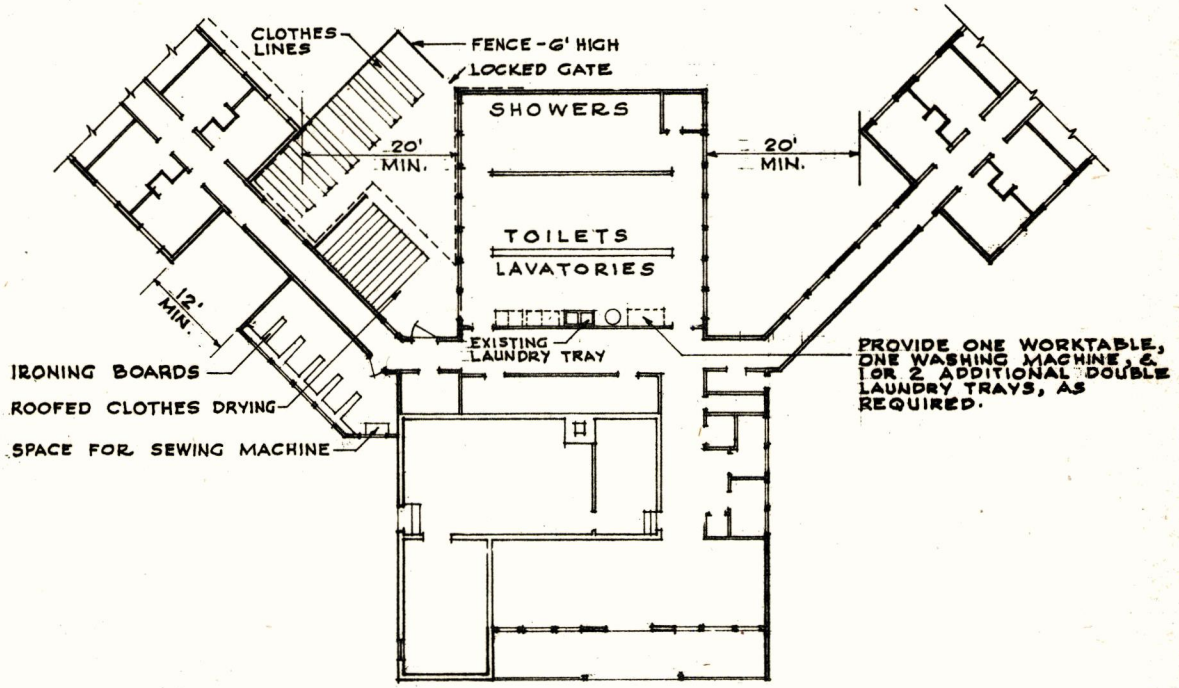
## SUGGESTED LOCATION OF ROOMS FOR IRONING & DRYING OF CLOTHES WHEN DORMITORY WINGS ARE AT 90° TO SERVICE UNIT.

| | | |
|---|---|---|
| PREPARED BY FPHA NHA | PROPOSED ALTERATIONS TO EXISTING DORMITORY BUILDINGS TO PROVIDE ADDITIONAL LAUNDRY FACILITIES. | AS-106 SHEET No. 1 OF 3 |
| | WAR DORMITORY PROJECTS - SERIES WD-1 (FRAME) & WD-2 (MASONRY) | AUG. 1, 1943. |

APPROVED Gilbert L. Robin TECHNICAL DIRECTOR




SCHEME C



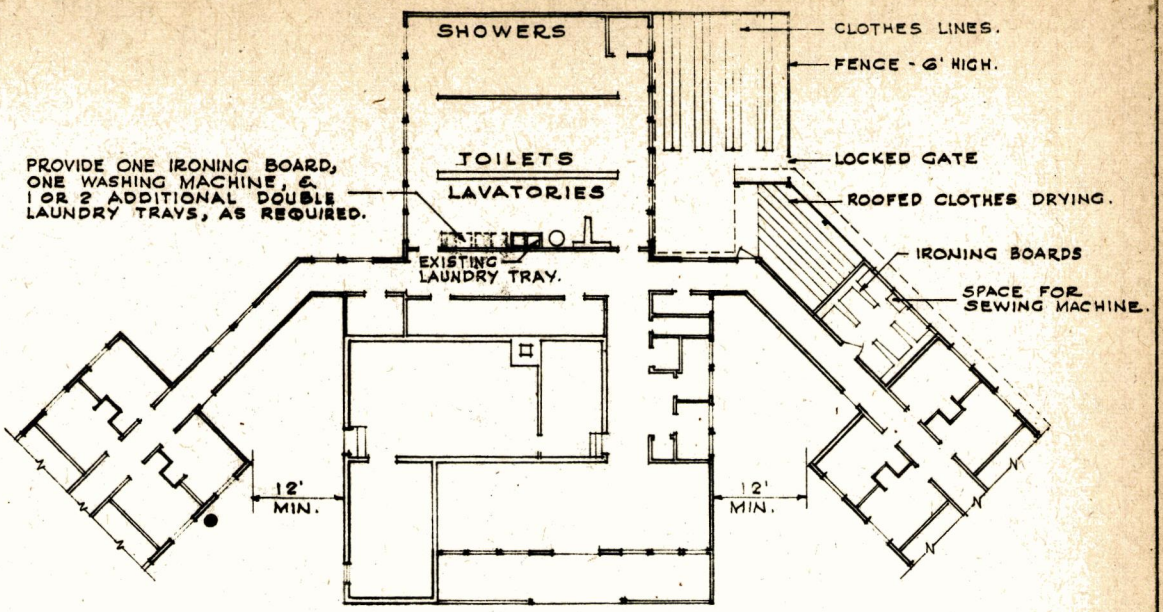

SCHEME D

Scale 0 5 10 15 20 25

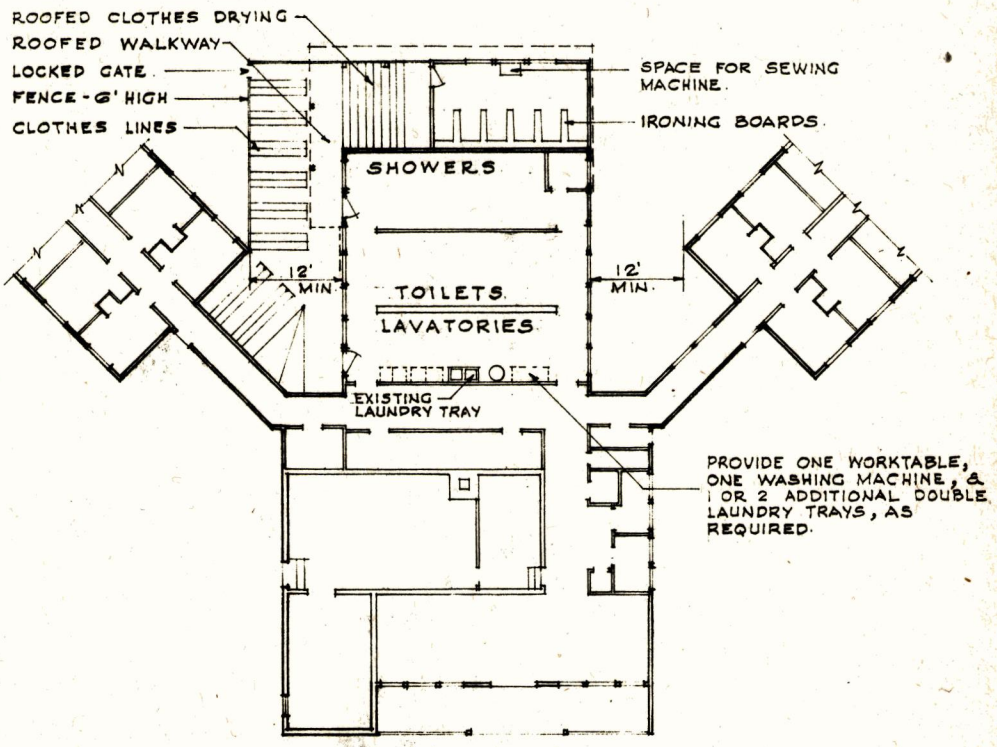
# SUGGESTED LOCATION OF ROOMS FOR IRONING & DRYING OF CLOTHES WHEN DORMITORY WINGS ARE AT AN ANGLE TO SERVICE UNIT

| | | |
|---|---|---|
| PREPARED BY FPHA NHA | PROPOSED ALTERATIONS TO EXISTING DORMITORY BUILDINGS TO PROVIDE ADDITIONAL LAUNDRY FACILITIES. | AS-106 SHEET No 2 OF 3 |
| | WAR DORMITORY PROJECTS - SERIES WD-1 (FRAME) | AUG. 1, 1943 |

APPROVED Gilbert G. Rodin TECHNICAL DIRECTOR.




SCHEME E




SCHEME F

Scale 0 5 10 15 20 25

# SUGGESTED LOCATION OF ROOMS FOR IRONING & DRYING OF CLOTHES WHEN DORMITORY WINGS ARE AT AN ANGLE TO SERVICE UNIT

| | | |
|---|---|---|
| PREPARED BY FPHA NHA | PROPOSED ALTERATIONS TO EXISTING DORMITORY BUILDINGS TO PROVIDE ADDITIONAL LAUNDRY FACILITIES. | AS-106 SHEET NO. 3 OF 3 |
| | WAR DORMITORY PROJECTS - SERIES WD-2 (MASONRY) | AUG. 1, 1943 |

APPROVED Gilbert E. Rodin TECHNICAL DIRECTOR

NHA
FPHA

SUPPLEMENT NO. 2
Bulletin No. 2
Part IA

November 11, 1943

SUBJECT: Proposed Alterations to Existing Management and Maintenance Buildings, Series WD-1, to Facilitate Handling Mail

The attached sketches indicate improved facilities for the care and handling of mail. The arrangements suggested place the mail cabinets in full view from the Lobby.

MAIL ROOM FACILITIES

1. Each Standard Mail Cabinet Unit contains 110 mail slots 2" x 5" inside measurements, with space below for small packages, magazines, etc. Additional space for larger packages should be provided under the Lobby Counter.

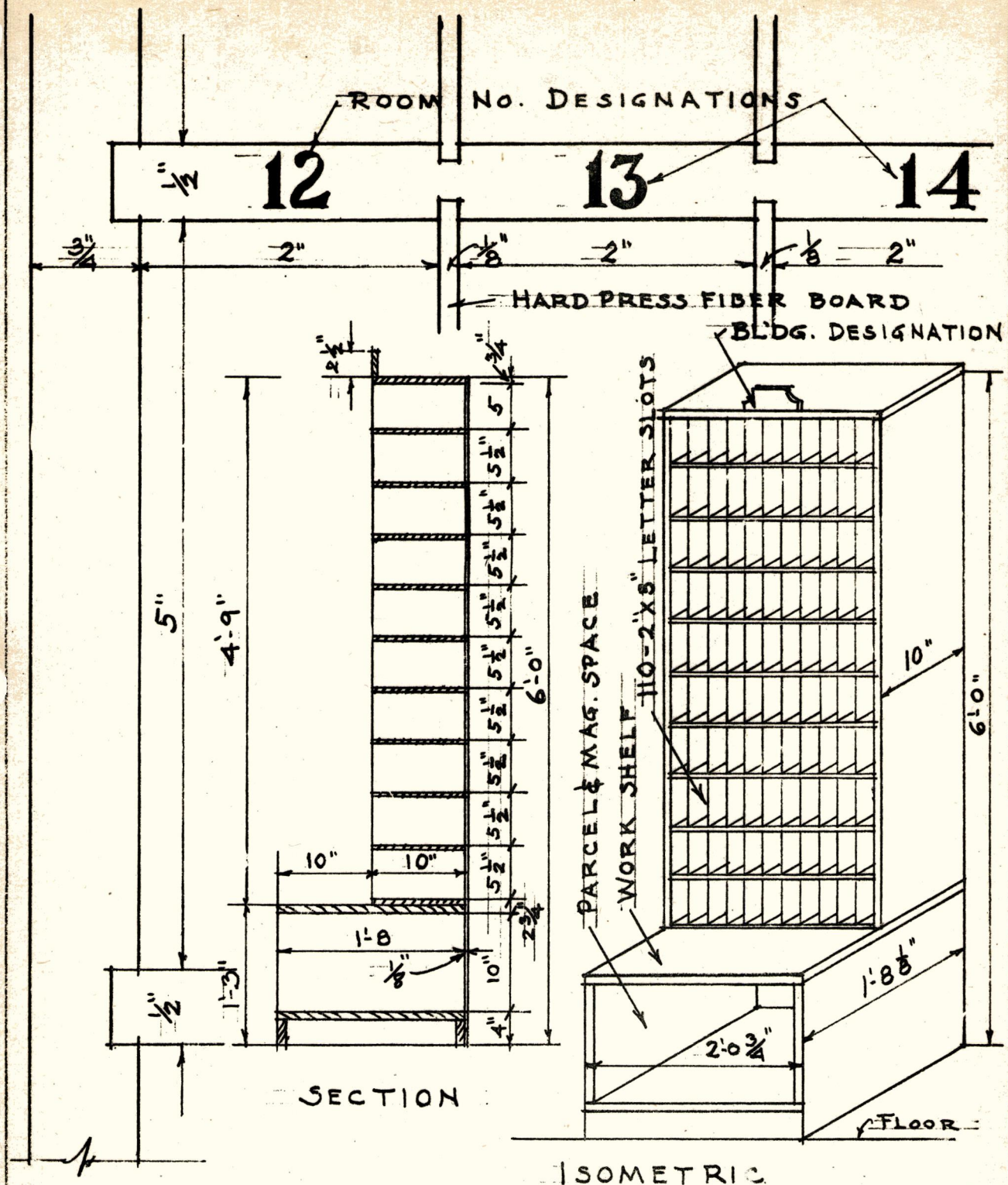
2. One mail slot should be provided for each dormitory ROOM.

3. The number of Standard Mail Cabinet Units shown on the attached sketches is based on the standard distribution of 50% single and 50% double rooms.

4. The existing counter should be used insofar as possible in its present location; the shaded portion of counter is to be new.

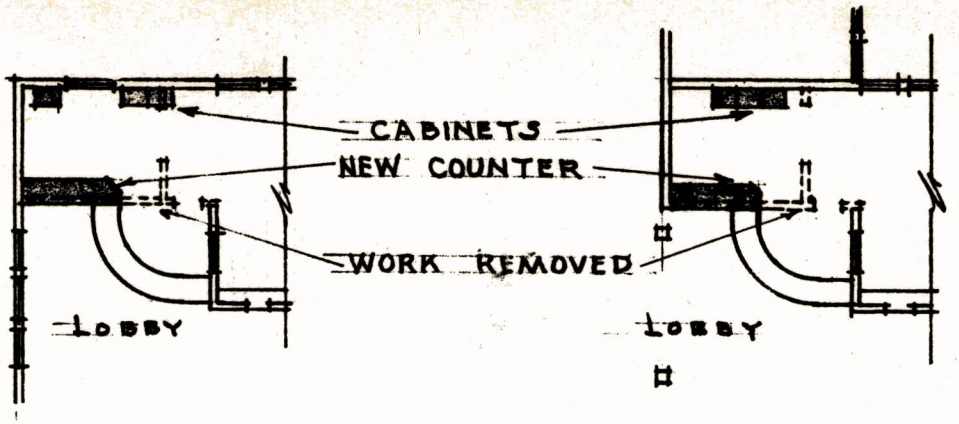
5. Partitions shown by broken lines are to be removed.

Attachments




# DETAIL OF STANDARD MAIL CABINET UNIT.

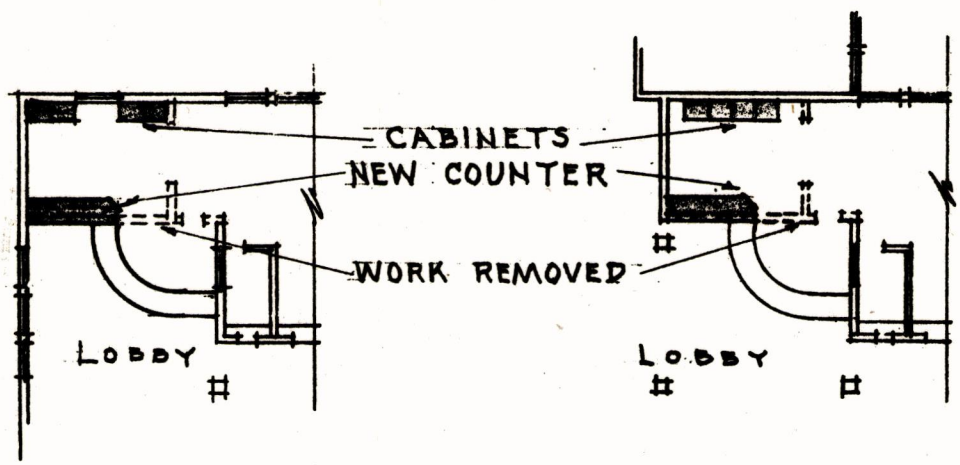
| | | |
|---|---|---|
| PREPARED BY F.P.H.A. N.H.A. | ALTERATIONS TO PRESENT MAIL ROOM | AS-251 SHEET NO. 1 |
| | WAR DORMITORY PROJECTS SERIES WD-1 | OCT. 30, 1943. |




M&M 250
SEPARATE

M&M 250
COMBINED

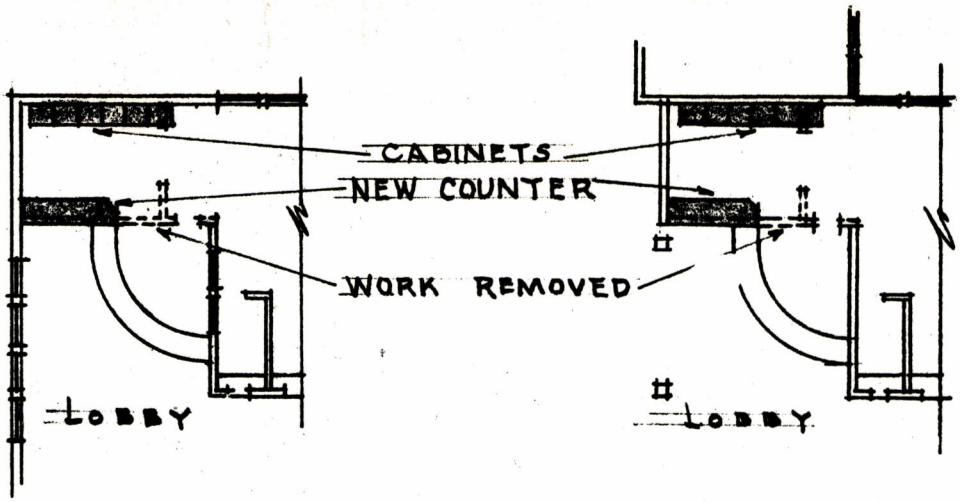
NOTE - FOR PROJECT FACILITY BLDG.-GROUP NO. 75 USE ONE MAIL CABINET; FOR NO. 150 USE THREE MAIL CABINETS. LOCATE ALL CABINETS IN OFFICE ROOM.




M&M 400
SEPARATE

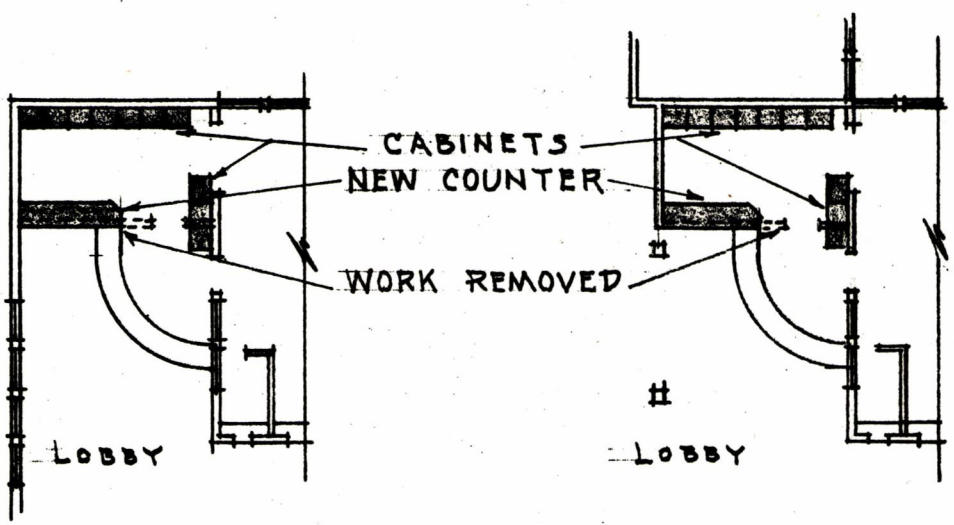
M&M 400
COMBINED

| PREPARED BY FPHA NHA | ALTERATIONS TO PRESENT MAIL ROOM | AS-251 SHEET NO. 2 |
|---|---|---|
| | WAR DORMITORY PROJECTS SERIES WD-1 | OCT. 30, 1943 |




M&M 650
SEPARATE

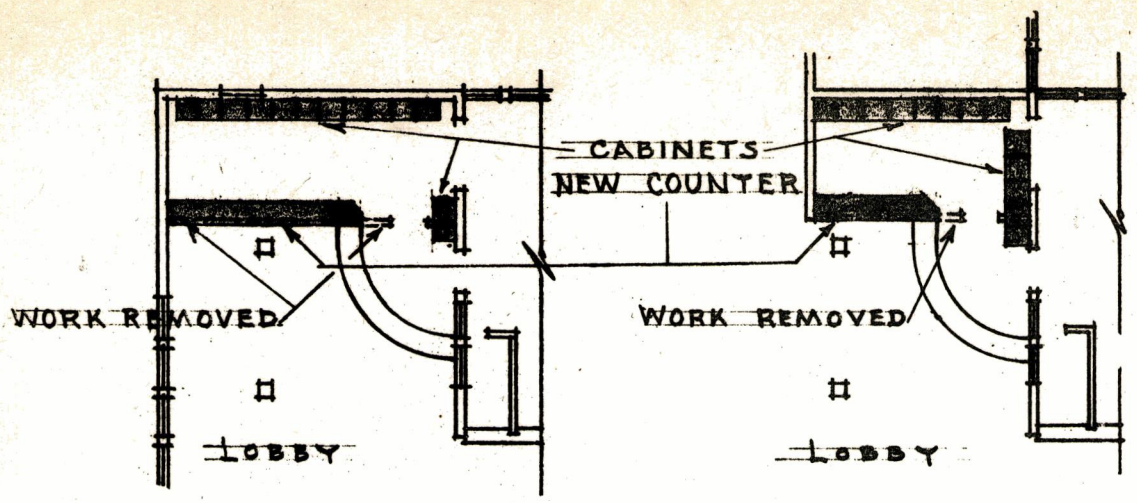
M&M 650
COMBINED




M&M 1000
SEPARATE

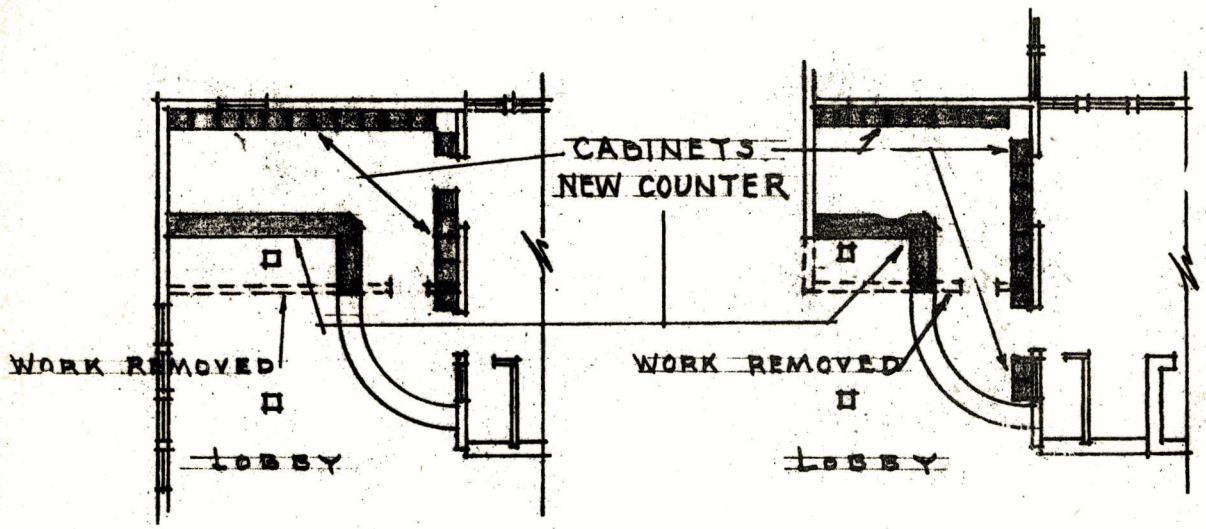
M&M 1000
COMBINED

| | | |
|---|---|---|
| PREPARED BY F.P.H.A NHA | ALTERATIONS TO PRESENT MAIL ROOM | AS-25L SHEET NO. 3 |
| | WAR DORMITORY PROJECTS SERIES WD-1 | OCT. 30, 1943 |




M&M 1500
SEPARATE

M&M 1500
COMBINED




M&M 2100
SEPARATE

M&M 2100
COMBINED

| | | |
|---|---|---|
| PREPARED BY F.P.H.A. NHA | ALTERATIONS TO PRESENT MAIL ROOM | AS-251 SHEET NO. 4 |
| | WAR DORMITORY PROJECTS SERIES WD-1 | OCT. 30, 1943 |

BULLETIN NO. 2

STANDARDS

FOR

TEMPORARY WAR HOUSING

PART I-B

UTILITY SELECTION

CONTENTS


| | Page |
|---|---|
| Purpose . . . . . | 1 |
| Scope . . . . . | 1 |

EXHIBITS

A - Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

B - Allowable Fuel and Equipment Combinations

C - Summary Interpretation of WPB Limitation Orders on Fuels

D - Area Maps Showing Fuels

E - Refrigeration Schedule by Percentage of Type



NATIONAL HOUSING AGENCY

FEDERAL PUBLIC HOUSING AUTHORITY

MARCH 1943

# UTILITY SELECTION
# TEMPORARY WAR HOUSING

## PURPOSE

This section has been prepared to guide the Regional Offices in the selection of utility services, in accordance with applicable policies and procedures as set forth in Chapter 3471, Selection of Utilities, of the Manual of Policy and Procedure. As stated in Chapter 3471, the preparation of recommendations on combinations of utility services by the Central Office Technical Division has been discontinued, and complete responsibility for selection within the limiting conditions imposed by WPB rulings, Limitation Orders, and Conservation Orders, rests with the Regional Offices.

## SCOPE

The material contained herein covers:

EXHIBIT A:

Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types: a comprehensive series of charts showing, for each region and for the standard TDU, WA, and WD plans to be employed in the present program, distribution by percentage and by types of cooking, domestic water heating, and space heating systems and fuels. Distribution indicated on the charts represents an equitable balance of all the relevant factors, such as availability of fuels, precedent, relative economy, and WPB rulings and Limitation Orders. Manufacture of materials and equipment under the "Controlled Materials Plan" will be scheduled in accordance with information derived from these charts. The utility services for each project should, therefore, be selected with careful regard to the overall distribution in order to avoid overruns in particular types of materials or equipment.

EXHIBIT B:

Allowable Fuel and Equipment Combinations: a series of tables scheduling the allowable fuel and equipment combinations for the standard TDU, WA, and WD plans. Conditions under which each combination may be employed are stated under "Remarks".

UTILITY SELECTION
TEMPORARY WAR HOUSING
(continued)

EXHIBIT C:

Summary Interpretation of WPB Limitation Orders on Fuels: a series of notes complementing Exhibit B, which summarizes and interprets the WPB Limitation Orders dealing with fuel selection. This exhibit should be used in conjunction with Exhibit B.

EXHIBIT D:

Area Maps Showing Fuels: a series of maps showing the respective areas in which coal, natural gas, and oil fuel are first choice for space heating, and indicating the second choice fuel for certain areas. Choices are based on availability and are coincident with WPB Limitation Orders.

EXHIBIT E:

Refrigeration Schedule by Percentage of Type: a table scheduling anticipated refrigeration needs: ice, electric and gas, in percentages of total refrigeration requirements for each region.

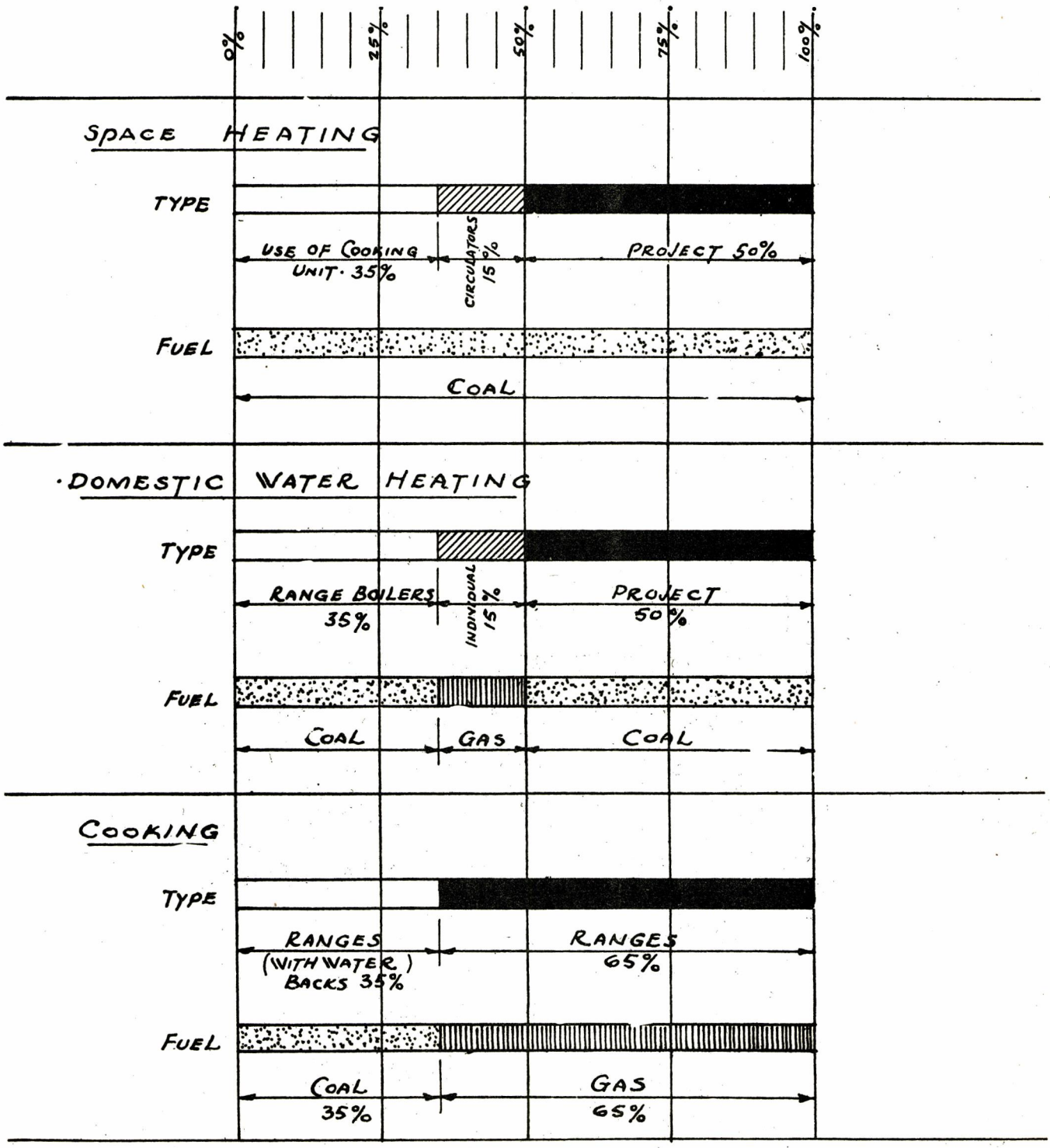
NHA
FPHA

March 1943

Bulletin No. 2
Part I-B
Exhibit A
Sheet 1

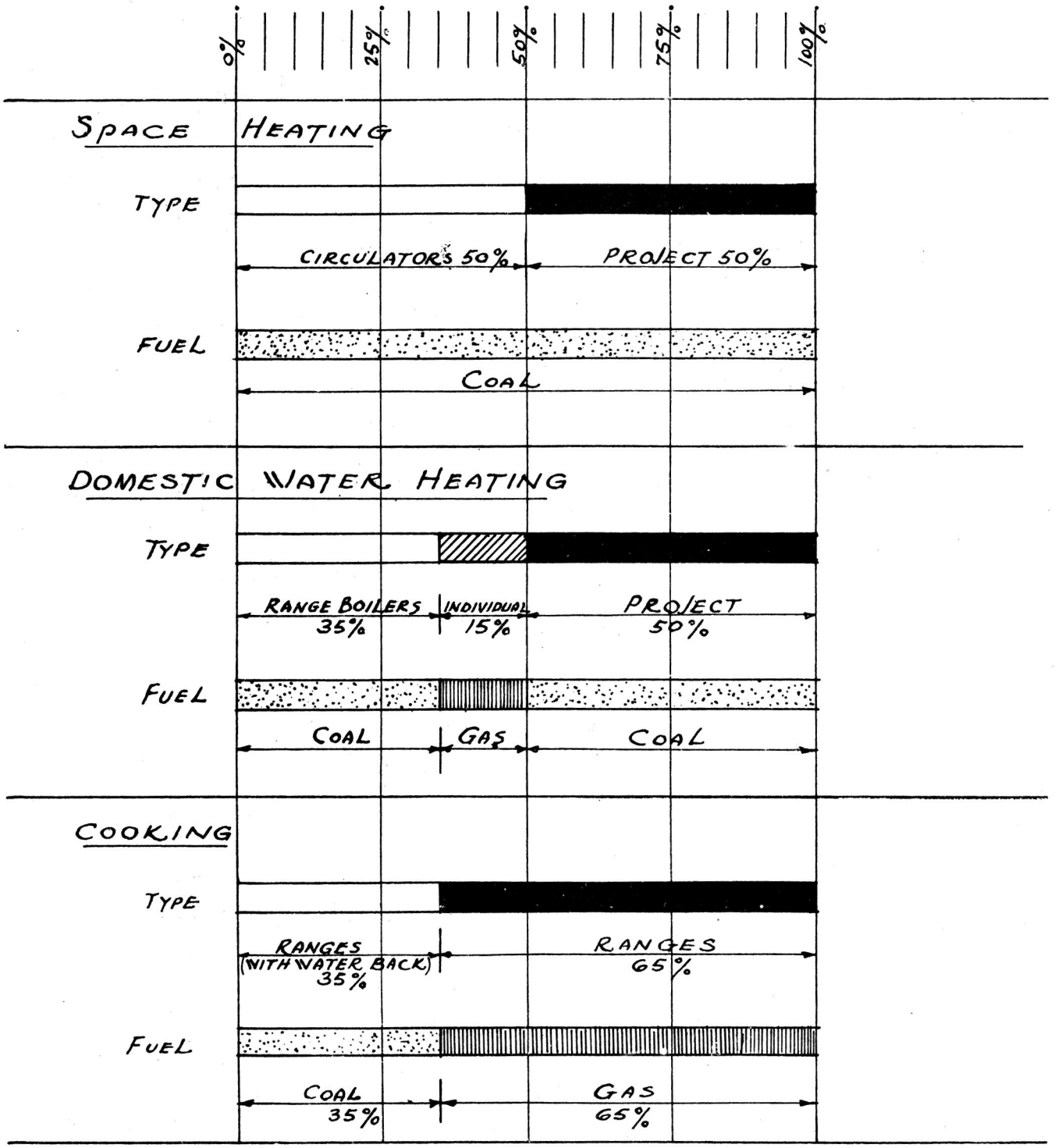
# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, O BEDROOM UNITS: REGION I



# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, 1, 2, & 3 BEDROOM UNITS: REGION I



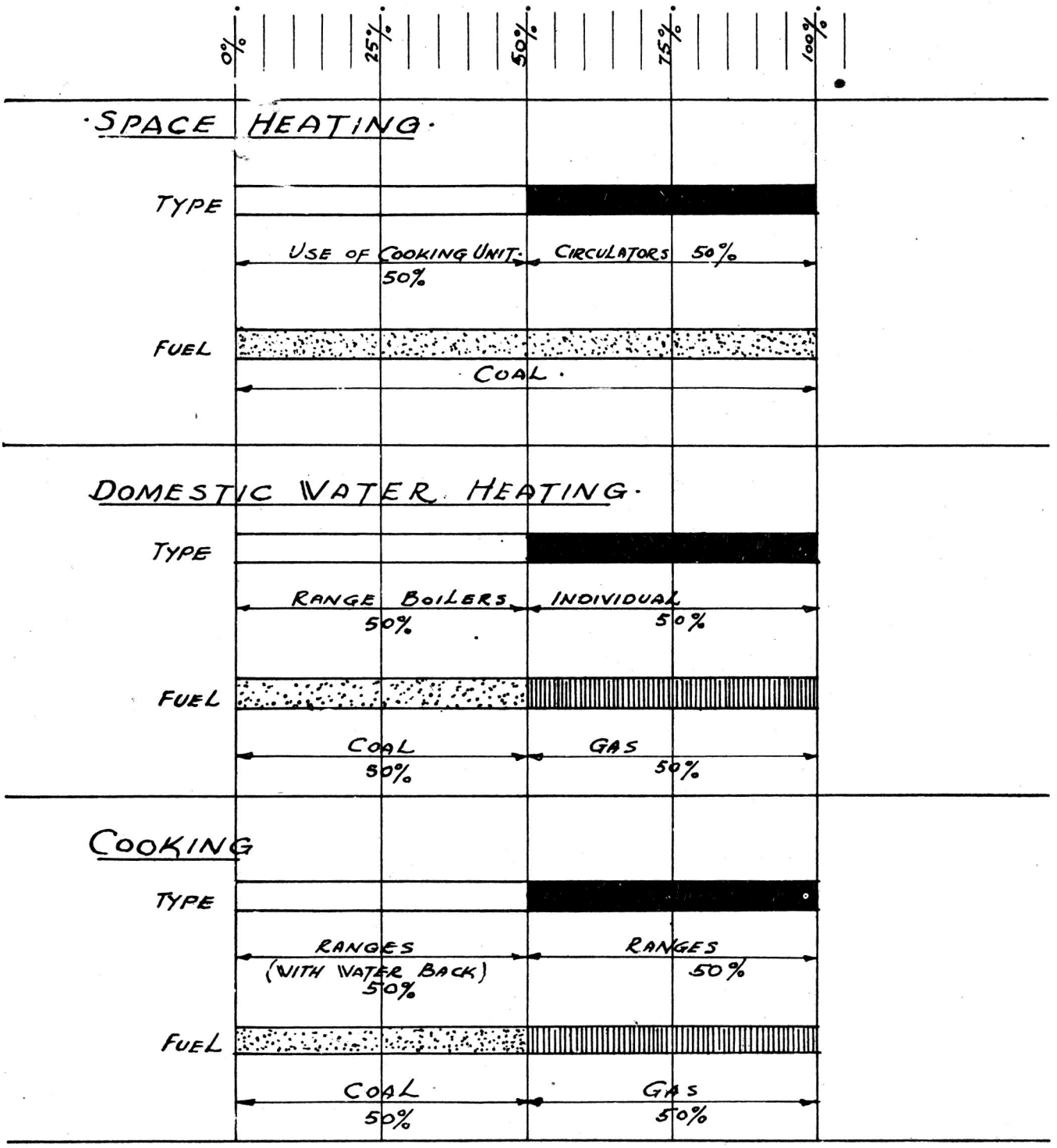
NHA
FPHA

March 1943

Bulletin No. 2
Part I-B
Exhibit A
Sheet 3

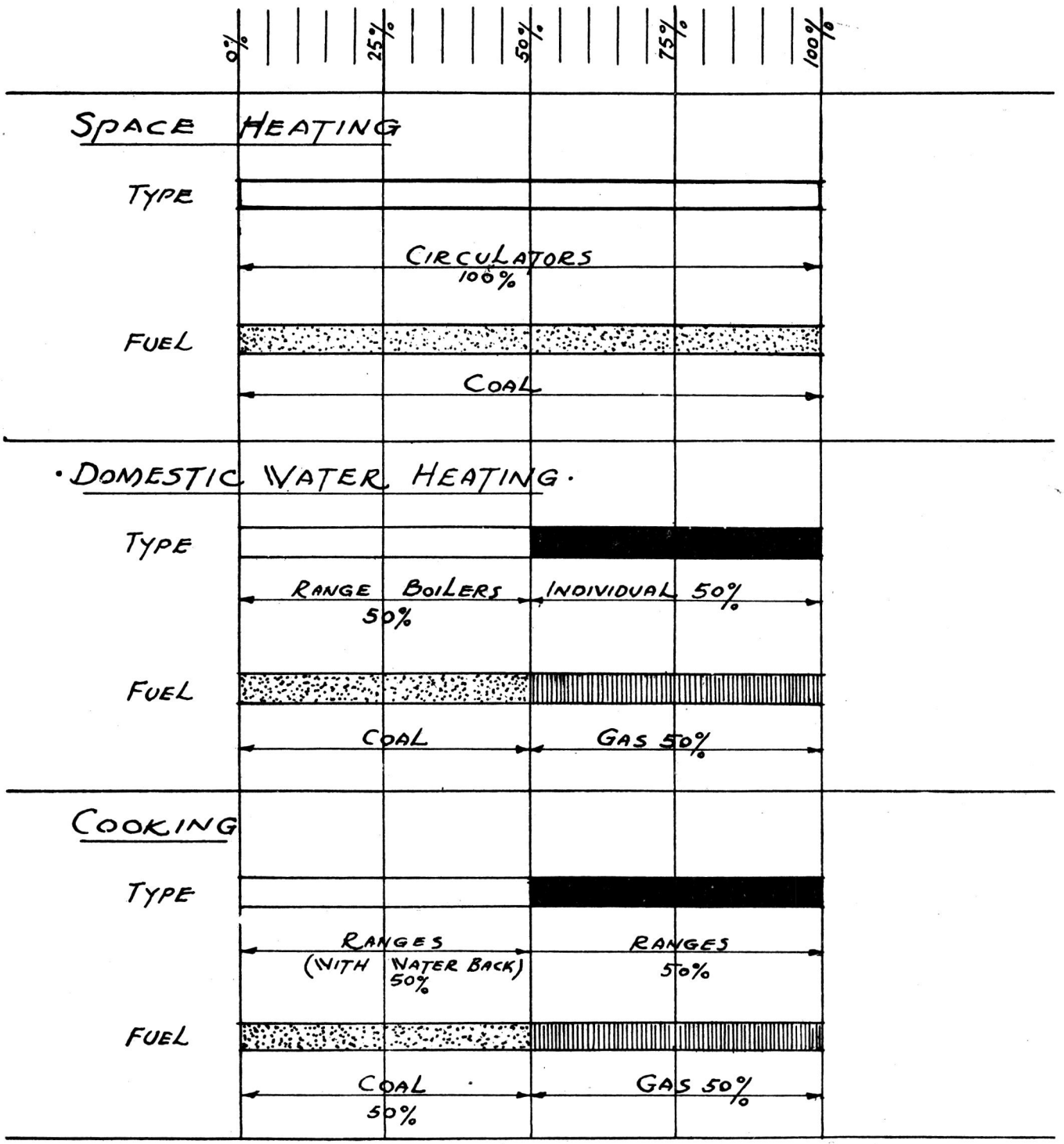
# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, O BEDROOM UNITS: REGION II



# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, 1, 2, & 3 BEDROOM UNITS: REGION II



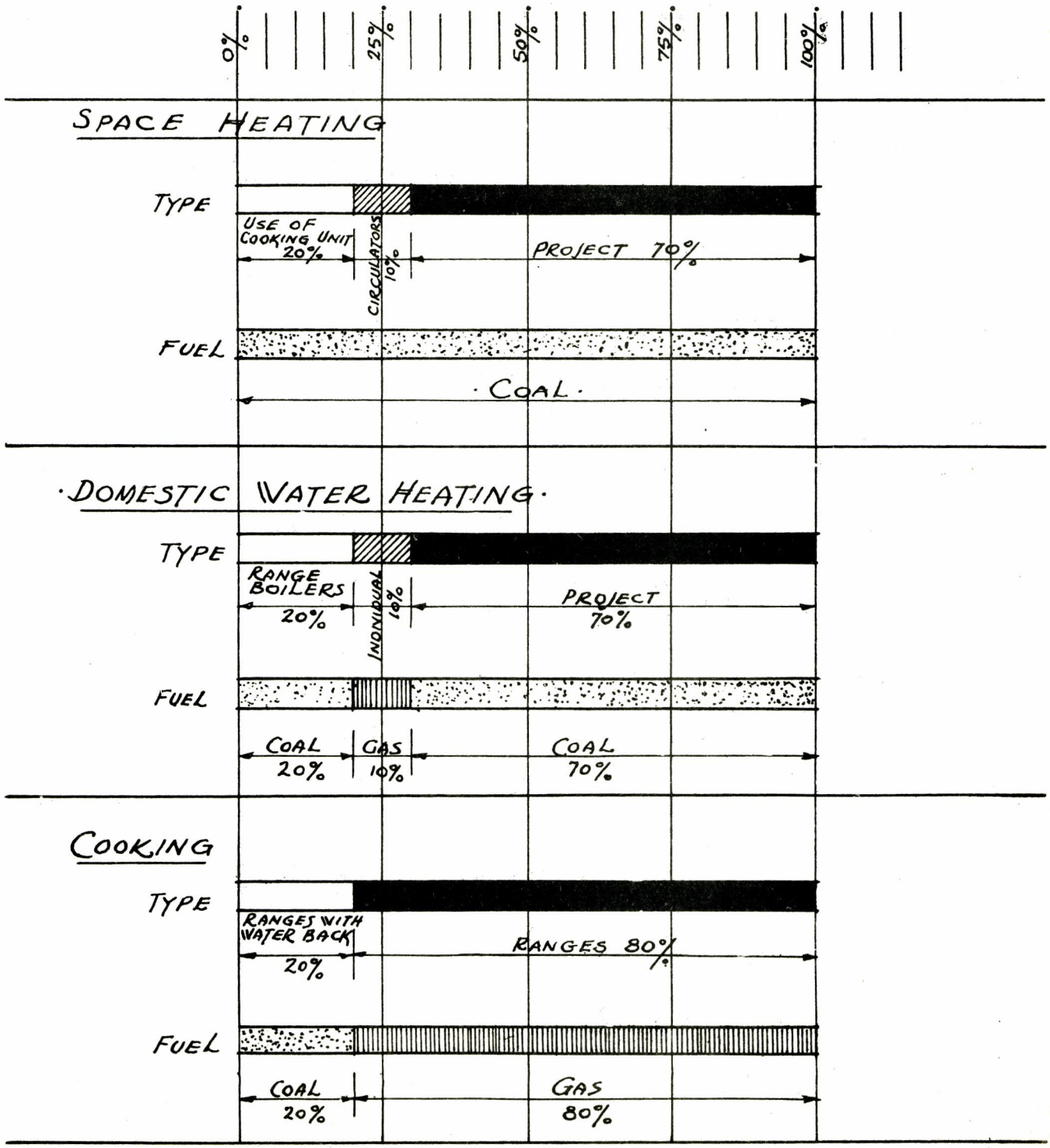
NHA
FPHA

March 1943

Bulletin No. 2
Part I-B
Exhibit A
Sheet 5

# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, O BEDROOM UNITS: REGION III



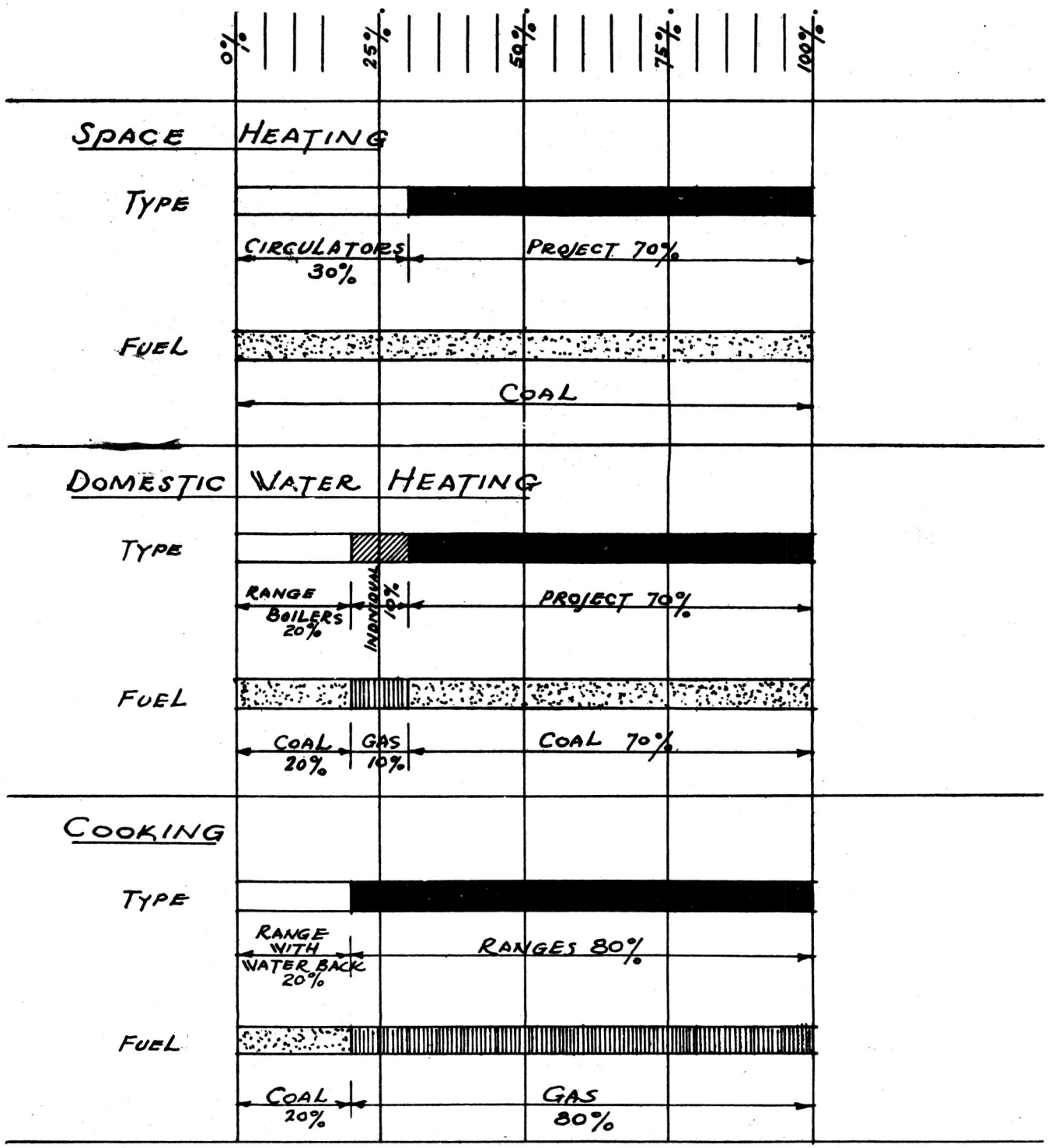
NHA
FPHA

March 1943

Bulletin No. 2
Part I-B
Exhibit A
Sheet 6

# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, 1, 2, & 3 BEDROOM UNITS: REGION III



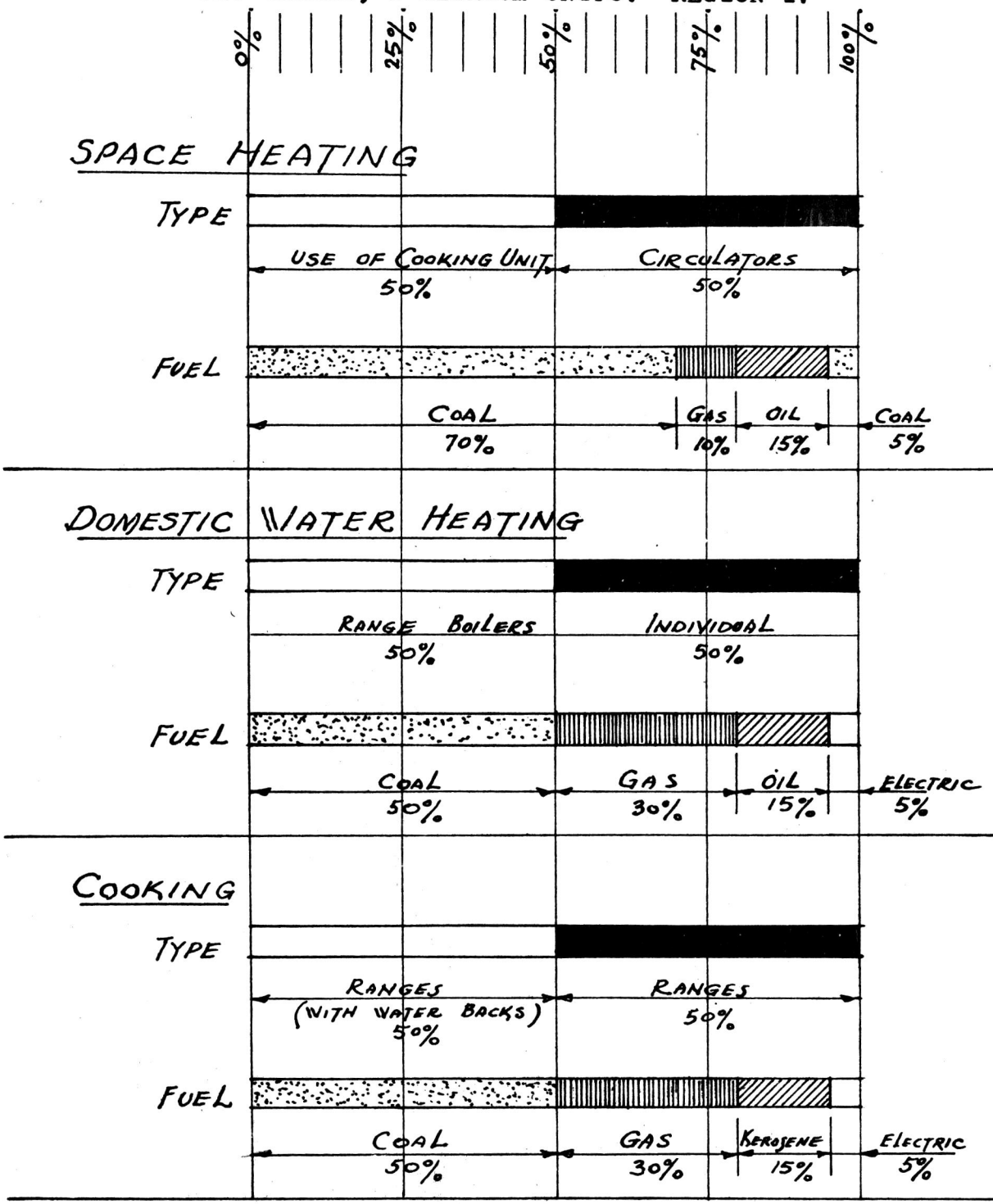
NHA
FPHA

March 1943

Bulletin No. 2
Part I-B
Exhibit A
Sheet 7

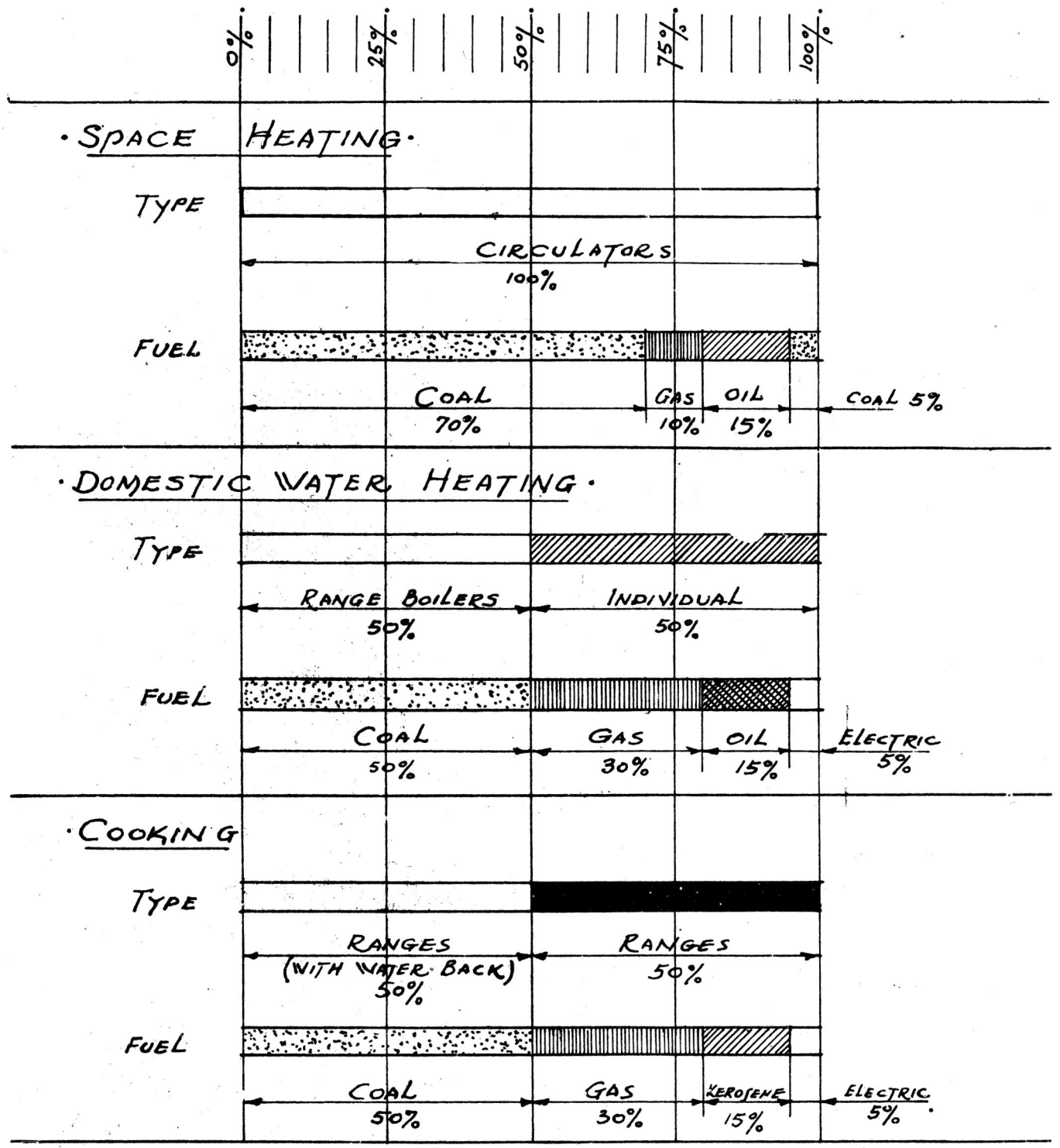
# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

