

apartment building standards

minimum requirements for planning, construction
and materials for apartment buildings
upon which loans are made under the
national housing act, 1944

*These Standards
should be examined
by Every Borrower*



CENTRAL MORTGAGE AND HOUSING CORPORATION

OTTAWA, ONTARIO

APARTMENT BUILDING STANDARDS

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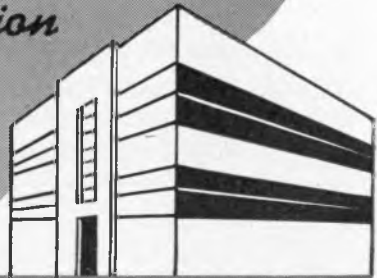
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*Central Mortgage
and Housing Corporation*

**BUILDING STANDARDS
for
APARTMENT BUILDINGS**



NATIONAL HOUSING ACT, 1944

Under Section 10, Sub-section 2 (a) and (b) of The National Housing Act, 1944, the Corporation has prescribed the following space and construction standards for family housing accommodation not included within the standards prescribed for detached, semi-detached, duplex and row housing.

1. GENERAL

- (a) These standards shall apply in all cases except where the provincial or municipal building codes are more exacting. In such cases the provincial or municipal codes shall apply.
- (b) Materials, equipment and construction methods, other than those referred to in these standards, may be employed provided adequate evidence is submitted to indicate that their suitability for the specific purpose is at least equal to those listed in the relevant portions of these standards.
- (c) An apartment building to be constructed in a manner not generally considered conventional, such as a prefabricated or patented type of building system, will be treated as a special case requiring special C.M.H.C. consideration based on the individual merit of the proposal.
- (d) The structural design for an apartment house shall be prepared by a registered architect or engineer or other authority acceptable to C.M.H.C.
- (e) Changes from the approved plans and specifications of the project on which a loan commitment has been made will not be permitted without first obtaining the written approval of C.M.H.C.

- (f) The prospective borrower is advised that construction shall not be proceeded with until plans and specifications have been approved by C.M.H.C.
- (g) The applicant or his contractor shall inform the lending institution of the proposed date of commencement of construction in order that the inspections may be made at the proper time.
- (h) Apartment houses three storeys or less in height may be of ordinary construction if local restrictions do not prohibit. If more than three storeys high, apartment houses shall be of fire-resistive construction. For detailed requirements see under "Fire Protection".

2. DEFINITIONS

- (a) "Air Well" shall mean an open space for the provision of air, unoccupied from the ground to the sky or from an intermediate floor to the sky, located on the same lot with the building which it serves, enclosed on all sides by walls or by walls and the line or lines of abutting areas.
- (b) "Alley" shall mean a narrow serviceway or passageway providing a secondary means of public or private access to abutting property.
- (c) "Apartment house" shall mean a type of multiple dwelling building, together with the land upon which it is situated, comprising more than three family and/or bachelor housing units, having common entrances and other shared facilities and services.
- (d) "Attic" or "roof space" shall mean the space which is between the top floor ceiling and the roof.
- (e) "Bachelor housing unit" shall mean a unit providing therein living, sleeping, eating, food preparation and sanitary facilities for one or two adults. Other essential facilities and services may be shared with other housing units.
- (f) "Basement" shall mean that portion of a building between two floor levels which is partly underground but which has at least one-half of its height from finished floor to finished ceiling above the average level of the ground (finished surface) adjacent to the exterior walls of the building.
- (g) "Cellar" shall mean that portion of a building between two floor levels which is partly underground and which has more than one-half of its height from finished floor to finished ceiling below the average level of the ground (finished surface) adjacent to the exterior walls of the building.
- (h) "Combination room" shall mean a room which is designed to serve appropriately the functions of two or more habitable rooms.

- (i) "Court" shall mean an open space for the provision of light and air, unoccupied from the ground to the sky or from an intermediate floor to the sky, located on the same lot with the building which it serves, enclosed on all sides by walls or by walls and the line or lines of abutting areas.
- (j) "Family housing unit" shall mean a housing unit designed to accommodate one family and including therein required space for living, eating, food preparation, at least two standard bedrooms and sanitary facilities. Other essential facilities and services may be shared with other housing units.
- (k) "Fire resistive construction" shall mean the types of fire resistive construction described in the National Building Code.
- (l) "Habitable room" shall mean a room designed for living, sleeping, eating or food preparation, and includes a den, library, sewing room or enclosed sunroom.
- (m) "The height of a building in feet" shall mean the vertical distance in feet between a horizontal plane through grade level and a horizontal plane through:
 - 1. the highest point of the roof assembly, in the case of a building with a flat roof or a deck roof;
 - 2. the average level of a one-slope roof provided that a roof having a slope of less than 20 degrees with the horizontal shall be considered a flat roof;
 - 3. the average level between eaves and ridge in the case of a pitched, gambrel, mansard, or hipped roof;However, if any main exterior wall which is combustible extends above the roof in the form of a false front, façade, or parapet wall, its highest point shall be considered the highest point of the building.
- (n) "The height of a building in storeys" shall mean the number of storeys contained between its roof and the floor of its first storey.
- (o) "Incombustible materials" shall mean those which neither burn nor give off vapours which burn under the conditions and methods specified in C.S.A. A54-1940.
- (p) "Multiple Housing Project" shall mean a housing project consisting of one or more apartment buildings together with any commercial space and buildings appropriate thereto.
- (q) "Private" when used with respect to a room or other space within a building, shall mean that such room or space is intended for personal use of an individual or family.

- (r) "Public" when used with respect to a room or other space within a building, shall mean that such room or space is intended to be used in common by the occupants of the building.
- (s) "Standard room" shall mean one of the following:
 - 1. A living room
 - 2. A bedroom
 - 3. A dining room
 - 4. A kitchen.
- (t) "Shall", where used, indicates a mandatory feature.
- (u) "Should", where used, indicates a feature which is not mandatory, but desirable.
- (v) "Storey, First" shall mean the storey closest to finished grade having its ceiling more than six feet above finished grade.
- (w) "Wall, Common" shall mean a vertical separation completely dividing a portion of a structure from the remainder of the structure and creating in effect a building which from its roof to its lowest level is separate and complete unto itself for the purpose for which it is designed, intended, or used, such wall being owned by one party but jointly used by two parties one or both of whom is entitled to such use under the provision of a lease.
- (x) "Wall, Party" shall mean a wall used jointly by two parties under easement agreement and erected at or upon a line separating two parcels of land each of which is a separate real estate entity.

3. SITE PLANNING REQUIREMENTS

(a) *Sewers, Water Mains, Roads, Green Areas, etc.*

1. Where the project involves the assembly of land to the extent that services, traffic routes, school and shopping centres become involved, the assembly of the entire project shall be approved by C.M.H.C. before work is commenced on any part of the project.

The site shall be developed to integrate efficiently the apartment buildings, shopping centres, school grounds, streets and their relationship to existing traffic routes and undeveloped land and topographical characteristics; parking compounds and garages, pedestrian walks and green areas, and all the detailed features necessary to each of the main elements noted above, shall be coordinated with the whole.

Storm and sanitary sewer facilities and water supply within the project shall show relationship to existing facilities of which the new services will become a part.

2. Arrangement of Buildings and Facilities: The plot, including buildings and all site improvements shall be harmoniously and efficiently organized in relation to the shape of the plot, topography, the shape, size and position of buildings with full regard to use and appearance. Plot planning shall provide for safe, comfortable, efficient and sanitary use by the occupants under all weather conditions. Services shall be appropriate to the needs of the occupants. Full advantage shall be taken of favorable views and other desirable features.

(b) Land Coverage, Yards and Driveways

1. Land Coverage: A maximum coverage of 50% shall be acceptable for interior lots and 60% shall be the maximum coverage for corner lots. A corner lot shall not exceed 22,000 sq. feet, for purposes of this section. The following exceptions may be considered:

- (i) Modification of the above will be permitted in a residential area, to agree with existing land uses, as established and stabilized by the presence of apartment houses with more than 50% and 60% coverage for interior and corner lots respectively or,
- (ii) Areas which are subject to redevelopment or rebuilding by reason of advanced obsolescence, and where residential use at more than 50% and 60% coverage is justified by reason of market demand for such housing. Such areas shall be in the immediate proximity of excellent facilities for shopping, transportation and other community services. Where the amount of area for high density housing is greater than the demand, only the most favorably located portions shall be considered for modification of the maximum coverage clause.