TDU SERIES, O BEDROOM UNITS: REGION IV



# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, 1, 2, & 3 BEDROOM UNITS: REGION IV



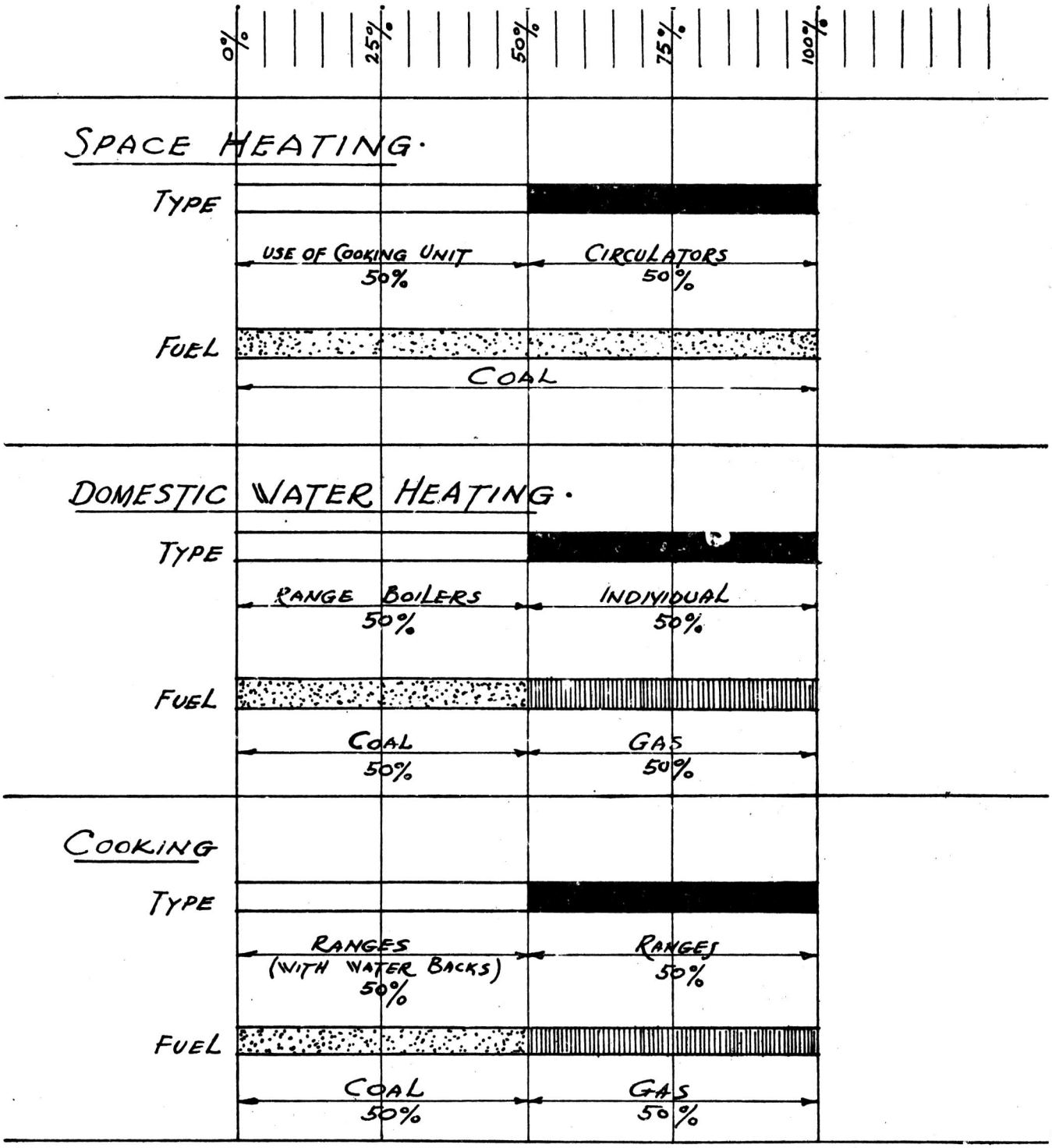
NHA
FPHA

March 1943

Bulletin No. 2
Part I-B
Exhibit A
Sheet 9

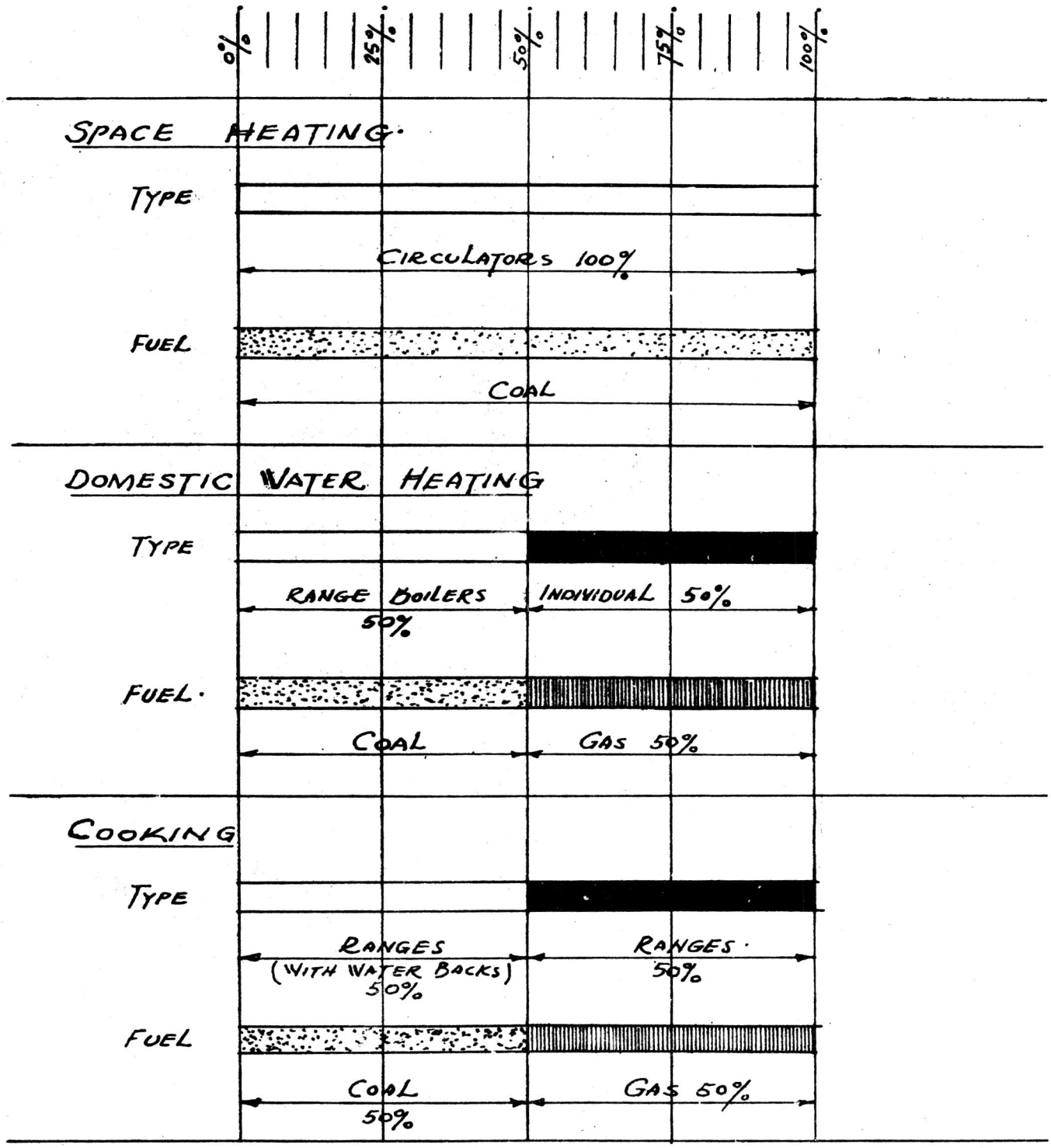
## Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

TDU SERIES, O BEDROOM UNITS: REGION V



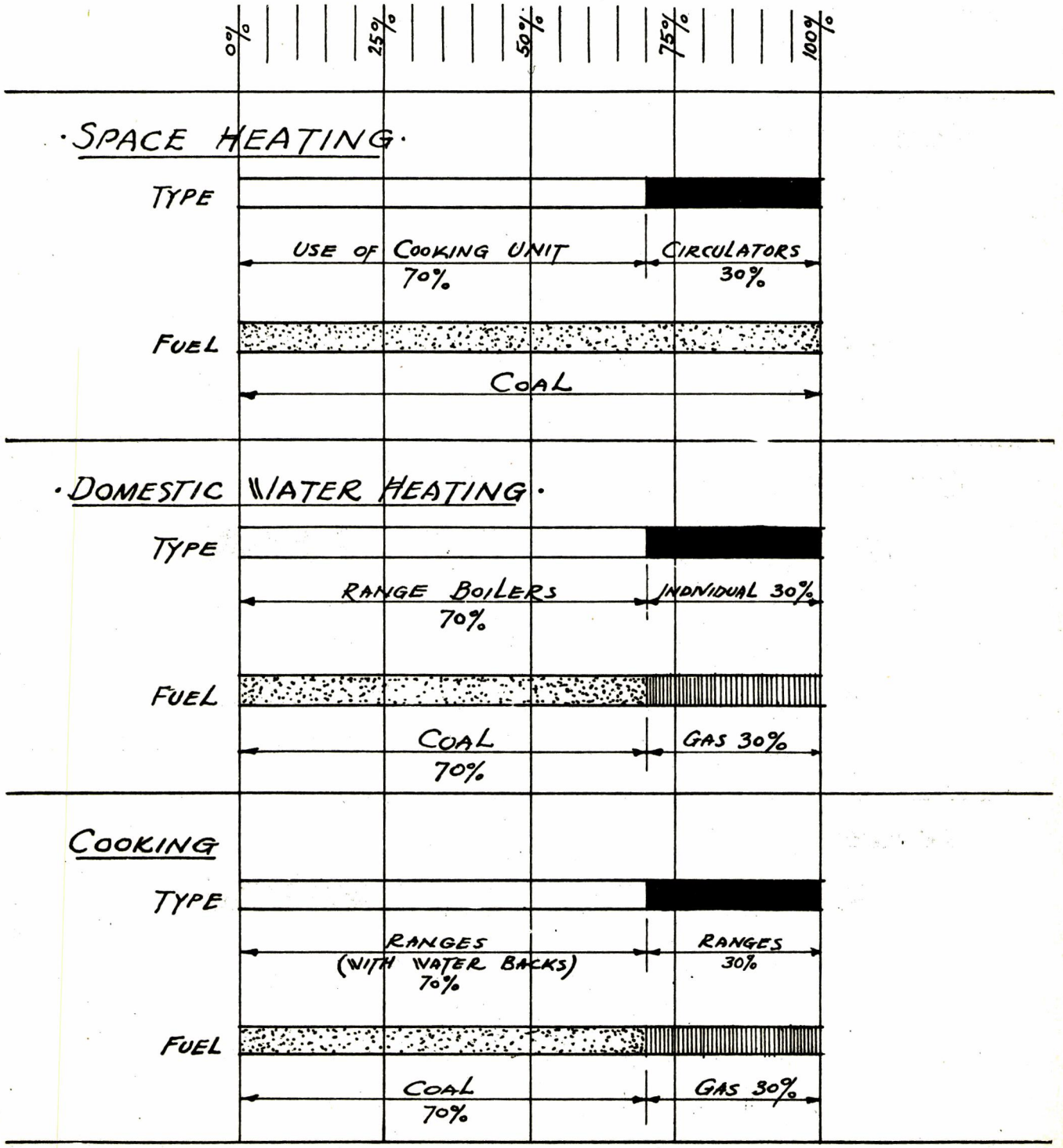
# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, 1, 2, & 3 BEDROOM UNITS: REGION V



# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

TDU SERIES, O BEDROOM UNITS: REGION VI



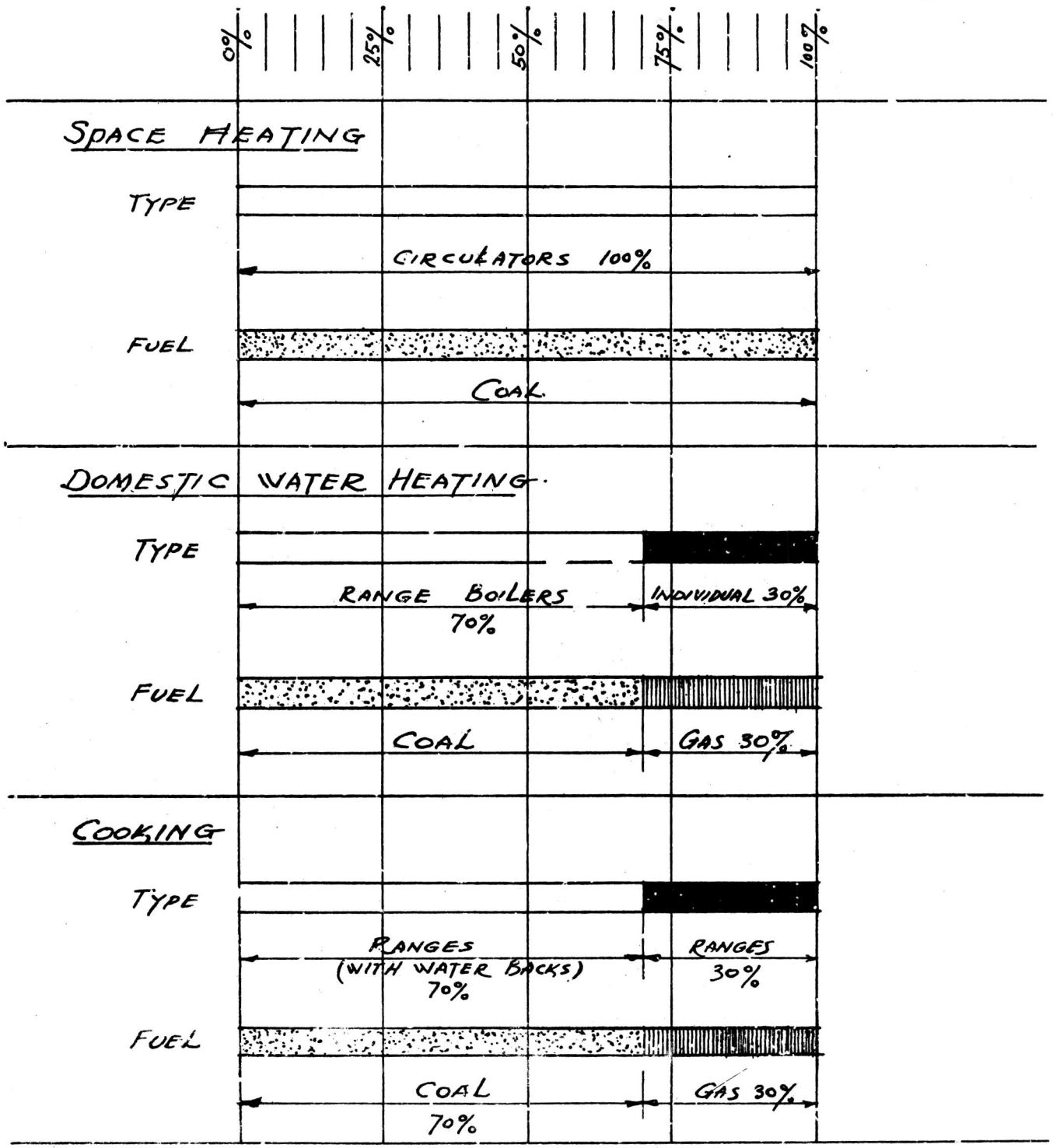
NHA
FPHA

March 1943

Bulletin No. 2
Part I-B
Exhibit A
Sheet 12

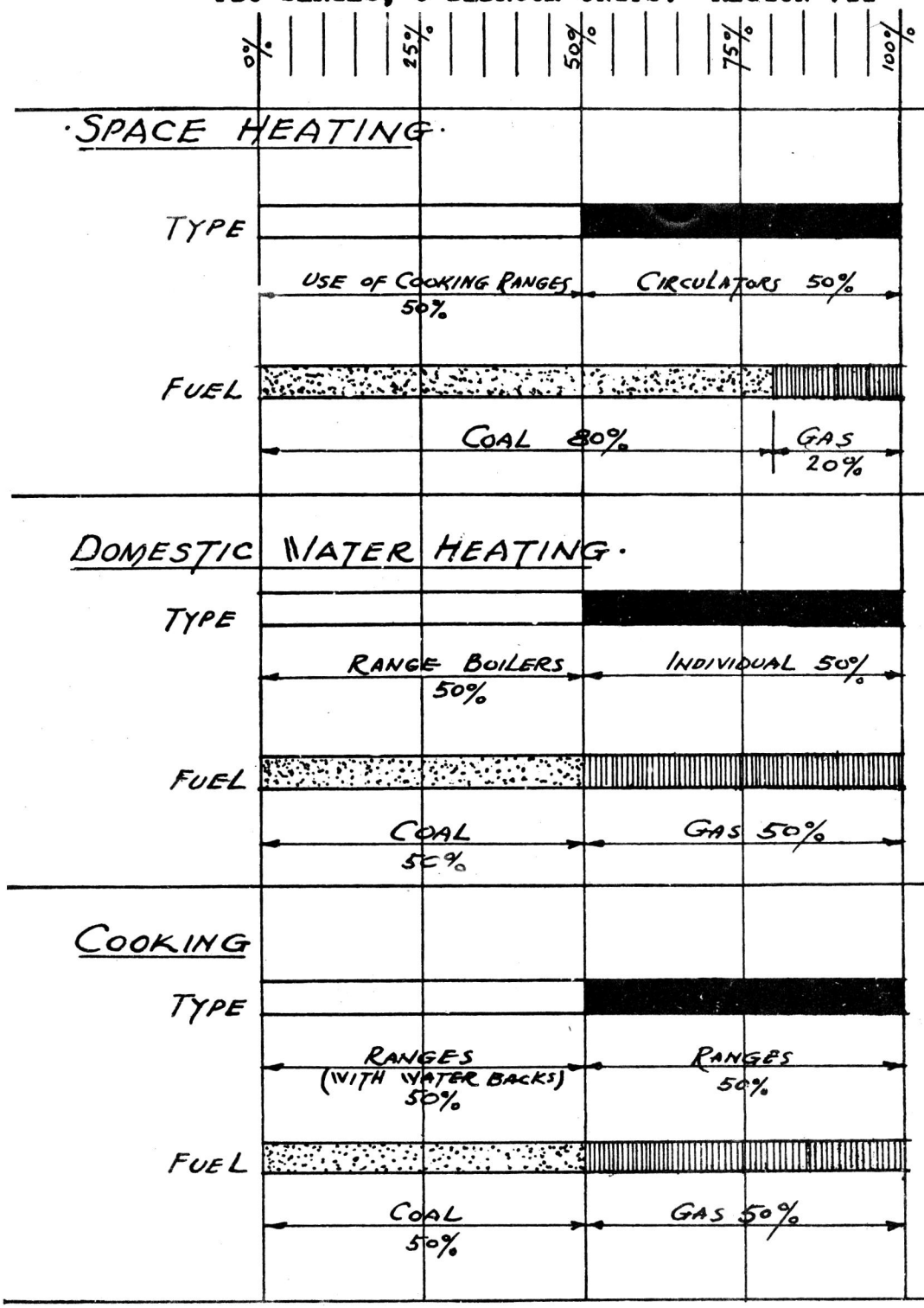
# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, 1, 2, & 3 BEDROOM UNITS: REGION VI



# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, O BEDROOM UNITS: REGION VII



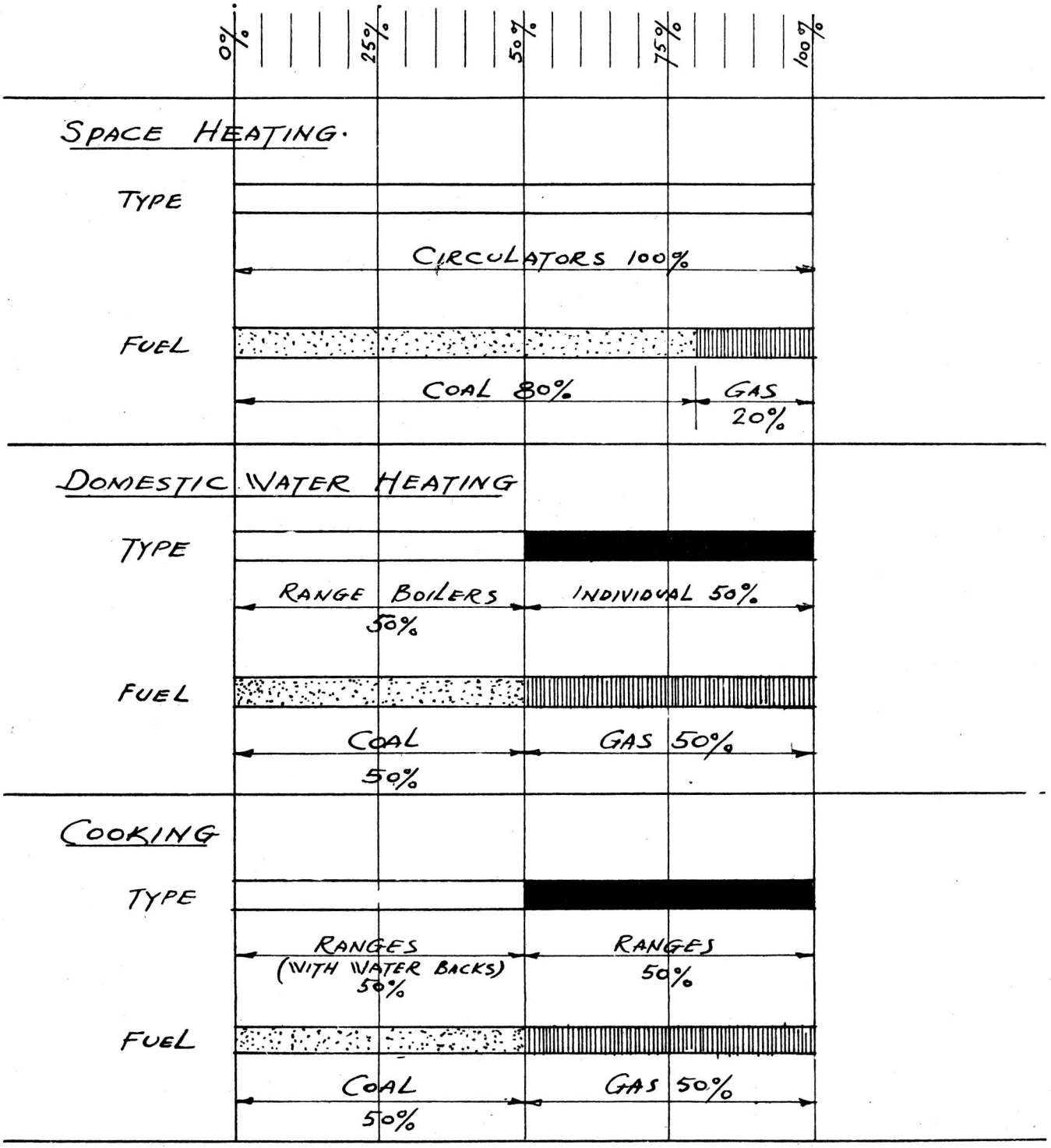
NHA
FPHA

March 1943

Bulletin No. 2
Part I-B
Exhibit A
Sheet 14

# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, 1, 2, & 3 BEDROOM UNITS: REGION VII



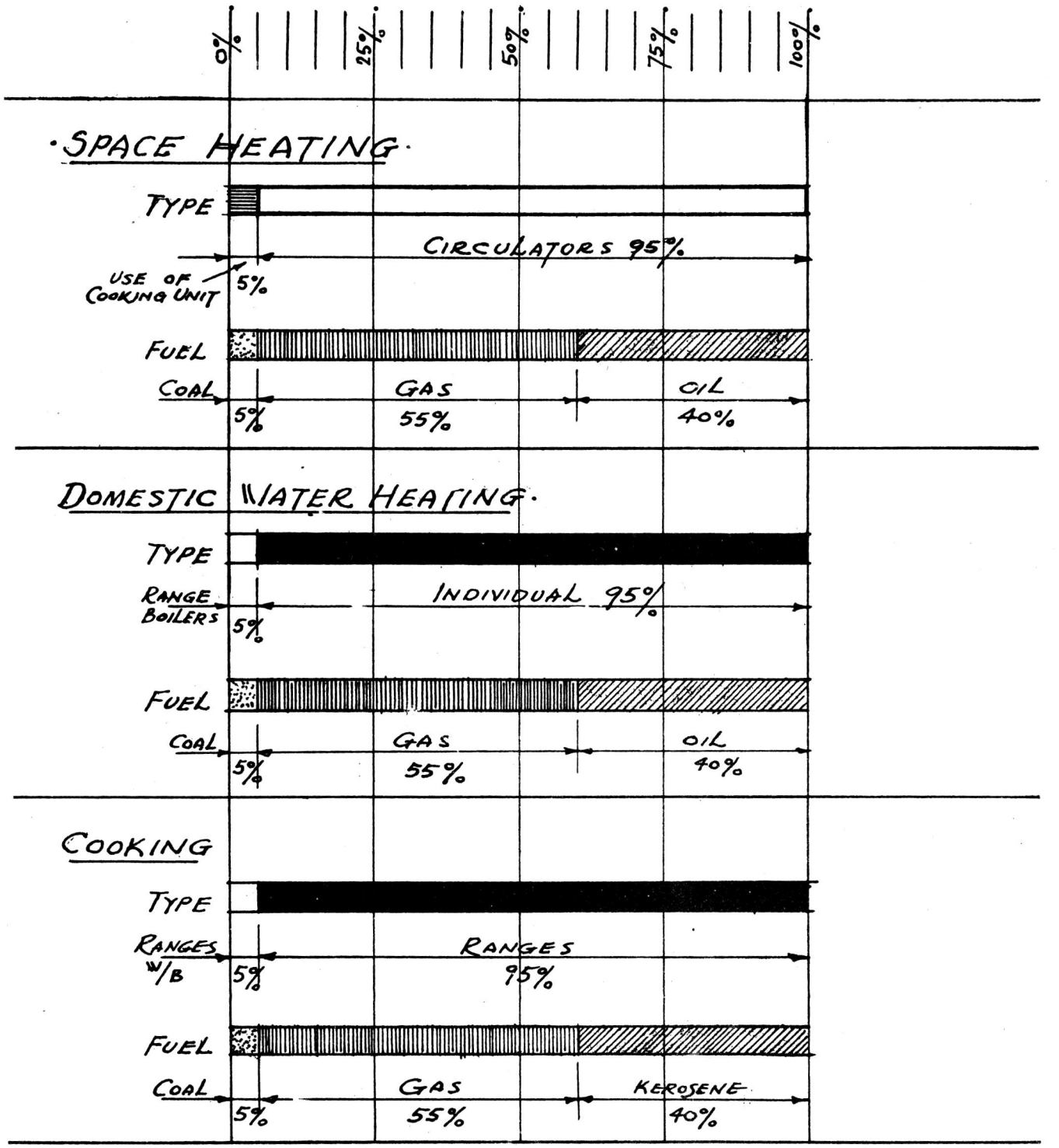
NHA
FPHA

March 1943

Bulletin No. 2
Part I-B
Exhibit A
Sheet 15

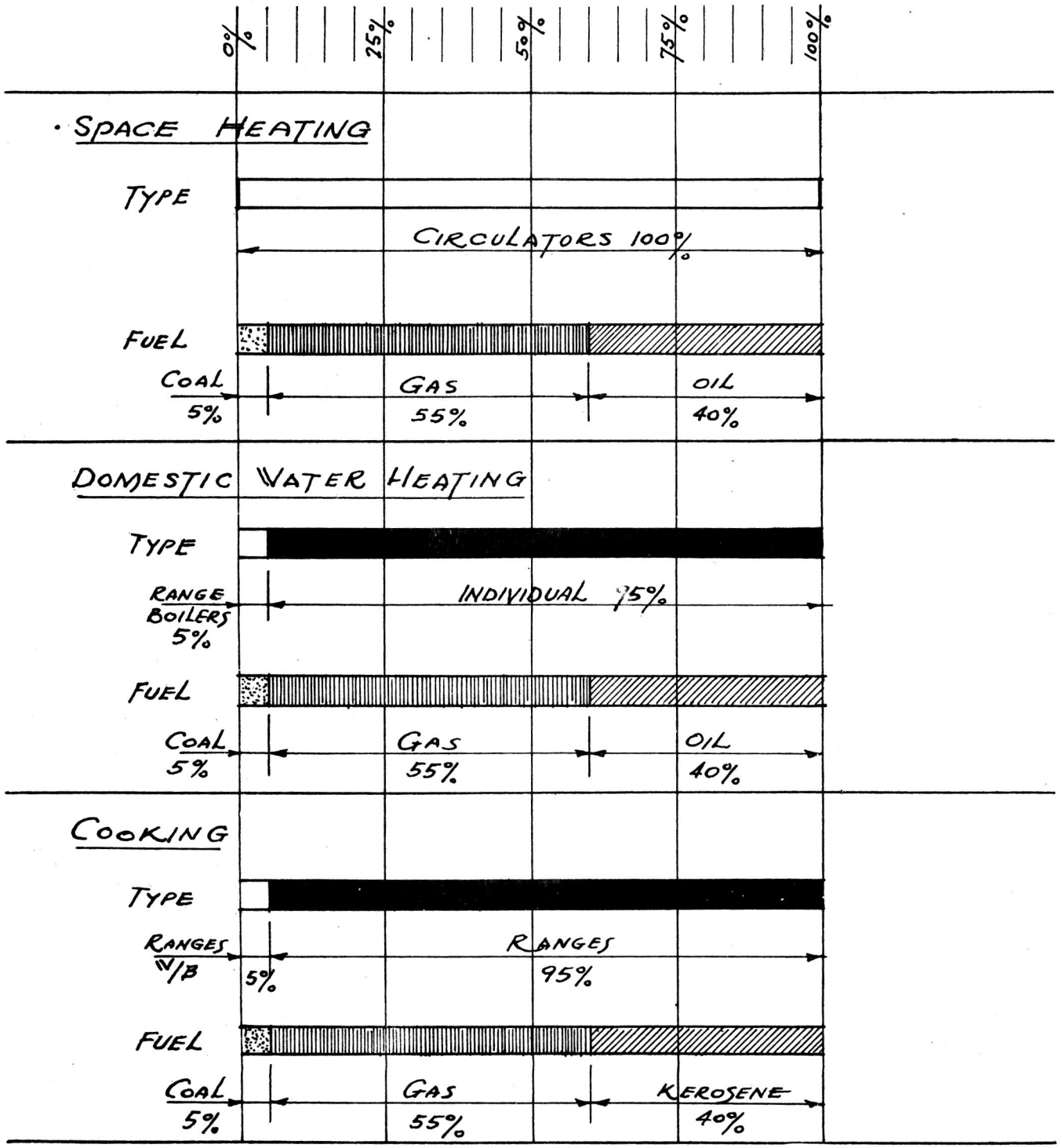
# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, O BEDROOM UNITS: REGION VIII



# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, 1, 2, & 3 BEDROOM UNITS: REGION VIII



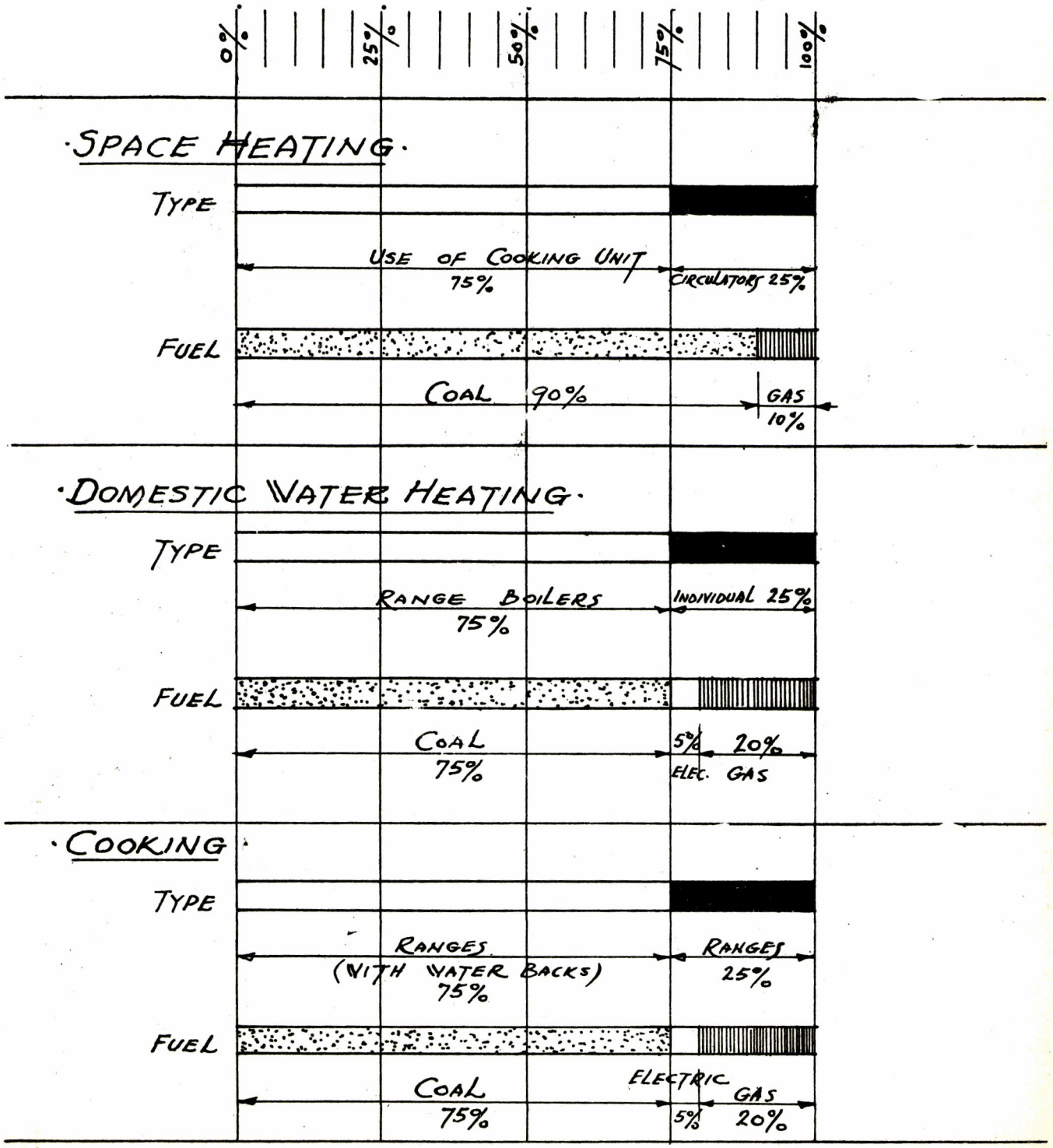
NHA
FPHA

March 1943

Bulletin No. 2
Part I-B
Exhibit A
Sheet 17

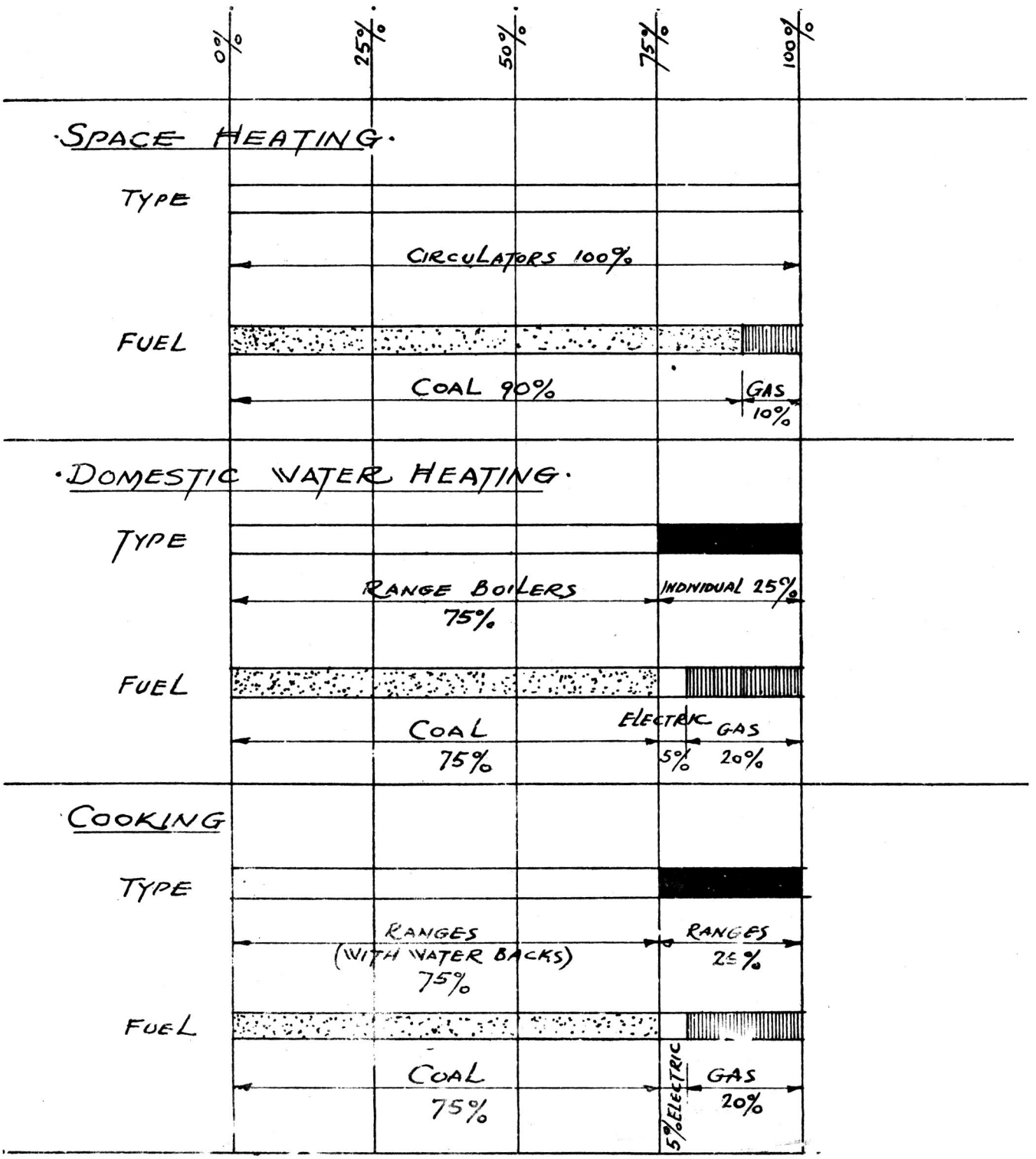
# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, O BEDROOM UNITS: REGION IX



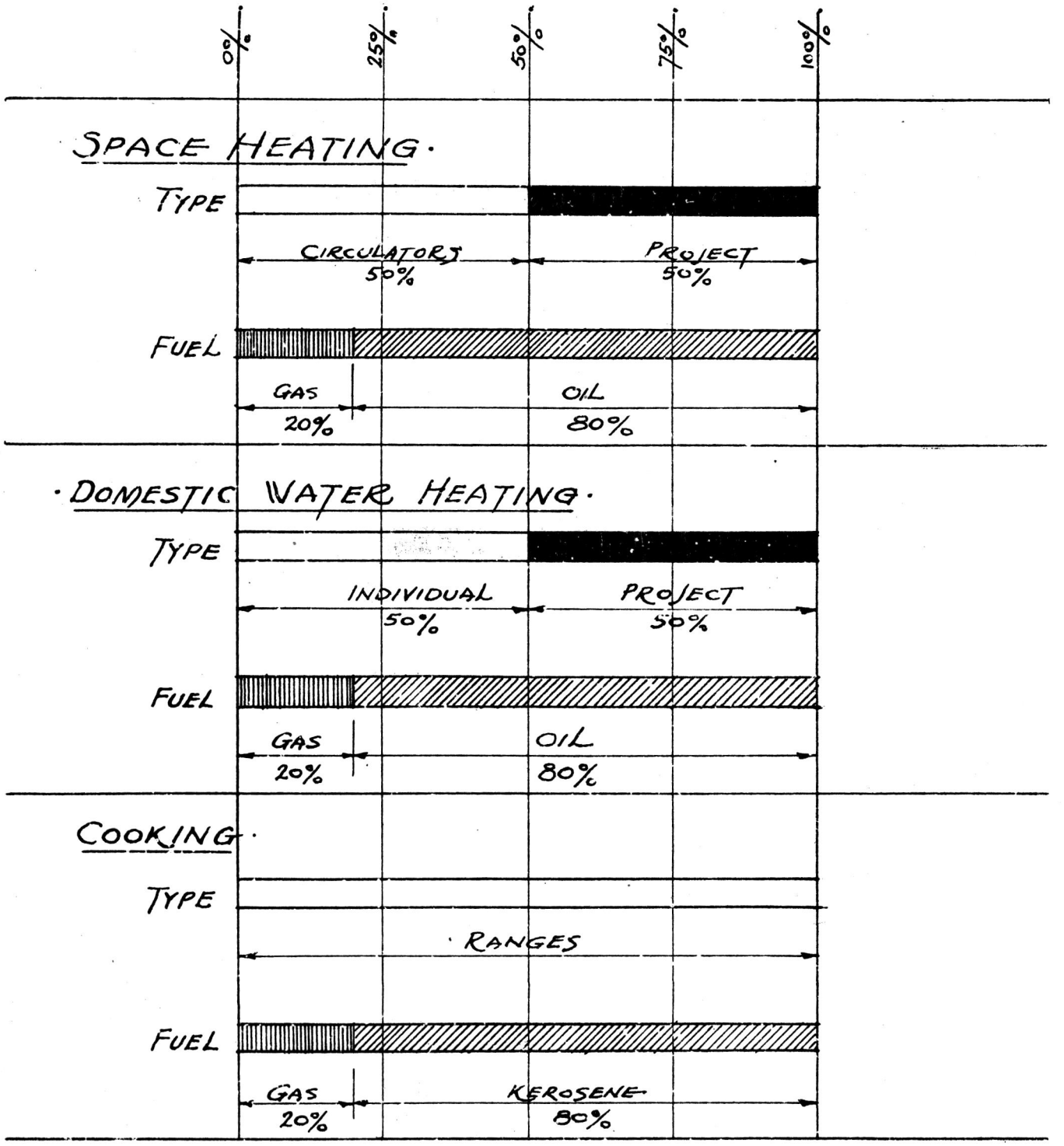
# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, 1, 2, & 3 BEDROOM UNITS: REGION IX



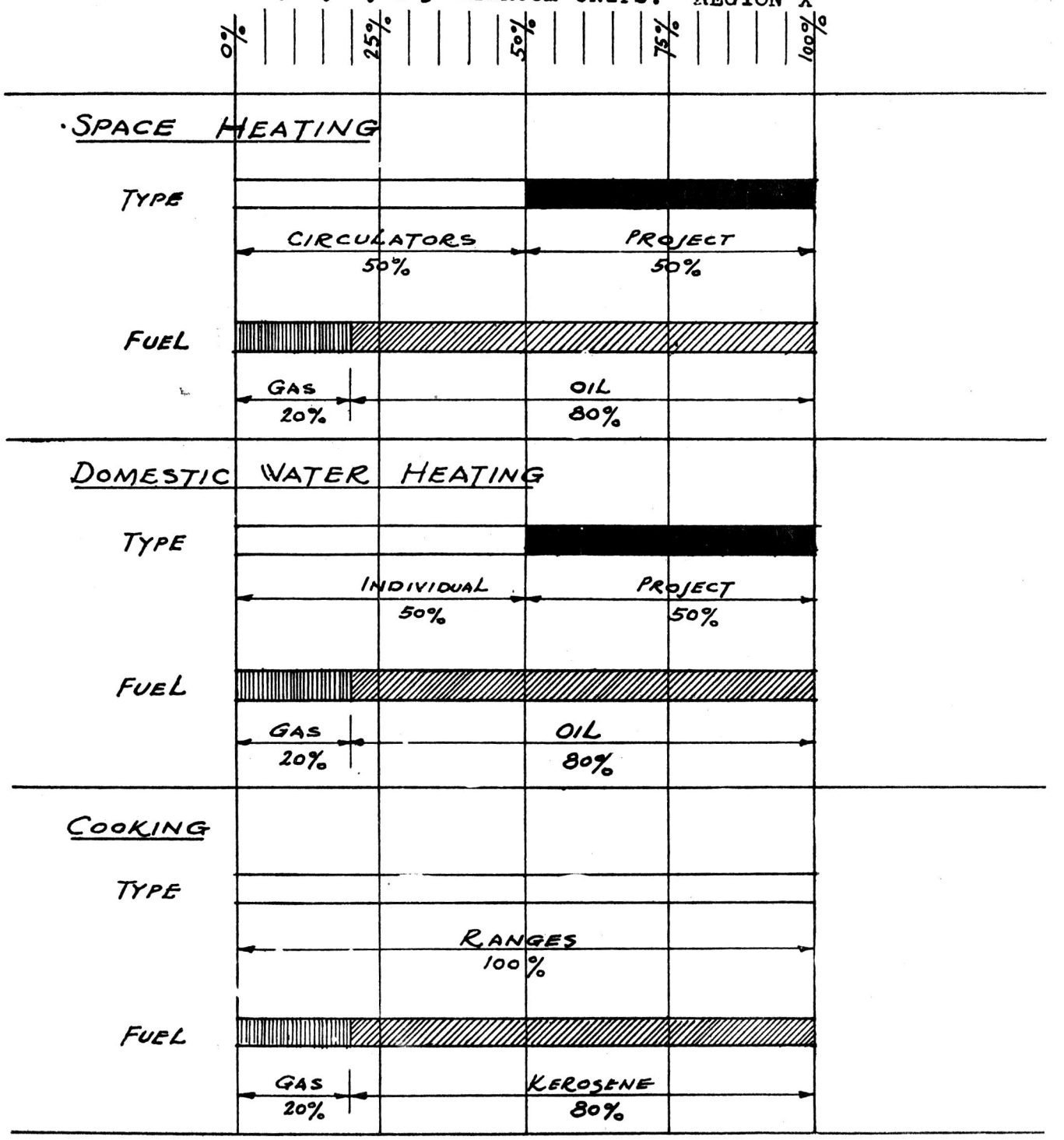
# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, 0 BEDROOM UNITS: REGION X



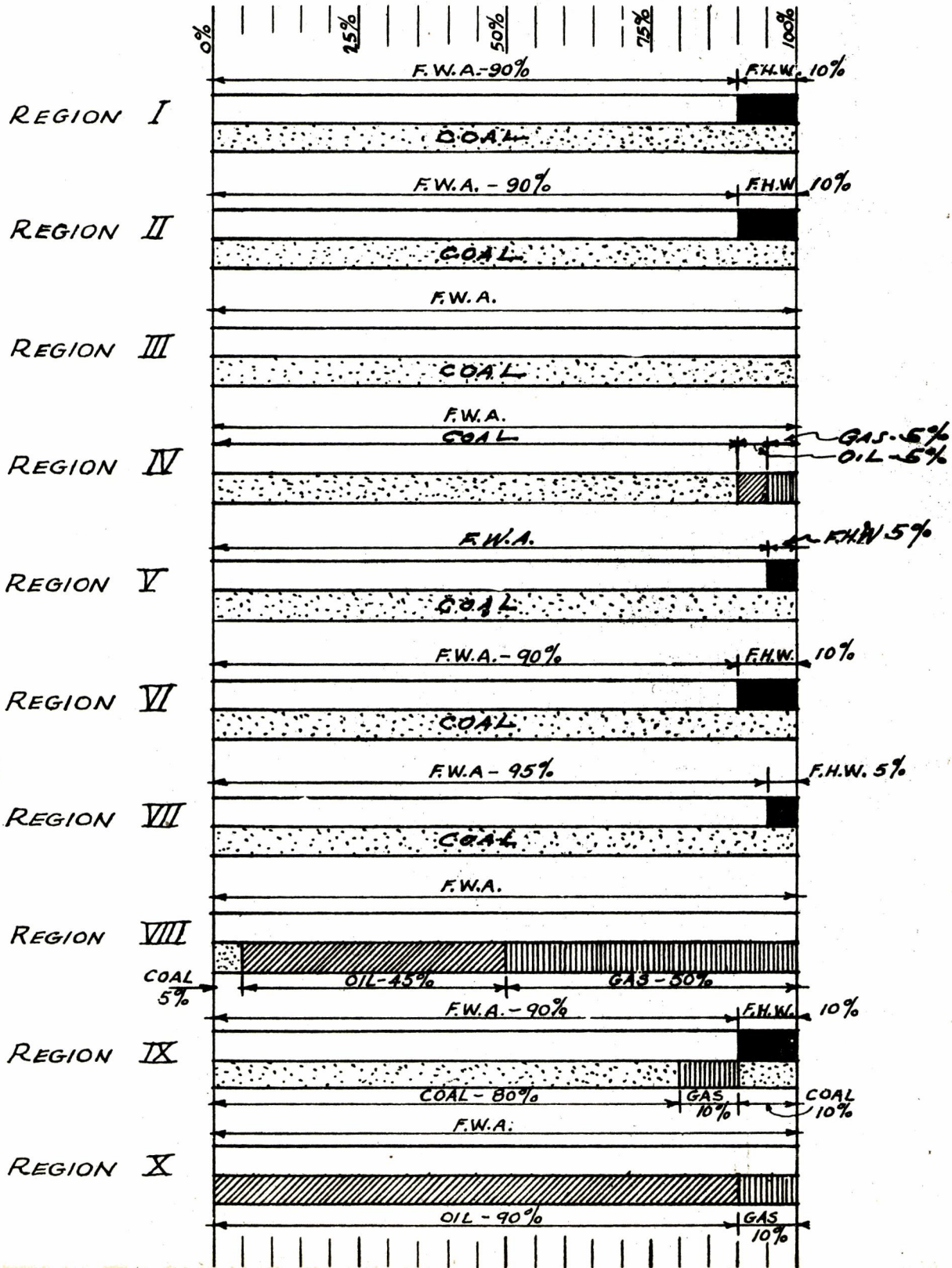
# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## TDU SERIES, 1, 2, & 3 BEDROOM UNITS: REGION X



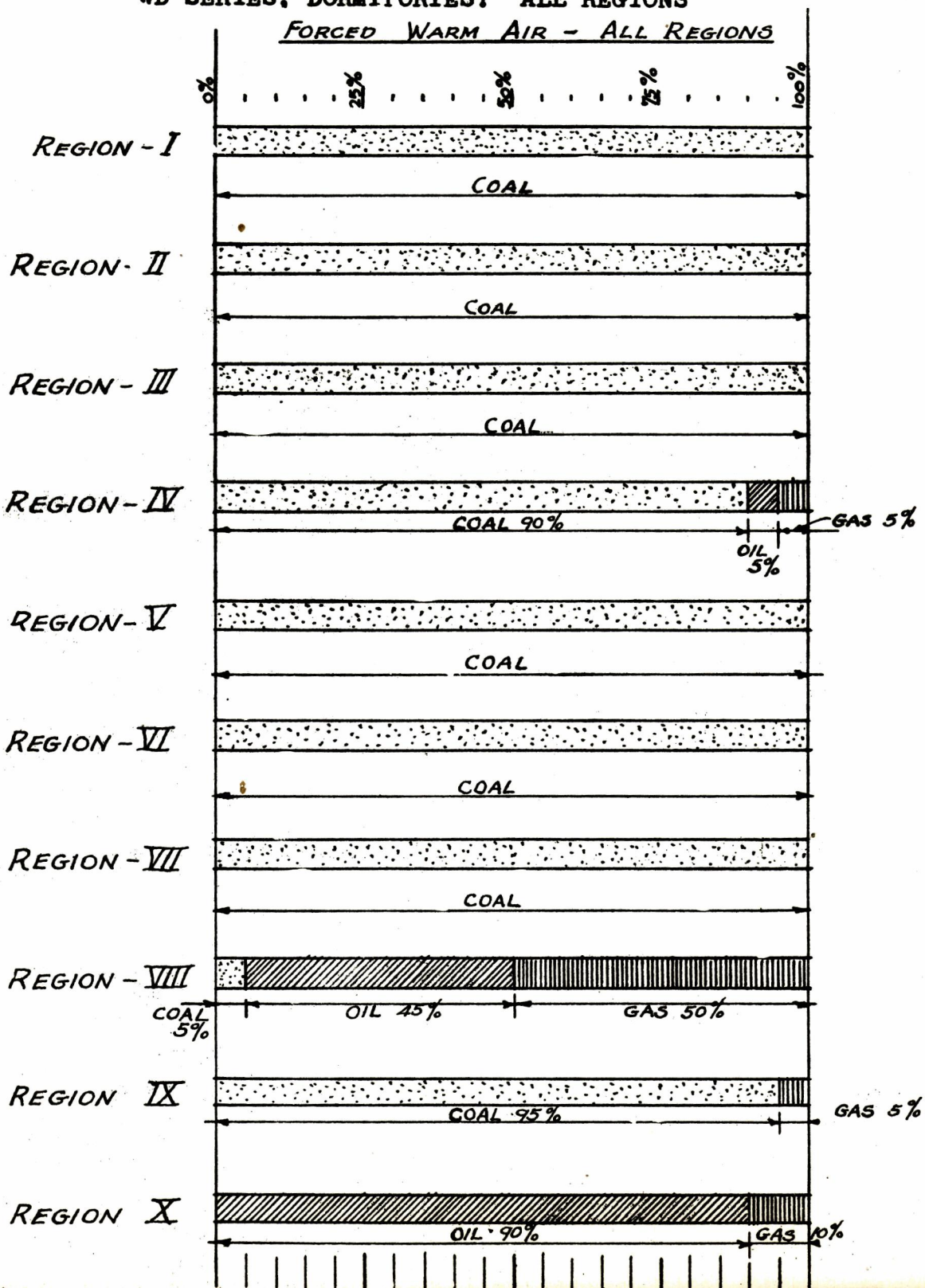
# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## WA SERIES, WAR APARTMENTS: ALL REGIONS



# Program Allotments of Cooking, Domestic Water and Space Heating Systems and Fuels by Percentages and Types

## WD SERIES, DORMITORIES: ALL REGIONS



# ALLOWABLE FUEL AND EQUIPMENT COMBINATIONS

| Cooking | Hot Water | Space Heating | Remarks |
|---|---|---|---|
| TEMPORARY FAMILY DWELLINGS - TDU SERIES | | | |
| Coal Range | Water back | | For '0' B.R. units in all climates and for 1, 2, and 3 B.R. units in mild climates. |
| Coal Range | Water back | Coal Circulator | For 1, 2, and 3 B.R. units in cold climates. |
| Gas Range | Coal group plant | *Coal group plant | For 2-story buildings only; forced warm air or forced hot water. Use of gas subject to WPB Limitation Orders L-31, L-31a, L-86, L-174. Gas piping limited to 175 pounds per dwelling unit. |
| Kerosene Range | Coal or oil group plant | *Coal or oil group plant | For 2-story buildings only; forced warm air or forced hot water. Use of oil subject to WPB Limitation Order L-56. Use kerosene ranges only in areas where oil for space heating is permitted. |
| Gas Range | Gas water heater | Gas Circulator | For all units. Subject to WPB Limitation Orders L-31, L-31a, L-86, and L-174. Gas piping limited to 200 pounds per dwelling unit. |
| Gas Range | Gas water heater | Coal Circulator | For all units. Subject to WPB Limitation Orders L-31, L-31a, L-86, and L-174. Gas piping limited to 175 pounds per dwelling unit. Particularly suitable for one-story units. |
| Kerosene | Oil water heater | Oil Circulator | For all units. Subject to WPB Limitation Order L-56. When oil is used for space heating it should also be used for cooking and water heating. |

*Select forced hot water only where heating season is long and where transportation makes fuel critical.

March 15, 1943

ALLOWABLE FUEL AND EQUIPMENT COMBINATIONS
(Continued)

| Cooking | Hot Water | Space Heating | Remarks |
|---|---|---|---|
| **DORMITORY APARTMENTS - WA SERIES** | | | |
| Electric hot plates | Coal group plant | *Coal group plant | Forced warm air or forced hot water, all fuels. Oil subject to WPB Limitation Order L-56. Gas subject to WPB Limitation Orders L-31, L-31a, L-86, L-174, and gas main located close or adjacent to site. |
| Electric hot plates | Oil group plant | *Oil group plant | |
| Electric hot plates | Gas group plant | *Gas group plant | |
| **DORMITORIES, M & M BLDG., MORALE ACTIVITIES BLDG. - WD SERIES** | | | |
| None | Coal water heater | Coal Furnace | Forced warm air, all fuels. Oil subject to WPB Limitation Order L-56. Gas subject to WPB Limitation Orders L-31, L-31a, L-86 and L-174, and gas main located close or adjacent to site. |
| | Oil water heater | Oil Furnace | |
| | Gas water heater | Gas Furnace | |
| **CAFETERIA - WD SERIES** | | | |
| Coal Range | Coal water heater | Coal Furnace | Forced warm air, all fuels. Oil subject to WPB Limitation Order L-56. Gas subject to WPB Limitation Orders L-31, L-31a, L-86 and L-174, and gas main located close or adjacent to site. Steam boiler for cooking to be fired with same fuel as furnace and water heater. |
| Gas Range | Gas water heater | Gas Furnace | |
| Gas Range | Coal water heater | Coal Furnace | |
| Gas Range | Oil water heater | Oil Furnace | |
| Oil Range | Oil water heater | Oil Furnace | |

*Select forced hot water only where heating season is long and where transportation makes fuel critical.

March 15, 1943

ALLOWABLE FUEL AND EQUIPMENT COMBINATIONS
(Continued)

| Cooking | Hot Water | Space Heating | Remarks |
|---|---|---|---|
| TRAILERS | | | |
| Kerosene | | Oil Circulator | WPB Limitation Order L-56 does not apply to trailers. |

| Sterilization | Hot Water | Space Heating | Remarks |
|---|---|---|---|
| INFIRMARY - WD SERIES | | | |
| Gas or Electricity | Coal water Heater | Coal Boiler | Forced hot water, all fuels. Oil subject to WPB Limitation Order L-56. Gas subject to WPB Limitation Orders L-31, L-31a, L-86, and L-174, and gas main located close or adjacent to site. |
| Gas or Electricity | Oil water Heater | Oil Boiler | |
| Gas | Gas water Heater | Gas Boiler | |

# SUMMARY INTERPRETATION OF WPB LIMITATION ORDERS ON FUELS

WPB Limitation Orders on fuels which have been issued to date are summarized herewith:

A. Manufactured Gas

Limitation Order L-174, issued August 25, 1942 prohibits use of manufactured gas for cooking, domestic water and space heating (master metered) in housing projects in all parts of the United States.

In the past, exceptions have been granted for the use of manufactured gas for cooking and cooking and water heating, only where the Company's supply of gas is adequate.

B. Natural (or Mixed Natural and Manufactured Gas)

Natural gas Limitation Orders L-31, as amended January 1, 1943, and L-31a, issued November 24, 1942, restrict the use of natural or mixed natural and manufactured gas for cooking, domestic water and space heating.

a. Use for space heating is prohibited in all areas; but exceptions where the supply of gas is adequate have been granted with respect thereto in those localities not specifically designated in Areas I, II, III, IV, V and VI, set forth in L-31, and in Area VII, covered by L-31a. Designated areas are listed below.

b. Use for cooking, or cooking and domestic water heating is permitted in all areas when estimated usage for entire project does not exceed 5000 cubic feet per day per project. Exceptions, when estimated usage exceeds 5000 cubic feet per day per project and where the supply of gas is adequate, have been granted.

## AREA I

Alabama (except the area served by the United Gas Pipe Line Company)
Arkansas (only the area served by the Mississippi River Fuel Company)

# SUMMARY INTERPRETATION OF WPB LIMITATION ORDERS ON FUELS

## AREA I (continued)

*California
District of Columbia
Georgia
Illinois
Indiana
Kentucky
Maryland
Michigan
Mississippi (except the City of Natchez, the Towns of Woodville, and Centerville, and the area served by the United Gas Pipe Line Company)
Missouri
New York
Ohio
Pennsylvania
Tennessee
Virginia
West Virginia

* War Production Board has granted exceptions for space heating, domestic water heating and cooking in Bay Area served by Pacific Gas and Electric Company.

## AREA II

Kansas (only the following counties):

| | | | |
|---|---|---|---|
| Allen | Crawford | Labette | Neosho |
| Anderson | Doniphan | Leavenworth | Osage |
| Atchison | Douglas | Linn | Shawnee |
| Bourbon | Franklin | Miami | Wilson |
| Brown | Jackson | Montgomery | Woodson |
| Cherokee | Jefferson | Nemaha | Wyandotte |
| Coffey | Johnson | | |

## AREA III

Iowa (only the areas served by Northern Natural Gas Co., and utilities obtaining any part of their requirements from this Company)

Kansas (only the areas served by Cities Service Gas Co., Kansas Power and Light Co., Kansas-Nebraska

# SUMMARY INTERPRETATION OF WPB LIMITATION ORDERS ON FUELS

## AREA III (continued)

Gas Co., Consolidated Gas Utilities Corp. Drillers' Gas Co., and utilities obtaining any part of their requirements from these companies, except those areas included in Area II above)

Minnesota

Nebraska (only the areas served by the Northern Natural Gas Co., Kansas-Nebraska Gas Co., Cities Service Gas Co., and utilities obtaining any part of their requirements from those companies)

Oklahoma (only the areas served by Cities Service Gas Co., Consolidated Gas Utilities Corporation, and utilities obtaining any part of their requirements from these companies)

South Dakota (only the areas served by Northern Natural Gas Co., and utilities obtaining any part of their requirements from this Company)

## AREA IV

Iowa (only the areas served by the Natural Gas Pipe Line of America, and utilities obtaining any part of their requirements from this Company)

Kansas (only the areas served by the Natural Gas Pipe Line of America, and utilities obtaining any part of their requirements from this Company, except those areas in Kansas included in Area II or III above)

Nebraska (only the areas served by the Natural Gas Pipe Line Co. of America and the utilities obtaining any part of their requirements from this Company)

SUMMARY INTERPRETATION OF WPB LIMITATION ORDERS ON FUELS

AREA V

Those areas in New Mexico, Colorado and Wyoming supplied by the Colorado Interstate Gas Company, or by any utility receiving all or any part of its gas supply from said company.

AREA VI

Those areas in Arizona and New Mexico (except Eddy, Lea and Chaves Counties in New Mexico) served by the El Paso Natural Gas Company or by any utility receiving all or any part of its gas supply from said company.

AREA VII

Those areas in Wyoming and Utah served by the Mountain Fuel Supply Company.

Those areas in Kansas served by the Panhandle Eastern Pipeline Company or by any utility receiving all or any part of its gas supply from said company, except areas in Kansas included in Area II above.

C. Liquefied Petroleum Gas

Limitation Order L-86, dated April 8, 1942, prohibits use of liquefied petroleum gas for any purpose in housing projects in all parts of the United States.

Exceptions may be granted by the WPB where use of liquefied petroleum gas is deemed to be in the public interest. Its use should be limited only to those areas where:

a. Natural, mixed natural and manufactured, or manufactured gases are not available, or their use not possible due to inadequacy of supply or piping weight restrictions.

b. Oil is not permitted due to WPB Limitation Order L-56.

SUMMARY INTERPRETATION OF WPB LIMITATION ORDERS ON FUELS

C. Liquefied Petroleum Gas (continued)

c. The transportation of coal is critical or its use not feasible.

Data for exceptions should be furnished on WPB Form PD-397.

D. Fuel Oil

Limitation Order L-56, as amended February 5, 1943, prohibits the use of oil fuel for domestic water and space heating in thirty-four states (except areas in Florida west of the Apalachicola River) and the District of Columbia. The fourteen states not affected by this Order are: Alabama, Arizona, Arkansas, California, Colorado, Idaho, Louisiana, Mississippi, Montana, Nevada, New Mexico, Texas, Utah and Wyoming. Use of oil for space heaters in house trailers is exempted from provisions of this Order.

Kerosene for cooking, although not prohibited by this Limitation Order, should not be used in the areas where fuel oil is prohibited for domestic water and space heating.

Nothwithstanding the fact that appeals for exceptions under Limitation Order L-56, are permissible, the WPB has granted only two such appeals made by Federal Public Housing Authority to date, under very compelling circumstances.

E. Coal

There are no Limitation Orders restricting its use.

F. Appeals for Exceptions

Appeals for exceptions to WPB Limitation Orders will be processed by Central Office. Information, to enable the processing of such appeals, must be furnished by Regional Offices and should include:

a. The Limitation Order from which exception is requested.

b. The part of the Limitation Order from which the appeal is made.

c. Project number and preference rating serial number

SUMMARY INTERPRETATION OF WPB LIMITATION ORDERS ON FUELS

F. Appeals for Exceptions (continued)

d. Location of project, and its relation to industry connected with war production.

e. What alternate facility would be required to serve if the appeal is denied.

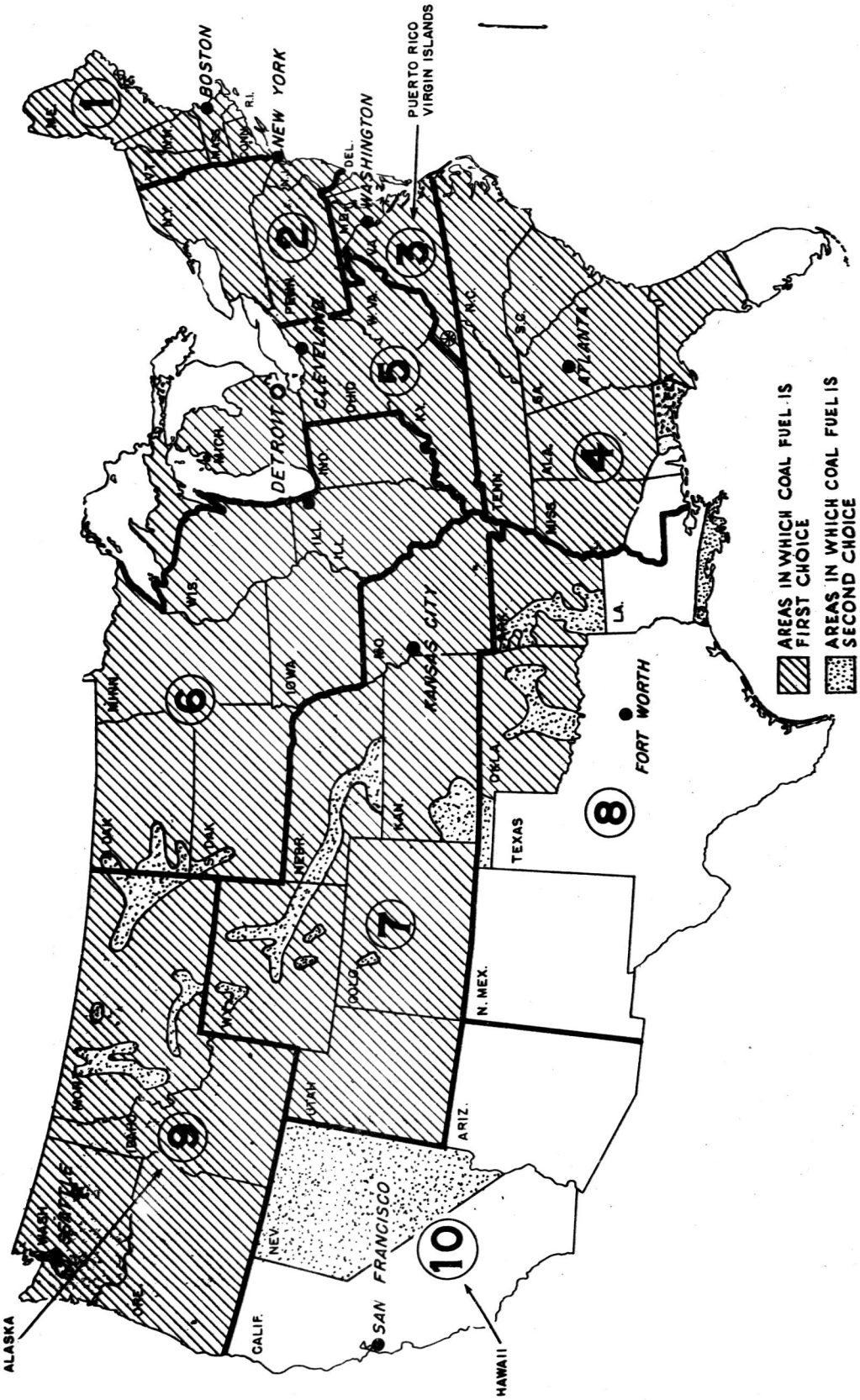
f. Relative cost of the change in facilities or equipment.

g. Date when project will be made available.

h. If a special form of release is required by War Production Board, these shall be certified and attached in the appropriate number.

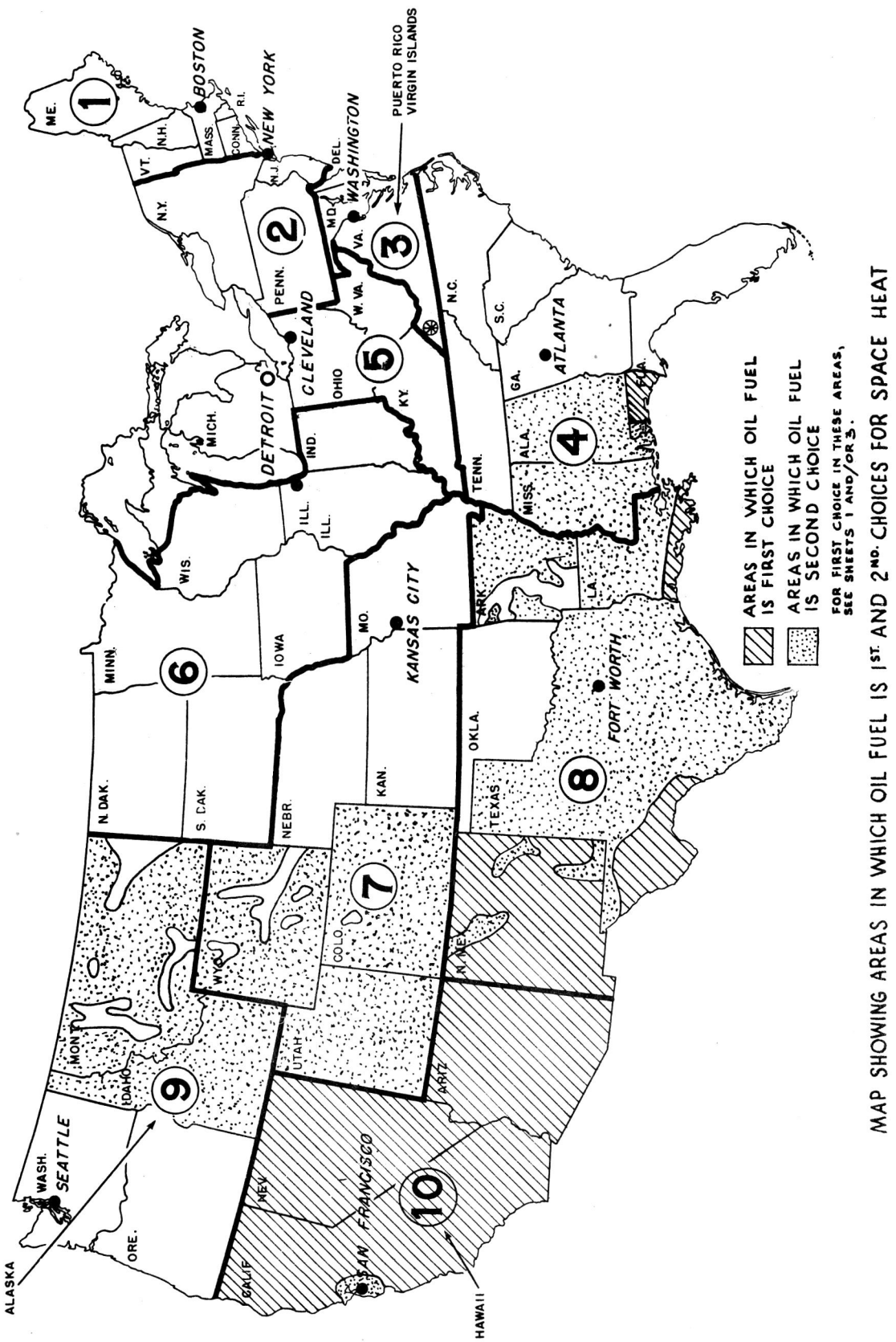
i. Other facts pertinent and in justification for granting of the appeal.

## AREA MAPS SHOWING FUELS



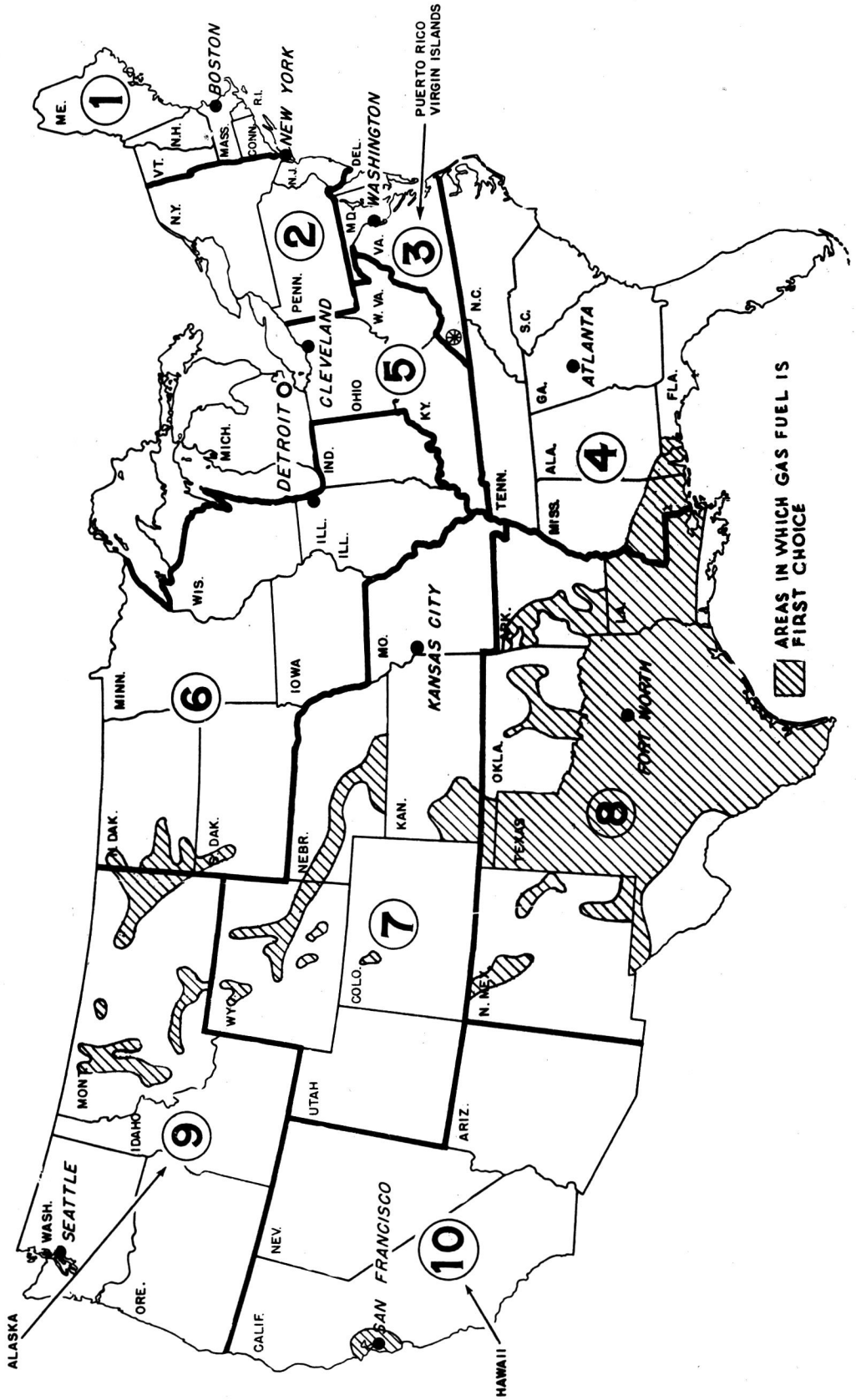

MAP SHOWING AREAS IN WHICH COAL FUEL IS 1ST AND 2ND CHOICE FOR SPACE HEAT

## AREA MAPS SHOWING FUELS




MAP SHOWING AREAS IN WHICH OIL FUEL IS 1ST AND 2ND CHOICES FOR SPACE HEAT

## AREA MAPS SHOWING FUELS




MAP SHOWING AREAS IN WHICH NATURAL GAS IS FIRST CHOICE FOR SPACE HEAT

# DOMESTIC REFRIGERATION SCHEDULE
## BY PERCENTAGE OF TYPE

| Region | Ice 3-½ cf Per cent | Ice 5 cf Per cent | Electric Per cent | Gas Per cent |
|---|---|---|---|---|
| TDU SERIES | | | | |
| I . . . . . | 8.5 | 76.5 | 15 | - |
| II . . . . . | 8.5 | 76.5 | 10 | 5 |
| III . . . . . | 8.5 | 76.5 | 15 | - |
| IV . . . . . | 8 | 72 | 20 | - |
| V . . . . . | 8.5 | 76.5 | 15 | - |
| VI . . . . . | 8 | 72 | 20 | - |
| VII . . . . . | 7.5 | 67.5 | 20 | 5 |
| VIII . . . . | 7.5 | 67.5 | 10 | 15 |
| IX . . . . . | 8 | 72 | 20 | - |
| X . . . . . | 8.5 | 76.5 | 5 | 10 |
| WA SERIES | | | | |
| All Regions | 100 | - | - | - |

March 15, 1943
FP 47969

SUBJECT: Spacing of Single and Twin Houses

Single and Twin Houses. These are usually arranged in rows or groups facing each other. For economy in utilities on one side and better light, ventilation, and privacy on the other, alternately narrower and wider spacings are generally used. Minimum spacings for these and for separation between dwellings in the row or group are given below.

Parallel Rows. The minimum spacings between parallel rows or groups of dwellings are 40 feet for the narrow space and 50 feet for the wide space. When the spaces between successive rows are made equal, the spacing shall be not less than 45 feet.

Separation in the Row. The minimum distance between dwellings in the row or group shall be 15 feet for single houses and 20 feet for twin houses; except that a space of at least 25 feet shall be provided between each group of not more than 6 such dwelling units of combustible construction. In the exceptional case of buildings of fireproof construction, this additional protective space may be omitted.

NHA
FPHA

CIRCULAR
9-15-43

TO: All Holders of Bulletin No. 2

SUBJECT: Part III, "Site Engineering," of Bulletin No. 2, Standards for Temporary War Housing

Attached are the standards for "Site Engineering" revised as of September 1, 1943, which supersede those dated January 1943.

Note the sheet of "Corrections" (inserted after the Table of Contents) covering changes made by the recent revodation of restrictions on the use of bituminous products for road construction and maintenance.

for Charles K. Agle
W. P. SEAVER
Assistant Commissioner
for Development

18275

NHA
FPHA

Bulletin No. 2
Part III
Site Engineering

September 15, 1943

# C O R R E C T I O N S

The following corrections should be made in Bulletin No. 2, Part III, "Site Engineering," dated September 1, 1943:

Pages 6 and 7

Substitute the following for the three subparagraphs under "b. Water-bound macadam, gravel, sand-clay, slag., etc. with bituminous surface treatment:"

"Recommendation No. 45, Amended, dated 10/5/42, of the Petroleum Coordinator for War, which deferred for the duration of the emergency the use of asphalt and tar products for public roads construction and maintenance, except as certified by the Public Roads Administration to be necessary for the successful prosecution of the war, was revoked on September 9, 1943. On the same date Petroleum Directive 72 was issued prohibiting the use of road oil (SC material) as a paving material or dust pallative.

"Recommendation No. 61 of the Petroleum Coordinator restricts the manufacture of asphalt cements to penetration ranges 50-60, 85-100, 120-150, 150-200 and 200-300; cut-back asphalts to grades MC-1, MC-2, MC-3, MC-5, RC-2, RC-3 and RC-5; and emulsified asphalts to types I, II, III and V."

Page 7

Delete the first two sentences of the first subparagraph under "d. Portland cement concrete."

Page 9

Delete the two sentences reading, respectively as follows:

"(The use of bituminous materials for walk construction is not permitted, except with special approval by the Office of the Petroleum Coordinator.)"

"(The use of bituminous materials on such areas is likewise permissible only with special approval by the Office of the Petroleum Coordinator.)"

Under "Surfaced Areas," which are suitable and permissible in temporary housing projects, add "bituminous surfacing" to "smaller recreation areas".

BULLETIN NO. 2

# STANDARD FOR TEMPORARY WAR HOUSING

## PART III

## SITE ENGINEERING

## C O N T E N T S


| | Page |
|---|---|
| General | 1 |
| Requirements of Other Governmental Agencies | 1 |
| Engineering Layout | 2 |
| Utilities and Topographic Maps | 2 |
| Grades and Surface Drainage | 2 |
| Streets, Drives and Parking Areas | 4 |
| Walkways | 8 |
| Surfaced Areas | 9 |
| Sewerage and Sewage Disposal | 9 |
| Water Supply and Distribution | 12 |
| Gas Distribution | 15 |

| | | |
|---|---|---|
| Fig. | SE-1A | Domestic Water Supply Pipe Sizing |
| " | SE-2 | Approximate Pressure Losses Through Cold Water Meters |
| " | SE-3 | Rainfall Intensities in Continental United States |
| " | SE-4 | Requisite Diameters for Storm Sewers |
| " | SE-5 | Peak Hour Gas Demands for Temporary War Housing |
| " | SE-6 | Gas Main Sizing - Low Pressure |
| " | SE-6a | Gas Main Sizing - Intermediate Pressure (5 lbs. to 1 lb. per. sq. in.) |
| " | SE-6b | Gas Main Sizing - Intermediate Pressure (10 lbs. to 1 lb. per. sq. in.) |
| " | SE-7 | Typical Roadway Cross Sections for Temporary War Housing |



NATIONAL HOUSING AGENCY

FEDERAL PUBLIC HOUSING AUTHORITY

September 1, 1943

This is a revision of the Site Engineering Standards issued January 1943. The principal changes and additions relate to: roadway section, p. 4; sewage pumping stations, p. 11; water supply, p. 12; and design limitations on gas distribution systems, p. 16. Additions to the Standards of January 1943, for Sewerage and Sewage Disposal, Water Supply Distribution, and Gas Distribution, are identified by the foot note, "Not included in the January 1943 issue (as approved by WPB) of these Standards." Such additions are in the nature of amplifications, not changes, in the previous Standards and should be regarded as an integral part of the present text.

# SITE ENGINEERING

## General

Controlling considerations in site engineering design, in their order of precedence, are:

a. Conservation of critical materials. Whenever necessary, economy in construction and maintenance should be sacrificed and local or so-called "standard" practice disregarded, in the interest of conserving critical materials.

b. Quickest possible construction. The availability of all required materials should be investigated and only those specified which are promptly available.

c. Minimum construction costs.

## Requirements of Other Governmental Agencies

These standards comply with the rulings of the War Production Board and the Petroleum Coordinator for War. As such rulings are amended, or new rulings are issued, the standards will be changed by releases from the Central Office.

Relative to sewers, and water and gas distribution:

a. These standards were approved by the Power and Construction Divisions of the WPB. The Construction Division agreed that, in reviewing applications for priority assistance, it would not reduce below these standards the kinds and quantities of materials requested. (This text contains some additions, identified as such, to the standards as approved by the WPB.)

b. While these standards represent maximum limits for design, the provision of adequate utility service will generally require designing upwards, as closely as practicable to such limitations without exceeding them. Thus, carefully calculated design becomes imperative.

c. These standards supplement, but do not supersede, the WPB Housing Utilities Standards as amended to August 25, 1942.

d. Appeals for exceptions to WPB requirements may be made, when considered necessary, under procedures described in Chapter 3480 of the Manual of Policy and Procedure. Design information required by the WPB is described in Section 3470:5 and in Exhibit 6 to Chapter 3482.

## Engineering Layout

Project plans must supply all information required for staking out buildings and surface improvements. For site plans laid out on rectilinear lines, building locations may be fixed by reference to property lines and roadways; for irregular site plans, they should be fixed generally by coordinates.

## Utility and Topographic Maps

The Surveyor's Utility and Topographic Maps should be included in the project contract drawings for informative purposes, unless all pertinent information thereon has been transferred to such drawings.

## Grades and Surface Drainage

The project grade design consists of fixing building floor elevations and finished grades for project streets, drives, walkways, lawns and other site areas. Prerequisites are:

An accurate topographic survey of the site

Established grades for city streets or improved highways bordering or traversing the site.

Grade elevations of existing sewers at the project site.

Adequate information on soil conditions.

Establishing of maximum and minimum permissible heights of building floors above finished grade at buildings.

Fixing the cross sections of new streets and drives.

The principal design features, apart from surface drainage, to be considered in developing project grades include:

Fitting the project to the site, to minimize earthwork. (To the fullest possible extent avoid heavy grading, in order to expedite construction, reduce cost and obviate the need for heavy equipment.)

A reasonable balance of cut and fill.

Avoidance of fills which will add to the depth of building foundations.

Eliminating, so far as possible, steps in yard walks at building entrances.

Providing even profiles for walks and drives and otherwise giving the site a pleasing appearance, without adding to construction cost.

Avoiding earth banks wherever possible.

Meeting satisfactorily existing ground levels at trees which are to be preserved.

Keeping finished grades as high as practicable, where rock will be encountered close to the surface, in order to minimize the Cost of grading and utility trenching.

Effective surface drainage of all project areas shall be insured by:

Giving adequate, continuous slopes to all parts of the site not occupied by buildings, walks not adjoining gutters to be given both cross and longitudinal slope; providing positive slopes away from buildings.

Sloping lawns and planted areas toward streets, driveways, walks and other surfaced areas.

Providing for surface drainage directly into public streets to the greatest feasible extent, in order to obviate or limit the need for project storm sewers.

Avoiding generally drainage from walks or other paved surfaces onto grassed areas; particularly avoiding flow across walkways, except where they adjoin curbs.

Providing storm water inlets, where necessary, to intercept the maximum run-off for which the storm sewer system (if any) is designed.

Avoiding "pockets" where stoppage of a drain would result in damage to buildings or serious wash across planted areas.

Grading with the utmost care the ground surface under buildings which have pier foundations, so as positively to eliminate depressions in which water might collect and to provide drainage to the exterior.

Maximum and minimum slopes. So far as site topography permits (without adding appreciably to construction cost), project slopes should be kept within the following limits:

| | Maximum | Minimum |
|---|---|---|
| Project streets and driveways | 8.00% * | 0.50% |
| Building entrance walkways | 15.00% ** | 1.00% |
| Other walkways | 15.00% | 0.50% |
| Earth ditches | 2.00% *** | 1.00% |
| Sodded "swales" | 10.00% | 1.00% |
| Paved gutters | - | 0.50% |
| Grassed areas | 15.00% | 1.00% |
| Earth banks | 2 to 1 **** | - |

* 5.00% for gravel, sand-clay and water-bound macadam.
** Flatten steep walkway grades at building platforms.
*** Depends on nature of soil. (See reference on page 5 to the use of "checks.")
**** 3 to 1 preferable.

Grading plans. Show finished grades, by spot elevations, in the full detail necessary for staking out site grading and constructing surface improvements. Give building floor elevations and finished grade elevations at building entrances, at corners of buildings, at intersections, termini and breaks in grade in roadways, walks and other paved areas, and at breaks in grade of lawns and planted areas.

Roadway profiles are not essential in the construction contract drawings, although it is generally necessary to prepare them in the course of the grade studies. In any event, curb grades (or grades at the sides of roadways having no curbs) should be shown on the grading plans. Such grades should be given at the returns into intersecting streets and roads, and elsewhere as required. Vertical curve data should also be shown.

Finished grade contours should be used only when the required grading cannot be shown practicably by spot elevations. Do not show grade contours crossing roadways or other surfaced areas.

## Streets, Drives and Parking Areas

Street and driveway cross sections must be fixed before the final site plan is drawn, in order to determine the requisite space between street lines and between building lines. Roadways with side ditches may require up to 20 feet greater street width than do those in which the paved area serves as a surface drain.

Roadway Section. For the main project drives the choice of section lies generally between (a) roadways with side ditches and (b) roadways with curbs. Favoring the former is lower initial cost; favoring the latter is lower maintenance cost and the feasibility of maintaining the drives in neater condition. The additional cost of curbing (or curb and gutter),

also generally of some storm sewers, in connection with curbed roadways, is in large part offset by the cost of culverts and foot-bridges, and by the slightly higher utility, grading and lawn preparation costs for roadways with ditches. Comparative estimates, taking into account the principal elements involved and considered in conjunction with the following guide, will facilitate selecting the section of street or driveway to be used in any given case.

| Conditions favorable to roadways with side ditches | Conditions favorable to roadways with curbs |
|---|---|
| Light slopes which will not produce erosive velocities of flow in the ditches. | Steep grades which would cause erosion in earth ditches and result in costly maintenance. |
| Clayey soil which will withstand erosion. | Sandy soil or loam, easily eroded. |
| Low project density, with ample space available for wide streets. | Relatively high project density - due to high land cost or other reason - making it desirable to minimize driveway widths. |
| Topographic conditions which would make the provision of storm sewers costly, even if they were designed for light run-off. | Conditions such as availability of a number of outlets, or low intensity of rainfall, which would permit constructing essential storm sewers, at comparatively low cost. |
| | Low prevailing local costs for portland cement concrete pavement and/or curb and gutter. |

For service drives, the inverted crown section of roadway is generally recommended. As a rule, there is insufficient space for side ditches, and the "dished" section costs less than roadways with curbs.

Where used, roadside ditches should preferably be shallow, rounded and grassed or sodded. When ditches of increased cross section are required, storm flows should be calculated and ditches and culverts designed accordingly. "Stops" or "checks" may be feasible in some instances for preventing serious erosion, when the proposed grades would produce velocities critical for the soil. It is important that culverts be kept high enough (or ditches deep enough), that sedimentation will not rapidly cause them to be clogged.

Metal gratings must not be used for storm water inlets. (This point is mentioned here as affecting roadway design.) Inlets of the "curb" type may generally be employed (if inlets are necessary), even when drainage is by roadside ditches.

Roadway and parking area surfacing should in general be as light and inexpensive as feasible, consistent with soil and climatic conditions and with a 5-year life. However, project roads used as construction roads may, consequently, require heavier design than would otherwise be necessary. (See Section 3501:4 of the Manual of Policy and Procedure.) Parking area surfacing should be lighter than that on roadways; for most conditions a thickness of 4 inches is ample.

Following are surfacing types to be considered, and recommendations concerning their use:

a. Water-bound macadam, gravel, sand-clay, soil-stabilized surfacing, etc., with or without calcium chloride.

This type of surfacing should receive prime consideration in all cases. Steep slopes will preclude its use in some instances. When used on curbed streets and drives, concrete curb and gutter is generally necessary.

b. Water-bound macadam, gravel, sand-clay, slag, etc., with bituminous surface treatment.

In Recommendation No. 45, Amended, dated 10/5/42, the Petroleum Coordinator for War deferred for the duration of the emergency, the use of asphalt and tar products for public road construction, unless such use is certified by the Public Roads Administration to be necessary to the successful prosecution of the war. Further, the use of bituminous material for parking area surfacing was made subject to special approval by the Office of the Petroleum Coordinator. (Copies of Recommendation No. 45, Amended, were forwarded to all regional offices.) Asphalt cement usage has since been restricted to penetration ranges 50-60, 85-100, 120-150, 150-200 and 200-300; cut-back asphalts to grades MC-1, MC-2, MC-3, MC-5, RC-2, RC-3 and RC-5; and emulsified asphalts to types I, II, III and V. (See Federal Specifications.) So far as practicable, asphalt cement and emulsified asphalt must be used in lieu of cut-back asphalt. (See Section 3483:9 of the Manual of Policy and Procedure for information regarding applications for the use of bituminous materials.)

It is understood that the PRA will certify the use of bituminous materials for road construction only when a surfacing without bituminous topping would result in a recurring maintenance problem or when substitution would cause serious delay

in project occupancy, and only when the thickness of bituminous topping will not exceed $\frac{3}{4}$ inch.

District engineers of the PRA should be consulted in the drafting of surfacing specifications, when the use of bituminous materials is contemplated.

c. Soil-cement.

This material is best adapted to roadways laid out in uniform width, permitting convenient operation of road-building equipment. It is not suitable for surfacing small parking areas and "stub" driveways. Bituminous topping is generally not essential for soil-cement roadways in temporary housing projects.

d. Portland cement concrete.

The above restrictions on the use of asphalt and tar products in road construction may warrant, in some instances, the construction of portland cement concrete pavement on roadways which would normally be bituminous-surfaced. Integral curb can be provided at relatively low cost. Concrete is the most suitable material for service drives of "dished" cross section.

When the use of concrete pavement is justified, a 5-inch slab, with thickened edges for main roadways, should be adequate, except where unfavorable soil conditions are encountered. The pavement must not be reinforced. Integral curb may be considered to serve the purpose of the thickened edge for main roadways.

Joints should be designed without dowels, tie bars, sheet metal, etc. A Portland Cement Association bulletin, "The Design of Plain Concrete Pavements for City Streets of Varying Traffic Classes," dated March 1942, illustrates various joint types requiring no steel.

Lean-mix concrete pavement and "cement-treated base" should be considered for projects in localities where such surfacing has been used successfully. (See publications of the Portland Cement Association.)

To the greatest possible extent, specify only such materials for roadway and parking area construction as are available in the immediate locality.

State Highway Department Specifications may be referred to in housing project specifications, but only after careful examination and the voiding of any requirements which would be impracticable or would involve unwarranted cost in their application to project work, such as requirements for construction methods wholly unadaptable to the project.

Roadway crowns for various surfacing types should be approximately as follows:

| | |
|---|---|
| Gravel and other calcium chloride treated surfacings | 1/2 inch per foot |
| Bituminous surface treatment | 1/4 inch per foot |
| Soil-cement | 1/4 inch per foot |
| Portland cement concrete | 3/16 to 1/4 inch per foot |
| Concrete (inverted crown): | |
| Single-lane roadway | 3/8 inch per foot |
| Two-lane roadway | 1/4 inch per foot |

Where practicable, grade service drive and parking area entrances to cross sidewalks at the walkway grade.

Curbs. Curbing, where used, should generally consist of concrete curb and gutter, for other than portland cement concrete pavement.

Minimum curb radii for intersections and turns are:

| Respective widths of intersecting roadways | Minimum curb radius |
|---|---|
| 10 feet and 10 feet | 25 feet |
| 10 feet and 16 feet | 20 feet |
| 10 feet and 20 feet | 15 feet |
| 16 feet, and greater widths | 10 feet |

## Walkways

Materials. For temporary housing, the least expensive type or types of walkways which will reasonably be satisfactory in service should be used. Alternate materials are:

a. Concrete, 3 or 3½-inch - Suitable for main walkways in most projects and for all walkways in projects located in regions of heavy snowfall. Concrete walks should be divided into flags by means of full depth joints. Gravel or cinder sub-base should not be provided. So far as practicable, use a less expensive type of surfacing than concrete.

b. Concrete blocks - Suitable principally for entrance walks and minor approach walks; salvageable.

c. Natural stone slabs - Desirable material for entrance and minor approach walks, where available at reasonable cost; salvageable.

d. Gravel, stone screenings, decomposed granite, etc. - Suitable principally for projects in mild climates.

(The use of bituminous materials for walk construction is not permitted, except with special approval by the Office of the Petroleum Coordinator.)

Avoid steps in walkways whenever possible. In climates where snow and ice are common, provide a wood handrail on one side, for runs of steps having more than six risers.

## Surfaced Areas

In general, the following surfaces are suitable and permissible in temporary housing projects:

Large play areas - Natural soil. (Maintain existing grades whenever possible.)

Smaller recreation areas - Natural soil; stabilized soil; gravel (with or without calcium chloride treatment).

Play areas for wheeled toys - Concrete (permissible only for very small areas).

Laundry yards - Grassed areas; gravel; stone screenings.

(The use of bituminous materials on such areas is likewise permissible only with special approval by the Office of the Petroleum Coordinator.)

## Sewerage and Sewage Disposal

Sewage Disposal. Disposal of sewage from sanitary sewers should be by connection to an existing sewer system when practicable. Otherwise, provide sewage treatment works:

a. only to the extent essential for the protection of public health, as determined by the Regional Director (see also Section 3470:6 of the Manual of Policy and Procedure),

b. consistent in design and construction with the temporary nature of the project,

c. designed to be built expeditiously and with a minimum of critical materials,

d. of the individual septic tank, tile-bed type only when percolation tests and local experience indicate definitely that this method of sewage disposal should prove successful; also only for projects of low density where amply space will be available for tile fields, and

e. designed for the following rates of sewage flow (unless local information on water consumption or sewage flow from housing projects indicates that other rates should be used):*

| | |
|---|---|
| Average, per 24 hours..... | 50 gallons per capita |
| Average, per 16 hours..... | 42 gallons per capita |
| Maximum, per 4 hours..... | 15 gallons per capita |
| Minimum, per 4 hours..... | 3 gallons per capita |

The general method of disposing of project sewage should be determined at the time the site is selected. (See Bulletin No. 25, "Site Selection for Temporary War Housing.")

The design of sewage treatment works requires the highly specialized services of a sanitary engineer. Sewage treatment plant design should, if practicable, meet the requirements of local and State Health Departments (see Section 3470:6 of the Manual of Policy and Procedure).

Design Bases for Sewers. Sanitary sewers should be designed for a maximum flow, with sewers flowing full, of approximately 250 gallons daily per capita. In general, grades should produce velocities of at least 2 feet per second with sewers flowing full or half full, although a velocity of 1½ feet per second may be used if sewage pumping, or excessive trench depths, can thus be avoided. Base design on n = 0.013 in the Kutter formula. Individual house connections may be 4 or 6-inch; short laterals and connections to dormitories and multi-family dwellings should be 6-inch; other lines should not be smaller than 8-inch.

Storm sewers should be provided only to the extent, necessary to prevent site or street flooding or serious erosion. Design storm sewers generally for a rainfall rate of only about 1/2 to 2/3 of that employed in the same locality for housing developments of permanent construction, but provide adequate protection for "pockets," if any, the flooding of which might cause serious damage. Where practicable, grades should produce velocities of at least 2½ feet per second with sewers flowing full. Storm sewer sizes may be taken from Figure SE-4, adjusting the drainage areas proportionately to any assumed rainfall rate lower than 4 inches per hour. Figure SE-3 may be referred to for ascertaining rainfall intensities in different localities.

Sewer Layout. It is preferable that main sewers follow principal project streets, but not if additional critical materials will be required or project costs appreciably increased. Except at crossings, sewers should not be located under the surfaced portions of roadways.

*Not included in the January 1943 issue (as approved by WPB) of these Standards.

A common trench must not be used for sewers and water lines (except immediately adjacent to buildings where the house sewer and water supply lines are necessarily located close together); so far as practicable, sewers should be laid at a greater depth than adjacent water lines and at least 10 feet laterally from them.

Customary practice should be followed in laying sewers at uniform grades and in straight lines between manholes and other appurtenances.

Sewer Appurtenances. Manholes on sanitary and storm sewers may be spaced up to about 500 feet. On sanitary sewers, cleanouts should be employed in lieu of manholes at the upper end of lines and at changes in direction in short laterals. On storm sewers, catch basins (or inlets) may be made to serve also as manholes. In lieu of cast iron manhole frames and covers, reinforced concrete should be used in streets, and concrete or creosoted wood in lawn areas. Provide steps of cast iron or steel bars, spaced not more than 15 inches, in manholes 6 feet or more in depth.

Catch basins (or inlets) at curbs shall be of the open-throat type. Drainage gratings, when used, should be of reinforced concrete. Metal gratings are not allowed.

Cleanouts in temporary housing projects should consist simply of removable plugs in the ends of lines.

Sewage Pumping Stations.* The following sewage pumps are supplied through the FPHA Procurement Division, Central Office, and must be used in project sewage pumping stations whenever capacity requirements permit:

Make and type: Chicago Pump Company vertical, pedestal-mounted, non-clog, No. VPMIMC4.

Suction: 4-inch.

Discharge: 4-inch.

Motor sizes and range of capacities:

| Motor | Pump Operating Capacities |
|---|---|
| 3 HP, 1150 RPM, 220 or 440 volt, 3-phase, 60 cycle, A.C. | 150 GPM against 30 feet head to 500 GPM against 17 feet head |
| 5 HP, 1750 RPM, 220 or 440 volt, 3-phase, 60 cycle, A.C. | 200 GPM against 42 feet head to 550 GPM against 23 feet head |
| 7½ HP, 1750 RPM, 220 or 440 volt, 3-phase, 60 cycle, A.C. | 250 GPM against 48 feet head to 700 GPM against 28 feet head |

*This section was not included in the January 1943 issue (as approved by WPB) of these Standards.

Pumping equipment specifications and a standard plan for a pumping station using the above pumps and accompanying control equipment, were forwarded to all regional offices on July 5, 1943.

Certain elements of the standard control equipment are not considered suitable for permanent installation in the pump pit. Therefore, a superstructure should be provided over the pump pit whenever the standard equipment is installed.

For the usual duplex installation, each pump should have a capacity of from 350 g.p.c.p.d. for small projects (about 100 DU's) to 250 g.p.c.p.d. for very large projects (approximately 1000 DU's).

Whenever possible, provide an overflow from the sewage pump to operate in case of pump or power failure. If the discharge from the overflow can be disposed of for a reasonable period of time without creating a nuisance or health menace, one pump only should be provided.

Sewer Plans. Show clearly on the sewer plans the locations and necessary invert elevations of all lines, also existing ground contours and finished grades at buildings and at intervals along roadways, walks, etc. Only under special conditions are sewer profiles required as contract drawings.

## Water Supply and Distribution

Source of Supply. The project water supply should be taken from an existing, approved, public water supply when practicable. The source of supply should be determined at the time of site selection (see Bulletin No. 25, "Site Selection for Temporary War Housing").

Independent Water Supply.* The selection and development of the project water supply, when and if an independent supply is necessary, should be based generally on the following design considerations:

a. Selection of that supply which will result in the lowest initial cost and the use of the least critical materials, even though the total cost (including operation) over a period of 5 years may be greater than for some other source.

b. Rates of domestic water consumption:

| | |
|---|---|
| Average daily | 50 g.p.c.p.d. |
| Maximum daily | 100 g.p.c.p.d. |
| Maximum momentary demand | (see page 13) |

c. Fire flows (see page 14)

*Not included in the January 1943 issue (as approved by WPB) of these Standards.

d. Combined pumping and storage capacity... Equal to total project fire flow for a period of 2 hours.

e. Static pressure of 40 lbs. per sq. in. at highest point in project.

f. Water treatment to the full extent necessary to insure a safe, drinkable supply.

Existing Supply.* When the project water supply is taken from an existing water works system, a careful check should be made on the adequacy of the supply works and existing mains to supply the required flows to the project. If the existing supply is not adequate, any feasible action should be taken toward providing the necessary enlargement.

Domestic Water Supply Demand. Water lines for domestic supply only, to temporary housing, should be sized for the following flows--maximum momentary demands--(interpolate for numbers of DU's not shown):

| Family Dwellings | | Dormitories | |
|---|---|---|---|
| No. of DU's | GPM | No. of Persons | GPM |
| 1..... | 7.5 | | |
| 2..... | 11 | | |
| 3..... | 15 | | |
| 6..... | 20 | | |
| 10..... | 30 | | |
| 15..... | 35 | | |
| 25..... | 50 | 50..... | 50 |
| 50..... | 75 | 100..... | 75 |
| 100..... | 110 | 200..... | 110 |
| 200..... | 190 | 400..... | 190 |
| 500..... | 300 | 1000..... | 300 |
| 1000..... | 500 | 2000..... | 500 |

The diameters of mains and services should be carefully calculated to deliver the above flows with a residual pressure at the building line of 25 lbs. per sq. in. (21 lbs. per sq. in. for one-story buildings*) or, in the case of dormitories and multi-family dwellings containing over 8 DU's, with a residual pressure of 6 lbs. per sq. in. at the most

*Not included in the January 1943 issue (as approved by WPB) of these Standards.

remote fixture, taking into account the friction loss in piping within the building. (Figure SE-1A may be used for approximating pipe sizes, pending detailed calculation.*) It is not required that service piping be smaller than $\frac{3}{4}$-inch. The foregoing rates of flow are not to be employed for sizing mains on which fire hydrants are located.

Fire Flows. The total fire flows for which project distribution systems are designed should be approximately as follows:

| Family Dwelling Units | Total Fire Flow GPM | Dormitory Units | Total Fire Flow GPM |
|---|---|---|---|
| 250 | 1000 | 250 | 1000 |
| 500 | 1500 | 500 | 1500 |
| 1000 | 2000 | 1000 | 2000 |
| 1500 | 2500 | 1500 | 2500 |
| 2000 | 3000 | 2000 | 3000 |
| 4000 | 4000 | 4000 | 4000 |

For less than 250 FDU's, the total fire flow should be taken at approximately 1000 GPM except when one hydrant only is required.* Total fire flows less than shown above should be provided in the case of small remotely located projects for which excessive amounts of critical materials would be required in providing such flows.*

The fire flow at any hydrant should be approximately 500 GPM, except at dormitory and project facility buildings where it should be approximately 750 GPM, with a residual pressure at the hydrant of 10 lbs. per sq. in. (35 lbs. per sq. in. residual pressure for direct hydrant streams*). The fire flow to serve any two adjacent hydrants should be approximately 1000 GPM.*

The demand for domestic purposes can usually be ignored in sizing water mains on which fire hydrants are located.

Fire Hydrants. Hydrant spacing should result in an average of one hydrant to each 140,000 sq. ft., or fraction thereof, of project area (excluding large play areas and unbuilt-upon areas), except that, for dormitory developments, the spacing should be the maximum which will permit reaching any building or dormitory wing with streams from two hydrants, using hose lengths not exceeding 250 feet.

Locate fire hydrants so that they will be accessible to a pumper--not more than 7 feet from the edge of the paved highway--unless the use of direct hydrant streams is definitely contemplated, protected from traffic hazards, and not closer than 25 feet (preferably 50 ft.) to dormitories, community facility buildings or long group houses. Keep hydrants off metered lines, where practicable. Where hydrants must be located on metered lines, the use of fire service type meters is preferred.

*Not included in the January 1943 issue (as approved by WPB) of these Standards.

Hydrants with 4-inch valve openings may be employed where a fire flow of not more than 500 GPM is required.

Valves. Valves should be provided only where indispensable to reasonably safe operating conditions. Valves should be omitted generally from hydrant leads but should be so spaced on fire mains that no more than two fire hydrants need be cut out of service in any section of the distribution system.

Water Main Layout.* Mains 4-inch and larger should preferably follow project streets (at one side of the surfacing) and it is desirable that fire mains be "looped," in order to eliminate dead-ends. However, water lines must be laid out for maximum economy and conservation of critical materials; and comparative designs and estimates, as necessary, should be made to determine the most economical layout. When mains are "looped", the required flow to any point should be assumed to be from both directions. Looping is rarely economical in domestic supply lines.

Materials for Water Lines. The availability and the time required for delivery of the several types of water pipe in the locality of the project should be investigated; the most available and suitable materials permitted by the War Housing Critical List should be used.

Information on Water Pressure.* The information on water pressure and existing supply mains and fire hydrants at or near the project site, which the surveyor is required to show on the Utility Map, should be repeated in full on the project drawings on which the project water distribution is shown.

## Gas Distribution

Operating Pressures.* Gas distribution piping is herein classed as follows:

Low pressure.....less than 0.5 lbs. per sq. in.
Intermediate pressure..... 0.5 to 20 lbs. per sq. in.
High pressure..... ..... over 20 lbs. per sq. in.

Note: One ounce of pressure equals 1.73 inches of water column.

For intermediate pressure distribution the design pressure should preferably not exceed 1/3 of that normally carried in the high pressure mains supplying the project. An initial pressure of 5 or 10 lbs. per sq. in. is commonly assumed on the outlet side of the project regulator, permitting a pressure drop of 4 or 9 lbs., respectively, within the distribution system.

*Not included in the January 1943 issue (as approved by WPB) of these Standards.

Peak-hour loads:

| Number of DU's | Peak-Hour Load in Therms | |
|---|---|---|
| | Cooking | Cooking and Water Heating |
| 1 | 0.7 | 0.8 |
| 2 | 1.1 | 1.3 |
| 4 | 1.7 | 2.0 |
| 6 | 2.2 | 2.6 |
| 10 | 3.0 | 3.7 |
| 20 | 4.7 | 6.0 |
| 50 | 9.0 | 12.0 |
| 100 | 15.0 | 20.5 |
| 200 | 24.0 | 34.0 |
| 500 | 45.0 | 63.5 |
| 1000 | 71.0 | 97.0 |

(Interpolate for numbers of dwelling units not shown)

Note: This schedule does not include space heating, for which the additional allowance should be 90% of the specified input of the connected heating appliances for the dwelling units served.

Example: The method of determining the peak-hour load for 480 DU's having gas ranges and water heaters, with gas having a calorific value of 550 Btu is illustrated on Figure SE-5. The result is 11,000 cu. ft. per hour.

Design Procedure. Following is a simplified design procedure applicable to low pressure systems and intended primarily for projects supplied through one or more master meters:

1. Ascertain the characteristics of the gas and its pressure at the point of supply (generally on the project side of the meter).

2. Select the longest run of piping from the point of supply to any dwelling unit, noting the number of dwelling units served at critical points along its length.

3. From the foregoing tabulation, take off the peak load at each of such critical points.

4. Determine the available pressure loss in the distribution system, by deducting from the initial pressure (at the point of supply) the requisite residual pressure at the appliance (generally about 3 inches) and a drop of 0.5 inch within the building.

5. Take pipe sizes from Figure SE-6 by entering this diagram on the horizontal line corresponding to the total length of the piping run. Where such line intersects the diagonal line representing the available pressure drop, draw a vertical line. Proceed upward

and/or downward on this line to the "cubic feet per hour" determined for each of the critical points selected, and note required pipe sizes. (For artificial gas, S = 0.45; for natural gas, S = 0.60.) Do not adopt a pipe size having an indicated capacity appreciably less than that required.

6. Follow the same procedure for shorter runs in the system, but maintain a reasonable uniformity in sizing.

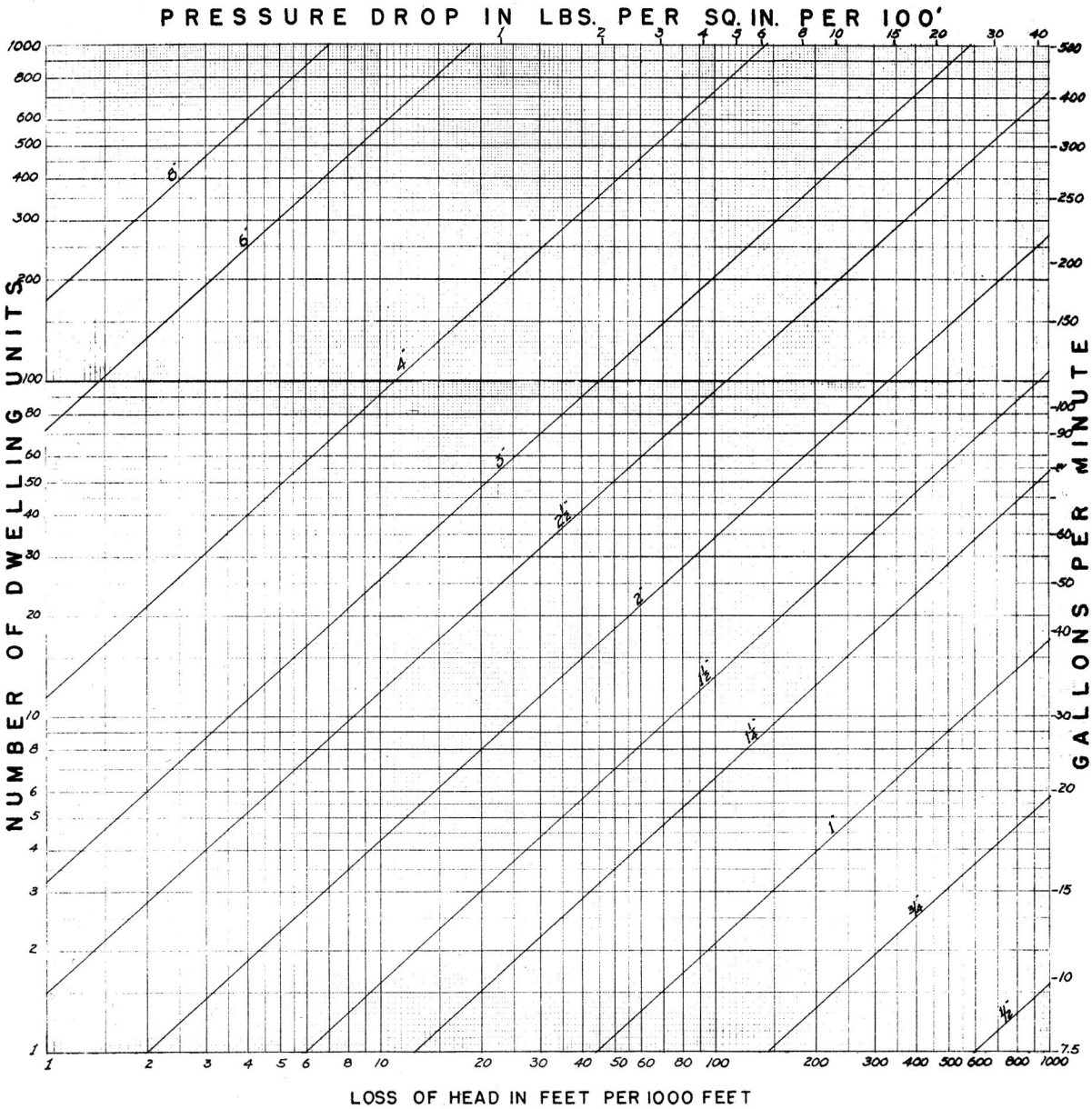
For intermediate pressure distribution systems the procedure is similar:

1. Follow steps 1, 2 and 3, as outlined for low pressure systems.

2. Having determined the initial pressure on the project side of the master regulator, and assuming a residual pressure of 1 lb. per sq. in. at the house regulator, compute the average drop per 100 feet, using the maximum distance obtained in step 2 above.

3. Enter Figure SE-6a (or SE-6b, depending upon the pressure drop available) on the ordinate corresponding to the average pressure drop determined in the preceding step and note the required pipe diameters at the "pipe capacity in cubic feet per hour" as required at each of the selected critical points.

   Note: Figure SE-6a is for a pressure drop of 4 lbs. per sq. in., i.e., from an initial pressure of 5 lbs. to a final pressure of 1 lb. at the house regulator, and Figure SE-6b for a pressure drop of 9 lbs. per sq. in., i.e., from an initial pressure of 10 lbs. to 1 lb. For other pressure drops the sizes of mains should be computed.