2. Yards: In determining the width of a yard of any building on a lot which has a street or registered lane, half the width of the street or lane, contiguous to such yard may be considered to be a portion of such lot.

(i) Adjacent to Windows of Habitable Rooms:

Any yard provided for a window or windows lighting or ventilating habitable rooms shall not be less than four feet wide plus two feet for each storey above such window; provided that such width need not exceed 15 feet; except that if the distance of any required window in the wall bounding such yard is in excess of 25 feet from the nearer end of such wall, the yard width shall be increased by not less than 10 per cent of such excess length.

(ii) Adjacent to Other Windows:

Any yard provided for any window or skylight lighting or ventilating any room other than a habitable room, or any hallway, shall not be less than four feet wide plus one foot for each storey above such window or skylight.

3. Driveways: Access to garages and parking compounds shall be by a driveway or driveways, as follows:

(i) Access for three or less cars—

Driveway shall be at least ten feet wide clear of all projections and parking space.

(ii) Access for more than three cars—

A dead-end driveway shall be not less than 18' wide clear of all projections and parking space.

A through driveway which connects two public streets or circles from a public street through the lot and back to the street shall be not less than 10' wide clear of all projections and parking space.

4. PLANS AND SPECIFICATIONS

(a) *Plans, Site*

General: Structures more than 3 storeys high or with a floor area exceeding 5000 square feet shall be designed by a registered architect or engineer. (See also Section 9).

The following information shall be provided:

1. Location map, showing the relation of transportation, shopping centers and other community facilities.
2. Plot plan, showing shape, area and size of the site, distances to street intersections, north point, general topography, location and grouping of buildings and other features as required in Section 3 (Site Planning Requirements).
3. A current, dated, topographic survey of the proposed site shall be prepared and signed by a registered land surveyor. It shall be drawn to a scale sufficiently large to indicate clearly the facts of the legal description of the land. This survey shall also show:
 - (i) Area of property in square feet, and if required, acres.
 - (ii) Sufficient elevations of the property and adjacent streets and sewers shall be provided to describe the character of the site.

- (iii) Easements, deed restrictions or public regulations which may limit the use of the land shall be shown.
- (iv) Buildings or structures on the proposed site or on property adjacent thereto shall be shown with height, size and brief description of each.

(b) Plans, Building and Miscellaneous Structural

1. Drawings of building plans, elevations, sections and details shall be provided sufficient to indicate all materials, methods of construction, equipment and facilities which are intended to form part of a mortgage security. No drawing shall be to a scale which is smaller than $\frac{1}{8}''$ to a foot. Larger scale drawings shall be provided to indicate all detail necessary to understand completely the proposed structure or structures.
2. The following detailed list of drawings should be provided to obtain conformance with Section 4 (b) 1. preceding:
 - (i) Grading and drainage plan (not essential when information is shown on a plot plan).
 - (ii) Basement or foundation plans — minimum scale $\frac{1}{8}''$ equals 1 foot.
 - (iii) General floor plans — minimum scale $\frac{1}{8}''$ equals 1 foot. A plan of each floor is not required if floor plans are typical.
 - (iv) Floor plans of typical housing units — minimum scale $\frac{1}{4}''$ equals 1 foot. These would not be considered essential if the general floor plans are drawn at $\frac{1}{4}''$ scale and include the usual detailed features.
 - (v) Roof plans — minimum scale $\frac{1}{8}''$ equals 1 foot. Roof plans are not essential where pertinent information is shown on other drawings.
 - (vi) General elevations — minimum scale $\frac{1}{8}''$ equals 1 foot.
 - (vii) Typical elevations — minimum scale $\frac{1}{2}''$ equals 1 foot. Such drawings should be furnished when the main elevations have detail which cannot be adequately shown to the smaller scale.
 - (viii) Outline cross sections — minimum scale $\frac{1}{4}''$ equals 1 foot. Such sections should include at least 1 complete cross section of each building type.
 - (ix) Erection of materials, structural parts and equipment, where not clearly shown in the general drawings, shall be detailed at not less than $\frac{1}{2}''$ equals 1 foot.
 - (x) Schedules — door and window schedules, interior finish, etc. — where this information is not provided on the drawings by other means or in the specifications.

- (xi) Mechanical trades — heating, plumbing and electrical work — prepare drawings to the same scale as corresponding plans, if this information is not incorporated on the main working drawings.

(c) *Specifications*

Specifications shall be drawn up to provide a complete description of the construction, materials, methods, finishes and equipment which together with the working drawings shall contain sufficient information for cost estimation, construction and determination of C.M.H.C. acceptability.

5. SPACE STANDARDS

Each housing unit shall provide suitable accommodation and facilities ordinarily considered necessary to a permanent home and shall include storage space. The accommodation and space provided for these purposes shall be not less than the following:

(a) *Type of Unit*

1. A bachelor housing unit shall contain not less than one bathroom and two habitable rooms, at least one of which shall be a bedroom or a combination room which includes bedroom accommodation.
2. A family housing unit shall contain not less than one bathroom and two bedrooms in addition to dining, living accommodation, and kitchen.
3. The number of bachelor units to be included in any project may be limited by C.M.H.C.

(b) *Room Sizes*

1. Standard Room sizes shall not be less than the following:

	Area	Width
Living Room.....	150 sq. ft.	10' 0"
Dining Room.....	80 sq. ft.	8' 0"
Kitchen.....	50 sq. ft.	5' 0"
First Bedroom.....	110 sq. ft.	9' 0"
Additional Bedroom.....	80 sq. ft.	7' 0"

2. Combination Room sizes shall not be less than the following (no other combinations are permissible):

	Area	Width
Living and Dining Room.....	190 sq. ft.	10' 0"
Living and Bedroom.....	200 sq. ft.	10' 0"
Kitchen and Dining Room.....	90 sq. ft.	7' 0"
Living, Dining and Bedroom.....	230 sq. ft.	10' 0"
Living, Dining and Kitchen.....	230 sq. ft.	10' 0"
Living, Dining, Kitchenette, Sleeping Accommodation (Bachelor Housing Units Only) ..	230 sq. ft.	10' 0"

A combination room shall not be divided, other than by a beam in the ceiling and/or cabinets not over 4 feet high.

3. Standard kitchens shall be provided for all family housing units.

Combined Kitchen Dining, kitchen alcoves or kitchenettes may be employed in bachelor housing units.

Such kitchen alcoves shall open off either a living or dining space and shall have a minimum floor area of 40 sq. ft. with a depth not exceeding the width of the open side.

If the area of the opening between the alcove and the adjoining room is less than 80% of the cross-sectional area of the alcove (measured in the plane of the opening), the alcove shall be provided with a window or windows as required for standard habitable rooms.

If the area of the connecting opening is greater than 80% of the cross-sectional area of the alcove (measured in the plane of the opening), the combined area of the alcove and the adjoining room shall be considered as the floor area for determining lighting and ventilation requirements. The distance from the rear of such an alcove to the wall containing the required window or windows shall not exceed 22 feet measured on a line at right angles to the required window or windows. Size of windows and ventilating areas shall be as required for standard habitable rooms.

4. Ceiling heights shall be not less than the following:

Basement floor to underside of beams.....6' 4" clear height
Principal habitable rooms except bedrooms..8' 0" clear height
Bedrooms and secondary habitable rooms...7' 6" clear height
provided that sloping ceilings may be used in such rooms if at least 50 per cent of the required floor area has a clear height of 7' 6". Any part of the floor over which the clear height is less than 4' 6" shall not be considered in computing the minimum floor area.

Bathroom.....7' 0" clear height

(c) *Closets and Storage*

- 1. Bedroom clothes closet area shall be not less than 6 square feet. Clearance between finished walls shall be not less than 24".
- 2. A minimum ceiling height of 6' 0" shall be provided above the required floor area of all clothes closets. Floors of clothes closets over stairways may be raised not more than 8" above the adjoining floor line, provided that at least 50 per cent of the closet floor is parallel to the adjoining floor.