## REQUISITE WATER PIPE DIAMETERS

IN RELATION TO
NUMBER OF DWELLING UNITS
AND AVAILABLE LOSS OF HEAD

---

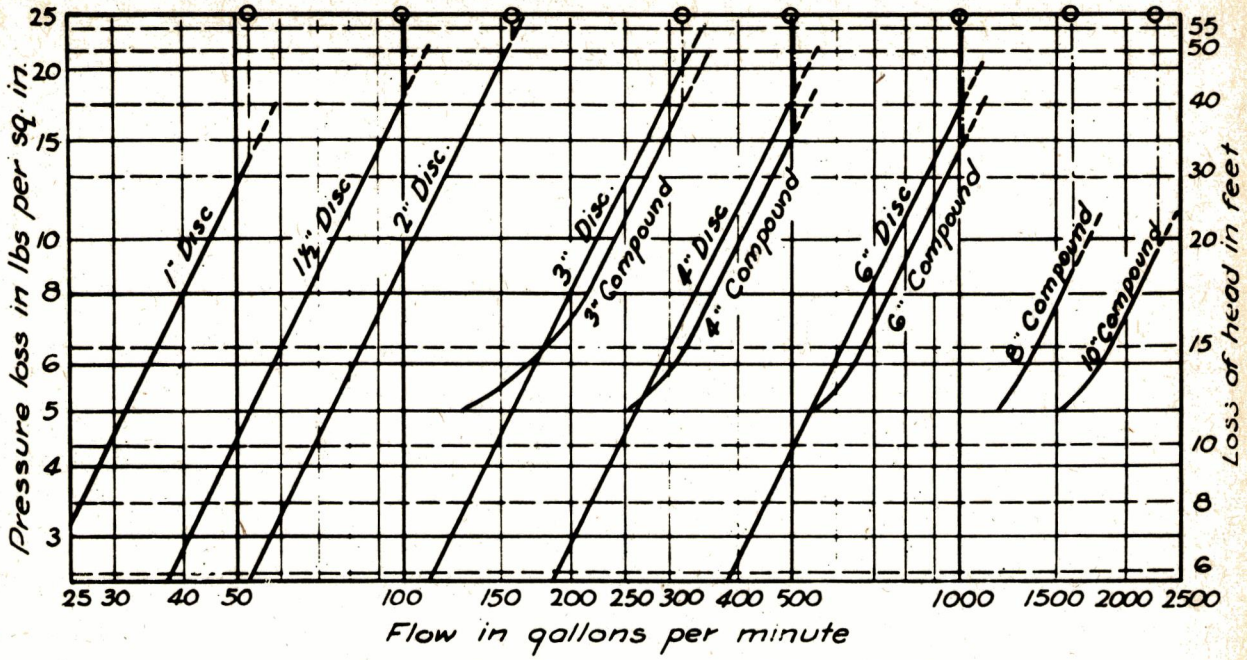
DIAGRAM BASED ON MAXIMUM MOMENTARY DEMANDS GIVEN IN FPHA STANDARDS FOR TEMPORARY WAR HOUSING DATED JANUARY 1943.

PIPE CAPACITIES FROM HAZEN-WILLIAMS FORMULA WITH C=120

ALLOW FOR PRESSURE DROP THROUGH METER AND REQUISITE RESIDUAL PRESSURE AT BUILDING LINE. CORRECT FOR DIFFERENCES IN GROUND ELEVATION

THIS DIAGRAM DOES NOT COVER WATER SUPPLY REQUIRED FOR FIRE PROTECTION

| NHA FPHA | DOMESTIC WATER SUPPLY PIPE SIZING | SE-1A |
|---|---|---|
| | TEMPORARY WAR HOUSING | 1-2-43 |

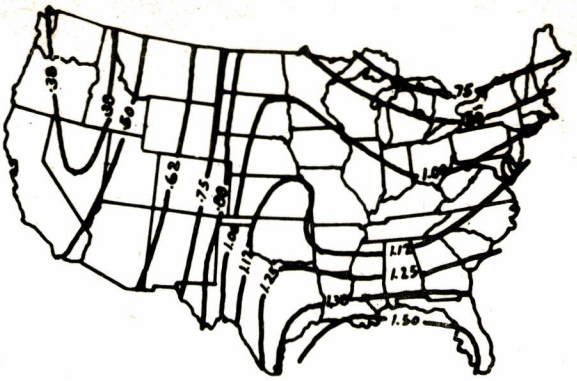



Note: Circles show flows required by AWWA specifications for pressure loss of 25#/9"

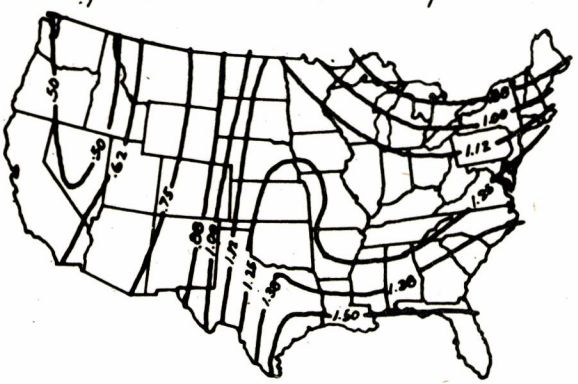
| | | |
|---|---|---|
| NHA FPHA | APPROXIMATE PRESSURE LOSSES THRU COLD WATER METERS (Averages for Various Makes of Meters) | FIG. SE-2 FEB. '42 |



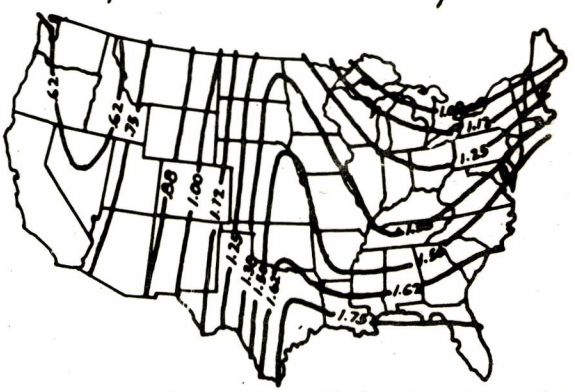
15 minute rainfall, in inches, to be expected once in 2 years.



15 minute rainfall, in inches, to be expected once in 5 years.



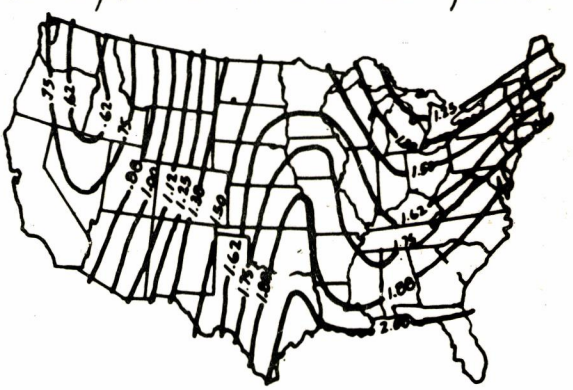
15-minute rainfall, in inches, to be expected once in 10 years.



15 minute rainfall, in inches, to be expected once in 25 years



15 minute rainfall, in inches, to be expected once in 50 years.



15 minute rainfall, in inches, to be expected once in 100 years.

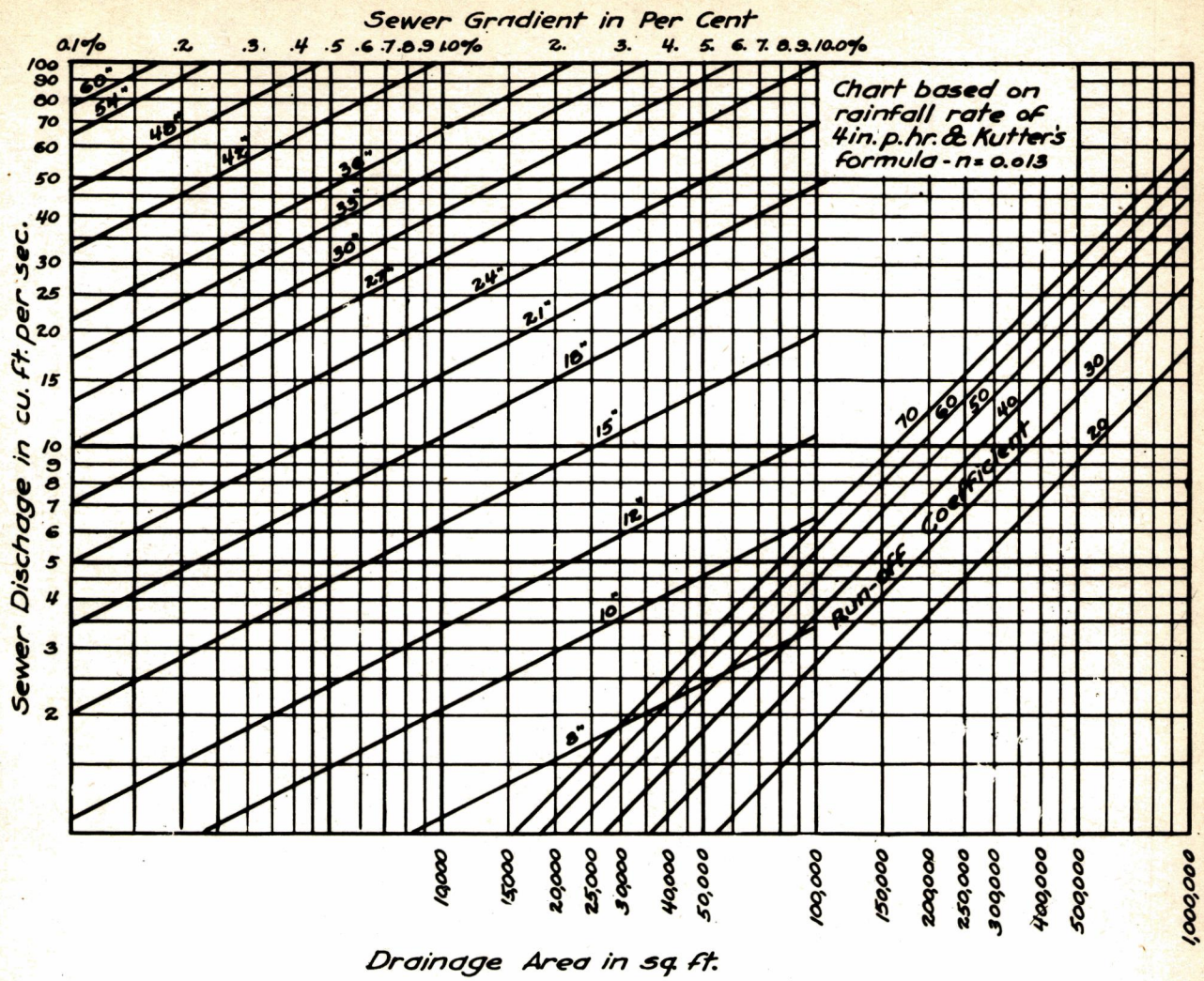
NOTE:

Approximate adjustments in rainfall rates for other than 15 minute periods:

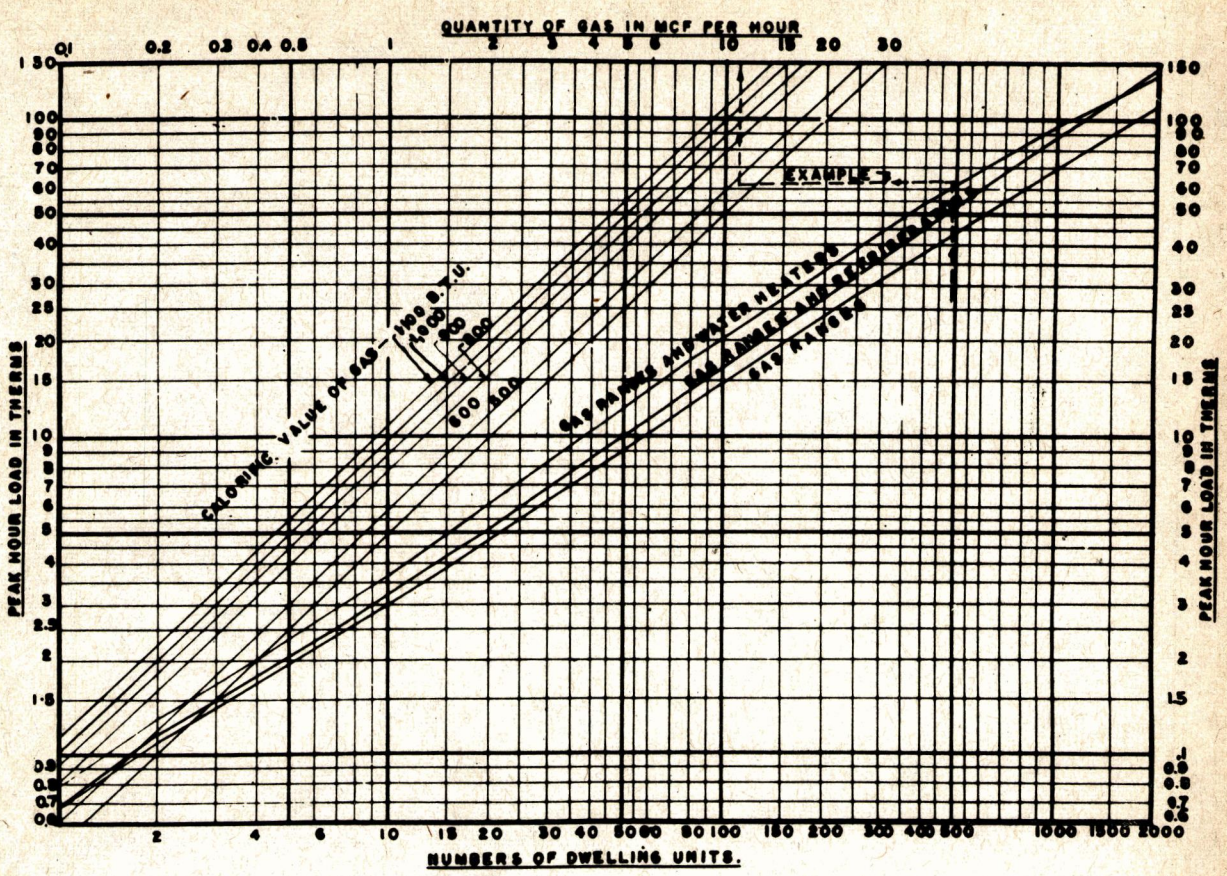
| | |
|---|---|
| For 5 minute period | add 45% |
| For 10 minute period | add 15% |
| For 30 minute period | deduct 30% |
| For 1 hour period | deduct 45% |

From "Rainfall Intensity-Frequency Data" by David L. Yarnell - U.S. Dept. of Agriculture, Miscellaneous Publication No. 204.

| | | |
|---|---|---|
| NHA<br>FPHA | RAINFALL INTENSITIES<br>IN CONTINENTAL UNITED STATES | FIG. SE-3<br>FEB. '42 |

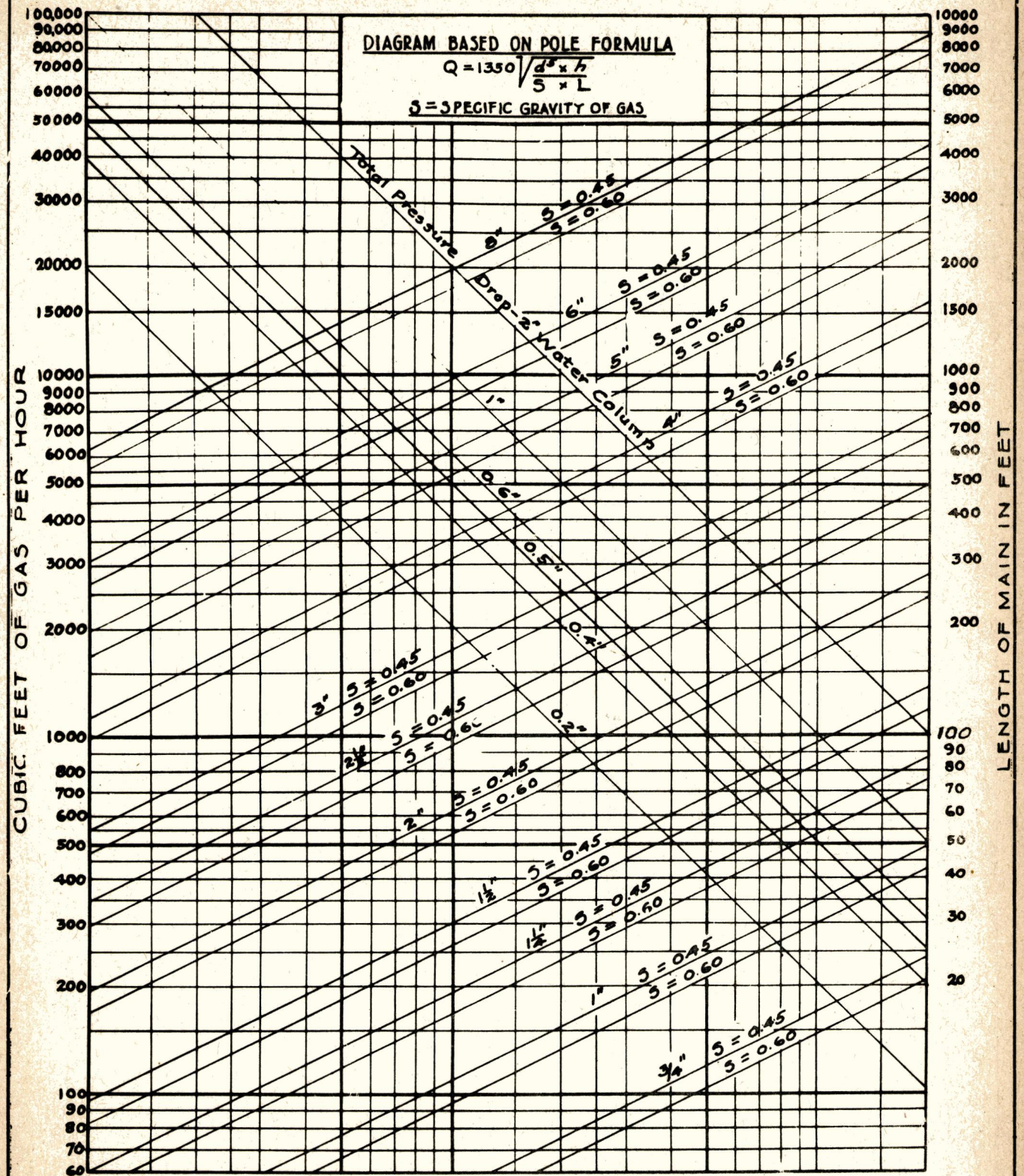



| NHA FPHA | REQUISITE DIAMETERS FOR STORM SEWERS | FIG. SE-4 FEB. '42 |
|---|---|---|

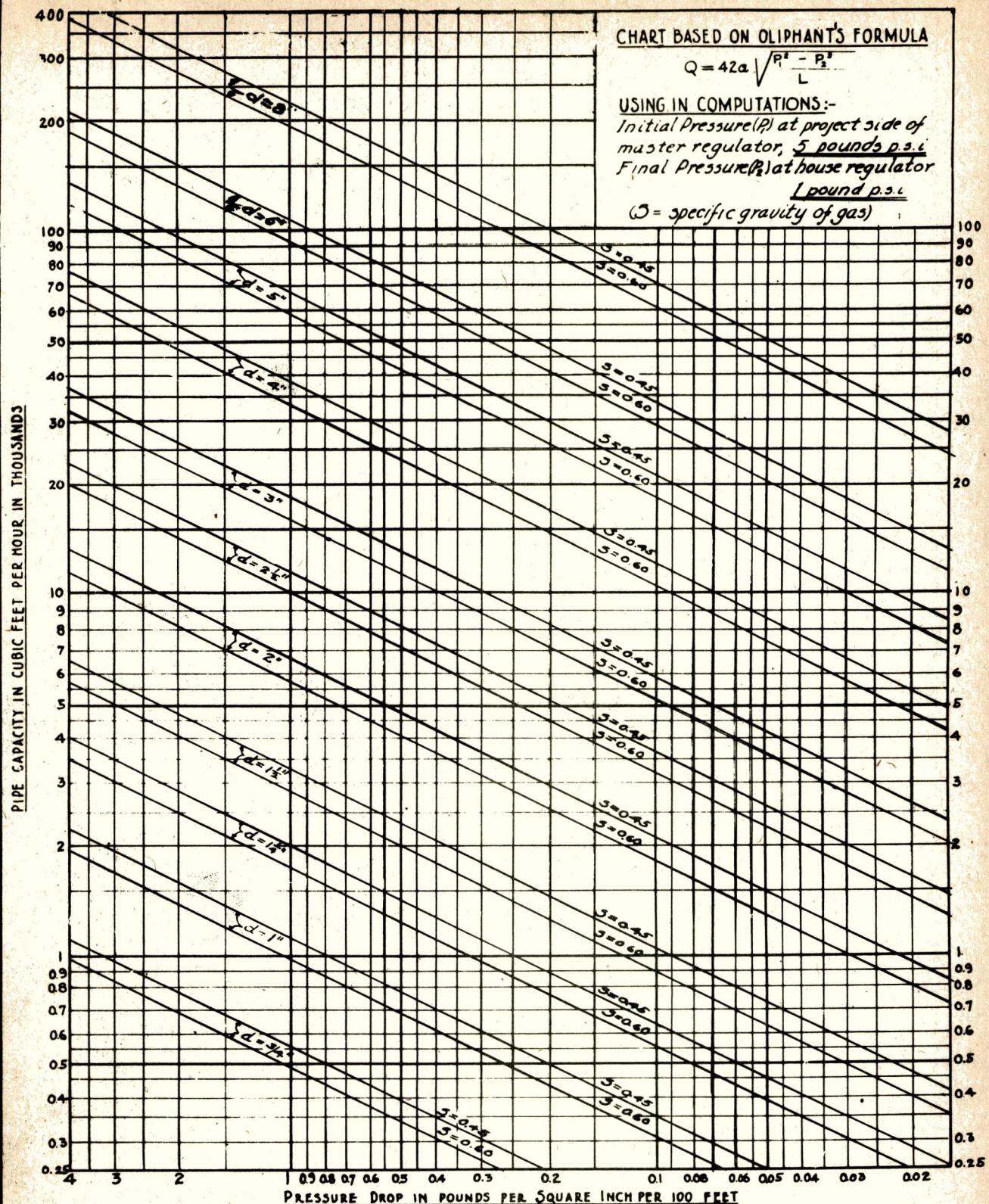



SPACE HEATING LOAD:- ADDITIONAL ALLOWANCE EQUAL TO APPROXIMATELY 90% OF SPECIFIED INPUT OF THE CONNECTED HEATING APPLIANCES. (FPHA STANDARDS JANUARY 1943)

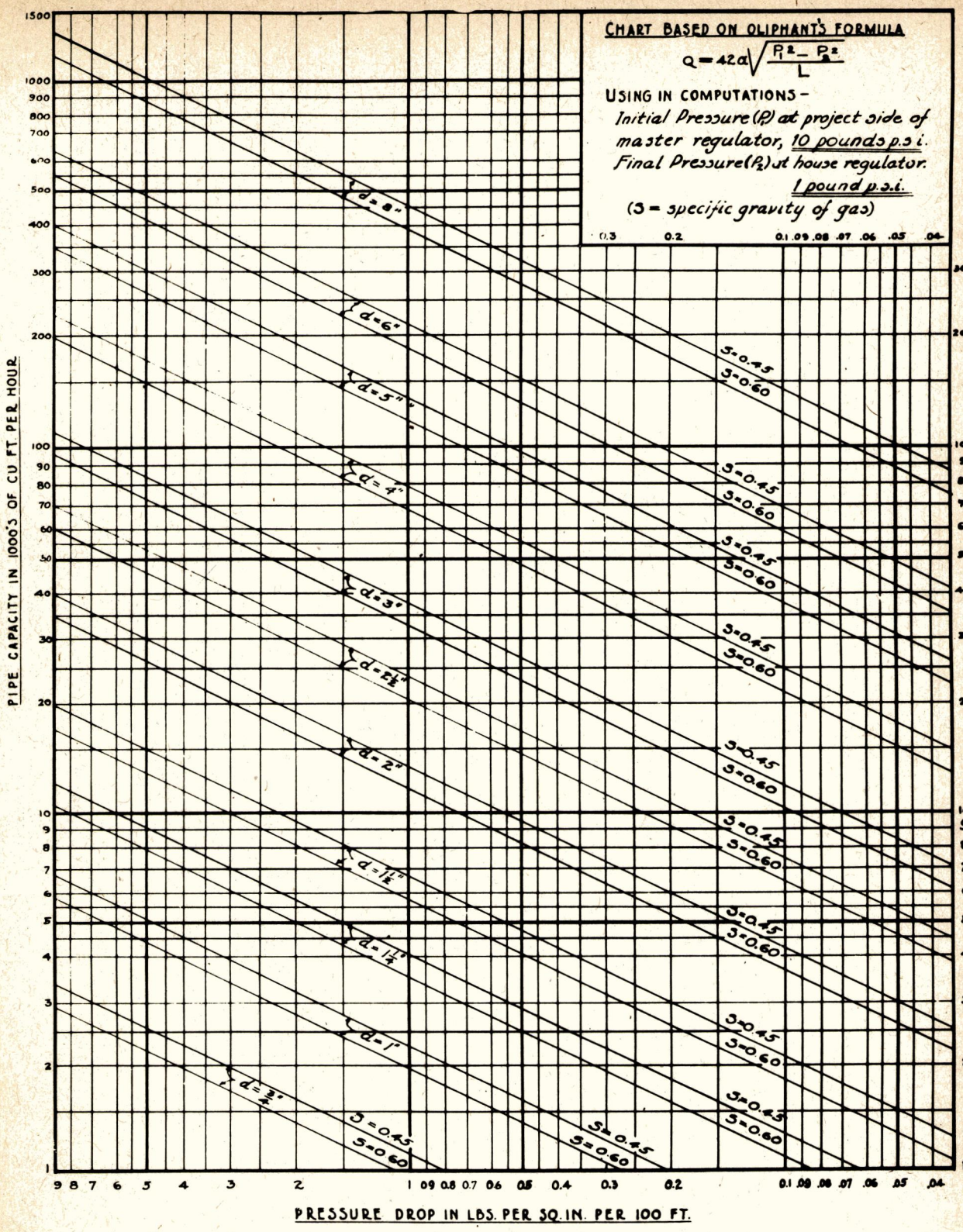
| | | |
|---|---|---|
| NHA<br>FPHA | PEAK HOUR GAS DEMANDS<br>FOR TEMPORARY WAR HOUSING | FIG. SE-5<br>AUG. '43 |



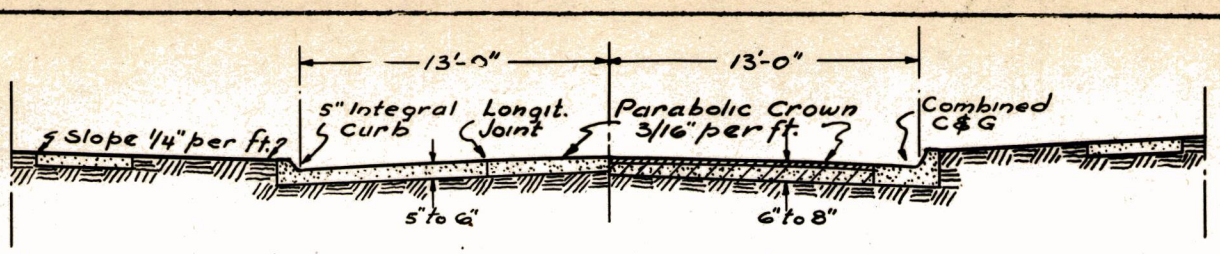

| NHA FPHA | GAS MAIN SIZING - LOW PRESSURE | FIG. SE-6 AUG. '43 |
|---|---|---|



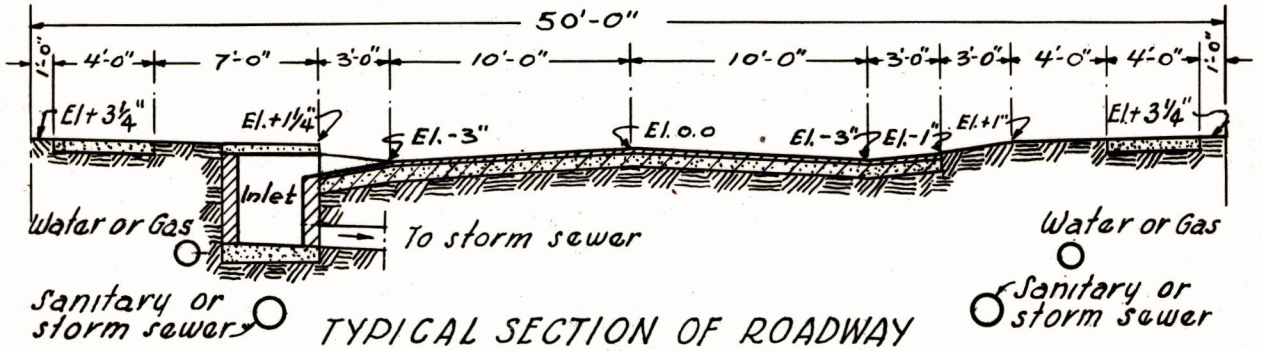

| NHA FPHA | GAS MAIN SIZING - INTERMEDIATE PRESSURE Pressure Drop of 5 lbs. to 1 lb. per sq. in. | FIG. SE-6a AUG. '43 |
|---|---|---|



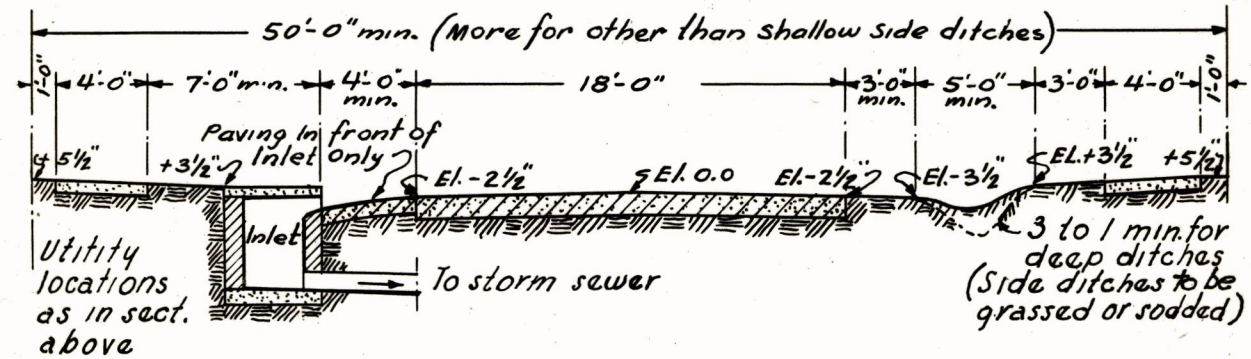

| NHA FPHA | GAS MAIN SIZING - INTERMEDIATE PRESSURE Pressure Drop of 10 lbs. to 1 lb. per sq. in. | FIG. SE-6b AUG. '43 |
|---|---|---|



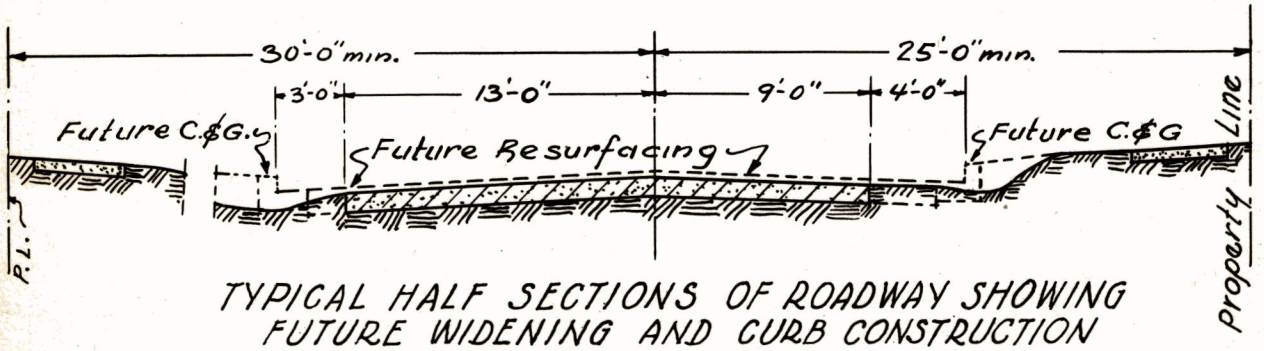

TYPICAL HALF-SECTIONS OF ROADWAY WITH CURBS
concrete — Bituminous surfacing on-macadam, gravel or stabilized base, etc.




TYPICAL SECTION OF ROADWAY
WITH BITUMINOUS PAVED GUTTERS




TYPICAL SECTION OF 18-FT. ROADWAY
WITH EARTH SIDE DITCHES




TYPICAL HALF SECTIONS OF ROADWAY SHOWING
FUTURE WIDENING AND CURB CONSTRUCTION
Note: Present roadway grades must be adjusted to probable future grades

| NHA FPHA | TYPICAL ROADWAY CROSS SECTIONS FOR TEMPORARY WAR HOUSING | FIG. SE-7 MAY '42 |
|---|---|---|

SUBJECT: Liquefied Petroleum Gas Systems

1. General: This section is issued to guide the design of all types of liquefied petroleum systems contemplated for FPHA war housing projects. Controlling considerations in the selection of the system are (a) critical material conservation, (b) construction time not to exceed date set for occupancy, (c) minimum construction cost, (d) minimum maintenance, and (e) maximum salvage value.

2. Selection of Liquefied Petroleum Gas: The following limitations shall be observed:

(a) WPB Limitation Order L-86 as Amended (April 7, 1944) prohibits the use of liquefied petroleum gas for any purpose in housing projects in all parts of the United States. Applications for exemption shall be made on Form WPB-809 (revised) and filed with the Petroleum Administration for War, Interior Building, Washington 25, D. C. (Ref: L-86). Exceptions may be granted where the use of liquefied petroleum gas is deemed to be in the public interest. Its use shall be limited, however, to those conditions where:

1. Natural, mixed natural and manufactured, or manufactured gases are not available or their use not possible due to inadequacy of supply or piping weight restrictions.

2. Oil is not permitted due to WPB Limitation Order L-56.

3. Transportation of coal is critical or its use not feasible.

(b) War Housing Utilities Standards.

Liquefied petroleum shall not be used for any function during the war period unless:

(a) the use of coal for cooking will result in unrentable units.

(b) there is an assured liquefied petroleum gas supply in the form of a renewable annual supply proposal from a reliable source.

(c) a preliminary inquiry of WPB indicates concurrence in the findings relative to the fuel availability in the locality.

3. Inspection and Approval Requirements: Only those liquefied petroleum systems which have been tested and approved by the Underwriters' Laboratories or a nationally recognized testing laboratory shall be considered.

The installation shall be inspected and approved by the authorities having jurisdiction. The design, installation and construction of the gas storage, distribution and utilization systems shall be in accordance with Pamphlet 58 of the National Board of Fire Underwriters.

(Cont'd)

All equipment for transportation and the method of transportation for liquefied petroleum gas shall be in accordance with Interstate Commerce Commission regulations.

Storage tanks, containers, equipment and fittings on storage tanks shall be constructed in accordance with the "Unfired Pressure Vessel Code" of the ASME, or in accordance with the API-ASME Code. All tanks shall be tested at the time of manufacture in accordance with code under which they are made. All tanks and containers shall have marking showing compliance with code under which manufactured or shall have marking required by the National Board of Boiler and Pressure Vessel Inspectors.

Appliances shall be of the type approved by the American Gas Association Testing Laboratory for liquefied petroleum gas and bear the seal of approval.

4. Evaluation of the Generally-Used LP Gas Types: The following is the average monthly gas usage for home appliances.

| Appliance | Explanation | CU. Ft. (1000 Btu) Nat. Gas Per Month | Cu. Ft. Propane (2500 Btu) | Cu. Ft. Butane (2000 Btu) | Lbs. LP Gas Per Month | Therms of Gas Per Month |
|---|---|---|---|---|---|---|
| Range | 4 person family | 770 | 308 | 256 | 36 | 7.7 |
| Automatic water heater | 900 gallon 80 deg. F. rise HW/Mo. | 1760 | 704 | 586 | 82 | 17.6 |
| Regrigerator | 6 cu. ft. | 920 | 368 | 306 | 43 | 9.2 |

5. Contracts: Prior to preparation of contract documents, select one or two distribution systems, and prepare layout and specifications for the selected systems.

The following construction, fuel service and maintenance contracts or a combination of these contracts are necessary for the installation, operation, and maintenance of an LP gas system:

(a) Construction contract for complete liquefied petroleum gas storage and distribution system from filling equipment up to the utilization point.

(b) Equipment contract for ranges, water heaters and space heaters.

(c) Installation, testing and adjustment contract for equipment noted in (b) above.

(d) Fuel supply contract.

(e) Maintenance contract.

(Cont'd)

6. Types of LP Distribution and Utilization Systems:

(a) Central storage tank system. This system consists of a single container or group of containers, serving as a high pressure liquid storage tank at a single location on the project with either of the following two types of distribution:

1) High pressure or intermediate pressure gas distribution piping from the first stage pressure regulator at the central storage tank to the individual regulator at each dwelling unit.

2) High pressure or intermediate pressure gas distribution piping from the first stage pressure regulator at the central storage tank up to the second stage regulator located at the secondary high or intermediate pressure storage tanks (accumulator gas tanks), each tank serving a group of dwelling units. From each accumulator tank, low pressure (12-1/2 inch water column) piping connects the second stage pressure regulators with the utilization equipment in dwelling units.

(b) Group storage tank system, similar to that described under (a) above but at more than one location on the project. Each tank serves a group of dwelling units with or without interconnections between the storage tanks or the distribution piping.

(c) Replaceable or rechargeable cylinder systems, located on solid foundation outside the building near the appliances.

1) Single ICC cylinder or container system for each dwelling unit, complete with one low pressure regulator.

2) Two ICC container systems with a throw-over manifold regulator between service and reserve container for each dwelling unit or group of dwelling units within one building, complete with one low pressure regulator.

3) Multiple ICC container system with control manifold connections between containers and a single pressure regulator for the entire installation serving groups of dwelling units in one or more buildings.

It is understood that a vendor may deviate from the standard layout and specifications by submitting his own layout and specifications with his bid. Such vendor's proposal shall be evaluated and the necessary contracts covering this work will be negotiated to the best interest of the Government.

7. Metering Methods: Standard liquefied petroleum gas meters record in cubic feet the volume of gas passed through. Pressure and temperature variations affect the heat content of the gas which has to be reduced to the contract base pressure and temperature. To establish the actually contracted heating value, provide a base volume index registering the total quantity of gas

(Cont'd)

passed through the meter in cubic feet at standard (contract) conditions of base temperature and base pressure. In case a base volume index or its equivalent, device cannot be obtained, install a base pressure index or its equivalent, registering the total quantity of gas passed through the meter in cubic feet at standard (contract) base pressure. For underground groups, tanks storing commercial butane liquid (no mixture) a "master gallonage meter" can be used. In this case, the minimum Btu content (100,000 Btu per gallon and 31.13 cubic feet of gas per gallon of liquid at 60 degrees F) shall be certified by the Shipper's Analysis Report.

8. Engineering Layout, Design Limitations: After a suitable system has been selected within the limitations enumerated herein, and a proper type fuel or combination of fuels chosen to suit the climatic conditions of the area for assured vaporization, prepare an engineering layout indicating one of the numerous possible solutions to be used as a design guide and for a basis of bidding. This layout shall not be used to exclude any other design having variations therefrom, unless the submitted variation will result in the use of critical materials beyond the maximum permitted by WPB, involves delays in the completion date, or adds to the maintenance and operation costs of the system. Bidders should be encouraged to submit their own system layouts reflecting their experience in the LP field, without lowering the minimum standards established in the design guide used as a basis for bidding and the specifications.

The design guide shall indicate a single line distribution system showing location of storage tank and distribution piping complete with sizes and available pressures. A detail drawing shall indicate the liquid filling piping, storage tank and its piping, pressure regulators, metering arrangement, pump and compressor piping, vaporizer and its piping, minimum earth coverage.

Indicate on the drawings the high pressure side of the first pressure regulator at the storage tank, the intermediate pressure between the first, and the second or final pressure regulators in pounds per square inch. From final pressure regulator to utilization point, a uniform low pressure of from 11-1/2 to 12-1/2 inches of water column is required.

The primary aim to conserve critical material shall be the governing factor. Therefore, preference shall be given to that proposed system where "in stock" materials and equipment are offered on a lease- or use-basis in lieu of requisitioning critical materials from WPB. The system shall be designed for the lightest specific gravity gas commonly used in public housing projects instead of a proposed liquefied petroleum gas of heavier specific gravity to permit a conversion to any LP gas use in the future, but in no instance shall the system be designed for a future use of natural or manufactured gas. Used or second hand storage tank may be used if properly tested at the time of installation for the pressure required for the considered liquefied petroleum gas in accordance with Bulletin 58 of the NBFU. In connection with central storage tank systems, use intermediate LP gas distribution system at approximately 15 pounds initial pressure at the load

(Cont'd)

side of the first pressure regulators permitting a maximum of 10 pounds of pressure loss in the distribution system, provided that no pipe size smaller than 3/4 inch is used for main and service piping and provided that the distribution system has a large enough gas storage capacity not to demand an unduly rapid rate of evaporation during peak demand periods, thereby interfering with the proper operation of system. The minimum operational requirement is defined as the facility and capacity to deliver peak demand quantity of gas at the utilization point at not less than 11-1/2 inches of water column during the lowest temperature period recorded in the last ten years. Vaporizer equipment installation is recommended where critical material saving is obtained, due to smaller distribution pipe size or where the minimum operational requirement cannot be obtained without it. The gas distribution system must be designed for a minimum overall weight of critical materials and must be in accordance with the War Housing Utilities Standards.

PEAK HOUR LOADS

| No. of D.U. * | Peak Hour Load in Therms | |
|---|---|---|
| | Cooking | Cooking and Water Heating |
| 1 | 0.7 | 0.8 |
| 2 | 1.1 | 1.3 |
| 4 | 1.7 | 2.0 |
| 6 | 2.2 | 2.6 |
| 10 | 3.0 | 3.7 |
| 20 | 4.7 | 6.0 |
| 50 | 9.0 | 12.0 |
| 100 | 15.0 | 20.5 |
| 200 | 24.0 | 34.0 |
| 500 | 45.0 | 63.5 |
| 1000 | 71.0 | 97.0 |

*Interpolate for exact number of dwelling units.

9. Distribution System Design: The quantity of gas that theoretically will flow through a given pipe at a given pressure varies inversely as the square root of the specific gravity of the gas. Tables based on the use of natural gas, therefore, can be adapted to the use of liquefied gas by multiplying the volumes shown by a correction factor. This factor is obtained by taking the square root of the quotient obtained by dividing the specific gravity of the liquefied gas by that of the natural gas.

10. Vaporization of LP gas: In an above ground liquefied petroleum storage tank there is saturated LP gas vapor above the stored liquid. The pressure in the tank remains unchanged if the composition of the liquefied gas and the temperature of the stored liquid remain constant, and vapor is not withdrawn from the tank.

(Cont'd)

Upon withdrawal of vapor, the pressure drops. Normally, heat from the atmosphere will vaporize the liquid. This vaporization will continue until the previous pressure is reached.

When the vapor is withdrawn at such a rate that the available atmospheric heat will not be sufficient to restore the pressure, then one or more of the following remedial steps are required:

(a) Restore the level of the liquid in the tank.

(b) Change the composition of gas to a type that vaporizes at a lower temperature.

(c) Introduce "artificial heat" by installing a vaporizer.

There are two types of generally used vaporization processes; flash and batch vaporization. If the liquid is drawn from the bottom of the tank and heated to supply the required gas, it is referred to as "flash vaporization." If the saturated vapor is withdrawn from the upper part of the storage tank and heated to supply the required gas, it is referred to as "batch vaporization."

11. Capacity Requirements of Storage Tanks: Storage tank sizes shall be based on a minimum of 20 gallons of net petroleum liquid stored per dwelling unit using maximum permitted "filling densities" established in NBFU Pamphlet 58, paragraph B-11. In determining tank size, allowance must be made for expansion of liquid under rising temperatures, as indicated in Pamphlet 58.

SUBJECT: Dual Water Systems

Dual water systems, one for domestic supply and the other for irrigation or fire protection, should be avoided whenever possible in temporary war housing projects.

When it is essential that dual systems be employed, the following precautions are to be taken to prevent any use of the non-potable supply for domestic purposes:

1. There must be no cross-connection between the domestic and the non-potable supply systems.

2. Different materials should be used for piping in the two systems.

3. The mains of the two systems should be laid as far apart as possible.

4. Yard hydrants on the non-potable supply must bear at all times a notice that the water is unsafe for drinking.

5. Yard hydrants on the non-potable supply must be of a type that can be opened and closed only with a special key.

6. As-built drawings should be prepared to show accurately the location of all lines in both systems.

# BULLETIN NO. 2

# STANDARDS

# FOR

# TEMPORARY WAR HOUSING

## PART IV

## CONSTRUCTION

## CONTENTS


| | Page |
|---|---|
| Applicable Standards and Codes | 1 |
| Design Principles | 1 |
| Fire Resistivity | 2 |
| Termite and Rot Protection | 6 |
| Thermal Insulation | 8 |
| Condensation | 11 |
| Foundation Design | 11 |
| Exterior Walls | 12 |
| Conventional Wood Framed | 12 |
| Conventional Masonry | 12 |
| Special Types of Construction | 13 |
| Interior Walls and Partitions | 13 |
| Non-bearing Partitions | 13 |
| Bearing Partitions | 13 |
| Interior Surface Materials | 14 |
| Floor Constructions | 14 |
| Wood Framing | 15 |
| Masonry Construction | 16 |
| Subsurface Investigation | 16 |
| Protection of Traps and Pipes against Freezing | 17 |



NATIONAL HOUSING AGENCY

FEDERAL PUBLIC HOUSING AUTHORITY

Revised June 30, 1943

# CONSTRUCTION

## APPLICABLE STANDARDS AND CODES

Type of construction shall be governed by requirements of:

1. The latest revised issue of WPB-NHA War Housing Construction Standards.

2. The WPB National Emergency Specifications for the Design of Reinforced Concrete Buildings.

3. The WPB National Emergency Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings.

In areas subject to earthquake, modify standard design for resistance to earthquake shock in accordance with the Uniform Building Code of the Pacific Coast Building Officials' Conference, 1940.

In areas subject to hurricane, modify standard design for resistance to tornado damage in accordance with local building code requirements or with local practice where no code exists. In areas subject to hurricanes, where no code or local practice is established, exterior wall studs should be continuous or spliced, and securely strapped to foundations and roof framing. Exterior masonry walls may require vertical ties from foundations to the roof framing, and a continuous beam capping the wall. Pitched roofs without overhanging eaves are preferred to flat roofs in such areas.

## DESIGN PRINCIPLES

Standard plan working drawings are based on the following design principles, and any modification of such standard plans, or special systems of prefabricated construction, shall take full cognizance of them:

1. Framing is designed for full construction dead loads, including partition loads, plus the following live loads in pounds per square foot;

   Floors:

| | |
|---|---|
| Dwelling rooms | 25 |
| Tenant activity spaces | 60 |
| Offices | 25 |
| Maintenance shops | 100 |
| Public corridors, hallways and stairways | 60 |

Roofs, on horizontal projected plane:

Pitch less than 6" per foot. . 20
Pitch 6" per foot or more. . . 15
Walls, on vertical projected plane. 20

2. Partition loads are considered to be spread uniformly, or supported on extra joists.

3. Live loads are reduced 25 per cent for loads on girders, posts, piers, foundations and soil.

4. Design for special concentrations where they are known to exist.

5. Observe uniformity, repetition of typical elements, and continuity of framing.

6. Correlate stepped floor levels with multiples of exposed exterior face of wood siding or shingles, or brick coursing on masonry units.

FIRE RESISTIVITY

All buildings must include the following fire safety provisions

1. Fire Stops. Provide adequate fire stops in wood stud walls and furred spaces, at floors, ceilings under attics and roofs, and around all chimneys. Fire stops above smoke inlets of chimneys shall be incombustible.

2. Draft Stop Divisions. In multiple family dwelling buildings, draft stop divisions shall divide the attic into sections corresponding as closely as possible to two dwelling units in the floor below. Draft stop divisions joints preferably located directly above a party wall partition, installed tightly against roof sheathing and ceiling; or a masonry wall carried to the roof sheathing.

In dormitory and public buildings, draft stop divisions in attics, and self-closing smoke screens in corridors, shall be approximately 75 feet apart. Self-closing smoke screens shall swing toward the outer fire exits. Opening between dormitory wings and service buildings shall be equipped with self-closing smoke screens.

3. Fire Stop Divisions. In all multiple family dwelling buildings with wood frame party partitions, the maximum number of families permitted between fire stop divisions is four. In all multiple family dwelling buildings with masonry party partitions, the maximum number of families permitted between fire stop divisions is six. Such fire stop divisions may be

a) 8" masonry fire walls

b) wood partitions covered on both sides with two layers of 3/8" incombustible wall board with staggered joints

c) a stairway with each of its enclosing partitions of wood construction covered on the dwelling sides with two layers of 3/8" incombustible wall board with staggered joints.

Fire stop divisions must fit tightly against wall and roof sheathing but the space between first floor and grade need not be closed.

In two-story dwellings having more than four but less than ten units per floor, and in which fire stop divisions (as required above) are stair hall partitions, at least one additional fire stop division, running from front to rear walls and from floor to roof without provision for present or future openings shall be provided. Such dwellings having ten or more units per floor shall have at least two such additional fire stop divisions.

4. Fire Exits. Provide fire exits at both ends of dormitory wings and a slow-burning type of outside stairs at the extreme outer end of all two story dormitories. Slow-burning construction requires that supporting timbers be not less than 2-1/2" thick and that stair treads and risers be 1-5/8" thick.

Protection required for combustible construction near heating or cooking equipment. Combustible construction is defined as containing wood or combustible boards, whether protected by plaster or gypsum board or not. Clearances from combustible construction to equipment shall be measured from the outer surface of the equipment to the combustible material, disregarding any intervening protection applied to such material. The following table indicates the clearances required:

| Equipment | Clearance from | Space required A* | Space required B* |
|---|---|---|---|
| Coal or oil circulating (jacketed) heaters | Jacket | 6" | 12" |
| | Smoke pipe | 12" | 18" |
| Gas space heater | | 2" | 6" |
| Coal ranges | Side, rear | 12" | 24" |
| | Smoke pipe | 12" | 18" |
| Kerosene | Side | 2" | 2" |
| | Rear | 6" | 6" |

* Column A indicates the minimum clearance required when the combustible construction is protected with 3/16" asbestos cement board supported on 1" incombustible furring; asbestos board must have 2" minimum clear openings at top and bottom for circulation of air. Column B indicates the minimum clearances required when no protection is provided.

| Equipment | Clearance from | Space required |
|---|---|---|
| Gas Range, Type B** | | 1" |

** American Emergency Standard Approved Requirements for Domestic Gas Ranges, American Standards Association.

When the equipment is located closer to combustible construction than the minimum distance indicated in the above table, the partition wall or ceiling must be built of brick, tile or concrete masonry units.

Smoke pipes from coal or oil heaters of any type or coal ranges shall not pass through closets. Smoke pipes which pass through partitions constructed of brick, tile, or concrete units shall be enclosed in fire clay thimbles. Where smoke pipes pass through combustible partitions, the partition must be cut away to provide a minimum clearance of 8" from the smoke pipe. In lieu of such clearance, the opening may be closed by providing a thimble built in with brick, tile or concrete extending at least 6" beyond the thimble in all directions; and the thimble shall clear the smoke pipe by at least 2".

An incombustible pad over combustible floors is to be provided as a Minimum protection under oil and coal burning heaters.

Chimneys

a) For coal or oil-fired equipment masonry chimneys, supported on masonry foundations, shall be built. They shall have a minimum thickness of 4" masonry surrounding terra cotta flue lining.

b) For gas-fired equipment chimneys of asbestos cement, or equivalent material meeting the requirements of the National Bureau of Fire Underwriters, may be used. Such chimneys shall extend at least 2 feet below smoke pipe connection and be without clean-out door.

Clearance for Wood Framing. All combustible framing and furring must be kept 2" from chimneys.

Public and common halls and stairways, in apartments of combustible construction, shall have two layers of incombustible wall board with joints staggered, on the dwelling side of stair partitions and continued through to the roof boards.

Access to Attics. One access door only shall be provided to each separate attic space which is partitioned off by draft stop divisions.

Wood shingle roofs are not permitted.

End-to-end spacing of buildings. The minimum spacing of group house buildings, end-to-end, to provide reasonable protection from conflagration hazard, varies with the exterior finish of the buildings and the added protection adopted for opposing ends. Minimum end-to-end spacing for ordinary conditions shall be:

| Type of building and finish | Building height 1-story | Building height 2-story |
|---|---|---|
| 1. Group houses with all masonry walls, end walls being without openings | 20 ft. | 30 ft. |
| 2. Group houses with incombustible exterior wall finishes (side walls other than masonry) end walls being without openings and without combustible overhang: | | |
| a. End walls of 8" masonry extending two feet outward from sides and two feet above roof or with two foot returns on sides | 20 ft. | 30 ft. |
| b. End walls of two half-inch layers of incombustible wall board or of 3/4" portland cement stucco | 30 ft. | 40 ft. |
| 3. Group houses with openings in end walls with combustible exterior wall finishes or with all masonry walls | 40 ft. | 50 ft. |

(See Part II of these Standards, "Site Planning", for other restrictions in spacing of buildings.)

Heater rooms with masonry walls and incombustible ceilings may be added at ends of group houses without increasing the required spacing between end walls of dwelling units.

For dormitory buildings (consisting of wings with central service unit) and for separate tenant activity buildings, the spacing for fire protection in relation to the type of wall construction, shall be at least equal to the minimum spacing required for group houses. The same space requirements apply to the opposing ends of central service units of dormitory buildings.

Exit doors from public spaces, except two-story apartments, shall open outward with door closers and hardware permitting easy opening from the outside.

Windows in dwelling buildings must be designed to permit easy escape through openings, in case of fire.

## TERMITE AND ROT PROTECTION

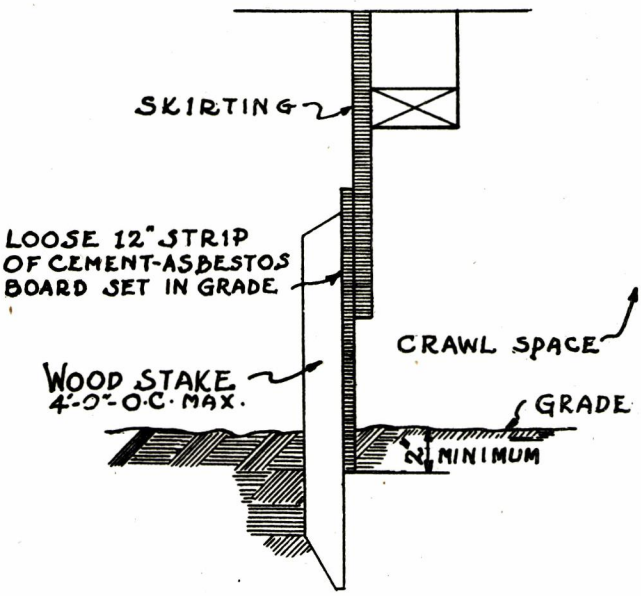
Metal termite shields cannot be used in all States, due to prevailing restrictions. The Defense Housing Critical List, December 12, 1942, permits limited use of ferrous metal for shields in Alabama, Florida, Louisiana, Mississippi, Texas and Hawaii. Ferrous metal flashing may be extended to provide a termite shield where masonry terraces, platforms or porch slabs and steps abut wood construction at exterior walls in these areas.

Proper site preparation and clearing, ample ventilation of crawl spaces, provision for visual inspection, and insulation of woodwork from contact with earth are essential.

Site Precautions: Remove all wood debris, stumps, logs, etc., on or near the surface of the ground of the site, before starting construction. Prevent burial of wood in the ground. Remove wood which accumulates during construction, such as form boards, stakes, chips, and scraps. Drain water away from foundations.

Structural Protection: Provide at least 12" clearance below all wood floor framing, for inspection of crawl spaces. Provide access and ventilation for each enclosed space. For ground floor areas of 400 sq. ft. or less, under normal conditions, use 100 sq. in. net of vent area at each side of buildings. For each additional 150 sq. ft. or fraction thereof, add 50 sq. in. to each side. If required by local conditions, additional vents must be provided.

For construction supported on piers the vents should be omitted and the skirts kept 2" to 4" above finished grades. Openings may be larger where ground conditions are not favorable. In low temperature localities, where heat loss may be excessive, openings should be closed during winter months, in the manner indicated below:




CRAWL SPACE
CLOSURE DETAIL
~SCALE 1½" = 1'-0"~

Exterior trim, sheathing, etc., should be 6" (minimum) above grade. Wood which cannot be given the required clearance from ground shall be impregnated with standard preservatives applied under pressure; or a rot-resistant type of wood shall be used.

Isolate masonry porches, steps, and terraces from wood on exterior faces of buildings, by clear space of 1-1/2" (minimum).

Seal tightly, with coal-tar pitch, all expansion joints, and spaces around pipes, bolts, anchors, etc., penetrating floors, and walls in contact with ground.

Monolithic concrete provides the greatest protection.

Provide means to permit regular inspections, after completion of construction, for the detection of possible termite infestations.

THERMAL INSULATION

The Defense Housing Critical List does not permit an hourly heat loss for any building, in B.T.U. per hour, in excess of 66 times the dwelling area in square feet, or 80,000 B.T.U. per dwelling unit, whichever is the smaller. Dwelling area is defined as the total area used for dwelling purposes contained within the exterior walls at each principal floor level.

Floors, walls, and ceilings shall be insulated to the extent necessary to insure that the over-all "U" factor of the floor, wall, or ceiling (to top surface of ceiling), air to air, shall be equal to the coefficients shown in the table (Table C-1,-"U" Factors for Various Design Temperatures) following. (See "Heating", Part VI, of this Bulletin for explanation of zones.)

Definition of "U" factors, methods of calculation, and transmission coefficients of materials shall be determined according to the current edition of the ASHVE Heating, Ventilating and Air Conditioning Guide. Certified reports to laboratories approved by regional offices will be accepted as defining the "K" value of insulating materials.

TABLE C-1*

"U" Factors for Various Design Temperatures**

| Structure Element | Design Temperature -20° | 0° | +15° | No Heat Requirements |
|---|---|---|---|---|
| Ceilings . . . . | 0.08 | 0.08 | 0.08 | 0.08*** |
| Frame Walls . . . | 0.22 | 0.22 | 0.44 | ---- |
| Masonry Walls . . | 0.22 | 0.30 | 0.56 | ---- |
| Wood Floors . . . | 0.13 | 0.13 | 0.13 | ---- |

* Not applicable to PSU units.

** A tolerance of 5% in the "U" factors is permitted, when necessary to accommodate standard thicknesses of materials.

***Use of ceiling insulation in zones requiring no heat is not limited by the Defense Housing Critical List, but is advocated for summer comfort.