3. A linen closet shall be provided, which should open into a hall. The floor of such a closet may be raised not more than 2' 6" above the adjoining floor level.
4. A coat closet or suitable space for hanging outer garments shall be provided. This space should be located in close proximity to, and accessible from, the front entrance of the housing unit.
5. An additional storage space of at least 150 cubic feet shall be provided for each housing unit. This storage space may be provided in the basement or other interior storage space. Protection from fire or theft shall be provided.

(d) *Vestibules and Halls*

1. The front entrance hall or foyer of each housing unit shall be not less than 3' 6" wide.
2. Any other hall or passageway within a living unit shall have a clear width of not less than 3' 0".
3. For public corridors and halls, see under "Fire Protection", Section 7 (e).

(e) *Privacy*

1. Rooms for toilet facilities shall not open directly into any habitable room. If bachelor housing units do not contain standard bedrooms, this requirement need not apply.
2. Access from bedrooms to bathroom shall be through a connecting hall. Passage through other rooms shall not be permitted except as alternative means of access.
3. Every bathroom or water-closet room shall have a door completely closing the entrance to it.

(f) *Design of Attic Space*

1. If an attic space permits the provision of an habitable room, the stair to the space shall comply with main stair requirements.
2. If an attic space does not permit provision of an habitable room, a stair providing access to such space shall comply with service stair requirements.
3. Joists beneath an attic space shall be designed as floor joists if a stair or fixed ladder provides access to such space.

(g) *Rooms in Cellars and Basements*

1. Cellars: No habitable room shall be constructed in any cellar.
2. Basements: Habitable rooms may be constructed in basements if the wall construction provides a unit heat loss not in excess

of that indicated in Section 39 for walls above grade, and if the exterior walls and the floor completely resist the passage of water.

Not more than 50% of a basement floor area in an apartment house shall be occupied by housing units.

(h) Access to Dwelling Units

Access to each dwelling unit shall be provided without the necessity of passage through any other dwelling unit.

(i) Public Bath Rooms

Public wash rooms or water-closet rooms in apartment buildings shall be directly accessible from public hallways.

6. LIGHT AND VENTILATION

(a) Rooms

- 1. Every habitable room shall be provided with one or more windows opening directly on a street, yard or court.
- 2. Every bathroom or water closet room shall be provided with one or more windows opening on a street, yard, court or air well, or with one or more skylights or with artificial lighting and a system of mechanical ventilation.

(b) Windows and Skylights, Areas of

- 1. The aggregate unobstructed glass area of any required window or windows shall be not less than 1/10 of the floor area of the room served by them, provided:
 - (i) A window in a bathroom or water closet room shall be not less than 4 square feet.
 - (ii) The glass area of a glazed door opening directly on a street, yard or court may be considered as a window.
 - (iii) Any other type of glass including glass block may be used in place of clear glass provided that the amount of light transmitted by any such installation shall not be less than the light transmitted by the required area of clear glass.
- 2. Skylights shall have an unobstructed glass area at least as great as that required for the window or windows replaced.

(c) Windows and Skylights, Openable Areas

- 1. Required windows shall open so that the aggregate open space will not be less than 1/20 of the floor area of the room served.
- 2. Skylights shall be equipped with moveable sashes with a net openable area not less than that required for the window or windows replaced. Equivalent means of ventilation acceptable to C.M.H.C. may be provided.

3. Storm sash provided for required windows or skylights shall be installed so that not less than one such storm sash per room shall be openable from within. The total openable area shall not be less than $\frac{1}{8}$ of the required glass area.

(d) *Courts*

1. Inner Courts. — Any inner court provided for a window or windows lighting and ventilating habitable rooms shall be so constructed that its least horizontal dimension will not be less than its height.

Any inner court provided for any window or skylight lighting and ventilating any room other than a habitable room shall be so constructed that its least horizontal dimension will not be less than one-half its height.

2. Outer Courts. — Any outer court provided for a window or windows lighting and ventilating habitable rooms shall be so constructed that its width will not be less than its length.

Any outer court provided for any window or skylight lighting and ventilating any room other than a habitable room shall be so constructed that its length will not be less than one-third its height; provided that its width need not exceed its length.

Every outer court shall open on a street, or on a yard conforming to the requirements of Section 3 (b) 2.

(e) *Air Wells*

1. Air wells may be employed to vent rooms other than habitable rooms.
2. The cross-sectional area of any air well shall not be less than 100 square feet. When an air well is in excess of two storeys in height this area shall be increased throughout by ten per cent for each storey above the second. Any air well shall be ventilated at its lowest level by a free air inlet and at its extreme height by a free air outlet, each of which shall have a minimum free cross-sectional area equivalent to ten per cent of the minimum cross-sectional area of the well, and shall be installed in such a manner as to ensure a free and continuous current of air.
3. Whenever an air well meets the requirements of an inner court in respect of size it may be used as such.

(f) *Air, Mechanical Ventilation*

1. Air for ventilating purposes shall be drawn from the exterior of the building and the intake shall be located so as to avoid contamination in concentrations greater than normal for exterior air of the locality in which the building is situated.

2. Any ventilation system serving a bathroom, kitchen alcove or water closet room shall be of the exhaust type.
3. No air from any housing unit shall be circulated directly or indirectly to any other housing unit or public hallway.

7. FIRE PROTECTION

General: An apartment house which is greater in height than 45 feet or 3 storeys or which has a greater first floor area than 5,000 square feet shall conform to the requirements of the National Building Code in respect to fire protection.

(a) Exterior Wall Exposure

1. No exterior wall or part thereof with a fire resistive rating of less than 2 hours shall be located within 3 feet of any lot line.
2. When exterior walls or part thereof are within 3' of any lot line, the roof covering of such a building shall be fire resistive. (See Section 45 (c).)
3. Every opening in any exterior wall or part thereof which is within 6 feet of any lot line shall be protected by a fire-resistive closure providing that the distance from the lot line may be reduced by 1/3 when the building does not exceed one storey.

(b) Building Heights

1. Apartment buildings of wood stud frame construction shall not exceed two storeys in height. Apartment buildings of plank (wood) frame construction, with walls at least 3" thick exclusive of sheathing, shall not exceed 3 storeys in height.
2. Apartment houses of exterior masonry bearing walls and wood frame construction shall not exceed 45 feet or 3 storeys in height.
3. Apartment houses which exceed 45 feet or 3 storeys in height shall be of fire-resistive construction as required in the National Building Code.

(c) Building Areas

1. Apartment houses, the first floor areas of which do not exceed 5,000 square feet, may be constructed of wood frame or masonry and wood frame; where the area exceeds 5,000 square feet, the degree of fire resistivity shall be as required by the National Building Code.
2. The permissible areas stated in 7 (c) 1. may be increased under the following conditions:
 - (i) Area limitations shall not apply if an apartment house is subdivided into sections not exceeding 5,000 square feet

by a wall of not less than 3 hour fire-resistive construction extending from footings to 2 feet above adjacent roof areas.

Such a wall shall not be pierced by any openings.

- (ii) Maximum area may be increased by 30 percent if the building fronts on 2 streets; or area may be increased by 50 percent if building fronts on three streets; or area may be doubled if an approved automatic sprinkler system is installed in all usable space.

(d) *Exits, Stairs, Passageways and Fire Escapes*

General: Exits shall be provided for every building, all floor areas and balconies. Exits — public stairs, public passageways, public entrances, service stairs or combined interior service and fire escape stairs — shall comply with the requirements of this Section.

1. An exit shall refer to any of the following which occur in the course of public travel from an entrance to a housing unit or other usable space, to the street or other safe area of refuge from fire:

- Exterior and interior ramps and passageways
- Exterior and interior stairways (public)
- Exterior fire escapes
- Doorways

- (i) Number of Exits:

At least two exits shall be provided for all housing units within an apartment house.

- (ii) Exit Travel:

The distance of travel from an entrance to a housing unit to the exit contiguous to a safe area of refuge shall be not greater than 75 ft.

- (iii) Exit Distribution:

Exits shall be placed as remote from each other as practicable.

- (iv) Exit Width:

For passage of not more than 50 persons, no exit width shall be less than 3' 0" at any point. For passage of more than 50 persons see Section 34 (b) 1. (iii).

2. The minimum, unobstructed width of any part of an exterior fire escape shall be not less than 22".

Where a doorway is closed by two or more doors, each door (or leaf) shall have a minimum width of 28".

3. Space under public stairs shall be left entirely open or shall be entirely closed without possible means of access.

4. Stairs shall be designed and constructed in compliance with Section 34.

5. *Access to Roofs*

- (i) In all buildings or parts thereof more than 3 storeys or 45 feet high which have roofs which do not slope more than 1 in 4, at least one interior stairway shall be continued to and through the roof by means of a bulkhead.
- (ii) Apartment buildings more than 25 feet or two storeys high, but not exceeding 3 storeys or 45 feet high shall be provided with a scuttle not less than 2 feet by 3 feet which will give access to the roofs of such apartment houses. The scuttles shall be equipped with fixed or hinged ladders leading to the roof exterior from the storey immediately below. At least one stairway or scuttle shall be provided for every 5,000 square feet of horizontal roof projection or fraction thereof.

(e) *Fire Resistance of Exit Enclosures*

- 1. The enclosure of any exit part as described under Section 7 (d) shall mean any part surrounding the exit or intended to divide the exit in two or more parts, or separate any portion of the exit from other space. For example, floors, ceilings, walls, partitions or doors and their frames.
- 2. Any part of an enclosure shall provide a fire resistive rating of not less than one hour.
- 3. No part in the construction of an enclosing door and frame shall have solid wood which is less than $1\frac{3}{4}$ " in thickness. Doors shall fit snugly, and shall provide minimum clearance with the finished floor, threshold or sill.

(f) *Separations Between Housing Units*

Walls and floors separating housing units from each other within an apartment house shall have a fire resistive rating of not less than one hour.

(g) *Support of Fire-Resistive Construction*

Fire-resistive construction shall be supported by construction having a resistance at least equal to that of the construction supported.

(h) *Attic Space*

Attic space shall not be usable for storage or workshop unless it is completely enclosed by fire-resistive construction equal to not less than one hour rating and all openings closed by $1\frac{3}{4}$ " solid slab door with self-closing device.

(i) *Garages*

Any part of a garage attached to or forming part of any apartment house shall have a fire resistive rating not less than that of the portion of the apartment house to which it is a part, and in no case shall the fire resistive rating be less than one hour.

(j) *Boiler Rooms, Incinerators*

1. Any boiler, furnace or incinerator shall be completely separated from residential occupancy by construction having a fire resistive rating of at least one hour with all openings to the building interior protected by self-closing fire doors.
2. Refuse chutes feeding directly into the combustion chamber of an incinerator, if they connect two or more storeys of a building, shall be enclosed in walls having a fire resistive rating of not less than two hours. All openings to such chutes shall be fitted with fire resistive metal doors in metal frames.

(k) *The following constructions will be considered to have one hour fire resistive rating:*

1. at least 3'' reinforced concrete;
2. double deck flooring above the joists either $\frac{3}{4}$ '' tongue and groove Shiplap or $\frac{5}{8}$ '' Plywood, with asbestos paper weighing at least 14 lbs. per 100 square feet between the decks;
3. gypsum plaster not leaner than 1:2 on perforated gypsum lath, with all joints covered with a 3'' strip of expanded metal lath;
4. other construction listed in Table I, Section 4.10 of the National Building Code which will provide a fire resistive rating of one hour.

8. SOUND INSULATION

Walls and floors separating housing units within an apartment house from each other and from all public space should provide for sound transmission loss of not less than 50 decibels.

The following constructions may be assumed to have a sound transmission loss of 50 decibels or more:

(a) *Walls*

1. Brick — Solid brick, 8 inches thick, plastered both sides with brown coat gypsum plaster, smooth white finish.

Brick on edge ($2\frac{1}{2}$ in.), plastered direct on one side, plastered on $\frac{1}{2}$ -inch fibre building board secured to 2- by 2-inch wood furring strips on other side.

Brick on edge ($2\frac{1}{2}$ in.), plastered both sides on $\frac{1}{2}$ -inch fibre building board nailed to 1- by 2-inch wood furring strips.

2. Hollow Clay Tile — One cell in wall thickness, plastered both sides on metal lath or $\frac{1}{2}$ -inch fibre building board secured to 1- by 2-inch wood furring strips.

Two cells in wall thickness, plastered direct on one side, plastered on $\frac{1}{2}$ -inch fibre building board secured to wood furring strips on the other side.

3. Concrete Blocks — 8-inch cinder or concrete blocks plastered both sides.
4. Plain Concrete — 7 inches or more in thickness plastered both sides.
5. Gypsum Blocks — Two panels of 2-inch solid or 3-inch hollow gypsum block with $1\frac{1}{2}$ inches air space between panels, not tied by bridging, and plastered on each side.
6. Stud Walls or Partitions — Wood studs, two layers of $\frac{1}{2}$ -inch fibre building board applied to both sides, plastered both sides. Staggered wood studs, no bridging, $\frac{1}{2}$ -inch fibre building board applied to both sides, plastered both sides.

(b) Floors

1. Wood Joist Floors — Floating floor consisting of $\frac{3}{8}$ -inch finished flooring, sub-flooring and nailing strips; $\frac{1}{2}$ " fibre building board; rough flooring; wood joists, plaster ceiling on gypsum or metal lath.

$\frac{3}{8}$ -inch finished flooring; sub-flooring; wood joists; ceiling separately supported, ends of ceiling and floor joists being nailed to a common support; $\frac{1}{2}$ -inch fibre building board; plaster.

2. Concrete — 4-inch reinforced concrete slab; furring strips; $\frac{1}{2}$ -inch fibre building board; brown coat plaster, smooth white finish.

$\frac{3}{8}$ -inch finished flooring, sub-flooring and nailing strips; $\frac{1}{2}$ -inch fibre building board; 4-inch concrete slab; plaster.

3. Steel Joist Floors — $\frac{1}{8}$ -inch linoleum; $2\frac{1}{2}$ inches concrete on metal lath; open web steel joists; metal lath; plaster.

Note: Except where less is specified, the term "plaster" means scratch and brown coats of gypsum or lime plaster, smooth white finish.

The specified insulation cannot be obtained if air leaks exist in any layer of the construction.

9. STRUCTURES, PROFESSIONAL SERVICES

- (a) Structures may be erected by the use of bearing walls, of skeleton and trussed framework, or a combination of these methods. Their employment shall satisfy the requirements of these Standards in all respects and shall be in accordance with sound and accepted engineering practice.
- (b) All structural members and loaded parts should be designed by a registered engineer or architect. All structures or portions of structures requiring to be designed by a registered engineer or architect shall be supervised during construction by such an authority or by a person responsible to such an authority.
- (c) Professional engineering services shall be employed in the design of:
 - 1. Any structure more than three storeys above basement or cellar.
 - 2. Any reinforced concrete beam other than a lintel less than 7' 0" in unsupported length.
 - 3. Any truss.
 - 4. Any apartment building structure the exterior walls of which are not bearing walls.
- (d) C.M.H.C. may request a loan applicant to retain the services of a registered engineer or architect, at the expense of the applicant, under the following circumstances:
 - 1. If the drawings and specifications for any apartment building do not indicate clearly the sizes of the structural members and the method of their attachment to contiguous structural parts.
 - 2. If the size of any structural member or a method of attachment appears inadequate.
 - 3. If the method of loading or construction is not met in common practice. C.M.H.C. may determine, in case of question, what constitutes common practice.

10. EXCAVATIONS

- (a) *General Instructions*
 - 1. Excavation shall extend to solid ground. The depth of excavation, except where solid rock is encountered, shall be below normal frost penetration line.
 - 2. Bottom of footing trenches shall be level. Where steps are necessary the vertical step shall not exceed the horizontal distance between steps. Horizontal distance between steps shall be not less than 2 feet.

- 3. Earth back filling shall be placed against foundation walls in not more than 1' 0" layers well tamped and compacted. Damage to waterproofing or damp-proofing caused by the placing of the back filling shall be repaired before the balance of the back filling is placed. Debris or frozen earth shall not be used as back filling.
- 4. Earth in the bottom of trenches shall be protected against freezing. Frozen soil shall not be acceptable as bearing, and must be excavated to unweathered soil.