## TABLE C-2

RESISTANCE VALUES (L/k) FOR BUILDING MATERIALS
(R=1/k)

### Exterior Materials

| | |
|---|---|
| Vertical Stud Space | 0.91 |
| 1 x 6 Board Sheathing Y P #2 | 0.95 |
| 25/32 Fiber Sheathing treated | 2.27 |
| 5/16" Plywood " | 0.49 |
| 1/2" Gypsum " | 0.38 |
| 1/2 x 6 Bevel Siding, Cedar Clear | 0.62 |
| 3/4 x 8 " " " " | 0.87 |
| x 10 " " " " | 0.87 |
| x 12 " " " " | 0.87 |
| 3/4 x 6 Ark. Pine B & B 106 | 0.78 |
| 5/8 x 6 Fir B & B 106 | 0.98 |
| 3/4 x 6 " B & B 106 | 1.17 |
| 16" Cedar Shingles 7½" to weather | 0.40 |
| 3/16" Asbestos Clapboards 230# | 0.07 |
| " Shingles 180# | 0.07 |
| 3/8" Ext. Plywood | 0.58 |
| 1/2" " " | 0.78 |
| Common Brick Veneer | 0.56 |
| Exterior Surface - 15 mile wind | 0.17 |

### Interior Materials

| | |
|---|---|
| 1/2" Plaster on 3/8" Gypsum lath | 0.42 |
| " " 1/2" Fiber " | 1.80 |
| " " 3/4" " " | 2.56 |
| " " 1" " " | 3.31 |
| 3/4" " " Metal | 0.23 |
| 3/4" Fiber board finish on studs | 2.27 |
| 1" " " " " " | 3.03 |
| 1/4" Plywood | 0.32 |
| 3/8" " | 0.48 |
| 3/8" Gypsum Wall board plain | 0.28 |
| 1/2" " " " " | 0.38 |
| 1" Vapor Sealed Mineral Wool Bats | 3.70 |
| 2" " " " " " | 7.40 |
| 3" " " " " " | 11.10 |
| Furring on Masonry | 0.83 |
| 3/4" Pine Boards | 0.95 |

(continued on next page)

TABLE C-2
(Continued)
RESISTANCE VALUES (1/k) FOR BUILDING MATERIALS
(R=1/k)

Interior Materials (continued)

| | |
|---|---|
| Vertical Interior still air surface | 0.61 |
| Attic surface still air (See Note 4) | 0.45 |
| Interior Surface upward | 0.51 |
| " " downward | 0.83 |

Masonry

| | |
|---|---|
| 8" Concrete block | 1.00 to 1.16 |
| 8" Burned Clay concrete block | 2.00 |
| 8" Cinder block | 1.70 |
| 8" " " , cinder filling | 2.50 |
| 12" Concrete block | 1.28 |
| 12" Burned clay concrete block | 2.13 |
| 12" Cinder block | 1.88 |
| 4" Common hard brick wall | 0.56 |
| 8" " " " | 1.12 |
| 12" " " " | 1.68 |
| 4" " " tile wall | 1.00 |
| 8" " " " | 1.67 |
| 8" Brick and concrete block wall | 1.24 |
| 12" " " " " | 1.72 |
| 8" " " cinder " " | 1.50 |
| 12" " " " " " | 2.33 |
| 8" " " tile " " | 1.67 |
| 12" " " " " " | 2.24 |
| Dampproof and plaster masonry | 0.21 |
| Furring on masonry | 0.91 |
| 5/8" Plaster on masonry | 0.21 |
| 10" Cavity wall (4" brick + 2" Air + 4" Tile) | 2.39 |
| 14" Cavity wall (4" brick + 2" Air + 8" Tile) | 3.06 |
| Horizontal air space, 3/4" upward | 0.76 |
| " " " 3/4" downward | 1.06 |

Notes for Table C-2

1. The resistance values in Table C-2 are taken or computed from tables in the ASHVE Guide, and are generally the average values of similar products of several manufacturers. Some materials may have greater resistance, in specific cases, than the values indicated. When manufacturers claim and are able to offer reasonable proof of greater resistance than these values, regional offices are justified in accepting such verified values.

Notes For Table C-2 (continued)

2. All values listed above are 1/k or a summation of 1/k only. To obtain the resistance of a wall or ceiling, inside and outside surface factors must be added in all cases.

3. For the formula, see current edition of the ASHVE Guide.

4. Since winter temperatures in ventilated attics will be low, the heat resistance of the roof is neglected.

CONDENSATION

Insulation and structural parts within walls or ceilings are subject to damage from condensation when the temperature within the construction becomes lower than the dew point.

To protect such insulation and construction: (1) install an effective vapor barrier on the warm side of the insulation (a) under floors over unheated crawl spaces, in walls, and under flat roofs, when the design temperature is +5° or colder, and (b) for ceilings under pitched roofs, when the design temperature is -5° or colder, and (2) provide moderate ventilation of confined spaces to prevent accumulation of water and vapor and possible resultant condensation in winter. A satisfactory amount of ventilation for roof space is provided by blocking out the facie board at the eaves to provide a one-half inch continuous opening. This should be located at the outer edge of roof overhang, to reduce infiltration of snow and blowing rain. (Added ventilation in some localities may be desirable for comfort.) Provide screens for all such ventilating openings.

If material impervious to vapor is used for exterior wall surfacing, each stud space must have a means of ventilating the space between the exterior surface and the insulation. Any wrapping used on the cold side of the insulation must have at least 5 times the vapor permeability of the vapor seal used on the warm side.

Pipe spaces on other vertical voids, extending from a crawl space under the first floor to the attic space, must be sealed tightly at top and bottom

When natural gas is used for kitchen ranges, provide vent flues from stoves to the exterior.

FOUNDATION DESIGN

Make adequate subsurface investigations prior to designing foundation.

Foundations may be of concrete, masonry units, or wood posts on spread concrete footings; and interior supports may be piers of concrete, masonry units, or wood posts on isolated spread concrete footings.

Wood posts of oak, cedar, chestnut, black cherry or other durable hardwood, squared as required for bracing, may be used in place of concrete or masonry. The bottom of all foundations shall be below the frost level.

Brick and masonry unit walls below grade, enclosing basement spaces, should be given 1/2" portland cement parging and dampproofing on the exterior surface only when water conditions warrant.

Brick or masonry units shall not be used for walls enclosing basements where a constant head of water will occur above the footing, or where walls support earth fills more than six feet high. For such conditions dense 3,000 pounds concrete made with ordinary materials, using customary methods, can be made watertight without addition of integral compounds and application of impermeable coatings, if proper precautions are taken. Use drain tile where necessary.

EXTERIOR WALLS

Conventional Wood Framed. Wood studs shall not be less than 2" x 3" (nominal) spaced not more than 24" on centers with horizontal bridging at mid-height. Diagonal bracing shall be used between the studs at each corner of the building, extending continously from floor to floor and/or floor to roof. Designs which do not follow these requirements shall be submitted to the Central Office for review. For various types of exterior wall covering permitted, see FPHA specifications for "War Dormitories" and "Temporary Housing".

Conventional Masonry. Brick, clay-tile and concrete units shall be permitted as optional construction, subject to compliance with thermal insulation requirements.

Concrete masonry units shall have an applied exterior finish of two coats of portland cement grout or be of an approved type of construction which will insure dry walls.

In localities where the regional office may determine that exterior tile walls are subject to sufficiently severe conditions of rain and exposure, the face of the walls shall have an applied finish of two coats of cement paint. Where there is reasonable doubt as to the severity of weather conditions, such painting should be done only if and when leaking conditions develop.

Mortar should be high in lime content to facilitate demolition of structure. See FPHA specifications for "War Dormitories" and for "Temporary Housing".

Minimum construction, as follows, is acceptable:

1. One-story walls and top story of two-story buildings 6" thick of wall bearing tile, or 8" thick of partition tile or equivalent concrete masonry units.

2. Lower story of two-story buildings 8" thick load bearing tile or concrete units.

Special types of construction. Hollow concrete units may be insulated by filling voids with granular or flaked materials such as cinders, burnt clay, slag or vermiculite.

A vapor seal, on the warm side of such insulated units, when required north of the 35° January isotherm, may be conventional membrane over woodfurring or, when no wood furring is used, a 1/8" layer of mastic dampproofing covered with a minimum coat of plaster.

New and experimental wall constructions must be submitted to the Central Office for approval prior to any use.

INTERIOR WALLS AND PARTITIONS

Non-bearing partitions may be of any of the following types:

1. Wood stud partitions, not less than 2" x 3" (nominal), spaced not more than 24" on centers. (Unusual designs shall be submitted to the Central Office for review.)

2. Masonry block partitions, with minimum thickness of 3", except short runs of cross partitions which may be 2".

3. Solid plaster partitions with a total thickness of 2".

4. Laminated partitions consisting of three layers of at least 3/8" thick gypsum wall board, or 3 layers of 0.34" thick laminated composition board, glued together and held in position with wood mouldings.

5. Stressed panels of plywood, composition board, or laminated composition board glued to wood studs in prefabricated buildings. Adequate cross bracing must be provided to transfer stresses to studs. Stressed panels must be structurally adequate.

Bearing partitions may be the following types:

1. Wood stud partitions not less than 2" x 3" (nominal), spaced not more than 23" on centers, with horizontal bridging at mid-height. (Unusual designs shall be submitted to the Central Office for review.

2. Masonry block partitions with a minimum thickness of 6" for brick or load bearing clay tile, and 8" for concrete units in two-story partitions when adequately braced at second floor line; minimum thickness of 4" for one-story structures.

INTERIOR SURFACE MATERIALS

Interior surfaces of all two-story buildings shall be of (1) incombustible wall board at least 3/8" thick, (2) plaster, or (3) exposed masonry.

Interior surfaces of one-story group houses may be of (1) combustible wall board (See FPHA specifications for "War Dormitories" and for "Temporary Housing".), or (2) any of the finishes approved above for two-story buildings.

Interior finish in one-story dormitories and in all project facility buildings must be incombustible.

FLOOR CONSTRUCTIONS

Wood Joists. The maximum (nominal) depth of wood joists generally shall be 10" and the maximum spacing of joists 24" on center.

Concrete Slabs. Concrete slabs supported on the ground shall be constructed without steel reinforcement.

Earth fills, compacted by hand-tamping or light-rolling shall not exceed one foot in depth. Deeper fills, used to support concrete floors, shall not exceed five feet and shall be laid in 6-inch layers sufficiently dampened, each layer thoroughly rolled with not less than 4 passes of a roller weighing at least 5 tons, unless the fills are of sand or bank-run sand and gravel thoroughly wetted and drained. Excavation for foundations can be cut through such fill and adequately compacted when backfilled.

All concrete floors supported on ground shall have a minimum thickness of 4" if plain concrete, or 6" if porous concrete. Except for basement floor slabs, laundries, store rooms, etc., a 6" layer of course gravel, stone, or slag shall be laid directly on the compacted fill, and a kraft fiber-reinforced waterproof paper laid on the gravel subgrade, before placing the floor slab.

"Weakened plane joints" shall be used for controlling the location of inevitable shrinkage cracks, in preference to expansion joints. These are partial vertical joints in the slab, made sufficiently "weak" to localize shrinkage movement to the joints. Such joints should be located 25 to 30 feet on center and, when possible, under partitions which extend continuously, without openings, across the building, thus concealing the joint. Score the slab from the top to within 1-1/2 inches of the bottom, just prior to initial set of the concrete.

Surfaces graded to drains shall have even pitch of not less than 1/8" per foot, without depressions which collect water.

Cement finishes should be completely bonded with slabs, and provide maximum surface strength with minimum shrinkage.

WOOD FRAMING

The following standards shall be observed:

Framing lumber for joists, rafters, lintels, beams, studs, posts, plates, and other ordinary members, shall be #2 common dimension, of common structural species or equivalent grades of hardwood.

Maximum stresses to be used in the design of members of the above species and grades shall not exceed the following:

| | |
|---|---|
| Extreme fiber in bending and direct tension | 1000 lbs/sq. in. |
| Horizontal shear . . . . . | 150 " " " |
| Compression perpendicular to the grain . . | 350 " " " |

Other grades shall follow current recommendations of the National Lumber Manufacturers Association.

For pitched roofs, pre-cut and assembled trussed-roof rafters are more economical than ordinary pitched rafters with or without interior supports since they eliminate all bearing partitions in the story below the roof and facilitate closing-in structures.

Flat roofs resting on interior beams or partitions and designed within the load and stress limits approved herein require less lumber than trussed pitched roofs.

Over wide openings, fix the ends of lintels with blocking, or use trussed bridging between studs, to avoid excessive lintel depths otherwise required for bending stresses.

Omit bridging for joist spans up to 14 feet, except in cases of special concentration.

Unless specifically detailed to suit stress conditions, joists should not be notched more than one-fourth of their depth at bearings, (nominal), nor should top or bottom edge be notched more than 1-1/4" between bearings and the 1/4 point of span, or notched at all within the center half of spans. No holes of a diameter greater than 1/4 the joist depth should be placed through joists, and all holes should be centered between top and bottom edges.

Stresses in special framing members, such as roof trusses or built-up girders, shall be designated on member details or a stress diagram.

Hardwood lumber is not controlled by WPB Limitations and its use should be encouraged.

MASONRY CONSTRUCTION

Brick and clay-tile with a high rate of absorption shall be damp when laid. Concrete units shall be laid dry, with special attention to the high durability and water-retentivity of the mortar.

Tooling of face joints shall be done after the mortar has taken its initial set. Methods of tooling shall be used which effectively compress the mortar to a smooth dense surface and give tight adherence to masonry units at exposed edges.

Chases in bearing walls shall be carefully located on drawings and be built in place, not cut out after walls are constructed. Omit chases in walls less than 12" thick.

Dimension story heights and stepped floor levels to suit standard masonry unit size, avoiding special units and cutting of standard units.

Optional types of lintels should be indicated. Exposed pre-cast concrete or wood lintels are permissible.

Flashings should be corrosion-resistant, protective-coated or approved membrane type.

SUBSURFACE INVESTIGATION

The character of the soil should be determined by test pits and or borings. The number, locality and depth of pits and or borings should be such as to provide adequate sub-soil information. (Refer to specification attached to Proposal for Survey, FPHA-1007 (Alternate) 6/7/43). A bearing value of about 3,000 pounds per square foot or more is desirable for building structures, but in locations where this value is not attained on sites which have been acquired, special consideration must be given to methods of safely carrying construction loads.

PROTECTION OF TRAPS AND PIPES AGAINST FREEZING

Determination of Need. Where buildings of any type in temporary housing projects are constructed with crawl spaces between first floors and grade, the regional office shall determine if plumbing traps, drain pipes from traps, and water service pipes will be subject to freezing. When protection against freezing id determined to be necessary, it shall be provided as required below.

Methods of Protection. An enclosure of wood or insulating fiberboard sheathing shall be constructed, of sufficient size to permit a minimum of three inches of insulation around such water piping, traps and horizontal drain pipes connected thereto. Place around the water service line a vitrified tile pipe, extending from below the frost line up into the trap enclosure, of sufficient diameter to provide a minimum of three inches of insulation between the tile pipe and the outside of the water pipe. Water pipe shall be centered in tile pipe and any joints in the latter shall be cemented.

Drawings and Specifications. Details of the required enclosure shall be placed on the drawings or be clearly described and called for in the specification. The entire trap enclosure and the vitrified tile pipe surrounding the water service line shall be packed with mineral type loose fill insulation.

Grade Soil in crawl space around water service pipes are to be sufficiently high to provide drainage to the exterior, and to positively prevent accumulation of water which would make the insulation ineffective.

NHA
FPHA
March 13, 1943
(Reprinted
July 25, 1944)

SUPPLEMENT 1/

Bulletin No. 2
Part IV

SUBJECT: Fire Resistive Standards for Alterations to Completed Dormitory and Family Dwelling Projects, Administration or Community Buildings

1. Projects taken over by FPHA from the Farm Security Administration, Public Buildings Administration or the Maritime Commission, or projects which have not been constructed under fire resistive standards comparable to the WD Series of the FPHA shall be reviewed by Regional Technical Staffs immediately.

2. Prepare plans for alterations to provide better fire control and an estimate of cost to cover such alterations.

(a) When estimates for alterations are not greater than 8 per cent of the original cost of the structures, no plans, specifications or justification are required by the Central Office and, after necessary funds have been made available, work should proceed immediately.

(b) When estimates for alterations exceed 8 per cent of the original cost of the structures, plans, specifications and justification for the expenditure must be sent to the Central Office for approval.

3. The following suggested standards should be carefully considered. Some items may not be practical on all structures.

(a) Install draft stops in attics, heat ducts and corridors, approximately 75 feet apart. Attic draft shops shall consist of two layers of 3/8" gypsum board, joints staggered and filled, extended to a tight fit against ceilings and roofs. Draft stops in ducts shall be automatic and meet N.B.F.U. Standards. Draft doors in corridors shall be one 1-3/4" stock cross panel doors, covered on each side with 1/8" asbestos mill board. Draft doors shall be hung on three butts and arranged to close by release of a fusible link and concrete weights hung on sash chain. Draft doors to be installed in cross partitions covered with 1/2" gypsum board.

(b) Install additional exits if necessary, so that each 75 ft. section shall have an exit. All exit stairways shall be closed type with risers and be of slow burning construction. Stringers, posts and steps at least 2-1/2" thick.

(c) Install draft stops in ducts at walls enclosing heater rooms.

---

1/ This supplement supersedes Regional Circular 7.55, dated 11-30-42, and should be filed before Supplement No. 1. It has been reprinted without change, and the original date of issue has been retained (together with the date of reissue) because of the reference to it in Exhibit 2 to Chapter 3646 of the Policy and Procedure Manual.

(d) Install automatic fire doors at all other openings to heater rooms.

(e) Line any flammable walls and ceilings of heater rooms with two 1/2" layers of gypsum board, joints staggered and filled.

(f) Line all flammable walls of corridors with one 1/2" layer of gypsum board.

(g) Cover all doors to corridors from rooms with at least 1/8" of asbestos cement mill board on corridor side.

(h) Cover all ceilings of first story in two story buildings with 3/8" of gypsum wall board joints filled.

(k) Provide 165° F. automatic sprinkler head supplied from domestic water service in all rooms used for trash collections, with control valve in accessible location.

(l) Provide exits for all floors at ends of all wings.

(m) All exit doors shall open outward and be equipped with easy opening hardware.

(n) Install ladders to roof at each fire exit.

(o) Provide 1 inch clearance from combustible materials for steam pipes.

(p) Provide thermostats in return air ducts to cut out fan when return air temperature reaches 120° F.

(q) Thermostats to be enclosed so as to be inaccessible to occupants.

(r) Provide rate of rise thermostats in central heating furnace rooms arranged to ring a gong on the outside of the buildings.

(s) Check standard clearance for metal heating ducts.

(t) Check 1 inch clearance from combustibles for transite vents from gas fired heating equipment.

(u) All exits should be clearly marked with exit lights on separate circuit. Directional arrows to exits should be posted in corridors.

(v) Check location of water service shut-offs and, where too close to buildings or located within the buildings, relocate where accessible in the event of envelopment of the building by fire.

(w) Hydrant layout should be checked with local fire chief and changes required to make hydrants accessible to pumping apparatus or to relocate them where too close to buildings for safety of fireman and apparatus in the event of fire.

(x) Suggest that alarm device in dormitories be an automobile horn with both bell ringer transformer and dry battery arrangement.

(y) Provide incombustible ash trays, trash and ash containers with covers.

(z) Provide pump tank fire extinguishers, five-gallons capacity at each exit.

4. The fact that some space may be sacrificed to carry out some of these requirements shall not operate to prevent the change.

5. CAFETERIAS

(a) Provide 6" clearance for range hoods and ducts.

(b) Partitions behind ranges to be constructed of or faced with incombustible material.

(c) Protection for combustible floors below cooking ranges to be ventilated type.

(d) If steam is available, arrange steam jet with quick opening valve for range hood.

(e) Asbestos protection under gas plates to be provided.

(f) Provide metal range hoods and ducts.

6. MANAGEMENT

(a) Require that dust mops, dust rags, etc. be hung up and not allowed to accumulate in piles.

(b) Post signs in telephone pay stations and at other locations with Fire and Police Department numbers.

(c) Provide detached paint storage.

(d) Established rigid rules for trash and rubbish collection and disposal.

(e) Require regular weekly soap and water clean-up of grease collecting on exhaust ducts, fans, etc. Ladders are to be provided to make this equipment easily accessible.

(f) Institute and maintain regular periodic fire drills.

(g) Maintain 24-hour watchment patrol with minimum hourly tours of each building. Watchmen must be mentally and physically capable, qualified for deputization, and properly instructed in emergency duties. Provide portable watch clocks or other means of tour supervision.

(h) Segregate occupants by shifts worked, to the maximum extent practicable.

NHA
FPHA

CIRCULAR
12-6-43

TO: All Holders of Bulletin No. 2

SUBJECT: Supplement No. 1 to Part IV, "Construction Standards for Rodent Control"

Attached is a copy of Supplement No. 1 to Part IV, dated December 1, 1943, to Bulletin No. 2, "Standards for Temporary War Housing," which should be inserted in Part IV. Also attached is a revised table of contents for Part IV, reflecting the change necessitated by the supplement, which should be inserted in place of the present table of contents.

These standards, which have been prepared in collaboration with the United States Public Health Service, are mandatory in all states in Regions IV and VIII and in certain states in Regions III, IX and X.

Charles K. Ogle

for W. P. SEAVER
Assistant Commissioner
for Development

Attachments

20615

# BULLETIN NO. 2

# STANDARDS

# FOR

# TEMPORARY WAR HOUSING

# PART IV

# CONSTRUCTION

## CONTENTS


| | Page |
|---|---|
| Applicable Standards and Codes | 1 |
| Design Principles | 1 |
| Fire Resistivity | 2 |
| Termite and Rot Protection | 6 |
| Thermal Insulation | 8 |
| Condensation | 11 |
| Foundation Design | 11 |
| Exterior Walls | 12 |
| Conventional Wood Framed | 12 |
| Conventional Masonry | 12 |
| Special Types of Construction | 13 |
| Interior Walls and Partitions | 13 |
| Non-bearing Partitions | 13 |
| Bearing Partitions | 13 |
| Interior Surface Materials | 14 |
| Floor Constructions | 14 |
| Wood Framing | 15 |
| Masonry Construction | 16 |
| Subsurface Investigation | 16 |
| Protection of Traps and Pipes against Freezing | 17 |

Supplements

Rodent Control . . . . . Supplement No.1



NATIONAL HOUSING AGENCY

FEDERAL PUBLIC HOUSING AUTHORITY

December 1, 1943



20615

STANDARDS FOR TEMPORARY WAR HOUSING

BULLETIN NO. 2, PART IV
Supplement No. 1

# RODENT CONTROL

CONTENTS


| | | Page |
|---|---|---|
| I. | General Requirements for All Types of Buildings . . . . . | 1 |
| II. | Special Requirements for Cafeterias, Restaurants, Lunch Rooms, and Food and Drug Stores. . . . . | 2 |
| III. | Special Requirements for All Types of Buildings, except Commercial Buildings listed in Part II. . . . . | 3 |
| IV. | Priority Ratings . . . . . | 3 |
| V. | Costs. . . . . | 3 |



NATIONAL HOUSING AGENCY

FEDERAL PUBLIC HOUSING AUTHORITY

December 1, 1943

20615

These Standards have been prepared in collaboration with the United States Public Health Service, to protect the health of war workers and their families, to prevent the spread of murine typhus fever and other rat-borne diseases, and to aid in maintaining sanitary conditions on war housing projects by providing for:

(1) rat-proofing of all commercial buildings in which food is stored, such as cafeterias, restaurants, lunch rooms, food and drug stores, and

(2) protection of other types of buildings by closing openings though which rats might enter and eliminating enclosed spaces which afford shelter and protection.

# RODENT CONTROL

These Standards apply to the construction of all types of buildings, and are mandatory in the following Regions and States:

| Region III | Region IV | Region VIII |
|---|---|---|
| Virginia | Alabama | Arkansas |
| | Florida | Louisiana |
| | Georgia | New Mexico |
| | Mississippi | Oklahoma |
| | North Carolina | Texas |
| | South Carolina | |
| | Tennessee | |

| Region IX | Region X |
|---|---|
| Oregon | Arizona |
| Washington | California |

## 1. GENERAL REQUIREMENTS FOR ALL TYPES OF BUILDINGS

The following requirements apply to all buildings whether existing, under construction or proposed.

Where wood floors are used, a clearance of 18" shall be maintained between floor joists and ground surface for all proposed construction. For existing buildings or buildings under construction this requirement shall be met insofar as practicable.

All openings in floors through which pipes or conduits pass shall be sealed from underneath the floors by metal collars placed around the pipes or conduits, or by other rat-proof materials.

Where ducts enter partitions or other walls, closures of metal or hardware cloth with mesh not more than one-half inch square shall be provided.

Inaccessible spaces under first floor construction which would permit rat harborage shall be avoided.

## II. SPECIAL REQUIREMENTS FOR CAFETERIAS, RESTAURANTS, LUNCH ROOMS, AND FOOD AND DRUG STORES.

### Existing Construction

Existing cafeteria buildings shall be examined, and all items under "New Construction" checked by the Regional Technical Staff. Variations from requirements shall be corrected insofar as practicable, provided abnormal expense would not be incurred.

### New Construction

Floors must be constructed of concrete, since the use of wood floor contributes to rat infestation.

Foundation walls around concrete floors must be of concrete or masonry pointed to prevent rats obtaining harborage or entrance to gravel fill under floors. Continuous foundation walls shall extend three feet below the ground surface or at least 20 inches in depth with a horizontal footing extending outward at least 8 inches from the exterior face of the building. Openings in foundation walls though which pipes are run shall be filled solidly around the pipes.

Exterior walls of frame construction shall have all spaces between studs filled solidly with brick nogging or similar masonry fill for a height of at least 12 inches above the concrete floor.

Openings through walls or partitions above foundations for the passage of ducts or pipes must be tightly closed with hardware cloth with mesh not more than one-half inch square or with sheet metal of at least 26 gage.

Drains must be capped with perforated metal covers fastened in place.

Exterior doors must fit tightly and, when likely to remain open during the day or night, must be supplemented with screen doors fitted with automatic self-closing devices. All jambs and exposed edges of exterior service doors, through which food or garbage is carried, shall be flashed with 26 gage metal to a height of 10 inches; exposed sills shall also be flashed with metal.

Refrigerators shall be installed in such a way that there will be no partially enclosed spaces beneath, behind or on the sides which might afford harborage for rats. Refrigerator doors must be flashed with metal as required above for exterior service doors. Floor mats inside refrigerators must be so constructed that the space under the slats shall not exceed one-half inch.

Adjustable skylights or clerestory windows must be screened with hardware cloth with mesh not more than one-half inch square.

Cabinets, shelves, and other fixtures shall be constructed free of enclosed spaces at floors by elevating them 12 inches or by installing rat-proof bases.

Metal containers, tightly covered, shall be provided for garbage.

## III. SPECIAL REQUIREMENTS FOR ALL TYPES OF BUILDINGS EXCLUDING COMMERCIAL BUILDINGS LISTED IN PART II

The following requirements shall apply to all new construction:

Construction shall follow the effective standards applicable to the prevention of termites and rot. (Refer to section on "Termite and Rot Protection" of Bulletin 2, Part IV.)

Concrete floors shall be used where it is not practicable to provide the under floor clearance required under Part I, "General Requirements for All Types of Buildings".

In foundation walls, crevices and interstices shall be carefully filled and pointed; vents shall be closed with metal grating or hardware cloth having mesh not more than one half inch square; and openings for pipes shall be filled solidly or flashed with collars of rat-proof material.

Spaces under buildings supported on wood posts or masonry piers shall be left open, where skirting is not required to prevent heat loss.

Litter and rubbish which have accumulated from construction operations must be removed from the site.

## IV. PRIORITY RATINGS

Priority assistance for procuring the critical materials required will, if necessary, be rendered by the Central Office.

## V. COSTS

Existing Construction or construction under Contract. The Regional Office should prepare an estimate of the cost of the work necessary, and submit a revised Form 501 to the Central Office Project Review Division.

New Construction. Cost of the work should be included in the estimated construction cost submitted on Form 501.

NHA
FPHA

CIRCULAR
1-4-44

TO: All Holders of Bulletin No. 2.

SUBJECT: Sound Reduction

Attached is Supplement No. 2, "Sound Reduction" to Part IV "Construction" of Bulletin No. 2, "Standards for Temporary War Housing" and a revised table of contents to reflect the change made by this supplement which should be inserted in place of the table of contents dated 12-1-43.

This supplement on sound reduction sets forth special requirements for the construction of partitions between dwelling units. These requirements supplement those for interior walls and partitions on page 13 of Part IV, "Construction" of Bulletin No. 2

for Charles K Ogle
Assistant Commissioner
for Development

Attachment

21193

# BULLETIN NO. 2

# STANDARDS

# FOR

# TEMPORARY WAR HOUSING

# PART IVE

# CONSTRUCTION

## CONTENTS


| | Page |
|---|---|
| Applicable Standards and Codes | 1 |
| Design Principles | 1 |
| Fire Resistivity | 2 |
| Termite and Rot Protection | 6 |
| Thermal Insulation | 8 |
| Condensation | 11 |
| Foundation Design | 11 |
| Exterior Walls | 12 |
| Conventional Wood Framed | 12 |
| Conventional Masonry | 12 |
| Special Types of Construction | 13 |
| Interior Walls and Partitions | 13 |
| Non-bearing Partitions | 13 |
| Bearing Partitions | 13 |
| Interior Surface Materials | 14 |
| Floor Constructions | 14 |
| Wood Framing | 15 |
| Masonry Construction | 16 |
| Subsurface Investigation | 16 |
| Protection of traps and Pipes against Freezing | 17 |

Supplements

| | |
|---|---|
| Rodent Control | Supplement No. 1 |
| Sound Reduction | Supplement No. 2 |



NATIONAL HOUSING AGENCY

FEDERAL PUBLIC HOUSING AUTHORITY

January 4, 1944

SUBJECT: Sound Reduction 1/

Partitions between dwelling units shall be such as to insure a sound transmission loss of at least 45 decibels.

Partition constructions which will provide at least the above-noted sound reduction, based on tests at the Bureau of Standards, follow:

(a) Wood studs, fiber lath, gypsum plaster.
(b) Wood studs staggered, plywood with 1/2" gypsum board.
(c) Wood studs, spring clips, gypsum lath, gypsum plaster.
(d) Wood studs staggered, metal lath, gypsum plaster.
(e) 4" brick partitions, plastered both sides.
(f) 8" tile or masonry unit partitions, plastered both sides.

When ply wood is applied to studs as in (b) above, the studs may be nominal 1 x 3, 16" o.c. with plywood glued to studs.

The efficiency of any commercial thickness of single tile or block partition unplastered is doubtful and, therefore, these materials are not recommended.

While there are no available test records on wood studs staggered with plaster on gypsum lath, or wood studs staggered with wall board, the Technical Division believes that such partitions may be considered to fulfill the required sound reduction, when both sides are plastered on gypsum lath or when two layers of 3/8" wall board are used on both sides.

Sound transmission laterally through floors can be reduced by providing a complete break in the floor construction under the party wall partition in frame constructions, permitting only the minimum necessary contact between the joists and floors. No laboratory tests have been made on such construction and no apparatus exists at the Bureau of Standards for making such tests. Experience and theory in this case, however, appears to be sufficiently established to justify the use of completely separate floor constructions to reduce the telegraphic effect of continuous floors.

Effect of cracks or holes. No matter what type of construction is used to minimize noise transmission, results will be seriously deficient if cracks or holes in the wall or partitions exist where sound waves can pass through. This condition is very apt to occur in wood partitions after shrinking of the wood floor joists, and it may be necessary to reset wood base boards and carpet strips in such cases, after buildings are well dried out.

1/ This insert supplements the requirements for interior walls and partitions on page 13 of Part IV "Construction" of Bulletin No. 2.

SUBJECT: Suspended Chimneys - Oil and Coal Fired Equipment

Suspended chimneys are permitted in one-story pitched roof dwellings with unoccupied attic spaces and flat roof dwellings without attic spaces, provided such chimneys meet the requirements of the Underwriters' Laboratories and bear their label.

Use of masonry or suspended chimneys should be determined for each project by a consideration of:

(1) utility combinations and types of equipment and

(2) other pertinent project conditions including geographical locations, type of construction, period of year for construction, costs, availability of bricklayers.

Masonry chimneys should be used when:

(1) coal ranges and coal space heaters are provided, since partitions required near such equipment must be protective masonry. (See Part IV, page 4)

Suspended chimneys may be used when the fuel combinations permit those items of equipment requiring flue connection to be connected readily to a single chimney. Such combinations include:

(1) coal fired space heater, gas water heater, and gas range

(2) coal fired space heater, electric water heater and electric range

(3) oil fired space heater, oil water heater and kerosene range.

When suspended chimneys are used, the masonry partitions indicated on the standard plans, Series WDU-10, may be retained or replaced by other incumbustible construction.

Priority Ratings. The approved critical material lists for standard building elements include the required steel for metal flues in connection with suspended chimneys.

NOTE: This Supplement incorporates the instructions contained in Mr. Seaver's book memorandum to all regional directors, dated 9-27-43, relative to this subject.

NHA
FPHA

CIRCULAR
2-5-44

TO: All Holders of Bulletin No. 2

SUBJECT: Revised Part V, Plumbing, Bulletin No. 2

Attached is Part V, "Plumbing", of Bulletin No. 2 , "Standards for Temporary War Housing", revised as of February 5, 1944, which supersedes Part V, dated January 1943, and all revisions and supplements thereto.

The principal changes consist of minor modifications and additions to pages 1, 2 and 3; deletion of Series WA-1, TDU-1, 2 and 3, and the addition of Series WDU-10 and WA-20; omission of the plumbing fixture schedule; revision of data on domestic hot water equipment; addition of "Correlation Between Purchase and Installation of Equipment Furnished under Consolidated Procurement"; and addition of details of flashings and pipe supports.

J. P. Murrin

W. P. SEAVER
for Assistant Commissioner
for Development

Attachment

21967

# STANDARDS FOR TEMPORARY WAR HOUSING

## BULLETIN NO. 2, PART V

## PLUMBING

CONTENTS


| | Page |
|---|---|
| Design Standards | 1 |
| Emergency Plumbing Standards | 1 |
| Dormitories, Series WD-1, 2 and 3 | 1 |
| Project Facility Buildings, Series WD-1 | 2 |
| Family Dwellings, Series WDU-10 and WA-20 | 2 |
| Project Facility Buildings, Series TDU | 3 |
| Domestic Water Heating Equipment | 3 |
| Correlation between Purchase and Installation of Equipment Furnished under Consolidated Procurement | 6 |
| Details of Flashings and Pipe Supports | 8 |



NATIONAL HOUSING AGENCY

FEDERAL PUBLIC HOUSING AUTHORITY

February 5, 1944


21967

## Design Standards

Design of plumbing shall be developed in strict compliance with the Emergency Plumbing Standards for Defense Housing and applicable rulings of the War Production Board, such as Limitation Orders and the War Housing Manual. Application of the data set forth therein will provide adequate sanitary facilities to safeguard the health and comfort of the occupants with minimum use of critical materials.

Applicable specification requirements stipulated in WD-19 of the Specification for War Dormitories, or T-16 of the Temporary Housing Specification should be used.

No modification or variation from plumbing layouts shown on standard plans may be made without prior approval by the Central Office. The lists of critical material, based on the standard plans and specifications, have been reviewed and approved by the WPB.

## Emergency Plumbing Standards

Where one of two or more alternate materials listed in the Emergency Plumbing Standards is customarily used in a locality, such material should be specified in order to utilize available labor to the best advantage and to minimize the possibility of jurisdictional disputes. (For example, the local code of Buffalo, New York, requires lead vent frames and water closet connections. This requirement should be followed for projects in that area).

Where a municipality has adopted the Emergency Plumbing Standards as the local code during the emergency, inspection of the work installed in that locality by the local municipal inspector is desirable as a matter of policy whenever possible, provided such inspection is performed without cost to the project. Many municipalities have offered their services for this purpose without obligation to the Government. Under any condition, the tests required in the Emergency Plumbing Standards must be followed.

## Dormitories, Series WD-1, 2 and 3

A service unit is provided for dormitories in which all sanitary and bathing facilities are located. There is no plumbing in dormitory wings.

1/ This Part supersedes Part V, dated January 1943, and all revisions and supplements thereto.

Project Facility Buildings, Series WD-1

Sanitary and domestic water heating systems have been designed for the following buildings:

Infirmary - 2100, 1500 and 1000
Morale Activities - 1500 and 1000
Management & Maintenance - 1500 and 1000
Cafeteria - 2100-1500, 1000A-650, 400-250, 175-125

Plumbing designs for project facility buildings of other sizes shall be governed by the layouts referred to above and by pertinent data contained in these Standards.

Cafeteria and kitchen equipment will be purchased by the Central Office Procurement Division, and installed by a kitchen equipment contractor. All plumbing connections to the kitchen equipment shall be made by the general contractor who shall connect to tail pieces and waste outlets furnished by the equipment contractor.

Family Dwellings, Series WDU-10 and WA-20

Each bathroom contains a shower, lavatory and water closet. The kitchen is provided with a combination sink and tray. Domestic water is heated by tenants in individual units. Two-story WA-20 War Apartments may be designed for project water heating (and project space heating) with the equipment located at the end of the building unit.

Where separate cold water service mains are installed for individual dwelling units, or for each two dwelling units with fixtures arranged back to back, one stop and waste valve located in a box at least 2-feet outside building wall shall be provided.

Where a single cold water service main is installed for several dwelling units in a building, one stop and waste valve located in a box at least 2-feet outside building wall shall be provided in addition to one control valve for each individual dwelling unit or for each two dwelling units having fixtures arranged back to back.

Where domestic hot water is project supplied, provide separate control valve for each individual dwelling unit or each two dwelling units where fixtures are arranged back to back.

Provide sillcocks as follows:

(a) On side of building where fixtures are located: One for each individual dwelling unit or for each two dwelling units where fixtures are arranged back to back.

(b) On side of building opposite to fixtures: One for each four dwelling units or fraction thereof, equally spaced.

Sillcock lines shall be arranged so that protection against freezing can be afforded by a control valve without the waste feature.

Project Facility Buildings, Series TDU

Plumbing requirements for project facility buildings for family dwelling projects shall be based on pertinent data contained in these Standards.

Domestic Water Heating Equipment

The domestic water heating equipment indicated on standard plans has been revised on the basis of the following data. Tables 1 and 2 are applicable to dormitories and project facility buildings; Table 3 to dwelling units; and Table 4 to both. Equipment for cafeterias will remain as is (see drawings).

*TABLE 1, QUANTITIES USED IN DETERMINING MAXIMUM HOURLY CONSUMPTION OF DOMESTIC HOT WATER ON BASIS OF PLUMBING FIXTURES

| Fixture | Gals. Per Hour |
|---|---|
| Lavatory | 4 |
| Shower | 30 |
| Bathtub | 20 |
| Sink and tray | 20 |
| Laundry tray | 28 |
| Kitchen sink | 10 |
| Service sink | 20 |

*Select heater and range boiler or tank size for dormitories and project facility buildings based on Tables 1, 2 and 4. Assume a 2-hour peak for net design load. Heater must have capacity to heat the desired quantity of water per hour 100 degrees F. above inlet water temperature.

*TABLE 2, LOAD FACTOR APPLIED TO NUMBER OF FIXTURES TO DETERMINE MAXIMUM HOURLY DEMAND

| No. of Fixtures | Load Factor |
|---|---|
| Up to 11 | 1.0 |
| 12 to 16 | 0.80 |
| 17 to 22 | 0.70 |
| 23 to 28 | 0.65 |
| 29 to 35 | 0.60 |
| 36 to 42 | 0.55 |
| 43 to 50 | 0.50 |
| 51 to 60 | 0.45 |

*Select heater and range boiler or tank size for dormitories and project facility buildings based on Tables 1, 2 and 4. Assume a 2-hour peak for net design load. Heater must have capacity to heat the desired quantity of water per hour 100 degrees F. above inlet water temperature

**TABLE 3, LOADS USED IN DETERMINING MAXIMUM HOURLY CONSUMPTION OF DOMESTIC HOT WATER ON BASIS OF NUMBER OF DWELLING UNITS--AND RESPECTIVE RANGE BOILER OR TANK SIZES-- (Project Operated Plants)

| No. of D.U. | Load (Gals. per hour) | Range Boiler (U.S. Gals.) | Tank (U.S. Gallons) |
|---|---|---|---|
| 4 | 80 | 66 | |
| 6 | 120 | 82 | |
| 8 | 150 | 120 | |
| 10 | 170 | | 155 |
| 12 | 190 | | 155 |
| 14 | 210 | | 210 |
| 16 | 220 | | 245 |
| 18 | 230 | | 245 |
| 20 | 240 | | 245 |

**Select heater and range boiler or tank size for dwelling units (project operated plants) based on Table 3. Range boiler and tank sizes shown are selected from Table 4. Assume 1-1/2 hour peak for net design load. Heater must have capacity to heat the desired quantity of water per hour 100 degreas F. above inlet water temperatures.

(e) Capacity of Heater: $\frac{582 - 184 \text{ gals.}}{2 \text{ hr. peak}} = 200$ gals. per hour

(f) The following equipment will meet these requirements:
1. Water heater, capacity of 200 gallons per hour (100 degree F. temperature rise of inlet water)
2. Storage tank, 245 gallons nominal capacity.

(g) Where an integral heater and tank unit is selected (oil or gas automatically fired), the heater and tank sizes may be varied from the above provided the overall capacity of the integral unit is not reduced.

Note: The same general procedure shall be followed in determining and selecting equipment meeting the requirements for dwelling units (project operated plants) except:

(a) Net design load shall be based upon a 1-1/2 hour peak computed as follows: Hourly load, gallons per hour (Table 3) x 1-1/2.

(b) Range boiler or tank size shall be selected from Table 3.

Correlation Between Purchase and Installation of Equipment Furnished under Consolidated Procurement:

To obviate misunderstanding concerning the contractor's responsibility in assembling and connecting equipment and related items furnished under Consolidated Procurement, the following schedules shall be used. This tabulation integrates the work to be performed by the contractor with the type and extent of the equipment furnished.

| Fixture | Furnished by Procurement Division | To be Furnished by the Contractor |
|---|---|---|
| Water Closet | Water closet - low down or close coupled tank and trim; closet seat less cover | 3/8" cold water supply from tank to wall, closet floor flange, closet setting compound, screws, nuts & bolts, non-metallic escutcheons. |
| Lavatory | Lavatory, concealed hanger, single or double faucets with gaskets and lock nuts, couplings and tail pieces. Drain plug with gasket, lock nut coupling and tail piece, stopper (no chain) and 1-1/4" P trap (slip inlet, threaded outlet). | 3/8" cold and hot water supplies, 3/8" x 1/4" reducing couplings from faucet tail piece to wall, 1-1/4" nipple from P trap to wall, screws, bolts, nonmetallic escutcheons for water supplies and waste. |

***TABLE 4
NOMINAL CAPACITIES OF RANGE BOILERS AND TANKS

| Range Boilers | | | Tanks | | | |
|---|---|---|---|---|---|---|
| Inside Diameter (Inches) | Length of Shell (Inches) | Nominal Capacity (US. Gal.) | Inside Diameter (Inches) | Length of Shell (Inches) | Nom. Capacity, Two Plus Heads (US Gals.) | Nom. Capacity, One Plus and One Minus Head (US Gallons) |
| 12 | 60 | 30 | 24 | 60 | 130 | 120 |
| 14 | 60 | 40 | 24 | 72 | 155 | 140 |
| 18 | 60 | 66 | 30 | 60 | 210 | 185 |
| 20 | 60 | 82 | 30 | 72 | 245 | 220 |
| 24 | 60 | 120 | 30 | 96 | 320 | 295 |
| | | | 30 | 120 | 390 | 365 |

***Standard sizes in accordance with WPB Limitation Order L-199. Select nearest standard range boiler or tank size based upon 40% of net design load for dormitories and project facility buildings. Range boiler or tank sizes for dwelling units shall be as scheduled in Table 3.

Example in use of foregoing tables: Select heater and tank size for dormitory building (Drawing 1S-NB-2W-A, dated August 21, 1943).

(Note: Figure 75% of nominal range boiler and tank capacities as useful storage.)

Solution:

(a) 11 lavatories @ 4 gals. per hour = 44 gal. per hour
9 showers @ 30 gals. per hour = 270 gal. per hour
1 service sink @ 20 gals. per hour = 20 gal. per hour
1 kitchen sink @ 10 gals. per hour = 10 gal. per hour
3 laundry trays @ 28 gals. per hour = 84 gal. per hour
1 bathtub @ 20 gals. per hour = 20 gal. per hour

26 fixtures = 448 gal. per hour (total hourly consumption)

(b) Net design load: 448 x 2 hour peak x 0.65 (load factor) = 582 gallons.

(c) Size of tank: 582 x 0.40 = 233 gallons. (Nearest standard tank size with two plus heads is 245 gallons).

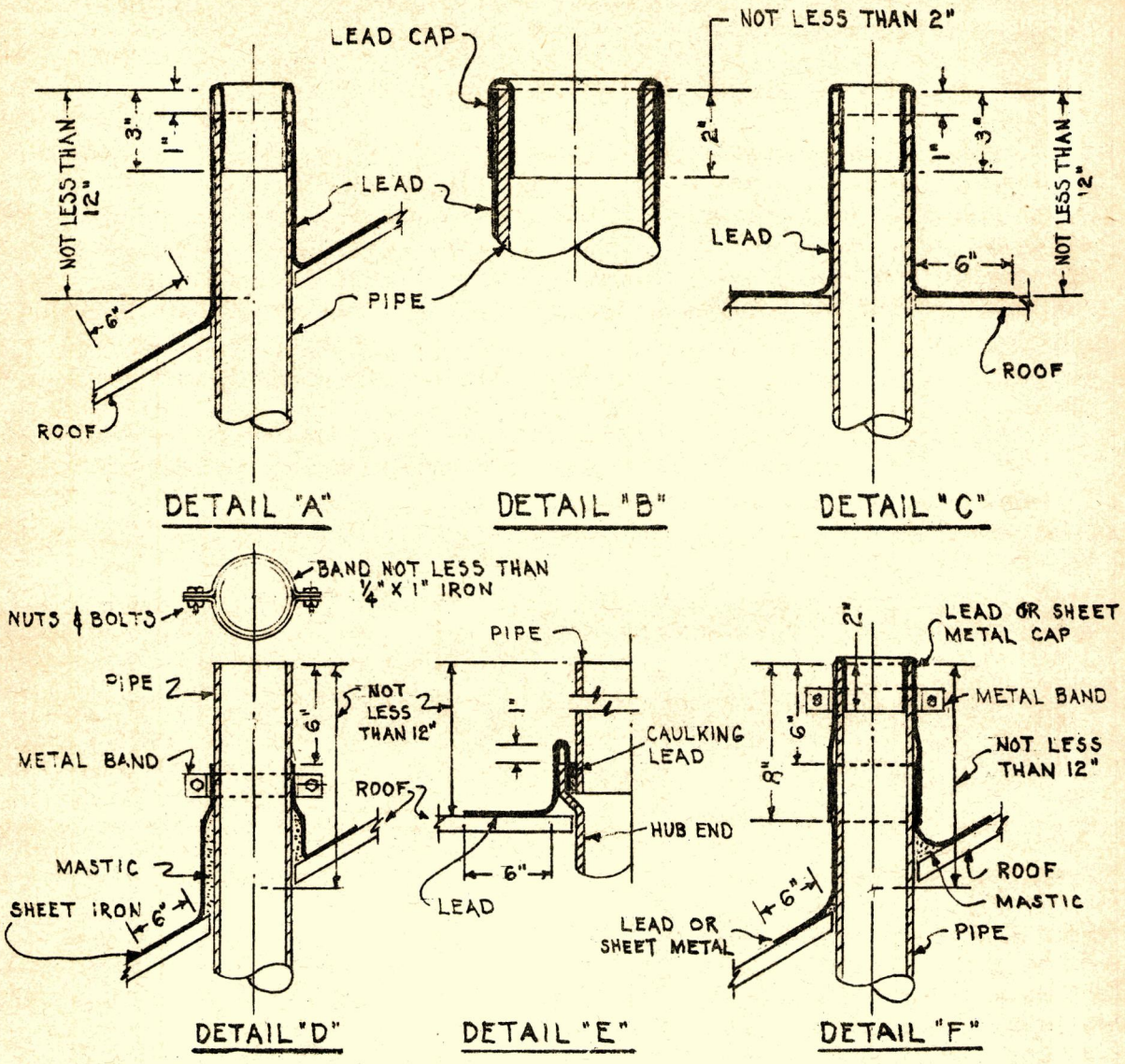
(d) Useful tank storage: 245 x 0.75 = 184 gallons.

| Fixture | Furnished by Procurement Division | To be Furnished by the Contractor |
|---|---|---|
| Shower cabinets | Receptor with integral drain (no trap), two side and one back enclosure panels and frame with curtain rod, combination supply fitting with goose neck and shower head; including shower curtain and hooks, soap dish, screws and/or bolts, and mastic calking compound. | Assembly of shower cabinet including application of calking compound to make cabinet watertight. Necessary connections and trap from shower outlet to drain; 1/2" cold and hot water supply from combination fitting to water supply; necessary drillings in side panel. |
| Sink and tray | Sink approximately 20" x 18" x 6" deep; tray approximately 20" x 18" x 12" deep. 1-1/2" tailpiece with strainer for sink, 1-1/2" tail piece with stopper for tray, 1-1/2" continuous waste with 1-1/2" P trap combination swing spout deck type faucet. | 1/2" cold and hot water supplies from combination faucet to wall, 1-1/2" nipple from P trap to wall, setting compound, nonmetallic escutcheons for water supplies and waste. Setting of sink and tray in cabinet. |
| Undercabinet for sink and tray | Knocked down, consisting of: Two side panels, front apron, rear board, top section with back, and center rail. Including screws, or bolts. Drilling for faucets. | Assembly of cabinet; application of setting compound to top of sink and tray before setting top of cabinet; screws and bolts. |
| Range | Range boiler, and 1/2" pressure relief valve | Temperature relief valve; making of all water connections between inlet and outlet opening in range boiler and waterback of stove; overflow from relief from relief valves to within 12" above floor; range boiler stand 18" high. Plugs for unused tappings. |
| Gas fired water | Gas fired water heater, crated 1/2" pressure relief valve and back draft diverter | Assembly of heater; making of all water connections, also gas connections with gas cock; overflow from relief valves to within 12" above floor; smoke pipe to chimney. Adjust equipment for proper operation. |

| Fixture | Furnished by Procurement Division | To be Furnished by the Contractor |
|---|---|---|
| Oil fired water heater | Oil fired water heater, crated and 1/2" pressure relief valve | Assembly of heater. Making of all water connections; overflow from relief valves to within 12" above floor; smoke pipe to chimney. Adjust equipment for proper operation |
| Electric water heater | Electric water heater, crated and 1/2" pressure relief valve | Assembly of heater. Making of all water connections, overflow from relief valves to within 12" above floor (electric connections to heater as specified under Electric Division). Adjust equipment for proper operation |

Details of Flashings and Pipe Supports

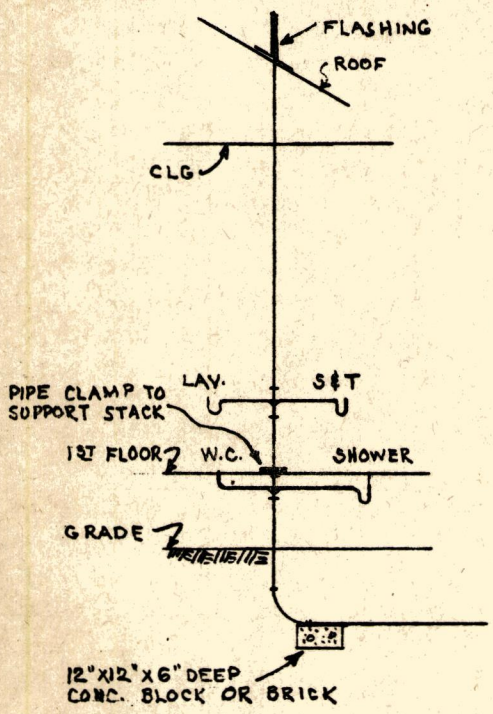
To prevent leaks around pipes passing through roofs and to provide for adequate pipe supports, the details indicated on the two following pages, titled "Vent Pipe Flashings", 11-10-43 and "Vertical Pipe Supports", 12-1-43, should be incorporated in the working drawings.



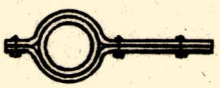

"A" LEAD FLASHING FOR SLOPING ROOFS
"B" LEAK PROOF CAP OVER LEAD COLLAR & PIPE
"C" LEAD FLASHING FOR FLAT ROOFS
"D" SHEET METAL FLASHING WITH BAND
"E" LEAD FLASHING CAULKED INTO C.I. HUB
"F" LEAD OR SHEET METAL FLASHING WITH CAP & BAND.

FLASHING LEAD - 2½ LB. HARD OR 3 LB. 50 FT.
FLASHING SHEET METAL NOT LESS THAN 26 GUAGE.
ALL JOINTS TO BE BURNED, SOLDERED OR PREFABRICATED.

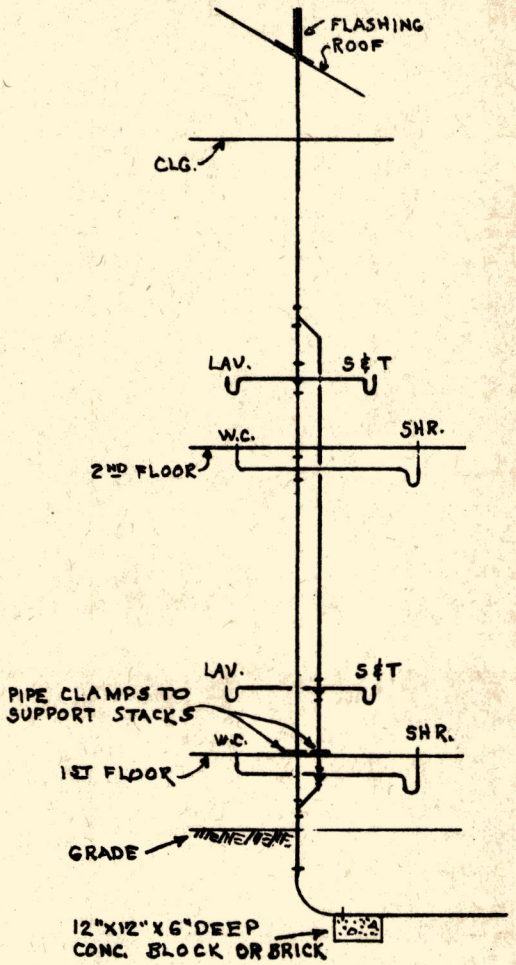
# VENT PIPE FLASHINGS




SOIL & WASTE STACK
FOR ONE STORY BLDGS.



FRICTION PIPE CLAMP




SOIL & WASTE STACK
FOR TWO STORY BLDGS.

# VERTICAL PIPE SUPPORTS

## Design Standards

Design of heating for temporary war housing is controlled by considerations of (1) conservation of and limitations on use of materials, (2) availability of fuels (and their effect on over-all project design), and (3) applicable orders and rulings of War Production Board.

Heating standards for temporary war housing have been set at a lower level than accepted practice. Heating is generally provided by means of directly-heated warm air, with less critical materials than metals substituted for metals wherever practical. Since the capacity of a heating system and the amount of critical material it requires are proportional, insulation and other features of construction which reduce heat losses are essential.

Manufacture of materials and equipment is being scheduled under the Controlled Materials Plan by the War Production Board in accordance with standards described herein. These standards and designs shown in Standard Plans must, therefore, be followed <u>without deviation</u>.

## Heating Zones

Standard Plans, with the exception of infirmary plans, show heating plans based on three design temperatures. Appropriate use of each is shown in the following table:

| Design Temperature (in degrees) | Range of Use Where design temperature ordinarily used is (in degrees) |
|---|---|
| +15 | +10 and warmer |
| 0 | -5 to +5, with storm sash and doors |
| -20 | -10 to -25, with storm sash and doors<br>Below -25, re-investigate the heating design and increase to capacity of the system or change construction, as, for example, through increased use of insulation, to reduce the heat losses to those figured for the -20° zone. |

Heating plans for infirmary buildings are based on design temperatures schedules by 10-degree intervals from +20 to -20 degrees. Where the design temperature ordinarily used lies between two zones, the next lowest temperature should be used.

## Heating Systems

Heating plans developed for standard plans, and allowable fuel and equipment combinations for all plan types, are shown in Exhibit B Part 1-B, "Utilities Selection," of Bulletin No. 2.

Heating systems for the standard plans are based on the "U" factors tabulated below.

Construction changes which result in greater heat losses must be offset by increased heat output. With forced warm air, increased heat loss can be offset by increasing the air delivery temperature (without increasing air quantities or changing the design) and increasing the furnace capacity. Where forced hot water is used, radiators, boilers and possibly pipe sizes must be increased if the heat losses are increased.

### "U" Factors Figured in Standard Plans*

| Plan Series | Construction Element | Heating -20° | Design 0° | Zone +15° |
|---|---|---|---|---|
| WA-20 | | | | |
| WD-1 & 2 | Ceiling | .08 | .08 | .08 |
| TDU-1, 2 & 3 | Wall | .22 | .3 | .56 |
| WDU-10 | Wood Floor | .13 | .13 | .13 |
| WA-1 | Ceiling | .072 | .072 | .072 |
| | Frame Wall | .15 | .15 | .15 |
| | Wood Floor | .11 | .11 | .11 |
| DD-2 | Ceiling | .072 | .072 | .072 |
| | Frame Wall | .076 | .076 | .076 |
| | Wood Floor | .11 | .11 | .11 |

* A tolerance of 5% in the "U" factors is permitted, when necessary to accommodate standard thicknesses of materials.

Notes: Ground slabs insulated at edges.
Storm sash and doors as indicated on plans.

SUBJECT: Controls for Heating

1. Use of Available Equipment. The WPB has requested that contractors be permitted to use heating control equipment which may be readily available and which will serve requirements within reasonable limits.

2. Effect on Projects Under Contract. On projects under contract where control equipment is specified but not readily obtainable, contracts should be modified to permit the use of such control equipment as may be available, if such equipment will serve reasonably well.