(b) Soil Classification

The classification of foundation bearing materials and determination of allowable bearing pressure shall be as approved by local municipal authorities where a qualified engineering staff is in charge. Where a qualified municipal engineer is not available, C.M.H.C. may request subsurface exploration at the expense of the applicant to determine if the proposed footings, as designed, might be expected to function safely.

11. UNEXCAVATED AREAS

- (a)* The top soil and all vegetable matter in an unexcavated area shall be removed. The ground level shall be at least 2 feet below the bottom of the floor joists and beams.
- (b)* When piping, duct work, etc. are located in unexcavated areas, an opening of not less than 2' x 2' shall be provided for access.
- (c)* Unexcavated areas shall be vented through the foundation walls with at least two vents of one square foot each, per five hundred square feet of unexcavated area. These vents shall be located in opposite walls. Non-corrodible screening of not over $\frac{1}{4}$ " mesh shall be installed in each vent opening.

12. FOOTINGS

- (a)* Footings shall be of poured concrete of sufficient width to ensure safe distribution of the loads. The width shall be determined by relationship of the load to the bearing capacity of the soil upon which it rests. Thickness of the footings shall not be less than the projection of the footing beyond the face of the foundation wall or other supported member and shall be not less than 6".
- (b)* Footings shall not be placed on filled ground or backfill unless such ground has been consolidated and the footings specially designed to suit these conditions.

- (c) Where the bearing capacity of the soil is sufficient to support load-
ing without footings or where bearing is on solid rock, footings
may be omitted.
- (d) Owing to the unusual soil condition in the Red River Valley area,
the design of all footings must be approved by a recognized, com-
petent authority. Actual construction shall be in strict accordance
to the approved design.
- (e) A qualified engineer or architect shall design footings for any struc-
ture where vertical loads are transmitted through more than three
storeys above the foundation wall or where unusual conditions
occur requiring stepped, offset or cantilevered footings or piling.

13. FOUNDATION WALLS

(a) *General*

1. Exterior foundation walls shall be of poured concrete or masonry.
In no case shall the thickness of exterior foundation walls be
less than those prescribed in sub-sections (d) and (e) of this
Section. Also, in no case shall the foundation wall thickness be
less than that of the wall above, except that foundation walls
supporting buildings of brick veneer and wood frame not more
than one storey high may be 8" thick provided wall construc-
tion does not project more than $\frac{3}{4}$ " beyond exterior face of
foundation walls, and wood studs are not larger than 2" x 4".
 - (i) Owing to the unusual soil condition in the Red River
Valley area, the design of all foundations must be approved
by a recognized, competent authority. Actual construction
must be in strict accordance to the approved design.
2. Foundation walls supporting wood frame construction shall
extend not less than 12" above the adjoining outside finish
grade, except where the exterior wall finish is masonry veneer.
3. Walls supporting masonry veneered wood frame construction
shall be extended so that the wood construction is not less than
6 inches above the finish grade line.
4. Lateral Stability
 - (i) Lateral stability shall be provided for all foundation walls
in accordance with the requirements of Section 21 (a).
 - (ii) Where required by the character of the soil or other local
conditions, all foundation walls below grade and all re-
taining walls shall be further strengthened with buttresses
or additional wall thickness to resist lateral soil or hydro-
static pressure.

5. All masonry chimneys shall have foundations of concrete or masonry which shall extend down to the level of the foundation wall footing surrounding the area where the chimney is located.

(b) Pilasters

- (i) Concrete Walls. Pilasters shall be provided where beams frame into 8 inch poured concrete walls. Minimum size of pilaster, 2" x 12" poured integrally with wall.
- (ii) Masonry Walls. Pilasters shall be provided where beams whose clear span exceeds 12 feet, frame into 10 inch masonry walls of buildings two or more storeys in height: Minimum size, 4" x 12" built integrally with wall.

(c) Beam Pockets

Provide 4-inch end bearing for beam. Provide not less than $\frac{1}{2}$ " air space between pocket and the sides and end of wooden beam.

(d) Foundation Walls of Concrete Blocks or Stone

1. Foundation walls of concrete blocks when no more than 7' below grade and when total height of foundation wall and wall supported does not exceed 30 ft. at eaves and 35' at ridge in gable ends shall be not less than 10" thick. When three storeys are carried, the wall thickness shall be 12" minimum. When four storeys are carried, thickness shall be not less than 16".
2. Mortar for concrete block walls shall not be less than 1 part cement to 3 parts sand by volume. Lime equal to 15 per cent of the cement by volume may be added. The block shall be laid up with full width mortar joints on all webs and cross joints grouted solid.
3. Walls shall be parged on the exterior face with cement mortar at least $\frac{1}{2}$ " thick, then waterproofed.
4. In all concrete block bearing walls, the course directly carrying the floor joists or other framing members shall be a course of solid concrete blocks or 5" of poured concrete or solid masonry, such as two courses of brickwork full thickness of wall. If poured concrete is used it shall be reinforced with wire mesh (expanded metal lath not acceptable).
5. Blocks shall be produced by a manufacturer who regularly submits his blocks for testing and inspection to an approved testing and inspection authority. The manufacturer shall furnish details and results of such tests to C.M.H.C. on demand. Tests shall be conducted in accordance with the procedure of A.S.T.M. designation C140-39.

- 6. The lending institution or C.M.H.C. may select blocks from those on a building site for testing by an approved testing and inspection authority at the expense of the builder.
- 7. Structural properties of the blocks shall be not less than the following:
 - (i) Hollow blocks shall have webs 1'' or more in thickness and the hollow spaces shall not exceed one third of the area of the end section.
 - (ii) The net area of any load-bearing hollow concrete block shall not be less than 60% of its gross area.
 - (iii) All voids in every concrete block shall be uniformly distributed.
 - (iv) Every concrete block shall be sound and free from cracks or defects that would interfere with the proper placing of a unit, or impair the strength or permanence of the structure.
 - (v) All load bearing concrete blocks shall at the age of 28 days or when delivered to the builder at the site conform to the requirements as set out in the following table:

ABSORPTION AND STRENGTH REQUIREMENTS

Minimum Compressive Strength pounds per Square Inch on Gross Area at 28 days.				Maximum Absorption pounds of water per cubic foot of concrete
Hollow Block		Solid Block		
Average of 5 tests	Individual Minimum	Average of 5 tests	Individual Minimum	
1,000	800	1,800	1,600	

8. Square edge flat bed stone walls, 12'' thick and rubble stone walls, 16'' thick, may carry two full storeys. When stone foundations are intended to carry buildings more than two storeys above the top of the foundation such a wall shall be designed by a competent authority experienced with the type of stone being used.

(e) *Poured Concrete Foundation Walls*

Except as noted, concrete shall conform to the Minimum Requirements under "Concrete" (Section 14). Concrete shall be placed in double forms, erected true to line and well braced against deflection

under load. Concrete shall be poured continuously without interruption. Forms shall not be removed until concrete has thoroughly set. Loads shall not be placed on concrete until sufficient strength has developed to support such loads. In foundation walls and other thick masses of plain concrete, the use of stone "plums" or fillers of sound quality will be permitted, provided the stones are completely embedded in the concrete. "Plums" shall be kept a minimum of 2" from the face of the forms, and other plums.

1. Thickness shall be not less than 8" for poured concrete walls supporting structures less than two storeys high without basements.
2. Thickness shall be not less than 8" for poured concrete walls supporting structures less than two storeys high above basements or cellars. Depth of such walls below grade shall not exceed 6'0", and concrete shall be restricted as follows:

Mix shall produce not less than 2500 pound concrete as required for reinforced concrete, Section 14 (b).

3. Thickness shall be not less than 10" for poured concrete walls supporting other structures not more than two storeys high above basements or cellars.
4. Thickness shall be not less than 12" for poured concrete walls supporting structures three storeys high above basements or cellars.

5. Cold Weather Requirements

- (i) Equipment shall be provided for heating the concrete materials and protecting the concrete during freezing or near-freezing weather.
- (ii) No frozen materials or materials containing ice shall be used. Salt or other chemicals for the prevention of freezing shall not be used in concrete mixes.
- (iii) Concrete mixed and deposited shall have a temperature of not less than 50° F. nor more than 100° F. when the temperature of the surrounding atmosphere is 40° F. or lower.
- (iv) Temperature of concrete shall be maintained at not less than 50°F. nor more than 80°F. for at least 70 hours after placing.
- (v) Whenever the atmosphere temperature at the site falls below 50°F. a continuous record of atmospheric temperatures shall be kept from the commencement of pouring until at least 72 hours after pouring operations are completed.

14. CONCRETE

(a) Ordinary Concrete

1. *At least 2000 lb. concrete (28 days) shall be used.* Tests may be required at contractor's expense to ensure that concrete provided has at least this minimum strength.
2. The quality and proportions of water, cement and aggregates all affect the strength and durability of concrete. Assuming employment of aggregates as specified in Section (b) 1 (iv) following, the proportions given below may produce 2000 pound concrete (28 days), if just sufficient water is used in the mix to make a plastic mass. *See slump test, Section (b) 1 (iii) following.*

One part cement, two parts sand and four parts crushed stone up to 2" in size. (Measured by volume)

or

One part cement mixed with six parts approved gravel. (Measured by volume).

3. Portland Cement shall comply with the requirements of C.S.A. Specification A5-1940.

(b) Reinforced Concrete

1. Materials and Mixes

- (i) *At least 2500 lb. concrete (28 days) shall be used.* Tests may be required at contractor's expense to ensure that concrete provided has at least this minimum strength.
- (ii) The quality and proportions of water, cement and aggregates all affect the strength and durability of concrete. Assuming employment of aggregates as specified in Section (iv) following, the proportions given below may produce 2500 pound concrete (28 days), if just sufficient water is used in the mix to make a plastic mass. *See slump test, Section (iii) following.*

One part cement, two parts sand and three and one half parts crushed stone which will pass through a 1½" ring. (Measured by volume)

or

One part cement mixed with five and one half parts approved gravel. (Measured by volume).

- (iii) Water for concrete shall be clean and free from injurious amounts of oil, acid, alkali, organic or other deleterious substances.

Only enough water shall be used in the mix to produce a concrete which will slump no more than 4" when the following slump test is employed:

The cone for slump test shall be 4" diameter at the top, 8" diameter at the bottom and 12" high. Rod shall be $\frac{5}{8}$ " round, 2'0" long and bullet shaped at rodding end.

The sample of concrete for testing shall be representative of the concrete being placed.

The slump cone shall be placed on a horizontal surface and filled with concrete in three layers of equal depth. Each layer shall be rodded with 25 well distributed strokes of the $\frac{5}{8}$ " rod. After the top layer has been rodded the surface of the concrete shall be levelled off with a trowel so that the cone is exactly filled.

The cone shall be immediately removed from the concrete by raising it carefully and slowly in a vertical direction.

The slump shall be measured immediately by determining the difference in inches between the height of the cone and the height of the slumped concrete.

- (iv) Quality of aggregates shall at least equal the requirements of C.S.A. Specification A23-1942. Tests may be required at the contractor's expense to ensure that aggregate of acceptable quality is being provided.
- (v) Cement shall be Portland Cement or High Early Strength Cement. Portland Cement shall comply with the requirements of C.S.A. Specification A5-1940. High Early Strength Cement shall comply with the requirements of C.S.A. Specification A57-1940.
- (vi) Reinforcement, when not specified in detail by a registered engineer or architect, shall conform to one of the following classes:
 - Billet-steel bars — C.S.A. Specification G30-1938
 - Rail-steel bars — C.S.A. Specification G31-1938
 - Cold-drawn wire— C.S.A. Specification G32-1938
 - Fabricated bar or
rod mats — C.S.A. Specification G45-1938
 - Welded wire fabric C.S.A. Specification G46-1938
- (vii) Admixtures shall not be used without the written instructions of a registered engineer or architect.

2. Forms and Placing

Reinforced concrete used for structural purposes such as floor slabs, columns, etc., shall be reinforced to details provided by an architect or by a qualified structural engineer. The concrete shall be carefully placed in tight forms.

3. Cold weather pouring—see Section 13 (e) 5.

4. Where competent structural engineering services are not available, the following table of slab thickness and reinforcing is given as a guide for minimum requirements in ordinary floor slabs of simple span (without beams) such as may be used as a floor between a basement and first floor, and over a garage. The calculations are made to provide for a maximum live load of 40 lbs. per square foot upon the slab.

REINFORCED CONCRETE SLAB

Span	Slab thickness	Reinforcing steel (round rods)
Up to 8'6".....	4"	$\frac{3}{8}$ " rods at 5" c/c.
8'7" to 10'0".....	4 $\frac{1}{2}$ "	$\frac{3}{8}$ " rods at 4" c/c.
10'1" to 11'0".....	5"	$\frac{1}{2}$ " rods at 7" c/c.
11'1" to 12'0".....	5 $\frac{1}{2}$ "	$\frac{1}{2}$ " rods at 6" c/c.
12'1" to 13'0".....	6"	$\frac{1}{2}$ " rods at 5" c/c.
13'1" to 14'0".....	6 $\frac{1}{2}$ "	$\frac{1}{2}$ " rods at 4" c/c.

To prevent cracking of slabs, temperature rods $\frac{3}{8}$ " diameter and 20" to 24" centres shall be laid in the slab at right angles to that of the main reinforcing.

Reinforcement shall be accurately placed and secured against displacement by using annealed iron wire ties or suitable clips at intersections, and shall be supported by concrete or metal supports, spacers, or metal hangers.

15. STRUCTURAL STEEL WORK

- (a) Structural steel work used in framing, etc., shall be of sufficient size and strength to carry safely the superimposed load as computed by accepted sound engineering practice and to meet with all local requirements in the matter of details of construction. The maximum allowable stresses of steel beams and columns shall not exceed those recommended by the Canadian Institute of Steel Construction. If steel beams and columns are to be used in the floor framing, etc., give dimensions and location on plans.
- (b) Bearing plates shall be designed to carry the load bearing on them, and shall have a minimum thickness of 5/16 inch.

16. BASEMENT COLUMNS

- (a) Brick or block columns shall be not less than 12" x 12" or 10" x 16". Monolithic concrete columns shall be not less than 10" x 10" providing the concrete mix is not less than 1-2-4, or certified 2000 pound concrete.
- (b) Steel pipe columns used in basements to support wood or steel beams shall be fitted with a steel plate at top and bottom. This plate shall be at least $\frac{1}{4}$ " thick. Where used to support wood beams, the dimensions of the plates shall at least equal the width of the beam. The plate shall be welded or screwed to the column and bolted or spiked to the beam. Welded, bolted, or riveted connections shall be used between steel columns and steel beams. No columns shall be less than 4" in diameter. Boiler tubes are not acceptable.
- (c) *Wood Posts*
 - 1. Wood posts used as basement columns shall be set on a concrete base raised at least 3" above the level of the finished basement floor, and at least 2" wider than the post. This base shall bear directly on the post footing.
 - 2. Square posts shall not be less than 6" x 6". Round posts shall have a minimum diameter of 8". The width or diameter of any wood post shall be not less than the width of the superimposed beam or girder. Where a beam is joined over the centre of a post, the bearing for each beam shall be not less than 4".

17. DRAINAGE

- (a) *Farm Tile Drain*

In all excavations where accumulation of water is likely to occur, and drainage can be provided, a continuous row of unglazed farm tile shall be placed in a bed of stone or cinders around the wall at the floor level, and if necessary, a row or rows under the basement floor. All shall be connected to a satisfactory drainage outlet. Tiles should be spaced about $\frac{3}{8}$ " apart, with strips of tar paper over the joints.
- (b) *Basement Floor Drains*

Floor drains shall be installed when connections to waste water disposal are possible. If they are used, the floor should be sloped to the drain. The drain shall be provided with a removeable grating or cover, set flush with the floor, and a drum or running trap.
- (c) *Hydrostatic Pressure*

Hydrostatic pressure occurring at foundation walls and floors of an apartment building containing housing units or required storage space in the basement shall be relieved by the use of a sump pit. This pit shall be drained by an automatic sump pump discharging into an adequate disposal system.

18. DAMP-PROOFING AND WATERPROOFING

(a) *A Dry Basement Shall be Provided*

1. Waterproofing or damp-proofing shall be applied to exterior basement walls and to floors in basements containing housing units or required storage space.
2. Damp-proofing shall be applied to all other basement or cellar foundation walls.