3. Control Limits. Where furnaces are equipped with controls permitting high air temperatures, stops should be applied to such controls to limit the settings to 175°. If this is not practical, printed notices stating that controls should not be set above 175° should be mounted at the furnace.

SUBJECT: Radiator Heating

1. War Production Board Approves Forced Hot Water, with Restrictions. Certain WPB restrictions on design of heating systems have been modified to permit more extensive use of radiator heating. The following telegrams dated July 12 and July 15 were sent to all regional offices by the Priorities Division:

Telegram of July 12.

"The War Production Board has approved under certain conditions the substitution of group forced hot water heating in place of group forced warm air systems.

A - The forced hot water system to serve project facilities buildings including schools, or store buildings, or buildings each containing a number of dwelling units.

B - The amount of steel required must not exceed amount that would be used in a warm air system if a steel furnace was used in place of cast iron furnace.

C - Other critical materials except cast iron must not exceed limits established for warm air systems.

D - No steel boilers shall be used.

E - Availability of radiators, boilers, pumps and pipes be first established.

In addition to above, group forced hot water systems may be used in TDU-1 and TDU-3 when dwelling units are for housing families with children where both parents are working. Details are being mailed and Technical Division will prepare and forward standards for buildings not already covered."

Telegram of July 15.

"Remytel July 12 concerning use of hot water systems for TDU-1 and TDU-3. Since the condition as stated in telegram is restricted to exceptional cases and since use under the provision creates additional management problems, suggest that you make no use of this provision until we have time to further investigate possibility of additional use of hot water systems for one-story TDUs."

2. Building Units Affected. The telegram of July 12 relaxed the restriction in the use of radiator systems by permitting group forced hot water in such structures as WD, TDU-2 project facilities buildings, schools and store buildings, subject to certain conditions. The use

of group forced hot water, in one-story family dwelling units (TDU-1 and TDU-3) when units are for families with children where both parents are working, is permitted.

Because the restriction in the case of the one-story family dwelling units (TDU-1 and TDU-3) might be difficult to apply, at the time of developing projects, the telegram dated July 15 was dispatched, which suggests that no provision be made for the use of forced hot water in TDU-1 and TDU-3 pending further information.

3. Effect on Design. To meet the immediate need this supplement establishes preliminary standards, which will be amplified and reissued at a later date.

4. Design. Forced hot water systems should comply in general with the principles illustrated in standard plans which have been issued, as follows:

Series WA
Series WD - infirmary
Series TDU-2

Systems should be designed for circulating high temperature water (approximately 210 degrees) and radiators should be sized accordingly.

The sections of the present WD and T specifications covering forced hot water systems shall be considered as part of these Standards.

For the larger community buildings, such as Tenant Activities Buildings, unit heaters may be utilized for spaces having a heat loss of 40,000 B.t.u. or more. Where unit heaters are used, and where lengths of runs are excessive, two pipe systems should be installed.

For long WD Dormitory wings, the heating systems should be similar to those shown for WA-1 plans, except that supply mains should be split to serve each side of wing, with a common return main in the center of the wing.

5. Radiator Locations. In placing radiators and running branches, a check should be made to avoid conflict with furniture layouts.

6. Availability of Materials. The question of availability of materials required for forced hot water systems has been discussed with the WPB.

The situation with respect to small cast iron boilers is expected to improve very shortly. Order L-187 issued by WPB, which greatly limited the output of cast iron boilers, was amended on July 1 and will result in a substantial increase of cast iron boiler production.

There does not appear to be a critical situation with respect to pipe, valves and fittings. All valves, including radiator valves, are iron body with brass trim.

There is a considerable supply of small sized circulating pumps in stock. The situation with respect to larger sized pumps (2-1/2 inches and larger) is expected to be critical, and the use of such pumps should be avoided where possible. To avoid the necessity for installing a large pump, boilers should be located as centrally as possible, and loads broken into two or more loops with a small pump on each loop.

Cast iron is not critical and there is a considerable stockpile of cast iron threaded pipe. It is difficult to cut and thread; but where there are long, straight, unbroken runs of piping, which may be made up of random lengths of pipe, its use may be practical and it should be so used.

NHA
FPHA
11-20-43

SUPPLEMENT No. 3
Bulletin No. 2
Part VI

SUBJECT: Installation Details for Mechanical Circulating Coal Fired Space Heaters (Kehm Heaters Model KFC-60-2)

Mechanical circulating coal fired space heaters are permitted in standard plan units depending upon geographical location as indicated on the accompanying map, showing "Normal January Temperatures", and explained to regional directors in Rodier's memorandum dated August 18. Limited quantities of these circulating space heaters are available through consolidated procurement.

The method of heater installation is illustrated by the accompanying sketch, "Installation Details of Space Heater with Mechanical Circulation", dated 11-3-43.

1. An outlet for the electric motor, not required by standard dwelling unit drawings, must be provided as shown on sketch.

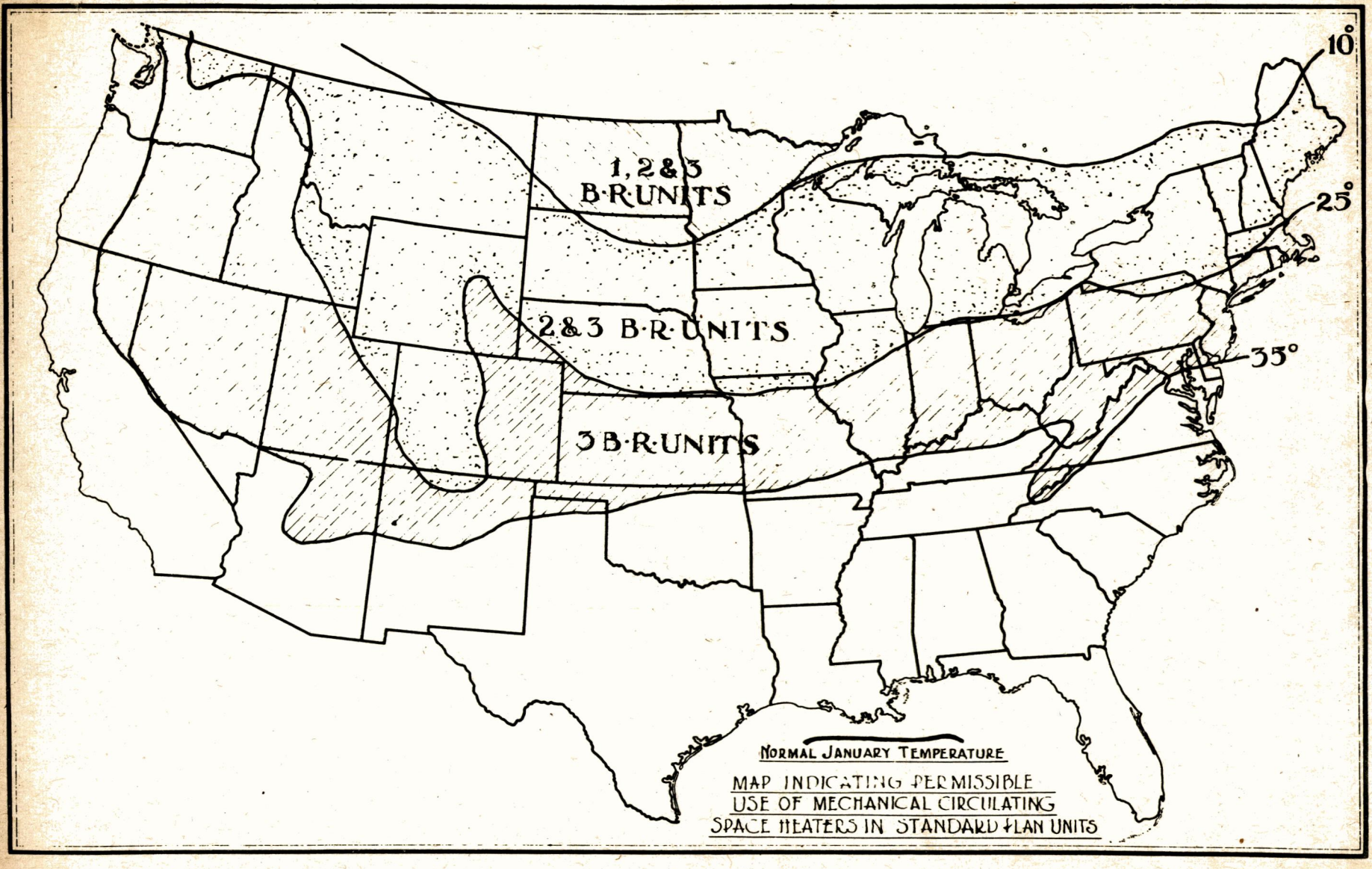
2. The heater should be connected to the kitchen appliance circuit, with nonmetallic sheathed cable.

3. A metal junction box and steel conduit should be provided on the brick wall, at least 15 inches from the heater.

4. From the junction box to the heater, heat resistant wire in flexible metal conduit should be installed.

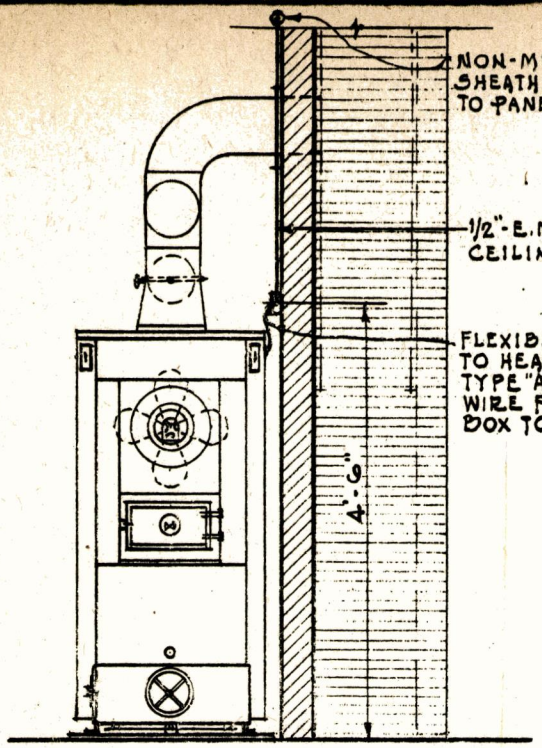
5. The disconnecting switch is included with the heater.

Attachments

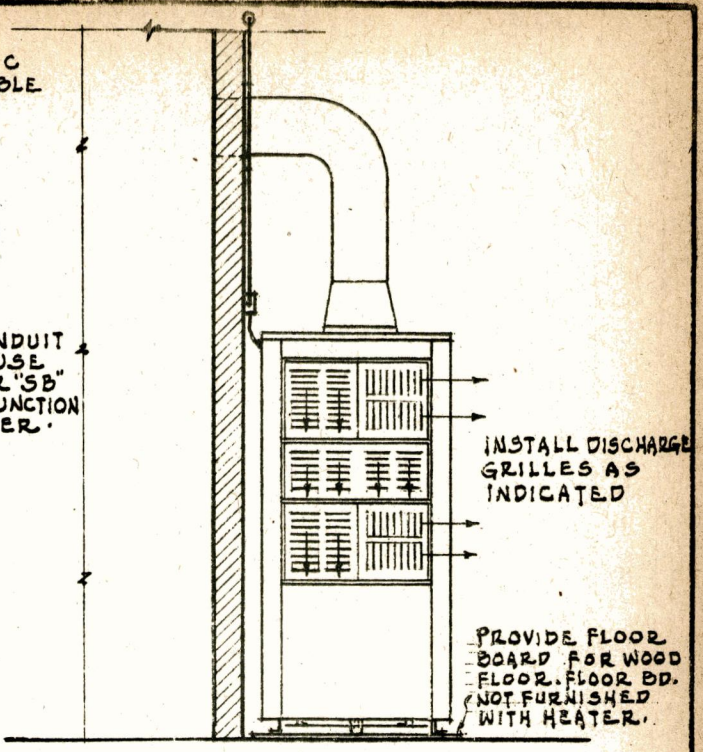



NORMAL JANUARY TEMPERATURE

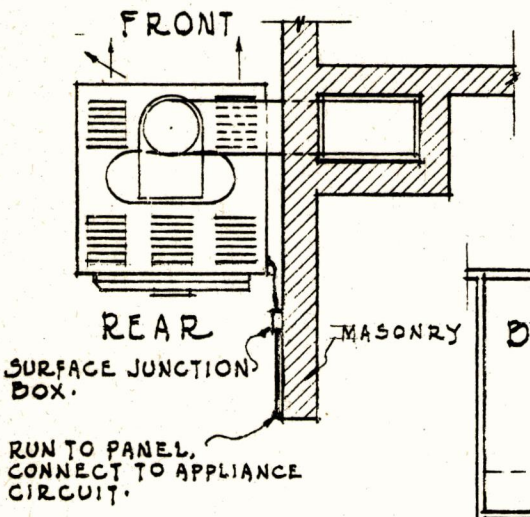
MAP INDICATING PERMISSIBLE USE OF MECHANICAL CIRCULATING SPACE HEATERS IN STANDARD PLAN UNITS

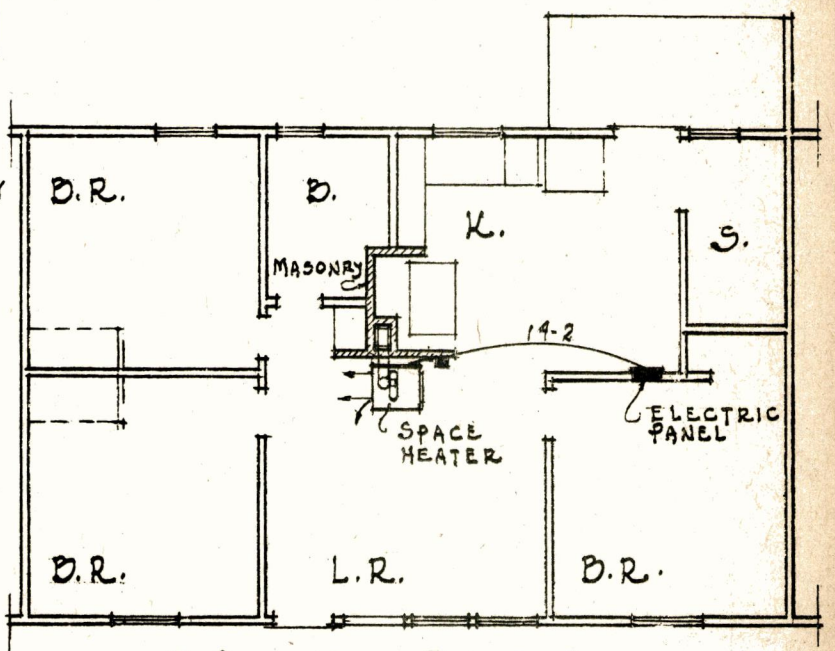



·REAR ELEVATION·




·FRONT ELEVATION·




·FLOOR PLAN·

·SCALE 1/8"=1'-0"·

# ·INSTALLATION DETAILS OF SPACE HEATER·
# ·WITH MECHANICAL CIRCULATION·

NATIONAL HOUSING AGENCY
FEDERAL PUBLIC HOUSING AUTHORITY
DATE: 11-3-43· TECHNICAL DIVISION·

·BULLETIN No 2.
·PART VI · SUPPLEMENT No 3·

NHA
FPHA

CIRCULAR
9-8-43

TO: All Holders of Bulletin No. 2

SUBJECT: Part VII, "Electrical" Bulletin No. 2, "Standards for Temporary War Housing"

Attached is Part VII, "Electrical," of Bulletin No. 2, revised as of September 7, 1943, which supersedes Part VII dated December 22, 1942, and all revisions and supplements thereto.

The attached Part VII is a revision of the Standards issued December 22, 1942, including subsequent supplements thereto. The principal changes relate to: interior wiring design, pages 1 to 6 inclusive; coordination of drawings, page 7; type of system (restricting use of underground service), page 8; Table E, page 9; Table G, page 11; secondary wire sizes, page 12; increased street lighting, page 12; greater use of push pole, page 16; lightning arrestors, page 16; and addition of Figures E-1, E-2, E-3 and E-4.

Charles K. Ogle
for W. P. SEAVER
Assistant Commissioner
for Development

Attachment

18137

# STANDARDS FOR TEMPORARY WAR HOUSING

## PART VII - ELECTRICAL

### CONTENTS


Interior — Page

Basic Design Standard . . . . . 1
Outlets - Circuiting. . . . . 1
Feeders . . . . . 1
Conductor Insulation - Where Permitted. . . . . 1
Grounding . . . . . 1
Electrical Service Equipment. . . . . 2
Master or Group Metering. . . . . 2
Motor Circuits - Cafeteria. . . . . 2
Protection of Circuits - Type R Wire. . . . . 3
Protection of Motor and Power Feeds . . . . . 3
Hot Plates. . . . . 5
Fire Alarm Systems. . . . . 5
Sizing of Lamp Bulbs. . . . . 6

Exterior

Design Controls . . . . . 7
Coordination of Drawings. . . . . 7
Type of System. . . . . 8
Demands . . . . . 8
Primary . . . . . 10
Transformers. . . . . 11
Secondary . . . . . 11
Street Lighting . . . . . 12
Pole Line Design. . . . . 13
Guying. . . . . 16
Lightning Arrestors . . . . . 16

Figures

Fig. E-1: Building Feeders, Center Service Contact - Lighting and Small Appliances (FDU). . . . . 17
Fig. E-2: Building Feeders, End Service Contact - Lighting and Small Appliances (FDU). . . . . 18
Fig. E-3: Size of Electrical Feeders - Lighting and Small Appliances (FDU) . . . . . 19
Fig. E-4: Permitted Use of Newly Recognized Conductor Insulations . . . . . 20



National Housing Agency
Federal Public Housing Authority
September 1943

# INTERIOR

## Basic Design Standard

The minimum standards of design set forth in the National Electrical Code, 1940, together with Interim Amendments issued by the Electrical Committee of the National Fire Protective Association, and the Underwriters' Laboratories Standards on Materials and Equipment, shall be the basis for design.

## Outlets - Circuiting

Locate outlets, controls and panels as shown on standard plans. Provide circuiting in compliance with NEC, using the lowest practical amount of conductors.

## Feeders

Size of feeders depends on load, distance of run, type of insulation, and method of installation. Wherever practical, arrange for service to enter center of building (center of load) (see Fig. E-1 attached). Bring service to end of building only where impractical to feed in the center of building (see Fig. E-2 attached). Restrict number of cable sizes to two per building. Fig. E-3 attached will be useful in determining cable sizes.

Service entrance conductors shall be at least No. 8, in accordance with NEC, Article 230.

Feeder or tap to single dwelling unit shall be not less than No. 10 wire.

## Conductor Insulation - Where Permitted

Service entrance conductors exposed to weather should be type 'SE'; exposed interior wiring are to be type 'EI' or equal; concealed interior wiring (ungrounded conductors) are to be type 'R' or its equivalent.

Interim Amendments to the NEC permit the use of certain newly-developed conductor insulations, with restrictions as to their application, (see attached Fig. E-4).

## Grounding

System ground conductors shall be as follows:

| Size of Largest Service Conductor | Ground Wire |
|---|---|
| #2 or smaller | # 8 |
| #1 or #0 | # 6 |
| #2/0 or#3/0 | # 4 |
| #4/0 to 350 MCM | # 2 |

If cold water piping is not available, provide No. 6 conductor to driven ground. Use driven ground of not more than 25 ohms resistance.

Equipment grounding conductors shall be as follows:

| Fuse Rating or Circuit Breaker Setting Supplying Equipment | Ground Connection | | | | | |
|---|---|---|---|---|---|---|
| | Wire | | Conduit | | E.M.T. | |
| 30 ampere | 14 | | 1/2 | | 1/2 | |
| 60 ampere | 10 | | 1/2 | | 1/2 | |
| 100 ampere | 8 | OR | 1/2 | OR | 1/2 | |
| 200 ampere | 6 | | 1/2 | | 1 | |

Electrical Service Equipment

Service switching and protective devices shall be mounted in an enclosure conforming to the standards of the Underwriters' Laboratories. This assembly may be mounted in a wooden box, on exteriors of buildings, for weather protection.

Master or Group Metering

Individual tenant metering is not covered by the blanket priority extended by the War Production Board. Arrange for building, group or master metering (do not provide tenant sub-metering). Agreement with the local utility company will determine metering method.

Motor Circuits - Cafeteria

Electric wiring, for motors up to 1 HP, shall be sized on the basis of 115 volts; for motors above 1 HP, on the basis of 230 volts.

Motor circuits of 1 HP and larger shall be three-wire to permit serving three-phase motors; size wires to allow the use of single phase motors.

Arrange panel board to permit connection of circuits feeding motors (up to 1 HP) on 115 or 230 volts.

Protection of Circuits - Type R Wire

Circuits shall be protected as shown in Table A:

TABLE A
PROTECTION OF CIRCUITS
TYPE R WIRE

| Wire Size | Fuse Rating or Circuit Breaker Setting | Wire Size | Fuse Rating or Circuit Breaker Setting |
|---|---|---|---|
| 14 | 15 ampere | 0 | 125 ampere |
| 12 | 20 ampere | 00 | 150 ampere |
| 10 | 25 ampere | 000 | 175 ampere |
| 8 | 35 ampere | 0000 | 225 ampere |
| 6 | 50 ampere | 250 MCM | 250 ampere |
| 4 | 70 ampere | 300 MCM | 275 ampere |
| 2 | 90 ampere | 350 MCM | 300 ampere |
| 1 | 100 ampere | | |

Notes: 1) Bus taps not over 5 feet long shall be size required by load. Branch circuit protection is sufficient for taps.

2) Bus taps over 5 feet long shall be protected within 5 feet of tap; except that protection may be located at load end of tap if tap conductors are of at least 1/3 the capacity of the feeder tapped, not more than 25 feet long, and terminate in a single set of fuses or circuit breakers.

3) Each ungrounded conductor (except motor circuit conductors) shall be protected according to the table above, protection to be provided at point of change in wire size. Motor circuit conductors are to be in accordance with Table 20, Chapter 10, 1940 National Electrical Code.

Protection of Motor and Power Feeds

Motors and power feeds shall be protected as shown in Table B:

## TABLE B
## PROTECTION OF MOTOR AND POWER FEEDS

**1 HP or less**

( Manually started (within sight of operator).
( Branch circuit protection is sufficient - not
( over: 20 ampere, 120 volt, or 10 ampere, 230 volt.

**1/8 to 1 HP**

( Automatically started. In addition to branch cir-
( cuit protection:
( 1. Overcurrent protection of 140% or less, or
2. Inherent protection against overheating, or
3. Part of an approved labeled assembly with safety controls.

**Less than 1/8 HP**

( Automatically started. Branch circuit protection
( is sufficient - not over: 20 ampere, 120 volt, or
( 10 ampere, 230 volt.

**More than 1 HP**

( 1. Rating or setting of branch circuit protective
( devices (percent of full load motor current).

| Type of Motor | Fuse Rating | | Cir. Brkr. Setting |
|---|---|---|---|
| Single phase | 300 | or | 250 |
| Squirrel cage (1-30A) | 250 | or | 200 |
| Squirrel cage (over 30A) | 200 | or | 200 |
| Direct current | 150 | or | 150 |

( Where the device supplies more than one motor,
( apply the above to the largest and increase by
( 100% of other motors.

( 2. Feeder and circuit conductors to have capacity
( equal to 125% of largest motor rating supplied,
( plus 100% of others.

( 3. Rating or setting of motor running overcurrent
( protection to be not greater than 125% and not
( less than 115% of full load current of motor,
( except that open type 40 degree AC motor may have
( 135%. Provide separate protection and disconnect
( for each motor.

( 4. Remote control circuits need be protected only
( when they extend beyond the machine controlled
( and the motor protection exceeds 500% of capacity
( of the remote control circuit.

Hot Plates

Electric hot plates furnished through Consolidated Procurement are equipped with a three-foot length of cord; electric receptacle outlets shall be located accordingly.

Fire Alarm Systems

An interior fire alarm system shall be provided in dormitory buildings and in project facility buildings. The system shall be selected from the five types described below and designed within material limitations in effect.

Type 1 - Automatic detecting type (heat sensitive cable)

Description: This system is composed of a continuous heat sensitive cable using two #19 twisted steel conductors with thermoplastic insulated and braided outer covering. The cable is connected to audible signals through relays. In addition to the automatic feature, manual control stations are provided.

Equipment Location: Cable shall pass through each dormitory room, public spaces, offices, toilets and closets; exposed on ceiling, supported by insulated staples. Manual stations shall be located at each normally-used exit. Audible signals shall consist of two four-inch bells or one eight-inch bell or horn in each dormitory corridor; and one or two audible signals in each project facility building (size and number of signals depends on area served).

Operation: Heat sensitive cable will make contact, which closes the circuit and operates the audible signal or signals within the building, when the critical temperature of 155 degrees F. is reached. Manual stations will likewise operate signals.

Test: This system should be tested and placed in operation by a representative of the equipment manufacturer.

Type 2 - Automatic detecting type (spot detectors)

Description: The system is composed of #19 insulated steel conductors connected to single thermostatic heat detectors. The conductors are connected to audible signals through relays. In addition to the automatic feature, manual control stations are provided.

Equipment Location: Heat detectors shall be located in each dormitory room, and in all public spaces, offices, toilets and closets. The manual station shall be located at each normally-used exit. Audible signals shall consist of two four-inch bells or one eight-inch bell or horn in each dormitory corridor; and one or two audible signals in each project facility building (size and number of signals depends on area served).

Operation: The individual heat detectors will make contact, closing the circuit and operating audible signal or signals within the building, when a pre-determined critical temperature has been reached. Manual stations will likewise operate the signals.

Test: This system should be tested and placed in operation by a representative of the equipment manufacturer.

Type 3 - Manually operated (open circuit type)

Description: This system consists of a standard 115 volt open circuit installation, consisting of #14 copper conductors connecting stations and signals.

Equipment Location: Manual stations shall be located at each normally-used exit. Audible signals shall consist of two four-inch bells or one eight-inch bell or horn in each dormitory corridor; and one or two audible signals in each project facility building (size and number of signals depends on area served).

Operation: Manual operation of any station will operate the audible signal or signals.

Type 4 - Self-contained alarm system

Description: This system consists of a self-contained spring-actuated eight-inch alarm gong; the spring controlled by a thermostatic latch, manual pull or both.

Equipment Location: One device shall be located centrally in each dormitory corridor and one or two devices in each project facility building (number of signals depends on area served).

Operation: A pull on cord or lever will sound gong. In case of the thermostatic latch, a pre-determined temperature rise will affect the thermostatic element and cause the gong to sound, through operation of the latch and spring.

Type 5 - Automatic detecting type (heat sensitive tubing)

This system is identical in Description, Equipment Location, Operation and Test to Type 1 (above), except that, in place of the steel conductors, a small diameter heat sensitive thermoplastic tube is used.

Sizing of Lamp Bulbs

Schedule lamp bulb sizes on drawings, except for family dwelling units.

## EXTERIOR

### Design Controls

Standards for exterior electrical design set forth herein are the maximum allowable. They are based on the requirements of temporary war housing within the limits of the maximum design standards established by the War Production Board.

Design of primary, secondary, and service facilities should relate to the service entrance facilities, service equipment and interior wiring so as to use the least overall weight of copper and steel. Design shall be governed, in the order named, by:

(1) Current standards and revisions issued by the Central Office as a result of changes in policy or revisions to the War Housing Critical List, Housing Utilities Standards, and limitation orders by the WPB.

(2) The NEC and the NESC, except where requirements of those codes conflict with these standards, or with orders and rulings of the WPB. These standards and pertinent WPB rulings take precedence over the Codes.

(3) Standard practice of local utility companies with respect to arrangement of service equipment and distribution system, except where such practice conflicts with these standards or with orders and rulings of the WPB.

Materials shall be as allowed by WPB "Housing Utilities Standards" amended May 1, 1944, except as hereinafter specified. Conductors insulated with rubber or rubber content are not allowed for primary, secondary, service drops, or for bracketing along a building. Do not use materials to raise minimum delivered voltage above 105 volts.

### Coordination of Drawings

Wherever practical, in the interest of conserving copper, the service to a building unit should enter at the center of load. Necessity for coordination of building unit working drawings and the site utility plan relative to service connections cannot be over estimated. The following points should be covered on the site utility plan and checked with the building working drawings:

(Cont'd)

1/ These pages 7 through 12 supersede corresponding pages 7 through 12 dated 9-7-43.

(1) point of service contact for each building or group of buildings.

(2) location of service equipment on or within building

(3) current characteristics of service at each building or group of buildings, with the number and sizes of conductors serving such units, such as "single phase 3-wire, 115/230 volts - 3 #8", "three phase, 4-wire 120/208 volts - 4 #6".

Types of System

Distrubution shall be overhead type, using a simple radial system.

Service conductors shall be run overhead. (Underground service construction may be used if special permission has been granted by WPB, after the conditions justifying underground service conductors have been clearly outlined.)

Where a choice of primary voltage is possible, construction of required facilities shall be made with the least overall weight of copper conductors. Generally, a system permitting the use of nominal 2400 volt pressure is preferred.

Where totalized meter readings are permitted by the utility company (with more than one point of metering under wholesale purchase), provide a pilot system to register demand impulses at one metering point.

Unless motor operated equipment of 5 horsepower and larger is required, provide single phase service. In view of the difficulty which may be experienced in obtaining single phase motors of less than 5 horsepower (particularly for kitchen operated equipment), space provisions should be made for an additional service conductor and additional transformer to operate in open delta with the single phase transformer installed.

Demands

Estimate electrical demands for family dwellings or dormitories on the basis of Tables C, D and E. As the peak demand imposed on the lighting load by electric refrigerators is of short duration, no increased demand shall be allowed for such refrigerators.

(Cont'd)

TABLE C
DEMANDS FOR FAMILY DWELLING UNITS

| Number of Dwelling Units | KVA Per Dwelling Unit — Conditions of Operation (See Table E) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 1 | .425 | .525 | .550 | .650 | 1.300 | 2.800 | 3.000 | 3.200 |
| 10 | .315 | .390 | .410 | .480 | .960 | 2.000 | 2.150 | 2.300 |
| 25 | .290 | .360 | .380 | .450 | .900 | 1.800 | 1.950 | 2.100 |
| 50 | .270 | .340 | .355 | .420 | .840 | 1.700 | 1.850 | 2.000 |
| 100 | .235 | .290 | .305 | .360 | .720 | 1.400 | 1.500 | 1.600 |
| 500 | .185 | .230 | .240 | .280 | .565 | 1.200 | 1.300 | 1.370 |
| 1000 or more | .142 | .175 | .182 | .218 | .435 | .930 | 1.100 | 1.150 |

Interpolate for number of dwelling units not shown. This table is for use in sizing feeders; use Table G for sizing and determining number of transformers.

TABLE D
DEMANDS FOR DORMITORIES AND ALL PROJECT FACILITY BUILDINGS

| Number of Dwelling units | KVA Per Person | Building | Watts Per S.F. |
|---|---|---|---|
| Dormitories | | Proj.Facility | |
| 1 person | .225 | M & M | 1.00 |
| 125 person (D.F. 2.0) | .110 | Ten. Activ. | 1.50 |
| 500 person (D.F. 2.5) | .090 | Cafeteria | 2.50 |
| 1000 person (D.F. 3.5) | .065 | Infirmary | 7.50 |

Interpolate for number of persons not shown. For persons above 1000, use factor set forth for 1000 persons.

TABLE E
KEY TO CONDITIONS OF OPERATION

| Facilities | Conditions of Operation | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Cooking | Oil or Gas | Oil or Gas | Coal | Coal | Oil or Gas | Elec. hot plate | Elec. range | Elec. range |
| Domestic Hot Water | Oil or Gas | Oil or Gas | Coal | Coal | Group | Group | Group | Elec. | Elec. |
| Space Heating | Circ | Forced Circ. | Circ | Forced Circ. | Group | Group | Group | Elec. | Forced Circ. |

(Cont'd)

IMPORTANT NOTE IN CONNECTION WITH TABLE E:

Although only eight combinations are listed, other combinations of utilities may be encountered. Since the conditions listed are arranged in order of increased load, they will serve as a guide in determining loads for other conditions.

Primary

Primary conductors shall be copper. The allowable loadings in KVA (uniformly distributed) for various systems follow:

TABLE F
ALLOWABLE LOADINGS KVA

| System Characteristics | Copper B & S Gauge | | |
|---|---|---|---|
| | #8 | #6 | #4 |
| Single phase | | | |
| 2400 volt | Up to 150 | 200 | 300 |
| 4160 volt | Up to 250 | 300 | 500 |
| Three phase | | | |
| 2400/4160 volt | Up to 400 | 600 | 800 |
| 4160/7200 volt | Up to 750 | 1000 | 1500 |

EXAMPLE: For a project with 500 dwellings using coal fired range, waterback and coal fired circulator (condition of operation #3, Table E) served by 3-phase, 2400/4160 volt system, determine size of primary:

Table C allows 240 watts per dwelling unit

0.240 x 500 = 120 KVA, Therefore, use #8 copper conductor for primary service

Extend primary lines only to the transformers served, routing over the shortest practical distances. Do not use closed loops.

Where utility company's primary "Y" system is solidly grounded, including zero potential, use common neutral for primary and secondary.

Transformers

Size transformers to serve at least the minimum number of dwellings given in the following table. (It is desirable from a loading standpoint not to exceed the maximum number of dwelling units).

(Cont'd)

TABLE G
NUMBER OF DWELLING UNITS PER TRANSFORMER

| Transf. Size KVA | Conditions of Operation (See Table E) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 5 | 15 to 22 | 15 to 18 | 14 to 17 | 12 to 14 | | | | |
| 7½ | 13 to 36 | 19 to 30 | 18 to 28 | 13 to 24 | | | | |
| 10 | 37 to 46 | 31 to 38 | 29 to 36 | 25 to 30 | 12 to 15 | | | |
| 15 | 47 to 68 | 39 to 55 | 37 to 52 | 31 to 44 | 16 to 22 | | | |
| 25 | 69 to 130 | 56 to 110 | 53 to 104 | 45 to 88 | 23 to 36 | 10 to 16 | 10 to 15 | 10 to 14 |
| 37½ | | | | | 37 to 53 | 17 to 25 | 16 to 24 | 15 to 22 |
| 50 | | | | | 54 to 70 | 26 to 35 | 25 to 32 | 23 to 30 |

NOTE: For Conditions of Operation 1, 2, 3 and 4, the dwelling unit groupings served by 10 and 15 KVA transformers should be given first consideration.

For Condition of Operation 5, the dwelling unit grouping served by 25 and 37½ KVA transformers should be given first consideration.

For Conditions of Operation 6 and 7, the dwelling unit grouping served by 37½ and 50 KVA transformers should be given first consideration.

Restrict the number of sizes of transformers on a given project to one where practical. Place transformers in center of load, permitting secondaries to radiate from transformers. Where varying numbers of dwelling units are placed on a transformer of a given size, the heavier loaded groupings should be near the source of primary service.

Size transformers for dormitory and project facility buildings on the basis of factors given in Table D.

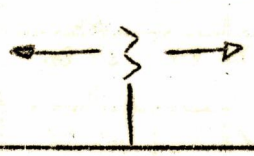
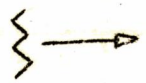
Secondary

Secondary conductors shall be of copper, weatherproof braid. Service drops may be in cable form if without rubber or rubber content.

Sizes of secondaries radiating from transformers shall not exceed the following (Table H):

(Cont'd)

TABLE H
SIZES OF SECONDARIES FROM TRANSFORMERS

| Transformer KVA | Wire Size | |
|---|---|---|
| | Transf. Serving Loads in More Than 1 Direction | Transf. Serving Loads in 1 Direction Only |
| |  |  |
| 5 to 15 | #8 | #8 |
| 25 | #8 | #4 |
| 37½ | #6 | #2 |
| 50 | #4 | #0 |

To reduce secondary copper conductor weights to a minimum, use a larger number of small capacity transformers in preference to a small number of large capacity. Only where there are concentrated loads, such as at cafeterias, tenant activity buildings and the like, should large capacity transformers be used. Conservation of copper conductors is the principal controlling factor in design.

In general, the secondaries from one transformer shall not be extended to a point where they are adjacent to the secondaries from another. Terminations should be at least one span apart.

Service loops for one story buildings with flat or hip roofs which do not give required clearance between grade and service loop should have a support on the structure, to obtain clearance over roadways and walks, in accordance with NESC (Article 232A) Fifth Edition.

Street Lighting

Consider only the minimum effective street lighting. At any point on any public thoroughfare, two street lights should be visible. The total number of street lights shall not exceed the total number of linear feet of roadway (project plus boundary streets), divided by 500, less the number of existing street lights on project and boundary streets. Any variation from the foregoing shall be described fully in the project submission.

Multiple type lighting only is permitted. Control each light from a manually operated switch located eight feet above grade. Provide a wood pole step for access to switch. Connect to secondary service on pole. Common control of lights on separate lighting circuit is not permitted.

(Cont'd)

When practicable, locate lights (a) at street intersections, (b) on poles which are necessary for purposes other than street lighting, and (c) on poles having secondary mains attached or on a pole not more than 150 feet from secondary mains. If secondary extensions for street lighting must be made, they should not exceed 150 feet and shall consist of No. 10 WP conductors.

## Pole Line Design

Pole spans should not be greater than 150 feet, with exact length of spans governed by location of service drops and yard and street lighting locations. Avoid needless changes in direction of pole lines. Place guys where they will not obstruct walkways, play areas, parking areas, etc. Avoid slack span wiring between poles.

Total bending moment (ft/lbs) due to wind pressure on pole, plus a safety factor of two (2Mp), and the moment (ft/lbs) due to wind pressure on conductors, plus a safety factor of two (2Mc) should be equal to, or smaller than, the moment of resistance of the pole (Mr).

Formula 1: $2Mp + 2Mc = \text{or} \quad Mr$

For straight line construction, apply the following formulae in determining "bending moment."

Formula 2: (Heavy loading district)

$$2Mp = \frac{H_1^2 (D_1 + 2D_2)}{4.5}$$

$$2Mc = \frac{H_2 n (d + 1) (S_1 + S_2)}{1.5}$$

Formula 3: (Medium loading district)

$$2Mp = \frac{H_1^2 (D_1 + 2D_2)}{4.5}$$

$$2Mc = \frac{H_2 \, n \, (d + 0.5) \, (S_1 + S_2)}{1.5}$$

Formula 4: (Light loading district)

$$2Mp = \frac{H_1^2 (D_1 + 2D_2)}{3}$$

$$2Mc = H_2 \, n \, d \, (S_1 + S_2)$$

Wherein:

Mr - Resistance moment at ground line (ft/lbs)
Mp - Bending moment at ground line (ft/lbs) due to wind pressure on pole
2Mp - Bending moment at ground line (ft/lbs) due to wind pressure on pole (safety factor 2)
Mc - Bending moment at ground line (ft/lbs) due to wind pressure on conductors
2Mc - Bending moment at ground line (ft/lbs) due to wind pressure on conductors (safety factor 2)
$H_1$ - Height of pole (ft) above ground line
$H_2$ - Height of conductors (ft) above ground line
$D_1$ - Diameter of pole (inches) at 6' from butt (See Table H)
$D_2$ - Diameter of pole (inches) at top (see Table H)
n - Number of conductors
d - Diameter of conductors (inches) (See Table 81 NESC, fourth edition
$S_1$ - (
$S_2$ - )

Apply the following formula in determining pole resistance:

Formula 5: $Mr = 0.000264 \, f \, c^3$

Wherein:

Mr - Resistance moment of poles (ft/lbs)
f - Allowable fibre stress (lbs/sq.in.) (See Table I)
c - Circumference of pole 6' from butt (inches) (see Table H). Multiply diameter given by 3.1416.

## TABLE H
## MINIMUM DIAMETERS OF WOOD POLES

| Pole Length (Ft.) | Ground from butt (Ft.) | Pole Class and Top Diameter in Inches | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 1 8.6 | 2 8.0 | 3 7.3 | 4 6.7 | 5 6.1 | 6 5.4 | 7 4.8 |
| | | Diameter 6 ft. from butt (in.) | | | | | | |
| **Southern Yellow Pine, Creosoted** | | | | | | | | |
| 25 | 5 | 10.9 | 10.3 | 9.5 | 8.9 | 8.3 | 7.6 | 7.0 |
| 30 | 5½ | 11.9 | 11.1 | 10.3 | 9.5 | 8.9 | 8.3 | 7.6 |
| 35 | 6 | 12.7 | 11.9 | 11.1 | 10.2 | 9.5 | 8.8 | 8.1 |
| 40 | 6 | 13.4 | 12.6 | 11.8 | 10.8 | 10.0 | 9.2 | 8.6 |
| 45 | 6½ | 14.0 | 13.2 | 12.2 | 11.5 | 10.5 | 9.7 | 9.1 |
| **Chestnut** | | | | | | | | |
| 25 | 5 | 11.8 | 11.0 | 10.3 | 9.5 | 8.9 | 8.1 | 7.6 |
| 30 | 5½ | 12.7 | 12.1 | 11.1 | 10.3 | 9.5 | 8.9 | 8.3 |
| 35 | 6 | 13.5 | 12.7 | 11.9 | 10.9 | 10.2 | 9.5 | 8.8 |
| 40 | 6 | 14.3 | 13.5 | 12.6 | 11.6 | 10.8 | 10.0 | 9.4 |
| 45 | 6½ | 15.1 | 14.2 | 13.2 | 12.2 | 11.5 | 10.5 | 9.9 |
| **Western Red Cedar** | | | | | | | | |
| 25 | 5 | 12.1 | 11.3 | 10.5 | 9.7 | 9.1 | 8.3 | 7.8 |
| 30 | 5½ | 13.0 | 12.2 | 11.3 | 10.5 | 9.7 | 9.1 | 8.4 |
| 35 | 6 | 13.8 | 13.0 | 12.1 | 11.3 | 10.3 | 9.7 | 8.9 |
| 40 | 6 | 14.6 | 13.8 | 12.9 | 11.9 | 11.0 | 10.1 | - |
| 45 | 6½ | 15.4 | 14.5 | 13.5 | 12.5 | 11.6 | - | - |
| **Northern White Cedar** | | | | | | | | |
| 25 | 5 | 13.8 | 13.0 | 12.1 | 11.3 | 10.3 | 9.5 | 8.9 |
| 30 | 5½ | 15.1 | 14.2 | 13.2 | 12.2 | 11.3 | 10.5 | 9.7 |
| 35 | 6 | 16.1 | 15.1 | 14.0 | 13.0 | 12.1 | 11.8 | 10.3 |
| 40 | 6 | 17.0 | 15.9 | 14.8 | 13.8 | 12.7 | 11.8 | - |
| 45 | 6½ | 17.8 | 16.7 | 15.6 | 14.5 | 13.4 | - | - |

## TABLE I
## ULTIMATE ALLOWABLE FIBRE STRESSES (MODULUS OF RUPTURE) OF WOOD POLES

Southern yellow pine, creosoted - - - 7400 lb., sq.in.
Chestnut - - - - - - - - - - - - - - - 6000 lb., sq.in.
Western red cedar - - - - - - - - - - 5600 lb., sq.in.
Northern white cedar - - - - - - - - - 3600 lb., sq.in.

In straight line construction, only transverse loads generally need consideration; vertical and resultant loads should be determined in sizing transformer and unbalanced pole structures.

Guying

Where loads imposed on poles are greater than can safely be supported, additional strength should be provided by guys. Wherever conductor stresses are unbalanced, and at angle and dead ends, guys should be provided where pole strength is not sufficient.

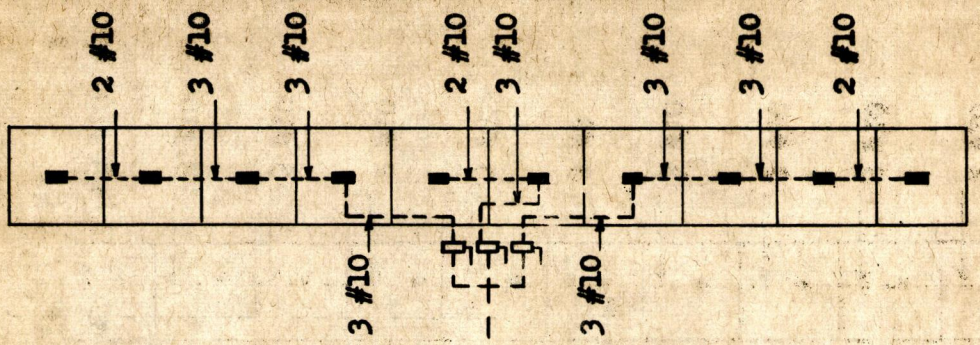
Stresses due to line angles between 10 and 60 degrees should be supported by a single guy placed to split line angle or resultant load. Angles greater than 60 degrees should be guyed in both directions. Use push poles wherever practical in place of metal guys.

Lightning Arrestors

In certain geographical areas where lightning discharges are infrequent, arrestors may be omitted as protection on overhead distribution lines. The general practice of the local utility company should govern.

FIG. E-1

BUILDING FEEDERS—CENTER SERVICE CONTACT
LIGHTING AND SMALL APPLIANCES
(FAMILY DWELLING UNITS)




▬ Indicates panel containing two circuit protective devices

Two Story

| | |
|---|---|
| For 2, 3 and 4 DU | - 3 #8 |
| For 5 and 6 DU | - 3 #8 |
| For 7 to 10 DU | - 3 #6 |
| For 12 DU | - 3 #4 |
| For 16 DU | - 3 #2 |
| For 20 DU | - 3 #2 |

---

MAXIMUM ALLOWABLE CONDUCTOR WEIGHTS
POUNDS PER DWELLING UNIT
(BASED ON CENTER SERVICE)

**Feeders**

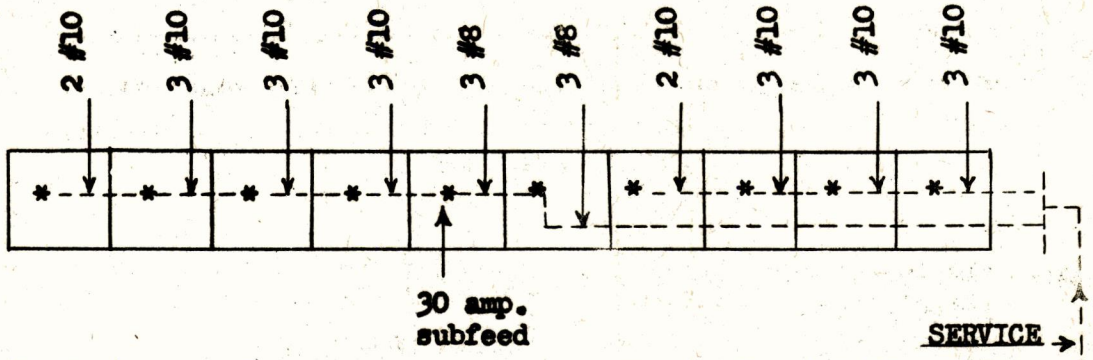
| No. D.U. Per Building | | Copper Weight per D.U. |
|---|---|---|
| One Story | Up to 4 | 2.0 |
| | 5 and 6 | 2.4 |
| | 7 and above | 2.7 |
| Two Story | Up to 8 | 2.5 |
| | 9 to 12 | 2.8 |
| | 13 and above | 3.2 |

**Branches**

| Size Dwelling Unit | |
|---|---|
| 0 bedroom | 2.2 |
| 1 bedroom | 3.0 |
| 2 bedroom | 3.5 |
| 3 bedroom | 4.0 |

For example - one story building having 6 DU composed of one 0-bedroom, one 1-bedroom, three 2-bedroom and one 3-bedroom units, should be designed within the maximum allowance of 34.1 pounds.

FIG. E-2
BUILDING FEEDERS-END SERVICE CONTACT
LIGHTING AND SMALL APPLIANCES
(FAMILY DWELLING UNITS)




*Indicates panel containing two circuit protective devices, unless otherwise noted.

Two Story

| | |
|---|---|
| For 2, 3 and 4 DU | - 3 #8 |
| For 5 and 6 DU | - 3 #8 |
| For 7 to 10 DU | - 3 #6 |
| For 12 DU | - 3 #4 |
| For 16 DU | - 3 #2 |
| For 20 DU | - 3 #2 |

MAXIMUM ALLOWABLE CONDUCTOR WEIGHTS
POUNDS PER DWELLING UNIT
(BASED ON END SERVICE)

**Feeders**

| No. D.U. Per Building | | Copper Weight Per D.U. |
|---|---|---|
| One Story | Up to 4 | 2.2 |
| | 5 and 6 | 3.2 |
| | 7 and above | 4.0 |
| Two Story | Up to 8 DU | 2.5 |
| | 9 to 12 DU | 3.1 |
| | 13 and above | 3.5 |

**Branches**

| Size Dwelling Unit | |
|---|---|
| 0 bedroom | 2.2 |
| 1 bedroom | 3.0 |
| 2 bedroom | 3.5 |
| 3 bedroom | 4.0 |

For example - one story building having 6 DU composed of one 0-bedroom, one 1-bedroom, three 2-bedroom and one 3-bedroom units, should be designed within the maximum allowance of 38.9 pounds.

FIG. E-3
SIZE OF ELECTRICAL FEEDERS
LIGHTING AND SMALL APPLIANCES
(FAMILY DWELLING UNITS)

| No. DU | Ampere at 230 V. | Wire Sizes | | |
|---|---|---|---|---|
| | | Rubber Type -Concealed- Code Grade 'R' | Synthetic Type -Cable Form- -Exposed- | Synthetic Type -Single Conductor- in free air -Exposed- |
| 1 | 12 | 2 #10 | 2 #14 | 2 #14 |
| 2 | 16 | 3 #10 | 3 #14 | 3 #14 |
| 3 | 20 | | 3 #12 | |
| 4 | 24 | | 3 #10 | |
| 5 | 28 | 3 #8 | | 3 #12 |
| 6 | 32 | | 3 #8 | 3 #10 |
| 7 | 36 | 3 #6 | | |
| 8 | 40 | | | |
| 9 | 44 | | 3 #6 | 3 #8 |
| 10 | 48 | | | |
| 11 | 52 | 3 #4 | | |
| 12 | 56 | | 3 #4 | |
| 13 | 60 | | | 3 #6 |
| 14 | 64 | | | |
| 15 | 68 | | | |
| 16 | 72 | 3 #2 | | |
| 17 | 76 | | 3 #2 | |
| 18 | 80 | | | 3 #4 |
| 19 | 84 | | | |
| 20 | 88 | | | |

NOTE: Feeder carrying total current, supplied by service-entrance conductor, shall be not less than #8.

FIG. E-4

PERMITTED USE OF NEWLY RECOGNIZED CONDUCTOR INSULATIONS
(TO REPLACE OR SUPPLEMENT TYPE R DUE TO SCARCITY OF RUBBER)

| WHERE PERMITTED | TYPE INSULATION | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | EI [7] | EI [4-7] | EG [6] | SB | SBW | SBW [4] | WP [5] | WP [4] | V [2] | SN [5] | RU [5] | A | AVA [2] | AVB [2] |
| **UNGROUNDED - LIVE** | | | | | | | | | | | | | | |
| Open wiring on insulators (10) | X [1] | | | X [1] | X [1] | | X | | X [1] | X | X | | | |
| Knob and tube, concealed (10-11) | | | | | | | | | | X | X | | | |
| Armored cable | | | | | | | | | X | X | X | | | |
| Nonmetallic sheathed cable | X [1-3] | | | | | | | | | X | X | | | |
| Service - entrance cable | | | | | | | | | | X | X | | | |
| Conduit | | | | | | | | | X | X | X | | X | X |
| Tubing | | | | | | | | | X | X | X | | X | X |
| Raceways | | | | | | | | | X | X | X | | | |
| Wireways | | | | | | | | | X | X | X | | X | X |
| **GROUNDED - NEUTRAL** | | | | | | | | | | | | | | |
| Open wiring (10) | | X | X | X [1] | | X [1] | | X | X [1] | X | X | X [1] | X | |
| Knob and tube (10) | | X | X | | | X | | X | | X | X | | | |
| Armored cable | | X | X | | | X | | X | X | X | X | | | |
| Nonmetallic sheathed cable (8) | | X | X | | | X | | X | | X | X | | | |
| Service - entrance cable (8-9) | | X | X | | | X | | X | | X | X | | | |
| Conduit (9) | | X | X | | | X | | X | X | X | X | | X | X |
| Tubing | | X | X | | | X | | X | X | X | X | | X | X |
| Raceways | | X | X | | | X | | X | X | X | X | | X | X |
| Wireways | | X | X | | | X | | X | X | X | X | | X | X |

REFERENCE NOTES

1. In dry locations only.
2. In dry locations unless lead covered.
3. For exposed work only. Not to be used for service entrance.
4. On alternating current systems only.
5. By special permission only.
6. Type EG refers to "other type specially approved for the purpose" (NEC Interim Amendment No. 44).
7. Type EIL (lead covered EI) may be used in wet locations (Sec. 3035, NEC).
8. Uninsulated ground conductors in defense emergency buildings (NEC Interim Amendment No. 43).
9. Uninsulated ground conductors in services (NEC Article 230).
10. Bare conductors not permitted
11. EI and EIL not permitted for switch loops.

NHA
FPHA

CIRCULAR
8-25-43

TO: All Holders of Bulletin No. 2

SUBJECT: Standards for Commercial Facilities

The attached "Standards for Commercial Facilities", Appendix 2 of Bulletin No. 2, "Standards for Temporary War Housing", revised as of July 20, 1943, supersedes the previous Appendix 2, dated August 1942.

Charles K. Rizle

for W. P. SEAVER
Assistant Commissioner
for Development

17764

# STANDARDS FOR TEMPORARY WAR HOUSING

## BULLETIN 2 APPENDIX 2

## COMMERCIAL FACILITIES

CONTENTS


| | | Page |
|---|---|---|
| I. | Policy Background | 1 |
| II. | Floor Areas | 1 |
| III. | Site Plan Factors | 2 |
| IV. | Design | 3 |
| V. | Diagrammatic Plans | 5 |
| VI. | Mechanical and Electrical Design | 6 |
| | Plumbing | 6 |
| | Heating | 7 |
| | Electric, Interior | 11 |
| | Parking Area Lighting | 11 |
| | Signs and Display Lighting | 12 |
| | Electric, Exterior | 12 |
| | Refrigeration | 13 |
| | Diagrammatic Plans of Store Groups | 14 |
| | Site Plan Studies | 15 |



NATIONAL HOUSING AGENCY

FEDERAL PUBLIC HOUSING AUTHORITY

August 25, 1943


17764

August 25, 1943

# COMMERCIAL FACILITIES

This appendix supersedes "Standards for Commercial Facilities," dated August, 1942 (Appendix 2 of Bulletin No. 2). Detailed standards on mechanical design have been added. See also Diagrammatic Plans for Commercial Facilities, issued as Series CF-1, sheets 1, 2 and 3 dated 6-5-43 and sheets 4 and 5 dated 7-10-43. The material on sheets 1, 2 and 3 is reproduced in part on pages 14 and 15 of this appendix.

## I. POLICY BACKGROUND

FPHA Policy on the provision of commercial facilities for war housing projects of family dwelling units is stated in Manual of Policy and Procedure, Section 3403:5. See also Section 3431:2, Funds for Development of Commercial Facilities. Manual Section 1653:2, which is being recoded to Chapter 1658, calls attention to "amortization deductions" by which store operators gain assistance in amortizing the cost of installing and equipping commercial facilities serving war housing projects.

## II. FLOOR AREAS

Maximum floor areas are established to provide a basis for the correlation of commercial facilities throughout the housing program. Maximum total areas (figured to exterior of walls but not including hoods, porches, platforms and the like) are:

| Number of Family Dwelling Units | Maximum Floor Area |
|---|---|
| 50 - 99 | 40 sq. ft. per unit |
| 100 - 199 | 4,000 sq. ft. plus 30 sq. ft. per unit over 100. |
| 200 - 299 | 7,000 sq. ft. plus 22 sq. ft. per unit over 200. |
| 300 - 399 | 9,200 sq. ft. plus 16 sq. ft. per unit over 300. |
| 400 - 499 | 10,800 sq. ft. plus 12 sq. ft. per unit over 400. |
| 500 and over | 12,000 sq. ft. plus 10 sq. ft. per unit over 500. |

These areas are based on the space required to serve all the needs of the project in the types of services offered, when no similar stores are available to the tenants. For projects under 50 units no maximum floor area is given; if stores must be built for such projects, the area should be determined in relation to the conditions of each case.

The types of services normally included are listed below, with floor areas in square feet, as a guide to normal relative space distributions in small, medium, and large commercial groups.

| Type of Service | Small Group | Medium Group | Large Group |
|---|---|---|---|
| Food | 3500 - 4500 | 5000 - 6000 | 6000 - 8000 |
| Drugs and Variety Merchandise | 1500 - 2500 | 3500 - 4500 | 5500 - 7000 |
| Barber Shop | 200 - 300 | 300 - 500 | 400 - 600 |
| Beauty Shop | 200 - 300 | 400 - 600 | 500 - 700 |
| Pickup Depot | 300 - 500 | 500 - 800 | 800 - 1100 |
| Toilets, lockers, heat, service corridors, etc. | 500 - 800 | 800 - 1100 | 1100 - 1400 |

Notes: Food, drugs and variety merchandise may be combined in a single store. In that case, the fountain and lunch service usually form a separate unit. In large stores, drugs and variety items may be separated. Barber and beauty shops may be combined, especially in small projects. The "pickup depot" includes space for laundry, dry cleaning and shoe repair agency (collection and delivery only). Space for actual work operations normally should not be provided.

If any of the services listed above is omitted, a reasonable corresponding reduction from total permissible floor area should be made. If minor additions to the list are made, to meet local conditions, they should be included within the established maximum floor areas.

Neighboring Housing. The presence of non-project customers may justify the use of the maximum permissible store area in cases where a smaller area would otherwise be sufficient to serve the project population.

Maximum areas are not required. Unnecessarily large stores increase costs for personnel, maintenance, heating, lighting, etc. Stores should be of the minimum area that will give satisfactory service, intensive wartime use being assumed. (Available funds and critical materials will be severely taxed to meet the need for commercial facilities in the national program.)

## III. SITE PLAN FACTORS

Location preferably should be central; a site near the community building is desirable; in order that the project, not transient trade or neighboring populations should be served. The conventional relation to street frontage is subsidiary to other plan factors.