(b) *Damp-proofing*

Basement and cellar walls to be damp-proofed shall be treated as follows on the exterior from finished grade to outside edge of footing:

1. Masonry unit walls — Apply $\frac{1}{2}$ " thick Portland Cement plaster coat over which apply at least one heavy coat of bituminous emulsion, undiluted hot tar, hot asphalt or other acceptable compound. The joint at bottom of wall and top of footing shall be caulked with mastic caulking compound before the plaster coat is applied.
2. Poured concrete walls — Apply at least one heavy coat of undiluted hot tar, hot asphalt or acceptable compound.
3. Other methods of damp-proofing and waterproofing may be used subject to the approval of C.M.H.C.

(c) *Waterproofing*

Where hydrostatic pressure occurs at the foundation walls and floors of an apartment building, a system of membrane waterproofing shall be applied at the exterior surfaces of the foundation walls enclosing the basement area. Basement floors shall be protected by applying a system of membrane waterproofing between two pourings of concrete, each of which shall be at least 3" thick. This membrane shall be carefully mopped to form a complete seal with the membrane of the exterior walls which shall enter the basement area between the footings and the foundation.

19. BASEMENT FLOORS

- (a) Concrete floors in basements shall be not less than 3 inches thick or as required in Section 18(c). Concrete shall be of the same mix as described for foundation walls in Section 14. Just sufficient water to make the concrete or finish workable shall be used. Floors shall be trowelled smooth or finished with a $\frac{3}{4}$ inch topping consisting of one part of cement to $2\frac{1}{2}$ parts of clean sand.
- (b) Dusting with dry cement when trowelling is not permitted.

- (c) The ground shall be levelled off and covered over with five or six inches of broken stone, bricks or cinders, before pouring the concrete. This fill may be omitted in dry locations where the ground is gravel, compact sand, hardpan or rock.
- (d) Where hardwood flooring is to be laid on sleepers over concrete on fill, the concrete shall be hot-mopped with two coats of asphalt or bituminous emulsion.
- (e) Where cinder fill is used under basement floors, cast iron drains or steel piping shall be protected from the cinder fill by stone or concrete fill.

20. WALKWAYS AND DRIVEWAYS

(a) Walkways

1. Walkways shall be provided to all entrances of apartment buildings and to garage and parking compounds. They shall be constructed to provide safe usage by pedestrians, furniture movers and operators of small-wheeled vehicles such as baby carriages and children's velocipedes.
2. Street walks shall be not less than the standards of contiguous municipal walks and in no case less than 5' wide.
Main entrance walks shall be not less than 4' wide.
Other walks shall be at least 3' wide.
3. No walkway shall be used as drainage for conductance of surface water. Walkways shall blend efficiently with the grading and planting layout of the lot. Walk gradients shall be between 1% and 3%.
4. Materials:
 - (i) Concrete should be used for all walkways other than garden paths. Any other durable all-weather surface will be acceptable, except that loose material such as gravel shall not be used as street walks and main entrance walkways.
 - (ii) Materials and construction methods for walkways shall at least comply with the requirements for driveways in Section 20 (b).

(b) Driveways

1. Driveway layouts shall satisfy the requirements of Section 3 (b) 3.
2. Driveway Construction:
 - (i) All-weather surfaces shall be provided for driveways, parking compounds and garage aprons.

- (ii) Loose material such as gravel, broken stone or bricks, cinders and slag is acceptable providing the material is placed to a minimum depth of 6" and topped with a thin layer of fine gravel (not sand).
- (iii) Surfacing brick shall be hard-burned and shall be laid in concrete over a 6" base of broken stone or gravel.
- (iv) An asphalt surface shall be rolled over a 6" base of broken stone or gravel.
- (v) Concrete shall comply with Section 14.
- (vi) Driveways shall not be placed over unconsolidated filled ground.

21. MASONRY CONSTRUCTION (EXCEPTING VENEER)

(a) *Lateral Support*

1. General Requirements:

- (i) Every masonry wall or partition shall be supported at right angles to the wall face by means of intersecting walls, piers, or by floor or roof constructions.
- (ii) Where lateral support is provided by intersecting walls or piers, such walls or piers shall have sufficient strength and stability to transfer to the ground all the lateral forces that they are assumed to resist. When lateral support is provided by floor or roof construction, such floor or roof construction shall be adequate to function safely as a horizontal beam or truss under the conditions imposed.

2. All masonry walls shall be:

- (i) Bonded at intersections of masonry-constructed walls.
- (ii) Tied to building frames of steel, concrete or wood where they are supported by, abut or adjoin masonry construction.
- (iii) Anchored to each tier of joists, beams, girders or floor construction bearing on such walls at maximum intervals of 6' 8".

Every wall anchor shall be of galvanized steel or wrought iron with minimum thickness of 3/16" and minimum cross sectional area of 9/32 sq. in. or approved equivalent. The abutting ends of all members end-anchored to masonry walls shall be strapped, lapped or otherwise fastened together so as to form a continuous tie from wall to wall. In walls parallel to joist construction, anchors spaced not more than 6' 8" o.c. shall engage the tops of at least three joists.

- 3. Corbelling of walls less than 12" thick (except for fire stopping) will not be permitted.

(b) Masonry Materials and Methods

- 1. Quality of brick types shall at least equal the following specified requirements:

<i>Type of Brick</i>	<i>Specification</i>
Clay or Shale.....	A.S.T.M. — C62-44T
Concrete.....	" — C55-37
Sand-lime.....	" — C73-39

2. Face Brick

- (i) Face Bricks shall be new clay, shale or concrete bricks of good shape and condition.
 - (ii) Face brick to be painted shall be new or clean second-hand brick of good quality, hard-burnt and with no chipped corners. Brick from old chimneys or brick coated with soot or creosote shall not be used. Before painting, this brick construction shall be wire brushed to remove all loose mortar after pointing has been completed. The wall shall then be treated with zinc sulphate solution (3½ lbs. per gallon of water) brushed to remove excess sulphate and primed according to paint manufacturers' directions.
 - (iii) Backing material may be hard-burnt and clean second-hand brick, concrete brick or block, terra cotta tile or sand lime brick.
 - (iv) Face brick shall be bonded into masonry backing by at least one header course in every fifth course. Where patented back-up masonry permits a brick header course to be properly bonded into the backing a header course not exceeding every sixth course is acceptable. If a special brick bond is used, alternate headers and stretchers may be used in the bonding course.
- 3. Bricks with medium to high rates of suction may develop ineffective bonding between brick and mortar unless such bricks are wetted down before laying. A rough test for determining if wetting is required may be made by sprinkling a few drops of water on the flat of the brick and noting the time of complete absorption. If this time exceeds one minute, wetting is not needed.
- Wetting of vitrified and semi-vitrified bricks is undesirable.

4. Masonry bearing walls employing stone either for the full thickness or as facing shall be constructed and the materials shall be at least as required in the National Building Code. Such masonry construction shall be supervised by a registered architect, engineer or other person acceptable to C.M.H.C.

5. Mortar

- (i) Cementing materials and aggregates shall comply with the specifications in the following table:

<i>Material</i>	<i>Specification</i>
Quicklime.....	A.S.T.M. C5-26
Hydrated lime.....	A.S.T.M. C6-46T
Portland cement.....	C.S.A. A5-1940
Natural cement.....	A.S.T.M. C10-37
Masonry cement.....	A.S.T.M. C91-40
Gypsum plaster.....	A.S.T.M. C28-40
Keene's cement.....	A.S.T.M. C61-40
Aggregate (sand).....	A.S.T.M. C144-44

- (ii) Quicklime shall be slaked with care to avoid over-heating and shall be stored in the wet condition for not less than 7 days before mixing; hydrated lime shall be stored in the wet condition for not less than 12 hours.

Water for use in mixing mortar shall be clean and free from deleterious amounts of acids, alkalis, salts, and organic matter.

- (iii) All mortars shall consist of one of the following types:

Lime-cement mortar

cement mortar

gypsum mortar

or approved substitutes, as hereinafter defined.