Distance served by a shopping center was formerly standardized to serve persons living within a radius of one-half mile, should, under war conditions, serve families living within one mile, walking distance.

Fire protection must be given special attention. Fire hydrants should be available, preferably not less than 50' away from any building. Stores should stand at least 80' away from other buildings. Fire walls, extending 2' above roof and beyond building walls, should be used to form protected sections of not over 5,000 square feet, unless this would necessitate the division of a store. (Twelve inch bearing walls are usually most economical.) Commercial operations involving high fire risks must be properly protected.

Orientation is very important; site plans and building plans (especially with reference to fenestration, hoods, and entrances) should, therefore, be studied together. Large windows preferably should not face west. In the South, north orientation is acceptable; in the North, east or northeast orientation is preferred but full north should be avoided for long frontages in which the principal entrances are located.

Parking requirements for shopping centers are calculated under normal conditions at 15% of the units served. For war housing, the amount to be provided should be based on project conditions, taking into consideration the restricted use of automobiles. Parking areas are expensive to install and maintain; as constructed under present conditions they are often dusty and unsightly. Preferably there should be land available for a high percentage of parking but the area paved for initial use should be the smallest practicable. If dust control cannot be provided, prevailing winds should be considered in the location of large parking areas. Parking on project and public streets, if legal and convenient, may be utilized.

Children's playgrounds are sometimes provided adjacent to shopping centers. The space should correlate with babybuggy parking and should have a shaded area, pavement for wheeled toys, benches, a few big stones, peeled logs, or similar play devices.

## IV. DESIGN

Design criteria are: minimum use of critical materials and manpower in construction; efficient operation with minimum personnel; low maintenance costs, including heating and lighting. The planning and construction system should be simple, compact, standardized, and adaptable to possible changes in occupancy.

Lessee's requirements should be met as fully as possible, especially in cases where the lessee supplies equipment. (For this reason early leasing is very advantageous.) If leases cannot be arranged before construction drawings

are made, partitions and fixtures must be located in accord with the best practice, adapted to the special circumstances of war work.

Fixtures and equipment should be furnished by the lessee to the greatest possible extent. This is desirable: (a) to reduce project costs and (b) to bring second-hand equipment into use.

Store consolidations should be determined in advance of design. Consolidation of food, drug, and variety services under one management frequently results in economical construction and operation.

In the details of planning, it should be recognized that store operators differ in their preferences and that many standardized methods are based on unrestricted availability of materials and competitive conditions which do not apply to a store serving a war housing project. Designers of project commercial facilities must consider the effect of limited competition and personnel shortage. The absence of the front foot land value factor constitutes a fundamental difference in design. Modules governing spacing of columns and bearing walls should be determined as a factor of construction cost, without consideration for the aesthetic standards of normal competitive store design. The architectural design should be controlled by considerations of economy and efficiency.

Depth of building plan is determined by topography, lighting, ventilation and other plan factors. Diagrammatic plans, Series CF-1, use 64' as a guiding depth for average conditions. Large stores should employ greater depths on favorable sites and all plans may be reduced in depth to fit difficult sites.

Light and ventilation demand special attention because of war conditions. Natural light should be used as fully as possible since war conditions may produce power shortages in some localities. Cross ventilation should be provided for all work space in order that comfortable conditions for personnel and customers may be assured, especially since fans will probably not be available.

Show windows should be omitted; shortage of labor will make them impracticable. Windows should afford good views into stores, at least from points near entrances.

Signs preferably should be painted on wall or window surfaces. Avoid general use of special materials and plan for reduced maintenance costs.

Porches and other types of shelter are useful adjuncts to stores, since they protect entrances and reduce congestion within the building by providing a convenient meeting place and parking for baby buggies. Porches, if used, should be located and designed for utility and stability. The construction should be simple and economical. Though varying with the climate and the size of the building, the porch area should rarely be more than 5% of the enclosed floor area.

## V. DIAGRAMMATIC PLANS

Diagrammatic plans for commercial facilities were issued 6-17-43, as Series CF-1, sheets 1, 2, and 3, dated 6-5-43. Sheets 4 and 5, containing diagrammatic mechanical and structural layouts, dated 7-10-43, were issued 7-19-43. The diagrammatic plans are guides to plan arrangements and should be followed as far as they apply to local conditions. Store plans are of three sizes, small, medium, and large, for projects of 250-to-400, 500-to-800, and 1000-to-1500 units respectively. These classifications refer primarily to the central small shop and service group; within the indicated ranges this part of each plan can usually be used without much change. The floor areas of the food store (and possibly of the drug and variety store) will often need adjustment, but the general layout indicated in each case can be followed. Preferably these adjustments should be made with a bay as a unit. Maximum permissible areas, in relation to project size, are fixed by the schedule on page 1 of this Appendix.

Sheet 1 of Series CF-1 shows layouts of small, medium and large store groups in which the food, drugs, and variety services are consolidated, other types of services being operated separately. Sheet 2 shows layouts for separate management of all stores. Sheet 3 gives examples of the ways in which the various plan units may be combined. Sheets 4 and 5 show suggested structural and mechanical schematic plans.

The critical material lists on which blanket priorities are based were taken from the diagrammatic plans of Series CF-1. The materials have been listed for each building. They have also been listed for a simple interior bay through an open store area. This permits the increase or reduction of those parts of a store which vary most closely with the size of the project. It also facilitates the adaptation of the diagrammatic plans to meet specific requirements.

## VI. MECHANICAL AND ELECTRICAL DESIGN

### PLUMBING

The standards for plumbing design set forth in Part V of this Bulletin, except as amended herein, shall apply. Where local codes permit use of non-critical materials or of smaller quantities of critical materials than the requirements stipulated in the Emergency Plumbing Standards, the local code may govern the design. For example, where a city code permits the installation of vitrified tile house drain, the city code or the Emergency Plumbing Standards (the latter requiring cast iron) may be followed. Applicable requirements of Division WD-19, "Plumbing", of the Specification for War Dormitories should be adopted.

Diagrammatic plans indicate the types and arrangement of fixtures and fittings. For guidance in designing drainage systems, a suggested schematic plan has been developed for one of the buildings.

Hot and cold water lines should be run to all fixtures requiring both, except that hot water line may be omitted for sinks in food stores. Plastic tubing and fittings may be used for pipe sizes of 3/8, 1/2 and 3/4 inch only. Such tubing should not be used when water is heated by coal.

Method of selecting domestic water heating equipment set forth in Part V of this Bulletin should be followed, using the maximum hourly demands indicated in the following table:

| Fixture | Maximum Demand Gallons Per Hr. |
|---|---|
| Lavatories (in toilets) | 4 |
| Lavatories (in beauty shops and barber shops) | 20 |
| Sink (lunch room and kitchen) | 20 |
| Sink (prescription department in drug stores) | 10 |
| Service sink | 20 |

See table in "Heating", below, showing allowable fuel and equipment combinations for services indicated.

## HEATING

The standards for heating design set forth in Part VI of this Bulletin, except as amended herein, shall apply.

Group heating systems in buildings having floor areas in excess of 6000 square feet may be by forced warm air or forced hot water. Group heating systems in buildings having floor areas 6000 square feet or less, shall be by forced warm air, except that forced hot water may be substituted therefor under the following conditions:

1. The amount of steel required must not exceed the amount that would be used in a forced warm air system if a steel furnace were used in place of a cast iron furnace.

2. Other critical materials, except cast iron, must not exceed the limits established for forced warm air systems.

3. No steel boilers shall be used.

4. The availability of radiators, boilers, pumps and pipes must be first established.

Designs for forced warm air systems should comply with the procedure outlined in the Technical Code for the Design and Installation of Mechanical Warm Air Heating Systems, issued by the National Warm Air Heating and Air Conditioning Association. Size furnaces to compensate for approximately 25% supply of fresh air. Applicable requirements of "Forced Warm Air Heating" (Division WD-20) of the Specification for War Dormitories should be adopted.

Designs for forced hot water systems should comply with accepted commercial practice. Use unit heaters for spaces with heat losses of 40,000 BTU per hour or greater, and cast iron radiators for smaller spaces; arrange for automatic and manual operation of each unit heater. Where the load requires $2\frac{1}{2}$ inch or larger pump, break load into two or more loops in order to use pumps smaller than $2\frac{1}{2}$ inch for each loop. Where heating load is composed predominately of radiators, use a single pipe loop. In order to conserve critical material, systems should be designed for water temperature of 210 degrees F. Applicable requirements of "Forced Hot Water Heating" (Division WD-21) of the Specification for War Dormitories should be adopted.

In localities where the use of gas for heating space is permissible, gas-fired vented unit heaters, gas-fired vented radiators and gas-fired vented space heaters may be used. In such cases the amount of critical material shall not exceed the requirements for the group heating system.

Diagrammatic Plans. For guidance in designing forced hot water heating systems, pipe runs have been indicated on the suggested schematic plan for one of the buildings.

In establishing critical material lists for blanket priorities, equipment has been sized on the basis of using forced hot water heating for three heating zones: -20, 0 and +15 degrees F. However, for actual designs, equipment and systems should be sized for the prevailing design temperature of the locality in which the buildings are located. Prepare critical material lists accordingly. (Storm sash and doors may be omitted for these facilities).

Design for inside temperatures of not over 65 degrees F. for food stores, of approximately 50 degrees F. for storage rooms, and of not over 70 degrees F. for the balance of the facilities. Air changes in stores and other large areas should not exceed three per hour; in storage rooms, not over one per hour.

Temperature controls should be reduced to a minimum for automatic operation. Wherever possible, they should be designed to avoid use of transformers and low voltage relays. For forced warm air heating controls and typical operating arrangements coincident with respective fuels, refer to specification "Forced Warm Air Heating", (Division WD-20) of the specifications for War Dormitories. For forced hot water and individually-fired unit heater controls, refer to the schedule shown in Table A (page 9 of this Appendix).

Allowable fuel and equipment combinations for respective utility services are indicated by the following table:

| Space Heating (Furnace or Boiler) | Domestic Hot Water (Heater) | Cooking (Range) |
|---|---|---|
| coal | coal | coal |
| coal | coal | gas |
| coal | gas * | gas |
| gas | gas | gas |
| oil | oil | kerosene |

*Use only when economically sound and available

The use of gas fuel is subject to WPB Limitation Orders L-31, L-31a, L-86 and L-174; for summary interpretations of these orders see Bulletin No. 2, Part I-B, Utility Selection. Gas main should be available adjacent to site.

The use of oil fuel is subject to Petroleum Distribution Order No. 13 (Bulletin No. 19) issued by the Petroleum Administration for War; it precludes use of oil for space and domestic water heating throughout the country, except upon the granting of an appeal.

TABLE A

| Equipment | Control Instrument | Function of Controls | | | Remarks |
|---|---|---|---|---|---|
| | | Coal (Hand-Fired) F.H.W. | Oil or Gas F.H.W. | Gas Ind. Fired | |
| Circulating Pump | Room type thermostat (locked cover) | Operate pump on and off at predetermined low and high room temperatures | Operate pump on and off at predetermined low and high room temperatures | | Where more than 1 pump is necessary, use separate thermostat for each pump |
| Oil or Gas Burner | Water temperature control (aquastat) | | Operate burner on and off at predetermined low and high boiler water temperature | | Arrange for boiler mounting |
| Air for combustion and check draft | Regulator (mechanically operated) | Operate ashpit and check draft doors | | | Arrange so that one door opens when other closes |
| Unit Heater | Water temperature control (aquastat reverse acting) | Subject to regulation of room thermostat, operate fan on and off at predetermined high and low heating return temperatures | Subject to regulation of room thermostat, operate fan on and off at predetermined high and low heating return temperatures | | Mount on return from heaters, arranged and wired to operate group of heaters on same heating circuit. |

(Continued)

TABLE A (Cont'd)

| Equipment | Control Instrument | Function of Controls | | | Remarks |
|---|---|---|---|---|---|
| | | Coal (Hand-Fired) F.H.W. | Oil or Gas F.H.W. | Gas Ind. Fired | |
| Unit Heater | Room type thermostat (with lock type cover) | | | Operate gas burner on and off at predetermined low and high room temperatures | Wired to operate group of heaters on same gas circuit |
| Unit Heater | Air control | | | Operate fan on and off at predetermined high and low air temperatures | Locate element in leaving air stream of one unit heater and wire to operate group of heaters on same gas circuit. |

## ELECTRIC - INTERIOR

Interior design shall be governed by the National Electrical Code, together with Emergency Interim Amendments, except that orders issued by the Federal Agency controlling priorities shall take preference. Use nonmetallic wiring systems. Applicable requirements of (Division WD-22) "Interior Wiring" of the Specification for War Dormitories should be adopted.

Working drawings shall show location of outlets for light and power, controls, and panels, circuiting and feeders, using standard symbols.

Provide for ceiling lighting not to exceed three watts per square foot, and for lights over or near each entrance and loading platform. Power outlets should be provided for necessary equipment, such as heating controls, refrigerators, fans, toasters, cash registers, mixers etc. Provide individual feeders and panels for each occupancy and for public space. Panel control of lighting circuits should be utilized where possible. Branch circuit centers and motor controls should be conveniently located and clearly identified. Do not run entrance conductors within frame building more than five feet unless overcurrent protection is provided at outer end of conductors. Provide meter gaps at panelboards to permit future use of individual tenant meters.

Lighting fixtures should be non-metallic generally, low in initial cost, require little maintenance and repair expense, simple and sturdy in design, with a lasting finish. Fixtures subject to moisture must be moisture-proof. Pull cords should be provided with "snubbers" or stops.

Wiring and fixtures in refrigerators must be of exposed weatherproof type.

## PARKING AREA LIGHTING

Flood lights may be mounted on building or on wood poles, connected to the project system. Locate control switches for convenient management control, not within the building.

Area lighting should not exceed 0.25 watts per square foot of area served. Fixtures and wiring for this purpose are restricted to the quantities included in the allowance of materials for interior wiring. Clearances shall be maintained in accordance with the rules of National Electrical Safety Code.

## SIGNS AND DISPLAY LIGHTING

Design Standards

Signs and display lighting should be drastically curtailed in order to save materials and electrical energy. No additional materials will be allowed generally for such purposes. Signs must be small, simple and made almost entirely of wood, with painted lettering. If illumination is necessary, it should be of the simplest type and of relatively low intensity. When a sign is not within sight of its control, a locking type switch must be provided. Exterior signs must be rigidly supported and swinging signs should not be used. No sign should project more than six feet beyond the face of a building and should be not less than eight feet above sidewalks and twelve feet above alleys. Signs mounted on roofs or over doors or windows should have not less than six inches of clearance at the bottom to prevent accumulation of trash, snow, ice, etc. Electrically lighted signs must be wired in accordance with the National Electrical Code.

## ELECTRIC - EXTERIOR

Design Standards. Applicable portions of Part VII of this Bulletin, and the National Electrical Safety Code, shall govern exterior distribution systems. Applicable requirements of (Division WD-23) "Overhead Distribution", of Specifications for War Dormitories should be adopted.

Transformer design demand should not exceed 6 watts per square foot for light and power purposes. Transformer banks larger than one 37-1/2 KVA or three 15 KVA per pole shall be installed on suitable platforms supported by two or more poles. Transformer kiosks and underground services may be used only where such installation results in the use of less critical material than would be required by an overhead type of installation.

Type of service should be determined after consideration of power requirements and systems available, to effect maximum overall savings of critical materials.

## REFRIGERATION

Designs should be determined in the light of (1) the need for conservation of, and limitations upon, the use of materials and (2) applicable rulings of the War Production Board, such as limitation orders and the War Housing Manual.

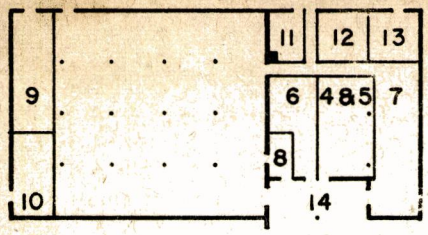
Refrigerator storage areas for respective store groups should be:

| Store Group | Area - Square Feet | |
|---|---|---|
| | Meats | Vegetable & Dairy |
| G-1 & F-1 | 120 | 100 |
| G-2 & F-2 | 175 | 120 |
| G-3 & F-3 | 250 | 150 |

Sizing and methods of construction to maintain desired temperatures outlined in the Refrigerating Data Book of the American Society of Refrigerating Engineers may be followed.

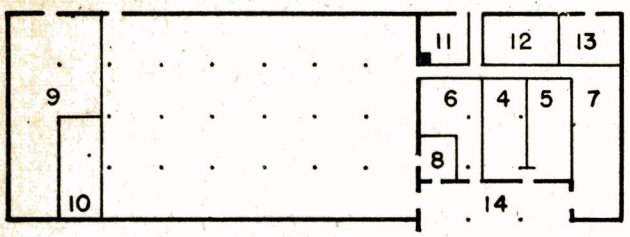
Critical material lists have been based upon the use of unit coolers integrally equipped with fans. Coolers, except for motors, are constructed of steel. Coolers should be installed in the refrigerator storage.

SMALL (250-400 D.U.) 64' x 128'

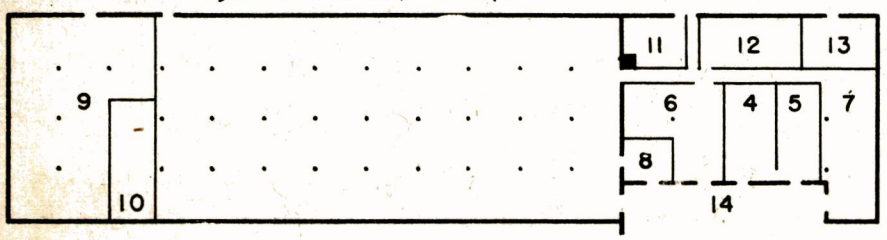



STORE GROUPS PLANNED FOR CONSOLIDATED MANAGEMENT OF FOOD AND DRUG STORE

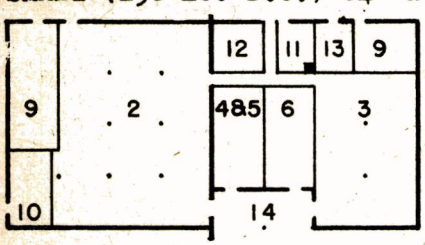
MEDIUM (500-800 D.U.) 64' x 192'




LARGE (1000-1500 D.U.) 64' x 272'

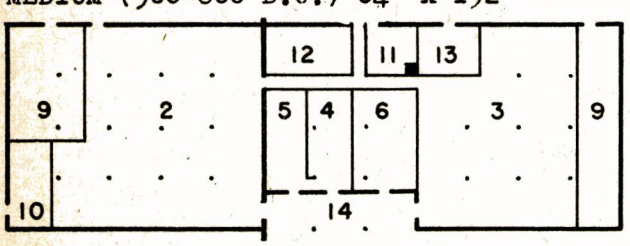



SMALL (250-400 D.U.) 64' x 128'

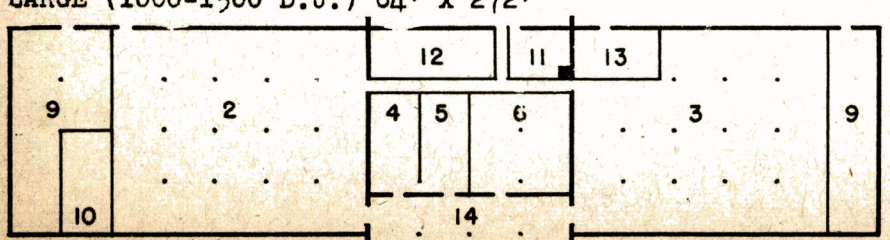



STORE GROUPS PLANNED FOR SEPARATE MANAGEMENT OF FOOD AND DRUG STORE

MEDIUM (500-800 D.U.) 64' x 192'




LARGE (1000-1500 D.U.) 64' x 272'



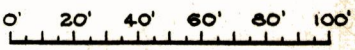

COMMERCIAL FACILITIES –

STORE PLANS FROM SERIES CF1, SHEETS 1 & 2

KEY

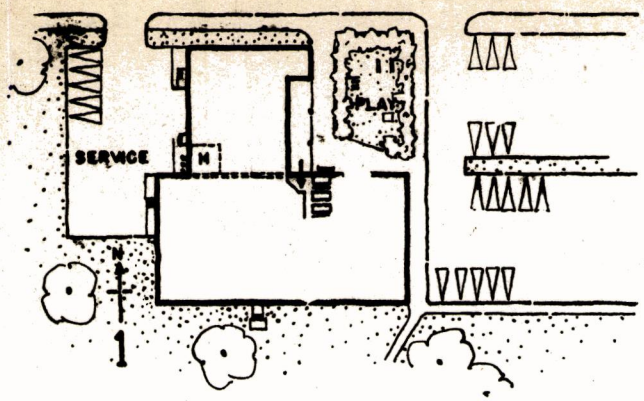
1. Foods, drugs & variety
2. Foods
3. Drugs & variety (including fountain & lunch area)
4. Beauty shop
5. Barber shop
6. Pick-up depot for dry cleaning, laundry, tailoring, shoe repair, etc.
7. Fountain & lunch room
8. Prescription booth
9. Storage
10. Refrigerated storage & compressors
11. Heater & janitor room
12. Lockers & toilets
13. Kitchen & kitchen storage
14. Public entrance orch

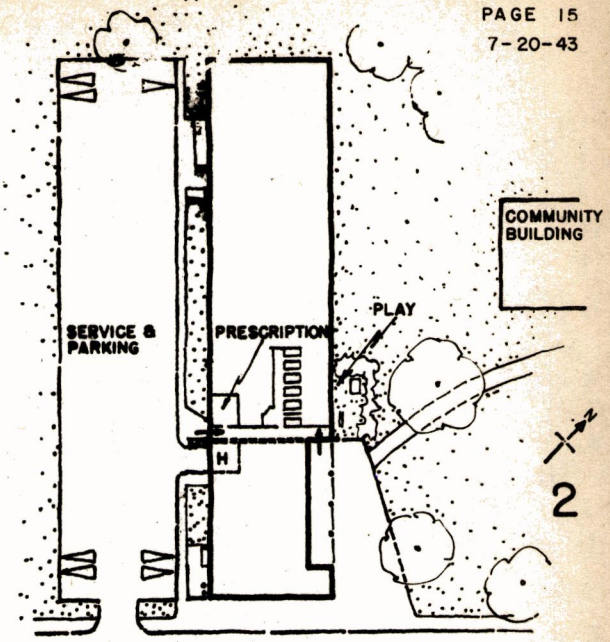
Scale 1" = 60'-0"

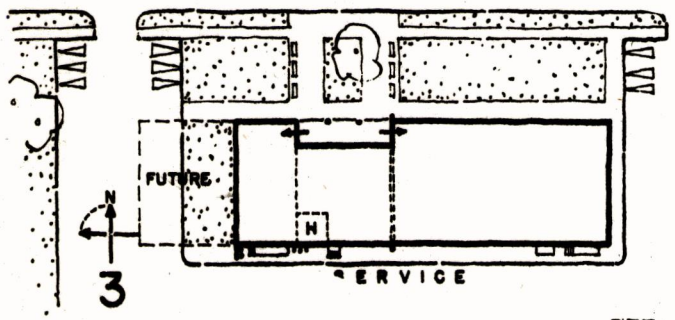


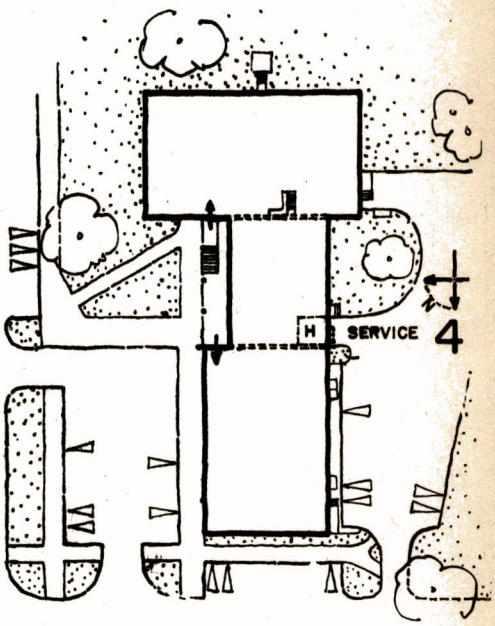

For further details see Diagrammatic Plans for Commercial Facilities, Series CF-1

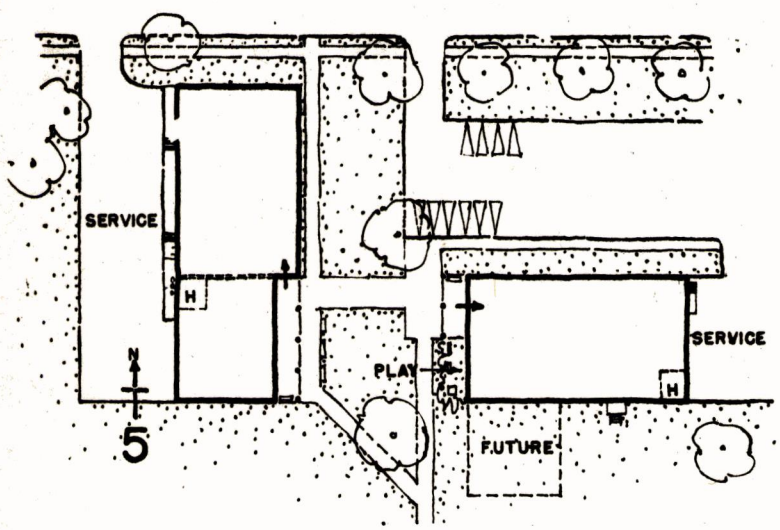
## COMMERCIAL FACILITIES – SITE PLAN STUDIES FROM SERIES CF-1, SHEET 3



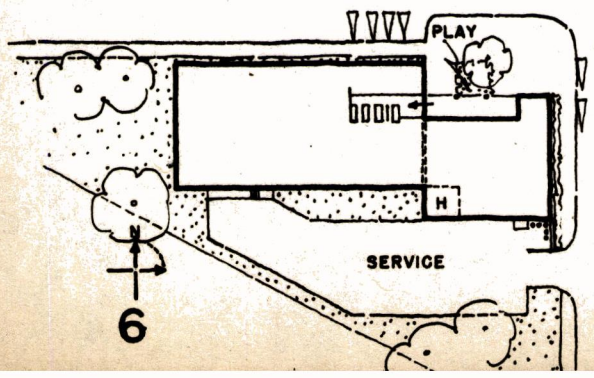



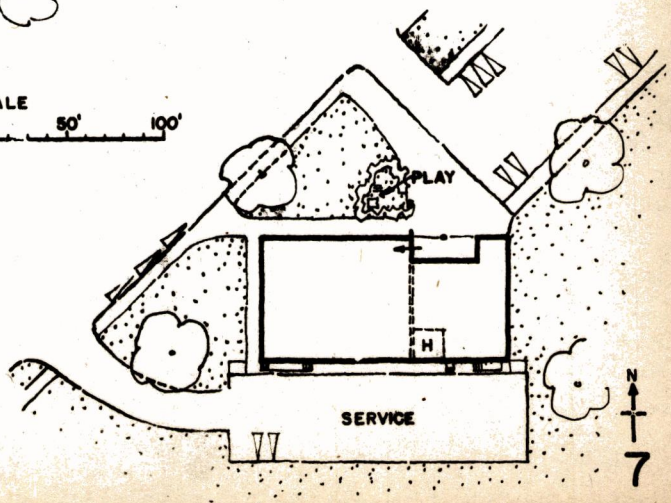




SCALE
0' 50' 100'



NHA
FPHA

CIRCULAR
7-28-43

TO: All Holders of Bulletin No. 2

SUBJECT: Revision of Bulletin No. 2, Appendix 3, "Standards for Project Facilities".

The attached Table of Contents and pages 1, 2, 3, 3a, 3b, 4, 5 and 6, revised as of July 28, 1943, should be substituted for the Table of Contents and pages 1, 2, 3, 4, 5 and 6, dated March 1, 1943, of Bulletin No. 2, Appendix 3.

Charles K. Agle
for W. P. SEAVER
Assistant Commissioner
for Development

16726

STANDARDS FOR TEMPORARY WAR HOUSING

BULLETIN 2 APPENDIX 3

# PROJECT FACILITIES FOR ADMINISTRATION, TENANT ACTIVITIES, OUTDOOR RECREATION CHILD SERVICE, HEALTH, AND OTHER ESSENTIAL PROJECT SERVICES

CONTENTS


| | | Page |
|---|---|---|
| | General Requirements | 1 |
| | Facilities Required | 1 |
| | Permissible Reductions or Omissions | 1 |
| | Determination of Specific Requirements | 1 |
| | Facilities for Groups of Projects | 1 |
| | Similar Types of Accommodations | 1 |
| | Dormitories and Accommodations for Two-Person Families | 2 |
| | Accommodations for Two Persons and Three or More Person Families and of 200 or More Dormitory Units | 2 |
| | Accommodations for Two Person and Three or More Person Families and of Less than 200 Dormitory Units | 2 |
| | Accommodations for Families of Two Persons and of Three or More Persons | 3 |
| | Example A | 3a |
| | Example B | 3b |
| 1. | Dormitory Projects | 4 |
| | Facilities To be Provided | 4 |
| | Space Requirements | 4 |
| | Standard Diagrammatic Plans | 4 |
| | Determination of Community Building Size | 5 |
| | Adaptation of Standard Plans to Specific Projects | 5 |
| | Fire Station or Equipment Space | 6 |
| | Public Telephones | 6 |
| | Outdoor Recreation Area | 6 |


(continued)

NATIONAL HOUSING AGENCY
FEDERAL PUBLIC HOUSING AUTHORITY
July 28, 1943

CONTENTS (Continued)


| | | Page |
|---|---|---|
| II. | Family Dwelling Projects | 7 |
| | A. Accommodations for Two Person Families | 7 |
| | Facilities To Be Provided | 7 |
| | Space Requirements | 7 |
| | Standard Diagrammatic Plans | 7 |
| | Determination of Community Building Size | 8 |
| | Adaptation of Standard Plans to Specific Projects | 8 |
| | Cafeteria | 8 |
| | Commercial Facilities | 9 |
| | Fire Station or Equipment Space | 9 |
| | Public Telephones | 9 |
| | Outdoor Recreation Area | 9 |
| | B. Accommodations for Three or More Person Families | 10 |
| | Facilities To Be Provided | 10 |
| | Space Requirements | 10 |
| | Standard Diagrammatic Plans | 10 |
| | Determination of Community Building Size | 11 |
| | Adaptation of Standard Plans to Specific Projects | 11 |
| | Child Service Centers | 12 |
| | Schools | 13 |
| | Commercial Facilities | 13 |
| | Fire Station or Equipment Storage | 14 |
| | Public Telephones | 14 |
| | Outdoor Recreation Area | 14 |
| | Supplements | |
| | Infirmaries for Dormitory Apartment Projects | 15 |
| | Programming for Family Dwelling Projects | 16 |


NATIONAL HOUSING AGENCY
FEDERAL PUBLIC HOUSING AUTHORITY
July 28, 1943

# PROJECT FACILITIES

## General Requirements

Facilities Required. Project Facilities as described herein shall be provided for all temporary war housing projects, except trailer projects, the standards for which are incorporated in Bulletin No. 4. (Refer to Manual of Policy and Procedure, Section 3403:3). Where the term "community building" or "community buildings" is used herein it refers to the buildings housing project services.

Permissible Reductions or Omissions. To the extent that satisfactory off-site facilities are conveniently accessible and meet project needs, the facilities required by these standards shall be reduced or omitted by the Regional Director as may be determined in consultation with the Office of Community War Services. (Refer to Manual of Policy and Procedure, Section 3403:3)

## Determination of Specific Requirements

The type of accommodations and number of units in a project shall be used as the basis for determining the facilities to be provided. Types of accommodations and their equivalents in units are:

| Accommodations | One Unit |
|---|---|
| Dormitories | 1 person |
| Family Dwelling units | |
| Two-person families | 1 family |
| Three or more person families | 1 family |

## Facilities for Groups of Projects

Project facilities to serve two or more projects, located within approximately one-half mile of each other and with convenient pedestrian access between them, shall be determined as set forth hereinafter.

## Projects Composed of Similar Types of Accommodations

Project facility buildings (except cafeterias on projects where the walking distance from units would exceed one-quarter mile) shall be provided on the basis of the total number of units of two or more projects composed of all dormitory units, all accommodations for two person families, or all accommodations for three or more person families.

Projects Composed of Dormitories and Accommodations for Two Person Families

Administration and tenant (morale) activity space shall be provided on the basis of the total number of units.

Cafeterias, trading posts, and infirmaries shall normally be provided for dormitory units only; they shall, however, be provided for the total number of units when two person families are accommodated in dormitory apartments, Series WA-1. (Refer to Notes 1 and 2 below). Appropriate plans shall be selected from Series WD-1.

Projects Composed of Accommodations for Two Person and Three or More Person Families and of 200 or More Dormitory Units

Administration space shall be provided on the basis of the total number of units; appropriate plans shall be selected from Series WD-1.

Tenant activity space shall be provided in separate buildings for occupants of dormitory units and of family dwelling units. Appropriate plans shall be selected (1) from Series WD-1 on the basis of the number of dormitory units, and (2) from Series TDU on the basis of the number of units for families of two persons and of three or more persons; only tenant activity portion of building, including child service space where there are 126 to 325 three or more person families, shall be used.

Cafeterias, trading posts and infirmaries shall be provided on the basis of the number of dormitory units; appropriate plans shall be be selected from WD-1. These facilities are provided primarily for the use of occupants of dormitories; but shall be programmed for the total of the dormitory units and units for two person families when the latter are accommodated in dormitory apartments, Series WA-1. (Refer to Notes 1 and 2).

Child service buildings (Series TDU Nos. 132, 133, 134) shall be provided on the basis of the number of units for families of three or more persons, where 326 or more such families are accommodated.

Projects Composed of Accommodations for Two Person and Three or More Person Families and of Less than 200 Dormitory Units

Administration and tenant activity space shall be provided on the basis of the total number of units; applying the standards for 3 or more person families.

Child Service Space shall be provided for projects comprising 100 to 325 families of three or more persons by a community building with a child service wing; and for more than 325 such family dwelling units by providing a separate child service building (or buildings).

Cafeterias shall normally be provided for dormitory units only; they shall, however, be provided for the total of dormitory units and of accommodations for two person families when the latter are accommodated in dormitory apartments, standard plan Series WA-1. (Refer to Note 2 below). Where it is estimated that less than 25 persons will be served at one time, special minimum meal service shall be planned on the basis of essential need for the specific project concerned. In such a case, the gross area shall be less than required by standard cafeteria plan No. 75 and special application for priority will be required.

Infirmaries shall be provided only when number of beds required is 4 or more. (Refer to Note 1 below).

Projects Composed of Accommodations for Families of Two-Persons and of Three or More Persons

Administration and Tenant Activity Space shall be provided on the basis of the total number of units, applying standards for families of three or more persons; and appropriate plans shall be selected from Series TDU.

Child Service Space shall be provided on the basis of the number of units for families of three or more persons only.

Cafeterias and Infirmaries shall be provided for two person families only if they are accommodated in dormitory apartments, standard plan Series WA-1.

NOTE 1

In programming infirmaries for two or more projects composed of dormitories and dormitory apartments, the appropriate size of infirmary shall be determined on the basis of the estimated number of beds required for the total number of units to be served, allowing 1.2 beds per 100 dormitory units and 1.8 beds per 100 dormitory apartment units.

NOTE 2

In programming cafeterias for projects of dormitory apartments or for combined projects of dormitories and dormitory apartments particularly attention should be paid to the estimated load on the cafeteria. An explanation of the capacity of standard cafeterias, as related to project population, is set forth in the note on page 5 under "Determination of Community Building Size".

The following examples illustrate the requirements and appropriate selection of standard plans for projects composed of dormitories and accommodations for families of two and of three or more persons. Example A includes more than 200 dormitory units and Example B less than 200 dormitory units:

Example A

PROJECT ASSIGNMENTS

| Accommodations | | Units |
|---|---|---|
| Dormitories | | 225 |
| Family Dwelling units | | |
| Two person families | 180 | |
| Three or more person families | 375 | |
| Total family dwelling units | | 555 |
| Total units | | 780 |

PROJECT FACILITY BUILDINGS

| Building type | Units accommodated | Series No. | Plan No. |
|---|---|---|---|
| Administration | 780 | WD-1 | MM-650 |
| Tenant activities: | | | |
| Dormitory units | 225 | WD-1 | MA-250 |
| Family dwelling units | 555 | TDU | No. 118* |
| Cafeteria | 225 (405**) | WD-1 | C-250 (C-400***) |
| Infirmary | 225 (405**) | WD-1 | I-250 (I-650**) |
| Child service building | 375 | TDU | No. 132 |

* Tenant activity portion of building only.

** If dormitory apartments (Series WA-1) are used as accommodations for two person families.

*** If dormitory apartments (Series WA-1) are used as accommodations for two person families. Plan C-650 may be used if the cafeteria load is estimated as more than 250 persons.

Example B

## PROJECT ASSIGNMENTS

| Accommodations | Units |
|---|---|
| Dormitory Units | 175 |
| Family dwelling units | |
| Two person families | 125 |
| Three or more person families | 300 |
| Total units | 600 |

## PROJECT FACILITY BUILDINGS

| Building type | Units accommodated | Series No. | Plan No. |
|---|---|---|---|
| Administration and tenant activities | 600 | TDU | No. 118 |
| Child service | 300 | TDU | No. 114* |
| Cafeteria | 175 (300**) | WD-1 | C-150 (C-250***) |
| Infirmary | 175 (300**) | WD-1 | ..... (1-250**) |

* Child service wing only; to be added to community building TDU-118.

** If dormitory apartments have been used as accommodations for two person families.

*** If dormitory apartments have been used as accommodations for two person families, Plan C-400 may be used if cafeteria load is estimated as more than 150 persons.

## I. DORMITORY PROJECTS

Facilities To Be Provided:

1. Administration (management and maintenance) for all projects.
2. Tenant (morale) activities for all projects.
3. Health services for projects of 200 or more units.
4. Cafeteria for all projects.
5. Trading post for projects of 200 or more units.
6. Fire station or equipment space for all projects.
7. Public telephone pay stations for all projects.
8. Outdoor recreation for all projects.

NOTE: If any of the above facilities exist, conveniently accessible, and wholly or partly available for project use, the required building or outdoor area for such facility shall be omitted or reduced proportionately. (See page 1, General Requirements).

Space Requirements

Gross areas to be planned for all indoor facilities are indicated on the standard diagrammatic plans, "Community Buildings", Series WD-1. Space requirements for outdoor recreation areas are indicated under "Outdoor Recreation Area".

Standard Diagrammatic Plans

Community Buildings, Series WD-1. This series consists of diagrammatic plans for project facility buildings for projects ranging in size from 50 to 2400 units and of final working drawings (frame construction) for certain of these buildings. Final working drawings shall be used as issued where the buildings, for which such drawings have been prepared, are appropriate in size for the project under development. Final working drawings shall be prepared locally, based on the diagrammatic plans, for buildings for which no working drawings have been prepared. Drawings prepared locally should be in general accordance with the design and construction indicated for other standard buildings for which final working drawings have been issued by the Central Office Technical Division. Plans prepared locally shall in no instance exceed the gross areas (calculated to outside of exterior walls) indicated by the diagrammatic plans and shall be reduced only where off-site facilities are available. (Page 1, General Requirements).

## Determination of Community Building Size

The appropriate size of community buildings to be provided shall be determined by the total number of units in the project under development as follows:

| Range of project size Units | Community building Series WD-1 |
|---|---|
| 50-100* | Group Plan No. 75 |
| 100-200 | " " " 150 |
| 200-300 | " " " 250 |
| 300-500 | " " " 400 |
| 500-800 | " " " 650 |
| 800-1200 | " " " 1000 |
| 1200-1800 | " " " 1500 |
| 1800-2400 | " " " 2100 |

*For projects of less than 50 units, facilities shall be planned on the basis of essential needs. In such cases, the total gross area shall be less than required by standard community building plan No. 75, and a special application for a priority rating will be required.

Note: The capacity of cafeteria indicated for each of the above project sizes is limited to serving 50 per cent of the total project population at one meal. Where it is estimated that more than 50 per cent of the project population will use the cafeteria during any one breakfast period (the period of concentrated demand), select size of cafeteria designed to serve a population of twice the number of persons expected to use it during this period. For example, for a dormitory project of 1,000 units, where it is estimated that 750 persons will use the cafeteria during the breakfast period, select the size of cafeteria designed for a population of 1,500 (range 1200-1800).

## Adaptation of Standard Plans to Specific Projects

The functional relationships between the various elements of the community buildings are illustrated by the groupings indicated in the standard diagrammatic plans. In adapting the buildings to a specific project, careful attention to orientation, relation to topography, correlation with the rest of the site arrangement, and to adequate servicing is essential for maximum convenience and efficiency. Because of the consolidated procurement of kitchen equipment, cafeteria plans must not be reversed.

On sites where the various facilities are to be provided in detached buildings, attention should be given to the following objectives:

Management-maintenance. Location near principal project entrance (or where it is readily visible from the entrance), to facilitate supervision.

Tenant (morale) activities. Preferably within one quarter mile walking distance of all units; if detached from cafeteria, provide convenient access between buildings. Direct access to outdoor recreation area is desirable.

Cafeteria and trading post. These should be within one quarter mile walking distance of all units. The trading post corridor provides a sheltered waiting space for the cafeteria.

Infirmary. A quiet location, near or connected with the cafeteria-kitchen for convenient food service, is essential.

Where practicable, community buildings should be located between living units and outdoor recreation area to reduce the transmission of noise. Where dormitory buildings are adjacent to outdoor recreation areas, the ends of buildings should face such areas.

Fire Station or Equipment Space

Space for storage of fire trailers (except in Group Nos. 75 and 150) and other equipment is provided in the Management-Maintenance Building. Where mobile pumping equipment is required, it will be furnished by the Federal Works Agency. (Refer to the Manual of Policy and Procedure, Section 2032:4 and Section 3403:1).

Public Telephones

Public telephone pay stations shall be provided, and must be accessible at all times.

Outdoor Recreation Area

A general recreation area shall be provided for each project. The following tabulation indicates the minimum areas required:

| No. of Units | Area (Acres) |
|---|---|
| 100 | 1.0 |
| 250 | 2.0 |
| 500 | 3.0 |
| 750 | 4.0 |
| 1000 | 5.0 |
| 1500 | 7.5 |
| 2000 | 10.0 |

The area required for a community building or buildings, service courts, paved areas and surrounding lawns varies widely. For purposes of preliminary studies and estimates this area may be considered as approximately one acre for projects of 50 to 200 units, two acres for projects of 200 to 500 units, three acres for projects of 500 to 1200 units, and four acres for projects of 1200 to 2400 units.

## II. FAMILY DWELLING PROJECTS

### A. ACCOMMODATIONS FOR TWO PERSON FAMILIES

Facilities To Be Provided:

1. Administration (management and Maintenance) for all projects.
2. Tenant activities for all projects.
3. Health clinic for projects of 50 or more units.
4. Cafeteria for projects developed with Series WA-1 standard plans.
5. Commercial facilities for projects of 250 or more units.
6. Fire station or equipment space for all projects.
7. Public telephone pay stations for all projects.
8. Outdoor recreation for projects of 50 or more units.

Note: If any of the above facilities are existing, conveniently accessible, and wholly or partly available for project use, the required building or outdoor area for such facility shall be omitted or reduced proportionately. (See page 1, General Requirements).

Space Requirements

Gross areas to be planned for projects of 50 or more units for all indoor facilities, except cafeteria and commercial services, are indicated by the standard diagrammatic plans, Community Buildings, Series TDU, dated February 1, 1943. Space requirements for cafeterias, commercial services, and outdoor recreation area are indicated below. For projects of less than 50 units provide one zero-bedroom unit for management and maintenance space and one two-bedroom unit for tenant activity space (plans for such spaces can be developed under blanket priorities).

(Cont'd)

## Standard Diagrammatic Plans

Project Facilities Buildings, Series TDU, dated February 1, 1943. This series consists of diagrammatic plans for community buildings for projects ranging in size from 50 to 1600 dwelling units. These plans shall be used as the basis for final working drawings, which shall be prepared locally. Plans so prepared shall in no instance exceed the gross areas (calculated to outside of exterior walls) indicated by the diagrammatic plans and shall be reduced only where off-site facilities are available (see page 1, General Requirements).

## Determination of Community Building Size

The appropriate size of community building to be provided shall be determined directly by the total number of units in the project under development as indicated by the following table:

| Range of project size Dwelling units | Community building Series TDU |
|---|---|
| 50-125 | Plan No. 111 |
| 126-225 | " " 113 |
| 226-325 | " " 115 |
| 326-425 | " " 116 |
| 426-550 | " " 117 |
| 551-700 | " " 118 |
| 701-875 | " " 119 |
| 876-1200 | " " 120 |
| 1201-1600 | " " 121 |

Note: Community building plans numbers 112 and 114 are for use on projects of three or more person families only.

## Adaptation of Standard Plans to Specific Projects

Community Buildings. In adapting the standard diagrammatic plans for community buildings to specific projects, careful attention to orientation, relation to topography, correlation with the rest of the site arrangement, convenient access from main project circulation, parking of staff cars, and to adequate servicing, especially for coal delivery and ash removal, is essential for maximum convenience and efficiency. Shed for storage of paint, equipment (except long ladders) and other inflammable material and for small paint jobs should be located at least 15 feet away from community building.

(Cont'd)

Space for possible future building shall be provided on the site. An area not less than 50 feet by 125 feet and at least 50 feet away from any other building site shall be indicated on the site plan by dotted lines and labeled "Site for Future Building." Such space shall be correlated with the rest of the site arrangement and shall be free of streets, walks, underground utilities, or other obstructions which might interfere with future construction.

Cafeteria

For projects planned with Series WA-1 standard plans, cafeterias shall be provided as required under Section I, DORMITORY PROJECTS. (Refer to "Standard Plans" and "Determination of Community Building Size"; in selecting the appropriate size cafeteria, note that one dwelling for couples counts as one unit; see page 1).

Commercial Facilities

Refer to Appendix 2 "Standards for Commercial Facilities", August 1942.

Fire Station or Equipment Space

Fire station or equipment storage space shall be provided in the maintenance space. Where mobile pumping equipment is required, it will be furnished by the Federal Works Agency (Refer to Regional Circular 7.63, dated 12-16-42; LD-812, dated October 22, 1942 and LD-810, Addendum No. 3, dated August 8, 1942.)

Public Telephones

Public telephone pay stations shall be provided. Stations shall be accessible at all times.

Outdoor Recreation Area

Space requirements. Outdoor recreation areas shall be provided for each project in accordance with the following tabulation of required minimum areas:

| Number of dwelling units | Area (in acres) |
|---|---|
| 50 | .25 |
| 100 | 1.0 |
| 200 | 1.25 |
| 300 | 1.5 |
| 500 | 2.0 |
| 750 | 2.6 |
| 1000 | 3.25 |
| 1500 | 4.5 |

For projects of an intermediate number of dwelling units not shown in tabulation, adjust size of recreation areas proportionately. The areas required for community building, service court, surrounding lawns, etc., not included in above table, vary widely. For purposes of preliminary studies and estimates this area may be considered as being approximately one-sixth to one-half acre for projects of 50 to 300 dwelling units, one to one and one-half acres for projects of 500 to 1,000 dwelling units.

Location. The recreation areas should be near the community building or the management and maintenance building (Extensive frontage on project streets should be avoided). To reduce noise and dust nuisance, ends of residential buildings should be toward play area.

## B. ACCOMMODATIONS FOR THREE OR MORE PERSON FAMILIES

Facilities To Be Provided:

1. Administration (management and maintenance) for all projects.
2. Tenant activities for all projects.
3. Health clinic for projects of 50 or more units.
4. Child service for all projects of 50 or more units.
5. Schools for all projects.
6. Commercial facilities for all projects of 250 or more units.
7. Fire station or equipment space for all projects.
8. Public telephone pay stations for all projects.
9. Outdoor recreation for all projects of 50 or more units.

Note: If any of the above facilities are existing; conveniently accessible, and wholly or partly available for project use, the required building or outdoor area for such facility shall be omitted or reduced proportionately. (See page 1, General Requirements).

(Cont'd)

## Space Requirements

Gross areas to be planned for projects of 50 or more units for all indoor facilities, except schools and commercial services, are indicated by the standard diagrammatic plans, Project Facilities Buildings, Series TDU, dated February 1, 1943. Space requirements for schools, commercial services, and outdoor recreation area are indicated below. For projects of less than 50 units provide one zero-bedroom unit for management and maintenance space and one two-bedroom unit for tenant activity and child service space, omitting one non-bearing partition (plans for such spaces can be developed under blanket priorities).

## Standard Plans

Project Facilities Buildings, Series TDU, dated February 1, 1943. This series consists of diagrammatic plans for community buildings for projects ranging in size from 50 to 1600 dwelling units and of diagrammatic plans and final working drawings for child service buildings. The diagrammatic plans for community buildings shall be used as the basis for final working drawings which shall be prepared locally. Such drawings shall in no instance exceed the gross areas (calculated to outside exterior walls) indicated by the diagrammatic plans and shall be reduced only where off-site facilities may be available. Final working drawings for child service building No. 133 shall be used as issued.

## Determination of Community Building Sizes

The appropriate size of community building to be provided shall be determined directly by the total number of units in the project under development, as indicated by the following table:

| Range of Project Sizes Dwelling units | Community building Series TDU |
|---|---|
| 50-125 | Plan No. 111 |
| 126-225 | " " 112 |
| 226-325 | " " 114 |
| 326-425 | " " 116 |
| 426-550 | " " 117 |
| 551-700 | " " 118 |
| 701-875 | " " 119 |
| 876-1200 | " " 120 |
| 1201-1600 | " " 121 |

Note: Community building plans numbers 113 and 115 are for use on projects of only two person families.



(Cont'd)

## Adaptation of Standard Plans to Specific Projects

Community buildings. In adapting the standard diagrammatic plans for community buildings to specific projects, careful attention to orientation, relation to topography, correlation with the rest of the site arrangement, convenient access from main project circulation, parking of staff cars, and to adequate servicing, especially for coal delivery and ash removal, is essential for maximum convenience and efficiency. Shed for storage of paint, equipment (except long ladders) and other inflammable material and for small paint jobs should be located at least 15 feet away from community building.

Space for possible future building shall be provided on the site. An area not less than 50 feet by 125 feet and at least 50 feet away from any other building site shall be indicated on the site plan by dotted lines and labeled "Site for Future Building". Such space shall be correlated with the rest of the site arrangement and shall be free of streets, walks, underground utilities, or other obstructions which might interfere with future construction.

## Child Service Centers

Programming. The number of pre-school children which may be normally expected in a project may be estimated as .75 child per family. Accommodations should be provided for approximately 20 per cent of the estimated total number of pre-school children.

Space in community buildings. For projects ranging in size from 50 to 325 dwelling units space for child service shall be provided in community building. In the smaller range, from 50 to 125 dwelling units, the community hall shall be used for such service; in the larger range from 126 to 325 dwelling units special play rooms and toilets are provided (Refer to Community Buildings, Series TDU, Plan Numbers 1/, 112, and 114, dated February 1, 1943).

For projects of 326 or more dwelling units, space in the community building shall be used for child service to supplement facilities in child service buildings (see below) as necessary, until an additional building is justified.

(Cont'd)

1/ Plan Number 111 has been omitted in accordance with correction made in Circular "Revisions to Appendix 3; 'Standards for Project Facilities,'" dated 9-22-43.

Child service buildings. For projects of 326 or more dwelling units separate child service buildings should be provided. The following table based on accommodating 20 per cent of the estimated number of pre-school children may be used as a guide to the number and size of buildings required:

| Range of Project Size Dwelling Units | Child Service Building Plan Number | Range of Accommodations Number of Children |
|---|---|---|
| 326-500 | 132 | 51-85 |
| 501-800 | 133 | 86-120 |
| 801-1000 | 134* | 121-155 |
| 1001-1300 | 132+133 | 137-205 |
| 1301-1600 | 133+133** | 172-240 |

* use of two number 132's permissible if justified by site conditions.

** use of three number 132's or one number 132 and one 134 permissible if justified by site conditions.

A location closely related to the principal flow of tenant traffic to and from work is frequently preferable to a geographically central location which might cause excessive walking or driving. A minimum space of 50 feet shall be allowed between any child service building and any adjacent building in order to (1) provide a fire protective belt and (2) reduce noise transmission to nearby dwelling units.

The building should be so arranged on the site that all of the play rooms may receive sunlight sometime during the day, preferably during the morning hours; in southern climates a favorable exposure to the prevailing breeze is essential. Convenient servicing should be provided for supplies, coal delivery, and ash removal; also parking space for staff cars.

Special play yards should be provided adjacent to each child service building in accordance with the following minimum requirements:

| Plan number | 132 | 133 | 134 |
|---|---|---|---|
| Play yard (square feet) | 4200 | 6300 | 8400 |

Play yards must be well drained; nearly level, maximum gradient 4 per cent; should have morning sun and afternoon shade; approximately 20 per cent of area paved, remainder in turf, where practicable. Paved area should be adjacent to exist from play rooms; sand box at one side, at lease 4 feet from building or fence.

(Cont'd)

## Schools

General. Schools, where required, are to be provided either on or off the site with funds supplied by the Federal Works Agency. Need for such facilities shall be determined jointly by Regional Directors of FPHA and the regional representatives of the Office of Education, and the Federal Works Agency. Refer to LD-810 and Addenda Nos. 1, 2, and 3, LD-811, and LD-812 and Regional Circular 7.63.

Space requirements. Refer to standard plans transmitted to regional directors by interoffice memorandum, August 24, 1942.

Combination school-community building. When a school is to be built as part of a project, it ought, if possible, to be planned to serve also as a community building. The design of the building will be governed by the allocation of responsibility of its construction and operation. If the construction of the school and community building is undertaken by the project, the two functions can be closely integrated, with practically all of the facilities of the building being designed for dual use. If the school wing is built and operated by another agency, a greater degree of separation may be necessary. These factors should be determined promptly and the building should be planned for the greatest possible service to the community. Sufficient space should be reserved for school playground to meet local school standards; where practicable, locate to serve as outdoor recreation area of project.

## Commercial Facilities

Refer to Appendix 2 "Standards for Commercial Facilities", August 1942.

## Fire Station or Equipment Storage

Fire station or equipment storage space shall be provided in the maintenance space. Where mobile pumping equipment is required, it will be furnished by the Federal Works Agency (Refer to Regional Circular 7.63 dated 12-16-42, LD-812, dated October 22, 1942 and LD-810, Addendum No. 3, dated August 8, 1942.)

## Public Telephones

Public telephone pay stations shall be provided. Stations should be accessible at all times.

(Cont'd)

Outdoor Recreation Area

General. Properly located and designed play areas tend to prevent accidents to children and to reduce damage to areas not intended for play. Restrictions on use of automobiles will increase demand for field space suited to adult play.

Space requirements. Outdoor recreation areas shall be provided in accordance with the following tabulation of minimum areas required:

| Number of Dwelling Units | Central recreation (sq. ft.) | Children's play yard (sq. ft.) | Total area required (acres) |
|---|---|---|---|
| 50 | 10,000 | 1,200 | .26 |
| 100 | 45,000 | 1,200 | 1.1 |
| 200 | 55,000 | 1,800 | 1.3 |
| 300 | 70,000 | 2,400 | 1.7 |
| 500 | 90,000 | 3,000 | 2.1 |
| 750 | 115,000 | 3,500 | 2.7 |
| 1000 | 140,000 | 4,000 | 3.3 |

For projects of an intermediate number of dwelling units not shown in tabulation, adjust recreation areas proportionately. The areas required for community building, service court, surrounding lawn, etc., not included in above table, vary widely. For purposes of preliminary studies and estimates this area may be considered as being approximately one-sixth to one-half acre for projects of 50 to 300 dwelling units, one to one and one-half acres for projects of 500 to 1,000 units.

Location. The recreation areas should be near community building or administration building (if no tenant activity space is required). Extensive frontage on project streets should be avoided. To reduce noise and dust nuisance, ends of residential buildings should be toward play ground.

Children's play yard should be well drained, have morning sun and afternoon shade, should be accessible from play rooms and convenient to toilets.

SUBJECT: Infirmaries for Projects Comprising Dormitory Apartments, Series WA-1 Standard Plans

1. Infirmaries shall be provided for all dormitory apartment projects of 400 or more units developed with Series WA-1 standard plans.

2. Standard plans, Series WD-1, Project Facility Buildings, include diagrammatic plans for infirmaries appropriate for projects of dormitory apartments, ranging in size from 400 to 1600 units and final working drawings (frame construction) for the larger infirmaries. Where applicable to a project, final working drawings shall be used as issued. Where other final working drawings must be used, they shall be prepared locally, based on the diagrammatic plans. Such drawings should, in general, be in accordance with the design and construction indicated on the final working drawings which have been issued. Plans prepared locally shall in no instance exceed the gross areas (calculated to outside of exterior walls) indicated by the diagrammatic plans.

3. Appropriate size of infirmary shall be determined on the basis of the estimated number of beds required, allowing approximately 1.8 per 100 units. The following tabulation may be used as a guide:

| Project Size<br>Number of units | Infirmary Size<br>Number of Beds | Infirmary Plan<br>Series WD-1, Plan No. |
|---|---|---|
| 400 - 550 | 8 | I - 650 |
| 550 - 800 | 12 | I - 1000 |
| 800 - 1200 | 18 | I - 1500 |
| 1200 - 1600 | 24 | I - 2100 |

4. Location of infirmary should be considered in relation to orientation, topography, correlation with the site arrangement, and especially with regard to the cafeteria for kitchen service, convenient access from main project circulation, parking of staff cars, and adequate servicing, coal delivery and ash removal.

5. For combined projects composed of dormitories and dormitory apartments, the appropriate size of infirmary shall be determined on the basis of the estimated beds required for the total number of units to be served, allowing 1.2 beds for 100 dormitory units and 1.8 beds per 100 dormitory apartment units. Infirmaries shall be provided, however, only when the number of beds required is 8 or more.

1/ This supplement supersedes the unnumbered Supplement (Page 15), dated 4-15-43. The corrections noted in the Circular, dated 9-22-43, "Revisions to Appendix 3, 'Standards for Project Facilities'" are incorporated in this supplement.

SUBJECT: Programming Project Facilities for Family Dwelling Projects (Superseding "SUPPLEMENT, Bulletin 2, Appendix 3, Page 16," dated 8-16-43)

Since all assignments for accommodations for two-person families and for families of three or more persons shall be considered as assignments for family units (Manual Section 3400:2) without qualifications as to size of family, the requirements for project facilities shall, as outlined in the relevant sections of Manual Chapter 3403, be applied as follows:

1. For outstanding projects programmed for two-person families which are too far advanced for re-interpretation as family dwelling projects for two or more, the standards for all project facilities for "Accommodations for Two-Person Families" (See Part IIA of this Appendix) shall be applied.

2. For projects programmed in accordance with current standard distribution of family dwellings by size (25% 1-bedroom units, 50% 2-bedroom units, and 25% 3-bedroom units), the standards for all project facilities for "Accommodations for Three-or-More Person Families" (See Part IIB of this Appendix) shall be applied on the basis of the total number of units assigned.

3. For projects programmed for family dwellings with variations from current standard distribution, the standards for all project facilities, except child service, for "Accommodations for Three-or-More Person Families" shall be applied. To determine the necessary space requirements for child service, the number of children for whom such service is to be provided may be estimated at .08 pre-school child per bedroom.

1/ This supplement supersedes "SUPPLEMENT Bulletin 2, Appendix 3, Page 16," dated 8-16-43.

NHA
FPHA

CIRCULAR
1-7-44

TO: All Holders of Bulletin No. 2, "Standards for Temporary War Housing."

SUBJECT: Child Service Play Yards

Attached is Supplement 3, entitled "Child Service Play Yards" dated 12-6-43, to Appendix 3 of Bulletin No. 2, "Standards for Temporary War Housing."

This supplement has been prepared as a guide for the location and design of play yards, which are required in connection with all child service facilities provided in war housing projects.

Approved lists of critical material requirements for Standard Play Equipment Storage Buildings Nos. 141 and 142 are to be appended to Bulletin No. 9. Small as these buildings are the quantity of critical material as approved is not quite sufficient for their construction. The balance of material needed should be available from the general project. See Page 3 of this supplement for conditions under which these buildings are to be provided.

Series CSPY includes:

(a) Typical Plans for Child Service Play Yards for:

Community Building 111 and other buildings where the community hall is used for child service;
Community Buildings 112, 114;
Community Trailer Groups (TPS-1.4);
Community Buildings, Trailer Projects (TPS-3.2); and
Child Service Buildings Nos. 132, 133, 134

(b) Dimension Data, Play Equipment Storage Building and Play Equipment Use Areas

Vandyke negatives of Drawings Nos. 1 through 5, Series CSPY, and Drawing No. 11, Series TDU, are being sent separately to the regions.

Drawing 11, Series TDU, shows plans and construction details for Play Equipment Storage Buildings.

Charles K. Eagle
for W. P. SEAVER
Assistant Commissioner
for Development

Attachment

21302

# CHILD SERVICE PLAY YARDS

This supplement establishes standards for the play yards which must be provided, in connection with indoor space designated for child service activities, in all projects including trailer projects.

Attached to this supplement are reproductions of Typical Plans for Child Service Play Yards, Series CSPY, Drawings 1, 2, 3, 4, 5, dated 11-11-43. These plans should be followed as closely as the building plan, site conditions and orientation permit.

Location. Play yards should be adjacent to, or have good access from, the rooms they serve.

Area should be at least 2100 sq. ft. per room for all Standard Child Service Play Rooms in Child Service Buildings, Child Service Wings and Community Trailer Groups. Provide a minimum of 1200 sq. ft. for play yards serving Community Building No. 111, and other community buildings, where the number of children is below the normal for standard play rooms. These areas do not include: area of steps, stoops, and platforms at building entrances, area of storage building or land not usable for equipment because of slope or other conditions. These areas may be increased moderately, if additional land can be used for play without increasing site improvement costs.

Combination of play yards serving two adjacent play rooms is recommended, to permit joint use of play space, pavement, and special equipment. The plan, however, should facilitate use by separate groups, as indicated in the typical plans.

Site should be well drained, relatively level, with slope preferably not exceeding 3%. (Steeper slopes may be included as an addition to the minimum area.) Southerly orientation is preferable in most climates; but the shade of trees or buildings should be available, at least in the afternoon. These play yard site factors should be considered when the child service building is located.

Surfacing should be of these types:

a. Grass or similar material for general play purposes and most equipment.

b. Pavement, such as concrete, smooth bituminous, or other hard surface suitable for wheeled toys and use in wet weather, and may consist in part of a walk, at least 3' wide, forming a circuit for wheeled toys. The total paved space (not including steps, ramps and platforms at building entrances) should not exceed 420 sq. ft. per play room served.

(Cont'd)

For trailer projects, pavement (or duck-board walks) should be the minimum necessary for access from building to play space and play yard equipment storage building.

c. Sand-clay or similar material for parts of play yard which will have intensive use, such as small spaces surrounded by pavement.

d. Tanbark, sawdust, or similar material may be used instead of grass under slides, climbing apparatus, and swings.

Types of Equipment. The typical plans show all fixed equipment, and part of the movable outdoor equipment, purchased by the Central Office Procurement Division. This equipment is listed, and described by drawings and specifications, in Bulletin No. 6, Equipment Specifications for Child Service Facilities for Family Dwelling Projects.

The typical plans also indicate preferred locations for additional equipment, such as swings and work benches, which may be supplied by the agency operating the child service, by others or constructed by the project maintenance personnel. In laying out play yards, consult the operating agency and follow its recommendations, concerning such additional equipment.

Location of Equipment. Place fixed equipment, and pieces which are difficult to move, near sides and ends of play yards, keeping central part of yard free for play purposes. Reserve a portion of surfaced area and space near building for packing boxes, play boards, hollow blocks, etc. Group pieces of equipment intended primarily for the use of the older children away from those intended primarily for the younger children. In order to assure free circulation, and prevent unnecessary hazards in use of equipment, allow free space at the sides and ends of each piece roughly in accordance with the diagrams on the attached Drawing No. 5.

Steps and platform, slides and swings should face an open area and should be so placed that children using them will not face the late afternoon sun.

Swings, if used, should be carefully located in order to reduce hazards to children approaching or passing by, when they are in use. Locate parallel to fence or building wall, preferably in a corner, and provide guard rails about 2' high to prevent children from crossing path of swing.

The standard sandbox supplied by the FPHA is 5'x8' closed, 8'x10'-4" open. A space approximately 14'x16' is required to accommodate the box and assure convenient access. The sandbox area must be well drained and substantially level. Except for trailer projects, and in dry climates, paved access to the box from the hard surfaced play area should be provided. Locate in corner or at side of play space intended primarily for the younger children, and preferably where easily accessible from a street or service drive, to permit delivery and removal of sand.

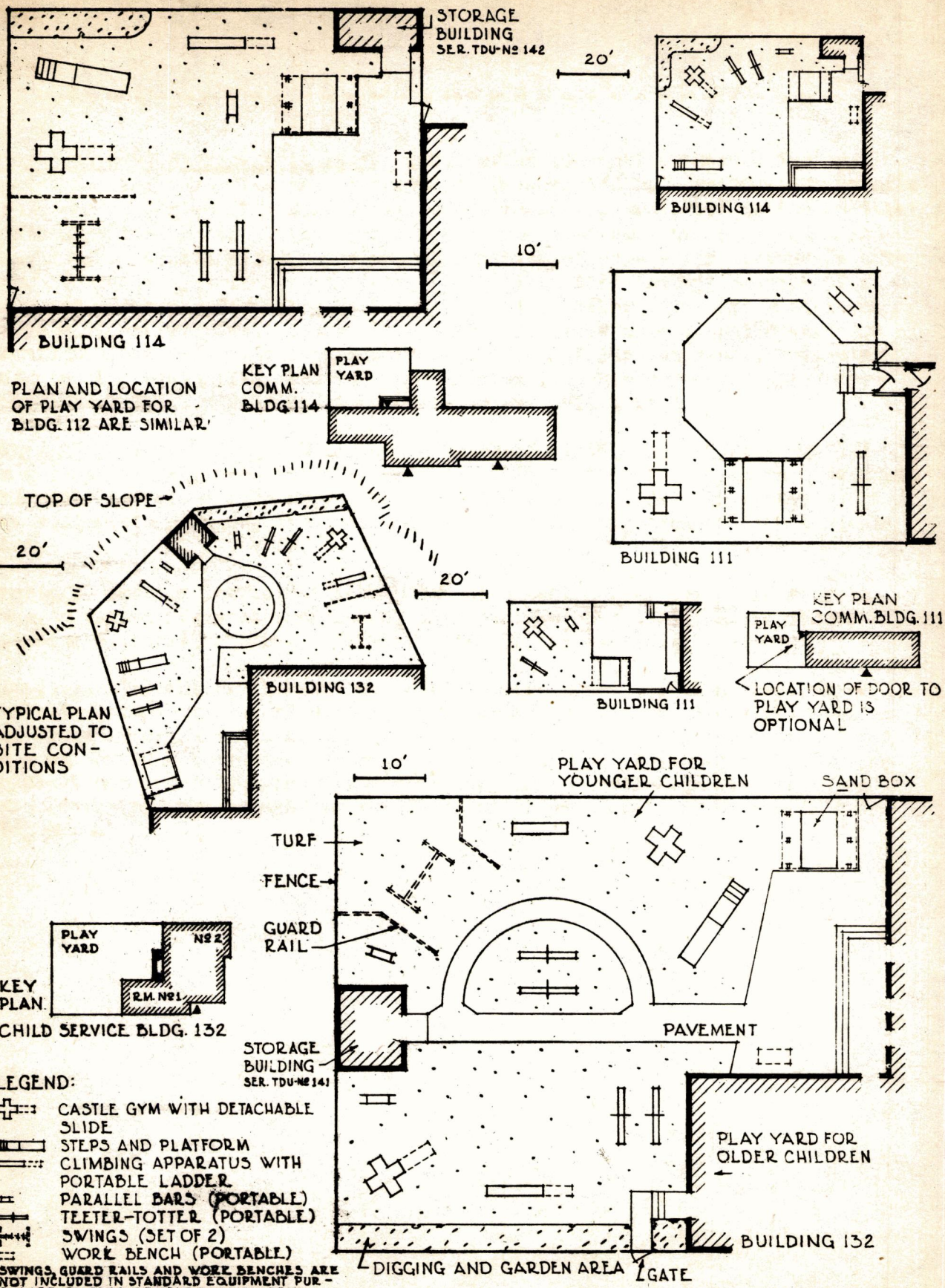
(Cont'd)

Play Equipment Storage Buildings. Information concerning these buildings, needed by play yard planners, is given on Drawing No. 5. Construction details are shown on Series TDU, Drawing 11, dated 11-15-43, available in the regional office. Building No. 141 is used for play yards serving two play rooms and No. 142 for yards serving one room, if satisfactory space for storage of outdoor play equipment is not otherwise available. They are not required for play yards serving Community Building No. 111 or other Community Buildings where child service activities are provided for less than 20 children. The location of storage buildings should be convenient for storage of portable outdoor play equipment. Provide paved access from paved area and play room entrances. Doors should not face north in cold climates.

Digging and Garden Area. Designate a "digging area" about 4' wide and 15' or more in length, preferably along a fence in that part of play yard designed primarily for older children. Where practicable, provide a protected space for children's gardens, as an extension of the digging area or in a separate plot.

Fencing. Provide fencing at least 3'6" high around play yard. If wood is used, a picket fence is preferable, with pickets on the inside, to reduce climbing by small children. Service gates are necessary.

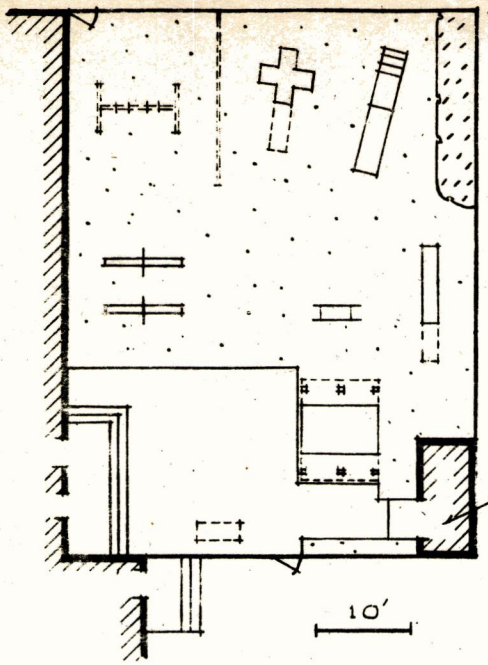
Planting. Present war housing standards permit planting, as a development cost item, for purposes of dust and erosion control only. Since planting in and around play yards is highly desirable - for appearance, for privacy, and as a windbreak - operating agencies and parents' groups should be encouraged to plant and maintain appropriate planting, such as quick-growing vines on yard fences and shrubs outside the fence or at protected points inside the play yard.

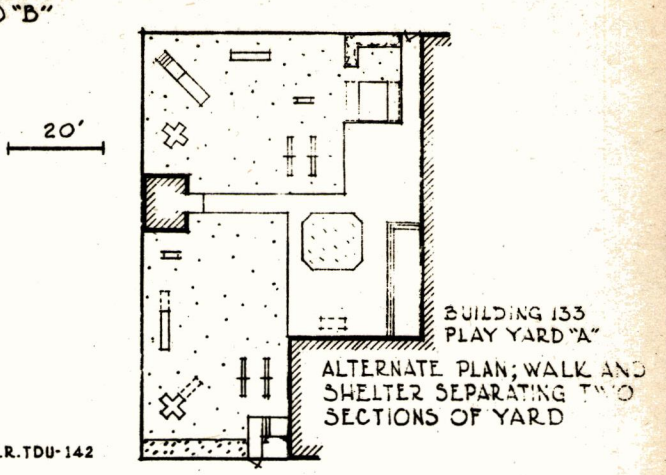


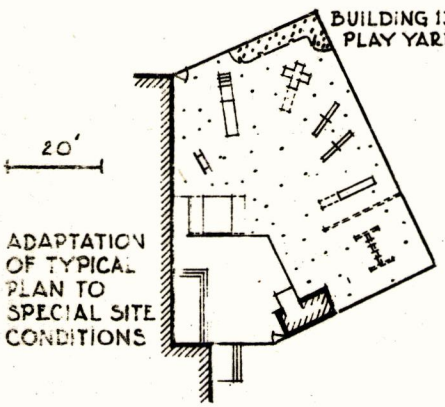

| PREPARED BY FPHA NHA | TYPICAL PLANS FOR CHILD SERVICE PLAY YARDS | SERIES CSPY | DRAWING 1 |
|---|---|---|---|
| | COMMUNITY BLDGS. 111, 112, 114, & CHILD SERVICE BLDG. 132 | 11-11-43 | |

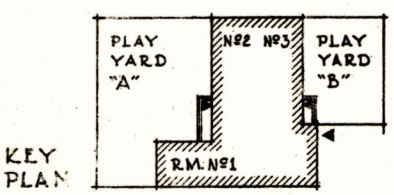
APPROVED Gilbert A. Robbins TECHNICAL DIRECTOR

JOB Nº 244

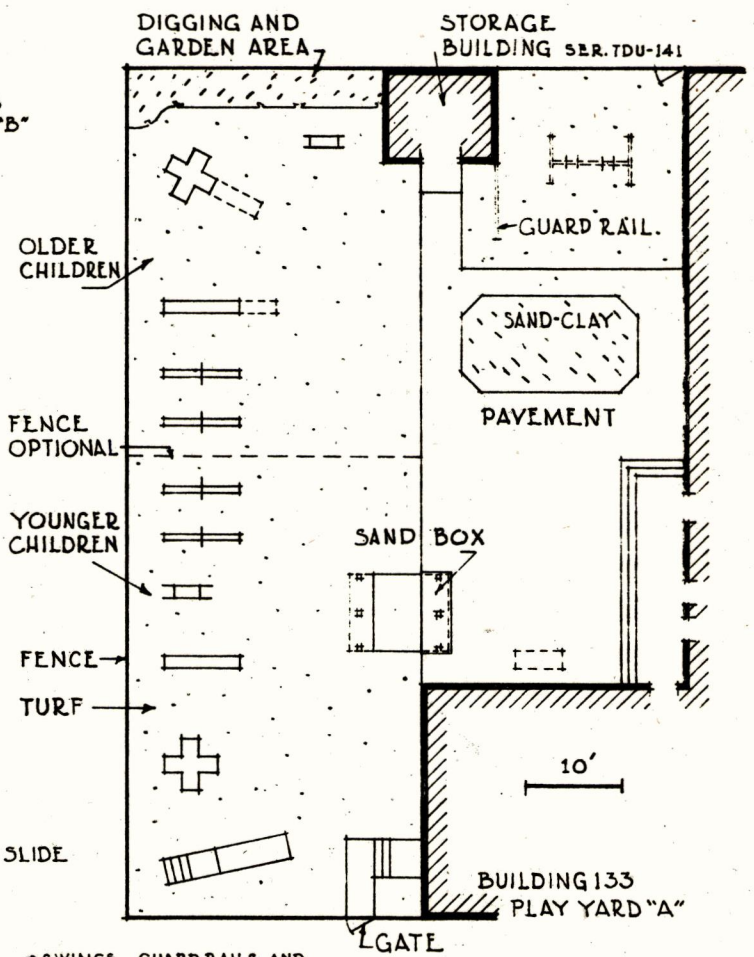



CHILD SERVICE BLDG. 133



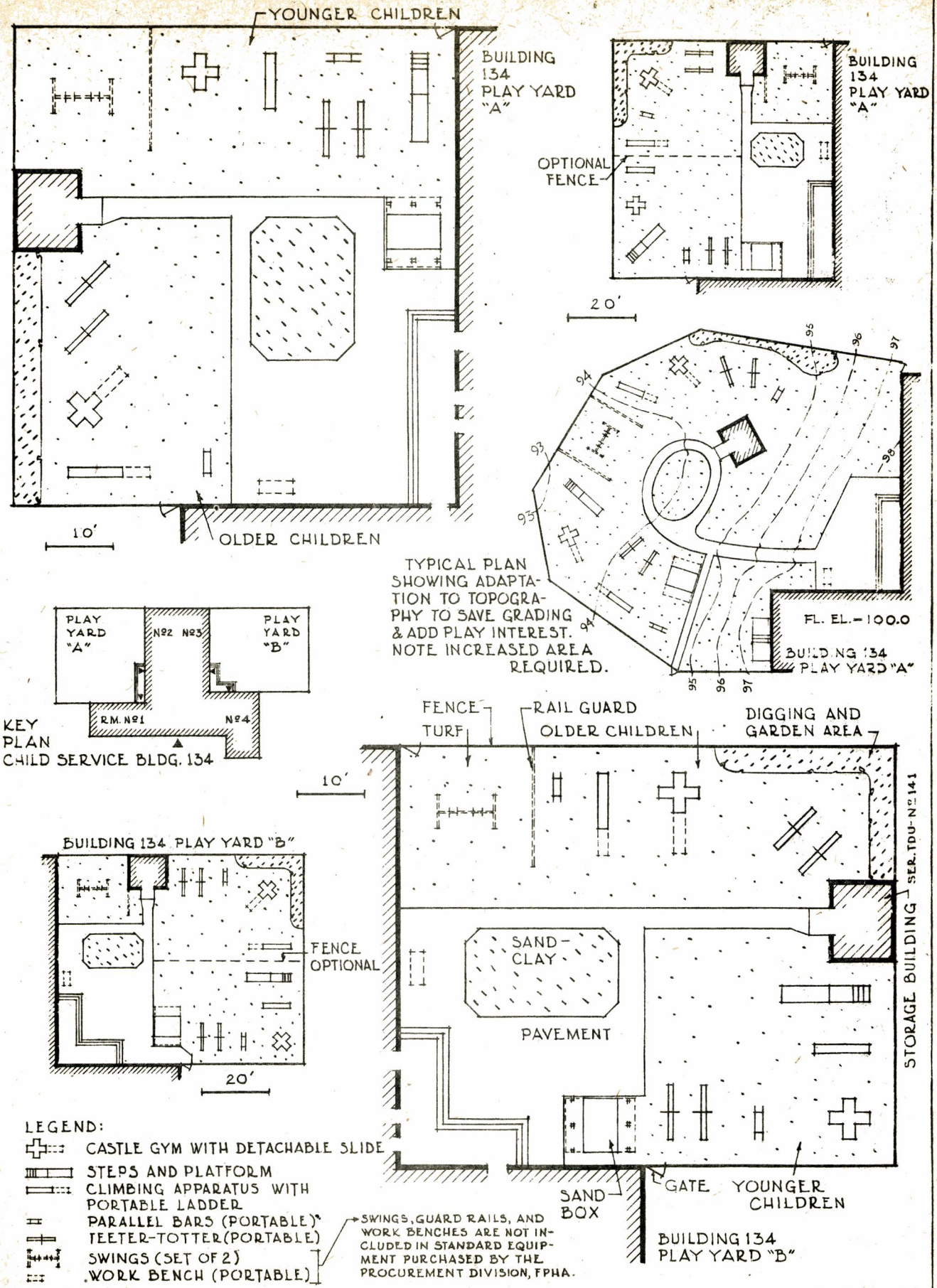

LEGEND:

- CASTLE GYM WITH DETACHABLE SLIDE
- STEPS AND PLATFORM CLIMBING APPARATUS WITH PORTABLE LADDER
- PARALLEL BARS (PORTABLE)
- TEETER-TOTTER (PORTABLE)
- SWINGS (SET OF 2)
- WORK BENCH (PORTABLE)

→ SWINGS, GUARD RAILS, AND WORK BENCHES ARE NOT INCLUDED IN STANDARD EQUIPMENT PURCHASED BY THE PROCUREMENT DIVISION, FPHA.

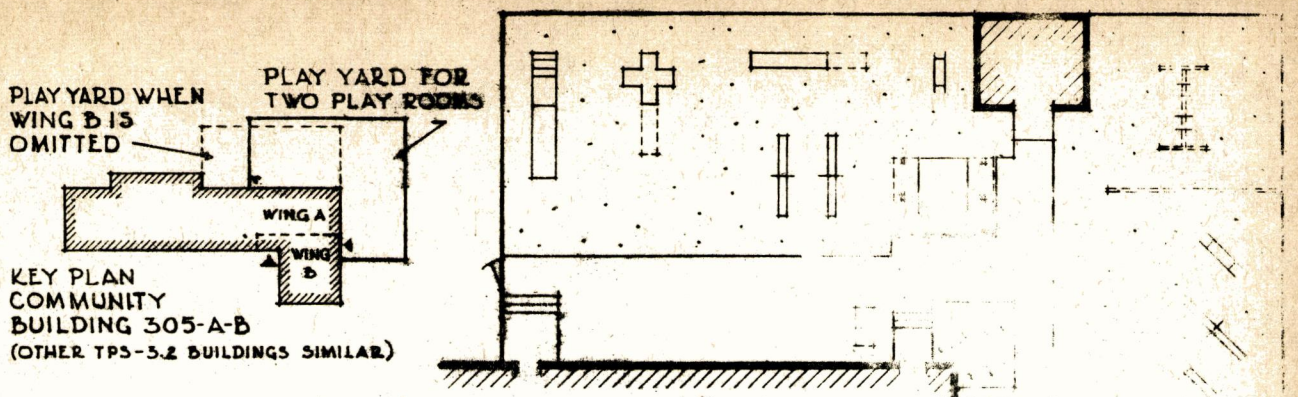
| PREPARED BY FPHA NHA | TYPICAL PLANS FOR CHILD SERVICE PLAY YARDS | SERIES DRAWING CSPY — 2 |
|---|---|---|
| | CHILD SERVICE BUILDING 133 | 11 - 11 - 43 |

APPROVED Gilbert L. Rodier TECHNICAL DIRECTOR JOB № 244

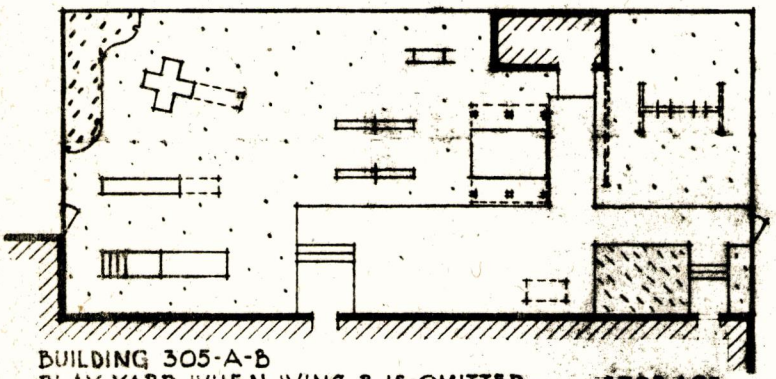



| PREPARED BY FPHA NHA | TYPICAL PLANS FOR CHILD SERVICE PLAY YARDS | SERIES DRAWING CSPY - 3 |
|---|---|---|
| | CHILD SERVICE BUILDING 134 | 11-11-43 |

APPROVED Gilbert A. Rodier TECHNICAL DIRECTOR JOB № 244



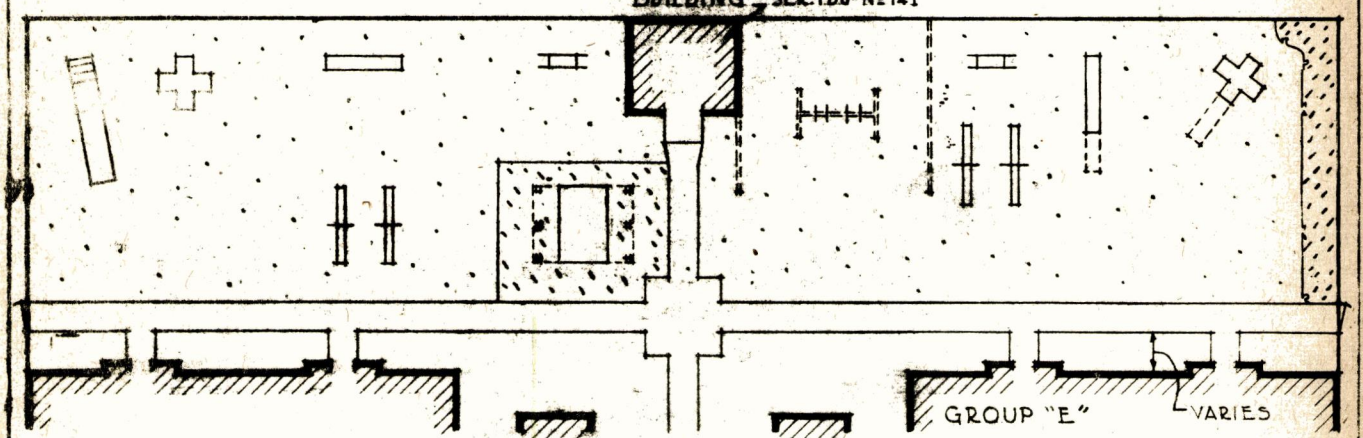

KEY PLAN
COMMUNITY
BUILDING 305-A-B
(OTHER TPS-3.2 BUILDINGS SIMILAR)

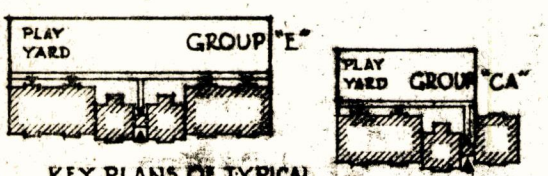



BUILDING 305-A-B
PLAY YARD WHEN WING B IS OMITTED

BUILDING 305-A-B
PLAY YARD FOR
TWO PLAY ROOMS

STORAGE BUILDING SER. TDU-№141




KEY PLANS OF TYPICAL
COMMUNITY TRAILER GROUPS

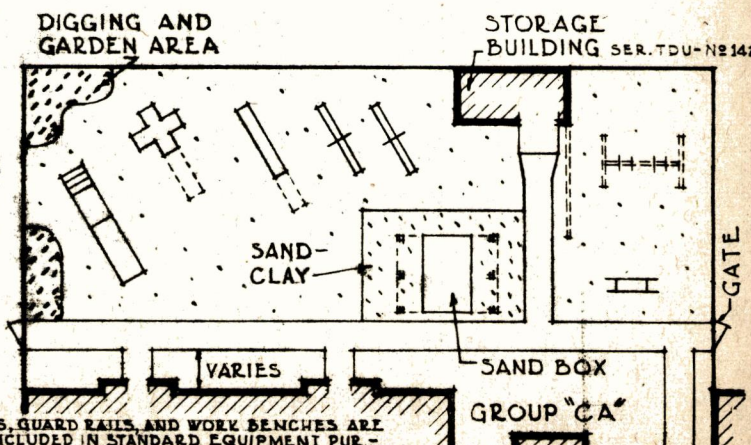
LEGEND:

- CASTLE GYM WITH DETACHABLE SLIDE
- STEPS AND PLATFORM
- CLIMBING APPARATUS WITH PORTABLE LADDER
- PARALLEL BARS (PORTABLE)
- TEETER-TOTTER (PORTABLE)
- SWINGS (SET OF 2)
- WORK BENCH (PORTABLE)

SWINGS, GUARD RAILS, AND WORK BENCHES ARE NOT INCLUDED IN STANDARD EQUIPMENT PURCHASED BY PROCUREMENT DIVISION, FPHA.

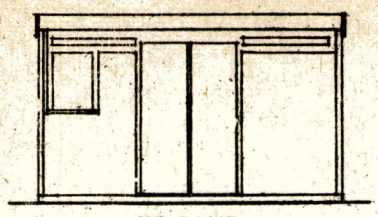
DIGGING AND GARDEN AREA

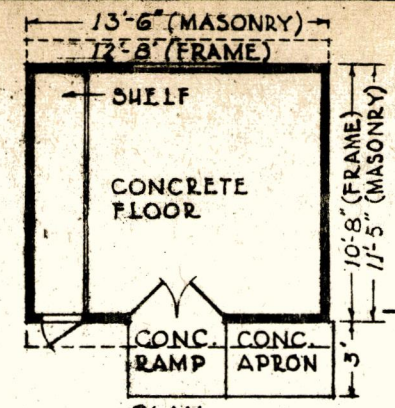
STORAGE BUILDING SER. TDU-№142

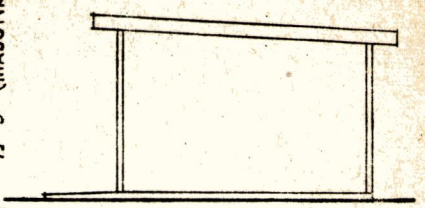



| PREPARED BY FPHA NHA | TYPICAL PLANS FOR CHILD SERVICE PLAY YARDS | SERIES DRAWING CSPY – 4 |
|---|---|---|
| | COMMUNITY TRAILER GROUP (TPS-1.4) AND COMMUNITY BUILDINGS (TPS-3.2) FOR TRAILER PROJECTS | 11 - 11 - 43 |

APPROVED Gilbert C. Rodier TECHNICAL DIRECTOR JOB № 844

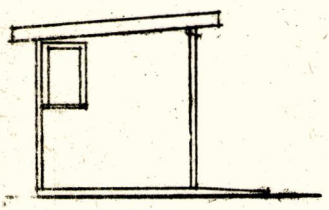


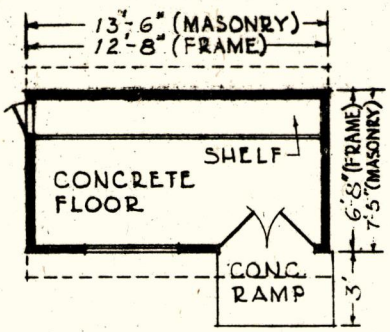



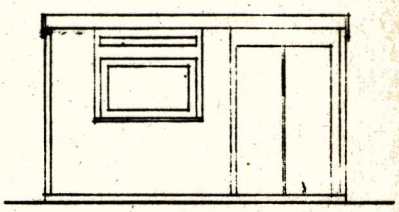




NOTE: THESE PLANS AND ELEVATIONS ARE FOR USE OF PLAY YARD PLANNERS. FOR CONSTRUCTION DETAILS SEE SERIES TDU DRAWING 11 DATED 11-15-43.

PLAN
STORAGE BUILDING Nº 141
FOR USE IN CONNECTION WITH PLAY YARD SERVING TWO PLAY ROOMS.

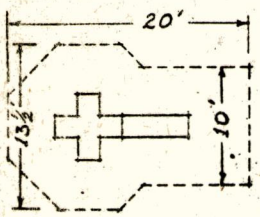


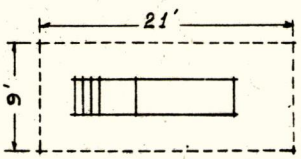




LOCATION OF DOORS — CAN BE REVERSED

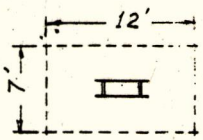
PLAN- STORAGE BLDG. Nº 142
FOR USE IN CONNECTION WITH PLAY YARD SERVING ONE PLAY ROOM



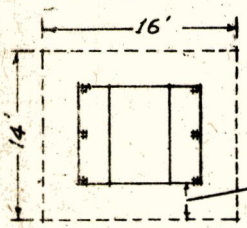

CASTLE GYM WITH PORTABLE LADDER




STEPS AND PLATFORM

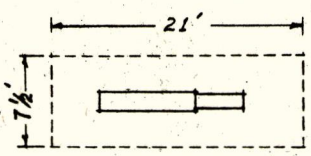



HORIZONTAL BARS (PORTABLE)

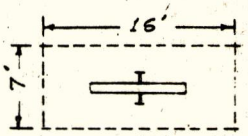



SAND BOX WITH COVERS OPEN.

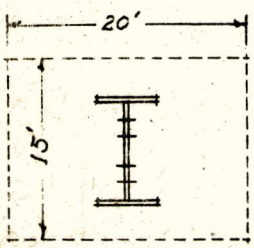
MAY BE 2' AGAINST FENCE OR BUILDING




CLIMBING APPARATUS WITH PORTABLE LADDER




TEETER-TOTTER (PORTABLE)
PAIRS MAY BE PLACED 5' CENTER TO CENTER




SWINGS
(NOT INCLUDED IN STANDARD EQUIPMENT PURCHASED BY THE PROCUREMENT DIVISION, FPHA)

DASH LINES INDICATE STANDARD USE AREAS, TO BE KEPT FREE FROM OBSTRUCTIONS, AROUND EQUIPMENT. LARGER AREAS ARE DESIRABLE. USE AREAS MAY OVERLAP ONE FOOT AT SIDES IF AMPLE SPACE IS AVAILABLE AT ONE END. STANDARD USE AREAS SHOULD NOT BE USED FOR ACCESS TO OTHER EQUIPMENT.

IN YARDS SERVING TWO PLAY ROOMS, LOCATE STEPS AND PLATFORM IN THE AREA INTENDED FOR YOUNGER CHILDREN. BOTH YOUNGER AND OLDER CHILDREN SHOULD HAVE CONVENIENT ACCESS TO SAND BOX, ALSO TO SWINGS WHEN THESE ARE PROVIDED.

FOR FURTHER INFORMATION ON PLANNING, SEE BULLETIN Nº 2, APPENDIX 3, SUPPLEMENT Nº 3, CHILD SERVICE PLAY YARDS.

REVISED 11-16-43

| PREPARED BY FPHA NHA | TYPICAL PLANS FOR CHILD SERVICE PLAY YARDS | SERIES DRAWING CSPY- 5 |
|---|---|---|
| | DIMENSION DATA, PLAY EQUIPMENT STORAGE BUILDING & PLAY EQUIPMENT USE AREAS | 11-11-43 |

APPROVED Gilbert C. Peterson TECHNICAL DIRECTOR JOB Nº 244

# CENTRAL RECREATION AREAS
## for Temporary Family Dwelling Projects

This supplement deals with the location and design of central recreation areas, including the placement of standard playground equipment, for projects comprised of temporary family dwellings. The three diagrammatic plans, prepared for projects of different sizes, illustrate the principal objectives to be attained in planning central recreation areas: close relationship between the community building and the outdoor recreation area; division of the area into small children's playground, apparatus area, court games, and field games, or other special areas; the desirable interrelations of one to another; convenient and safe access to each, and good orientation for games and playground equipment.

For most projects these objectives may be readily achieved if a diagrammatic scheme for the project center, (community buildings and outdoor recreation areas) is sketched and incorporated in early site plan studies before the plan as a whole is frozen. On projects where time does not permit such correlation, the space reserved for outdoor recreation should be developed, insofar as practicable, with the objectives outlined herein, as illustrated by the diagrammatic plans.

A brief check list, of the principal elements to be considered, follows:

Location. The central recreation area should be near the community building, and in some cases may be a factor in its location. Land too low for buildings, or filled land, is usually satisfactory for play. If the site is steep, with no opportunity to form an adequate level area by filling, it will be necessary to use the most favorable land available.

To reduce noise and dust nuisance, it is preferable that the ends of residential buildings be toward the playground. If this proves impractical, rears (service side) or fronts (living room side) may be toward it, preferably the latter, with a boundary treatment of walk and fence. (See accompanying diagrams for suggested location of fencing where ends of building face play area.) Locations adjacent to rear lot lines of residences outside the project should be avoided.

The site should be of the minimum required area, well drained, and approximately level. Slopes in excess of 4% greatly reduce the value of playgrounds. Rough or steep land available in addition to the minimum required area is, however, frequently useful for recreation purposes.

Access to the central recreation area should be provided by public walks will be convenient from all parts of the project; traffic warning signs should be used where the main walks cross vehicular ways. Access to the various play areas should be direct, convenient, and so planned that crossing of active or special play areas will not be necessary.

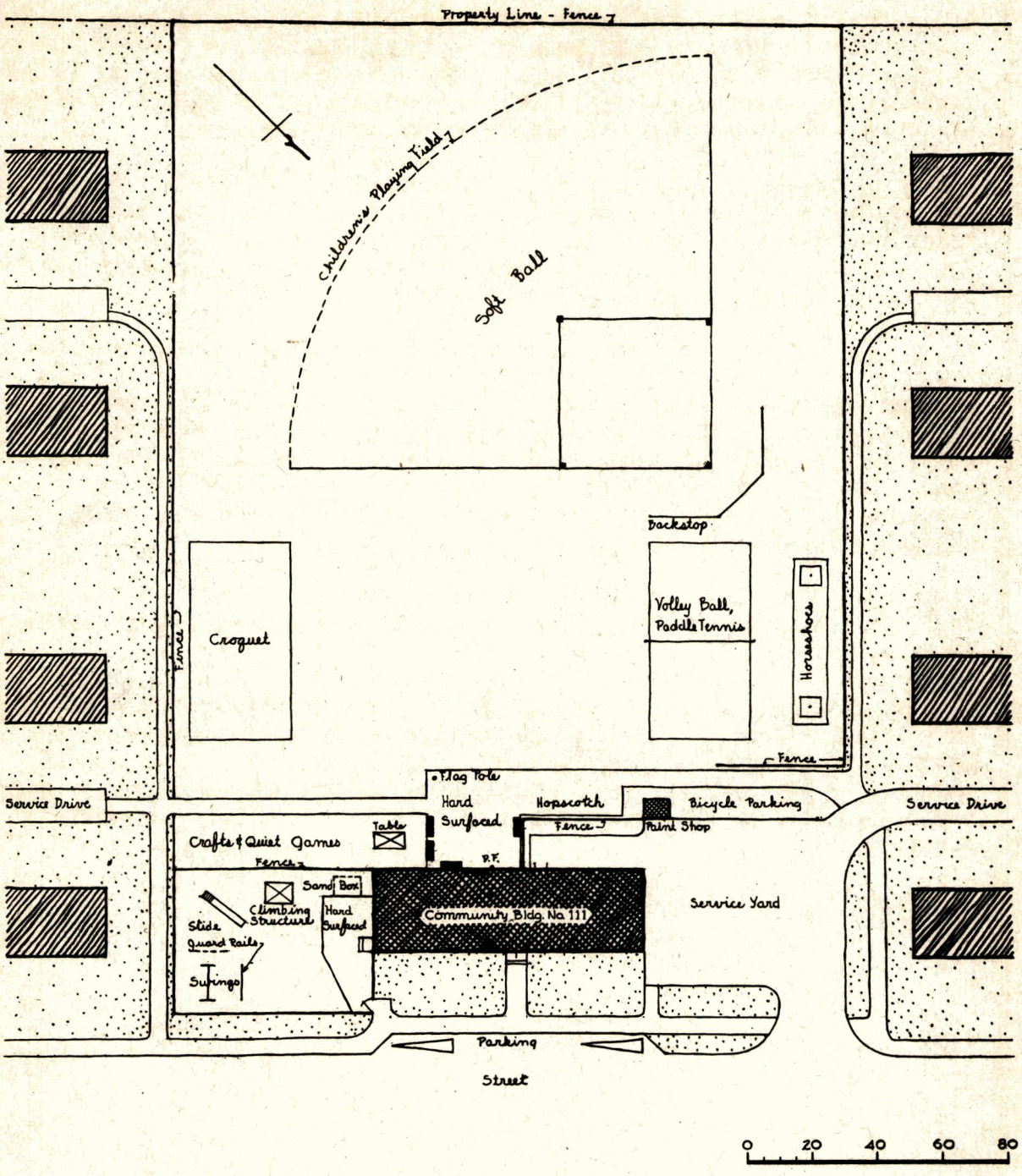
Surfacing should be grass, preferably, or natural soil for large play areas; and natural soil, stabilized soil or gravel (with or without calcium chloride treatment) for the smaller recreational areas. In very small specialized areas, such as those used for wheeled toys, ping-pong and hop-scotch, hard-surfaced areas are recommended.

Playground apparatus should be located along the sides of a recreation area.

Fencing is essential (1) in back of swings, (2) between an area designed especially for the use of smaller children and that intended for the activities of older children, and (3) along all sections of the playground where fixed playground equipment or game courts are located adjacent to walks or tenant yards. Guard rails may be used, where satisfactory and adequate, in lieu of fences.

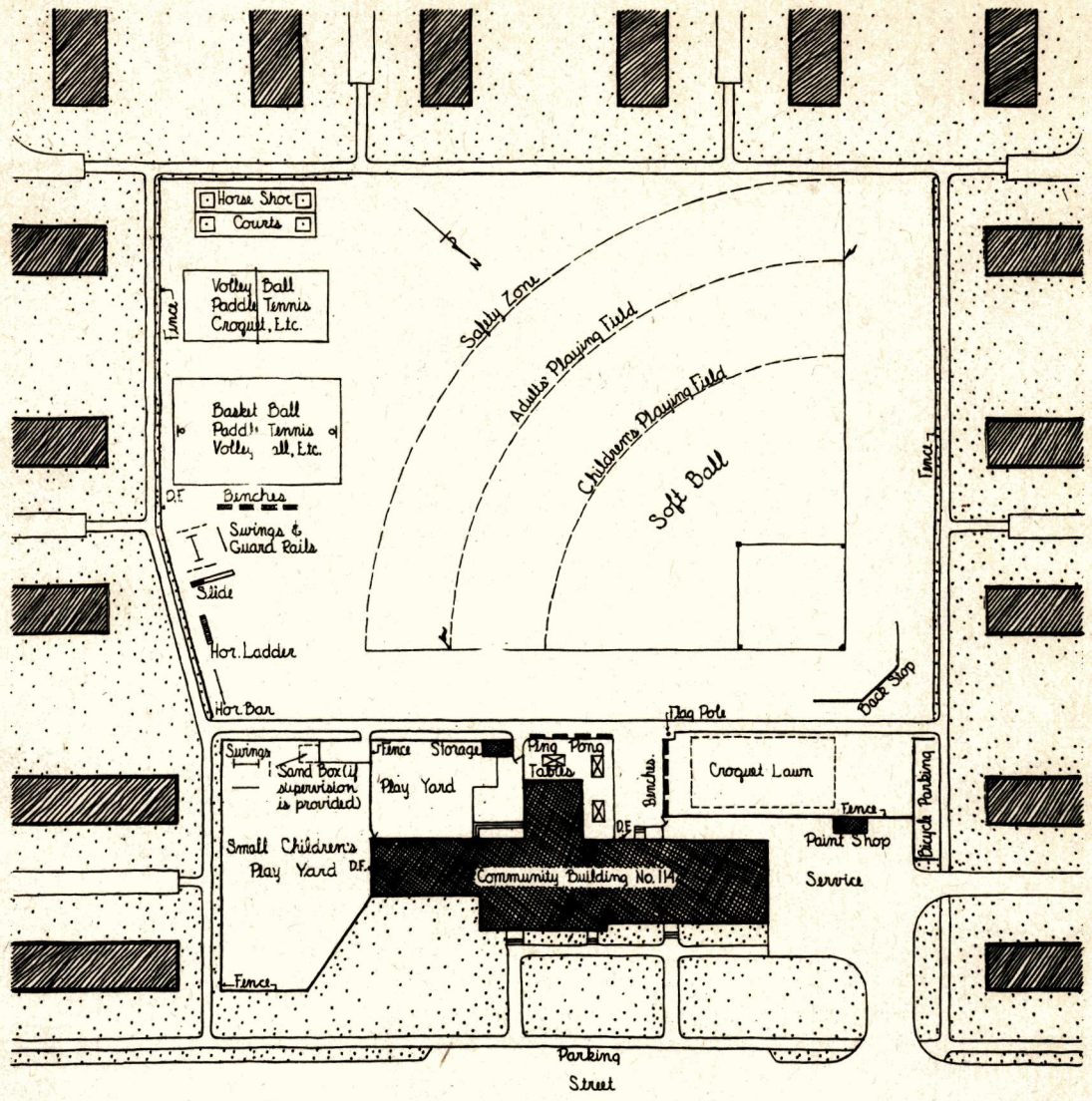
Planting. Current war housing standards permit planting, as a development cost item, only to the extent required to prevent or reduce soil and dust erosion.

Shade. Existing trees, if any, which will provide shade, should be preserved, particularly along the edges or in corners of the recreation area, the location of playground apparatus, game courts, or other features being adjusted as necessary. If no natural shade is available, temporary shade may be provided by the construction of light shelters and quick-growing vines.




50 TO 125 DWELLING UNITS

DIAGRAMMATIC PLAN OF PLAYGROUND
TEMPORARY FAMILY DWELLING PROJECTS
SITE PLANNING SECTION, TECHNICAL DIVISION, FPHA

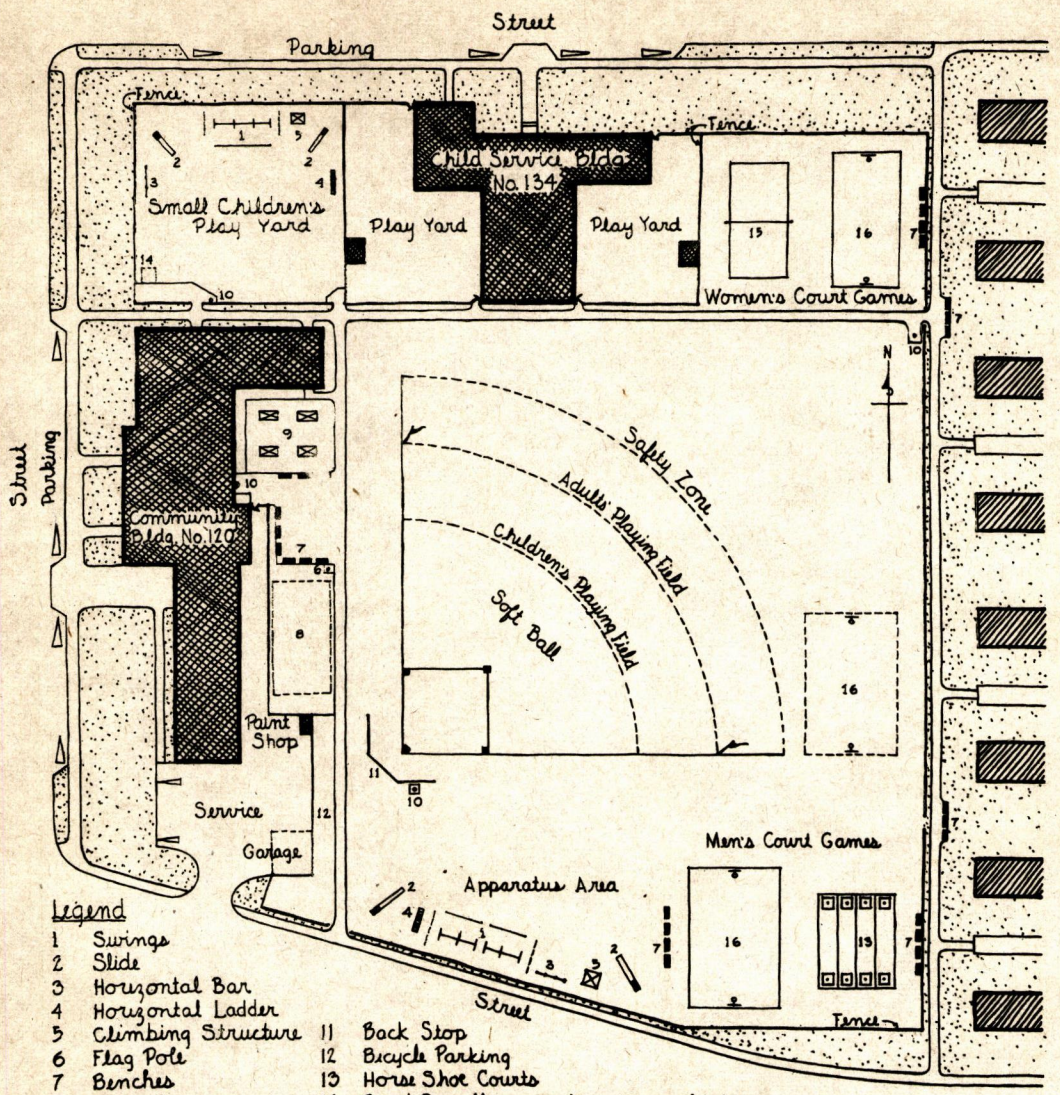



Note

For detail layout of "Play Yard" refer to Supplement No. 3, "Child Service Play Yards", to Appendix No. 3, Bulletin No. 2.

226 TO 325 DWELLING UNITS

DIAGRAMMATIC PLAN OF PLAYGROUND
TEMPORARY FAMILY DWELLING PROJECTS
SITE PLANNING SECTION, TECHNICAL DIVISION, FPHA




Legend

| | | | |
|---|---|---|---|
| 1 | Swings | 11 | Back Stop |
| 2 | Slide | 12 | Bicycle Parking |
| 3 | Horizontal Bar | 13 | Horse Shoe Courts |
| 4 | Horizontal Ladder | 14 | Sand Box: If supervision is provided. |
| 5 | Climbing Structure | 15 | Multiple-use Court: Volley Ball, Paddle Tennis, Croquet, Etc. |
| 6 | Flag Pole | 16 | Multiple-use Court: Basket Ball, Volley Ball, Paddle Tennis, Etc. |
| 7 | Benches | | |
| 8 | Croquet Lawn | | |
| 9 | Ping Pong Tables | | |
| 10 | Drinking Fountain | | |

0 40 80 120 160

Note

For detail layout of "Play Yard" refer to Supplement No. 3, "Child Service Play Yards", to Appendix No. 3, Bulletin No. 2.

876 TO 1200 DWELLING UNITS

DIAGRAMMATIC PLAN OF PLAYGROUND
TEMPORARY FAMILY DWELLING PROJECTS
SITE PLANNING SECTION, TECHNICAL DIVISION, FPHA

# PLANNING PROJECTS OF PORTABLE FAMILY DWELLINGS

## General Requirements.

Whenever there is occasion to provide new family dwellings of the portable type 2/ the regional offices shall use standard plans Series PFD-100 and specifications "Supplement PFD" covering fabrication and erection. These plans and specifications supersede all those previously issued for portable units (Series PSU, PFD, and PFD-2).

These units are planned for the use of oil primarily, for space heating, unless gas is available at the site; if any other fuel is proposed for such units the prior approval of the Central Office Development Branch is required.

Projects comprising such units shall be planned generally in accordance with the requirements for other types of temporary family dwelling units as set forth in Bulletin No. 2, including supplements and appendices. The principal variations from these requirements, together with some data and additional requirements applicable to projects comprised of portable family dwellings, are noted hereinafter.

## Standard Plans and Specifications.

Working drawings for portable family dwellings, 1-, 2- and 3-bedroom units, are available. 3/ The complete set consists of the following drawings, dated 6-30-45:

Sheet A. Diagrammatic Site Plan Studies
(Not to be included in contract drawings)

" 1. Floor and Foundation Plans
" 2. Elevations
" 3. Floor and Roof Panels
" 4. Wall and Partition Panels
" 5. Wall Sections and Details
" 6. Cabinet and Closet Details
" 7. Plumbing and Heating
" 8. Interior Electric Wiring
" 9. Details - Various Alternate Materials
" 10. Laundry Building

1/ This Appendix supersedes Appendix 4, dated 11-22-44.

2/ See Manual 3401:8 which regulates the use of portable units.

3/ A 3-bedroom unit is to be used in exceptional cases only when authorized by the Central Office.

Specifications covering the fabrication and erection, including mechanical and electrical work, of portable family dwellings are titled "Temporary Housing Specifications - Supplement PFD - Portable Family Dwellings", June 30, 1945. This Supplement PFD supersedes and voids "Supplement PSU-Portable Shelter Units - Fabricated," dated August 10, 1943, and "Supplement PSU-2 - Portable Shelter Units - Fabrication," revised December 30, 1943.

If found desirable, because of local conditions, the regional office may separate the fabrication and erection into two contracts. (See Manual of Policy and Procedure, Section 3502:1).

Applicable parts of the Temporary Housing Specification are to be used in preparing project specifications; for Example, Excavating and Grading, Site Improvements, Utilities, Lawns and Planting and Overhead Distribution (Electrical).

Certification and Material Lists. Regional offices will, as heretofore, be required to certify that the requirements of the War Production Board Order P-55-c (Schedules 1 and 2) are complied with (Section 3482:1) and that materials per unit do not exceed those indicated on the FPHA "Materials List for PFD-100" dated July 9, 1945, and in List 122, Bulletin No. 9, dated 7-25-44, for Laundry Building; both of which have been distributed to all regional offices. Where it appears that local conditions warrant additional materials, an application for approval of the increased requirements together with justification therefor must be submitted to the Central Office Priorities Section, for review and approval jointly with the Technical Division.

Site Planning.

Property density (units per acre of land utilized) may range from 8 to 12 units per acre; net density (units per acre of land utilized minus area of unbuildable land and areas allocated to principal playgrounds and land serving community facility buildings) should be from 10 to 16 units per acre. The diagrammatic site plan studies on Sheet A are based on a distribution of 50 percent 1-bedroom units and 50 percent 2-bedroom units.

Minimum spacings between buildings, shall be as follows:

| | |
|---|---|
| Front to front | 40 feet * |
| Front to rear | 35 feet * |
| Rear to rear | 30 feet |
| End to front or rear | 15 feet |
| End to end | 10 feet |

* May be reduced to not less than 30 feet, provided the space on the opposite side is increased proportionately.

Street Design: Project streets and service drives should correlate with the topography and existing streets; should be as few as practicable, simple and direct in pattern, and adapted to serve as routes for major utility lines. Street widths should be held to a minimum consistent with anticipated traffic loads. Street and dwelling locations should be so correlated that the distance from the curb, measured along a paved walk (1) to the dwelling entrance shall not exceed 200 feet and (2) to the location of a fuel oil tank for any dwelling shall not exceed 150 feet. Where practicable, a slight increase in density can be attained by planning principal project streets to serve as fire belts.

Parking space shall be provided for approximately 50 percent of the dwellings, but may be increased if local experience has proved that a higher percentage is justified.

Laundry Building. Laundry buildings shall be provided at the ratio of one laundry building to 50 dwellings. Where site conditions do not permit division of dwelling groups into even groups of 50, one laundry may be placed to serve not more than 55 dwellings. The location of laundries should be so correlated with location of dwellings that the walking distance, from any dwelling measured along a paved walk to either entrance of the laundry, shall not exceed 350 feet.

Outdoor Clothes Drying. Clothes lines should be provided for each dwelling: 30 feet for 1-bedroom units and 40 feet for 2-bedroom units. Additional lines should be provided for each laundry, allowing 6 to 8 feet per dwelling unit.

Oil storage drums may be placed at each dwelling or in groups at convenient intervals, depending on climatic or site conditions, practicable distances from street curbs, and local preferences. When in groups adjacent to a walk, drums should preferably be placed on one side of the walk only. Note: The group plans shown on Sheet A are based on locating a drum at each dwelling (or on the use of gas); modifications would be necessary to accommodate groups of drums.

Fire protection belts shall be provided around groups of not over 100 dwellings and 2 laundry buildings, and around each community building or group of such buildings. These belts shall not be less than 80 feet; and other requirements shall be the same as for other types of temporary family dwellings (see Bulletin No. 2, page 7).

Community Facilities. The standards in Bulletin No. 2, Appendix 3, Section II-B are applicable.

Site Engineering.

Grading. Site grading should be limited generally to shaping roadways, parking areas and roadside ditches, and to other changes essential to site drainage with yard areas conforming to existing grades insofar as practicable. The ground surface under PFD units, which are set on piers, should be graded to eliminate all depressions in which water might collect, and should slope to the exterior.

Storm Sewers. Storm sewers should be planned only when it is impracticable to dispose of the storm drainage by means of swales, earth ditches and culverts.

Streets and Drives. Street and driveway surfacing should generally be of a material costing substantially less than Portland cement concrete, such as waterbound macadam or stabilized soil with bituminous surface treatment.

Walks. The use of concrete should be limited generally to main walkways. Gravel, disintegrated stone, concrete stepping stones, or other less expensive materials, are preferable for secondary and entrance walks.

Water Distribution. Water mains and hydrants for fire protection should be provided to the approximate extent required under Part III of this Bulletin; but the total fire flow provided should not exceed 1,000 GPM.

Sprinkler Heads. Experience in the use of sprinkler heads installed in the "mobile house" units has led to the inclusion of this protective device in the plans and specifications for Series PFD-100. 1/

Selection of Fuels.

A schedule, "Fuel and Equipment Combination", is shown on Series PFD-100, drawings, Sheet No. 7. Each region shall be guided by the existing restrictions in the selection of fuels for the equipment combinations indicated. Fuel oil for water heating, hitherto restricted, is now permitted in this type of dwelling unit by an exception to PDO-13, which has been granted by the Petroleum Administration for War. No exception is needed for the use of kerosene for cooking, or fuel oil for space heating. Wherever practicable and economical, gas and electricity are to be used.

1/ Consideration is being given to having sprinkler heads provided in existing portable dwelling units.