- (iv) Portland cement, natural cement, masonry cement, and aggregate other than that used in gypsum mortar shall be measured by volume, dry, before mixing with water; gypsum and aggregate used in gypsum mortar shall be proportioned by weight; lime whether delivered as hydrate or quicklime shall be measured by volume in the form of wet putty.

Lime-cement mortar shall consist of not less than one part lime putty, with one part of Portland cement, and with not more than 6 parts of aggregate.

Mortar consisting of one part of masonry cement or natural cement with not more than 3 parts of aggregate and having a compressive strength at 7 days of not less than 500 pounds per square inch, may be substituted for lime-cement mortar.

Cement mortar shall consist of one part Portland cement with not more than 3 parts of aggregate with a lime addition of not less than 10 nor more than 25 per cent of the cement content.

Cement grout shall consist of one part Portland cement with not more than 3 parts of aggregate.

Gypsum mortar shall consist of one part calcined gypsum with not more than 3 parts of aggregate by weight.

- (v) Masonry exposed to weather shall be laid up in lime-cement mortar proportioned as described in (iv) preceding.

Load-bearing masonry constructed of hollow units and masonry exposed to soil shall be laid up in lime-cement or cement mortar proportioned as described in (iv) preceding.

Non-bearing masonry not directly exposed to the weather or soil may be laid up in gypsum mortar. Gypsum mortar shall not be used for any other purpose. Gypsum mortar shall be proportioned as described in (iv) preceding.

- 6. Walls constructed of monolithic concrete masonry shall be built as described for foundation walls. Adequate reinforcing over openings in monolithic walls shall be installed.
- 7. Masonry walls constructed of concrete units shall conform to the tables in Section 21. Construction of the wall and the manufacture of the concrete units shall be the same as required for foundation walls.

Concrete blocks may be used in a finished wall, provided the outer face is finished with a special waterproofing paint or cement finish. Otherwise concrete block walls shall be finished in stucco.

- 8. Gypsum masonry which is not reinforced shall be restricted to furring, fire-proofing and non-bearing partitions. Reinforced gypsum shall be designed and supervised during construction by a registered architect or engineer.
- 9. During periods when temperatures are likely to drop to 32° F. or lower, masonry shall be protected against freezing until such time as the setting of the mortar has advanced sufficiently to prevent any displacement of the masonry on subsequent thawing. In addition equipment shall be provided for heating of materials entering into masonry construction. No frozen materials or materials containing ice shall be used.

(c) *Bearing Walls*

- 1. As these Standards apply only to apartment buildings, the requirements in clauses 2 and 3 following do not apply to heavy occupancy structures, such as heating plants. Heavy occupancy structures are required to be designed by registered architects or engineers.
- 2. Thickness, in inches, of Solid Masonry Walls, shall be in accordance with the following table:

Storey	Height of wall, storeys above foundation wall		
	1	2	3
Third.....			8
Second.....		8	8
First.....	8	8	8
Basement or cellar.....	8	10	12

- 3. Thickness, in inches, of masonry walls constructed of hollow units shall be in accordance with the following table:

Storey	Height of wall, storeys above foundation wall		
	1	2	3
Third.....			8
Second.....		8	8
First.....	8	8	10
Basement or cellar.....	8	10	16 (or 12 solid)

(d) *Thickness, in Inches, Required for Non-Bearing Masonry Walls*

- 1. Solid Construction:

Storey	Height of wall, storeys above foundation wall		
	1	2	3
Third.....			8
Second.....		8	8
First.....	8	8	8
Basement or Cellar.....	8	8	12

- 2. Hollow Unit Construction:

Storey	Height of wall above foundation wall		
	1	2	3
Third.....			8
Second.....		8	8
First.....	8	8	10
Basement or Cellar.....	8	10	12

(e) Cavity Walls

1. Cavity walls shall be not less than 10" thick and the cavity shall be not less than 2" nor more than 3" in width. The height of a cavity wall shall be not more than 25 ft.
2. Bricks used in cavity wall construction shall conform to the same requirements as for solid masonry wall construction. Stone in cavity wall construction shall be 6" or more in thickness with bearing surfaces sawn or tooled flat.
3. The outer face and the interior backing shall be securely tied together with suitable bonding ties of adequate strength. A steel rod, 3/16" in diameter or a metal tie of equivalent stiffness coated with a non-corroding metal or other approved protective coating shall be used for each 3 sq. ft. of wall surface. Ties shall be embedded in horizontal joints of the facing and backing. Additional bonding ties shall be provided at all openings spaced not more than 3' apart around the perimeter and within 12" of the opening.
4. Parapet walls shall be constructed of solid masonry from the top of the parapet to a point approximately 1' below the adjacent roof level.
5. Where floor and roof systems are carried by cavity walls, loads from roof and floor members shall be distributed over the full cross section of the cavity wall by a bridging of solid masonry not less than two brick courses in depth.

(f) Damp-Proofing Masonry Walls Above Grade

1. All masonry walls excepting cavity walls bonded with metal ties shall be treated at the interior faces to arrest moisture travel beyond these faces, as described in sub-section (i) following:
 - (i) Nailing strips $\frac{3}{8}$ " by $1\frac{3}{4}$ " located not more than 18" on centres shall be built into masonry walls described in the preceding paragraph. The interior of the wall shall be parged or back-plastered, covered with asphalt saturated felt weighing 15 lbs. per square and lapped 4" at joints. Furring strips $\frac{7}{8}$ " by $1\frac{3}{4}$ " shall then be applied vertically at 16" on centres.
 - (ii) In cavity walls bonded only with metal ties the requirements of sub-section (i) preceding shall apply, except that parging and saturated felt may be omitted.
2. Damp-proof courses shall be installed in all masonry walls to bar passage of moisture from one part of the structure to another as follows:

- (i) A damp-proof course shall be installed immediately under the first floor joists or sill to prevent the capillary rise of moisture.
- (ii) When brick masonry or other jointed window sills are employed a damp-proof course shall be provided under the full length of such sills.
- (iii) In cavity walls a damp-proof course of flexible material shall be provided over the heads of all window and door openings. The course shall be built into the inner leaf, and slope downwards as it crosses the cavity towards the exterior.
- (iv) Where the flashing of roofs joins masonry parapet walls, such flashing shall extend through the thickness of the masonry wall to form a damp-proof course.

22. MASONRY VENEER FOR FRAME CONSTRUCTION

- (a) Height of masonry veneer finish for frame constructed walls shall not exceed 35' above foundation walls.
- (b) Purpose of masonry veneer shall be considered as weathering surface only. It shall not be considered as contributing to the strength of a frame wall.
- (c) Stone veneer 6" thick or better with bearing surfaces tooled or sawn flat, or brick veneer 4" thick or better will be acceptable.
- (d) Masonry veneer shall be secured to frame walls by non-corrodible metal ties every 16" in height and width. All masonry units shall be set in mortar specified in Section 21 (b) 5.
- (e) Masonry veneer shall not be erected until the wood frame to which it will be attached is sheathed and covered with saturated felt in accordance with Section 23.

23. FRAME CONSTRUCTION

- (a) *General*
 - 1. All members in wood frame construction other than finish and millwork shall be so framed, anchored, tied and braced together as to develop the strength and rigidity necessary for the purpose for which they are used.
 - 2. Wood framed walls shall include bearing walls constructed of studding, sills, plates and sheathing or plank-framed walls with or without sheathing as described in Section 23 (c). Skeleton construction comprising a structural frame of wood columns

and girders shall not be considered as being within the meaning of Wood Frame Wall Construction; such wooden skeleton construction shall be considered non-conventional requiring specific C.M.H.C. acceptance based on individual merit.

(b) Stud Construction (exterior walls)

1. All sills and girders on top of foundation walls and piers shall be levelled, shimmed up, bedded in cement mortar, and anchored with $\frac{5}{8}$ " bolts at 8' 0" centres.
2. Top plates shall be not less than doubled 2" thick material, the same width as studs, lapped at all corners and at all intersecting partitions. Laps shall be securely spiked. End joints in top plates shall be made over studs.
3. Studding in exterior walls shall be not less than 2" x 4" spaced 16" o.c. Studs may run from sill to roof line provided they do not exceed 20' in length. Studs shall be in continuous lengths without splicing.
4. Stud frame walls shall be strengthened by fitting horizontal girths between the studs at mid height; girths shall be 2" thick and of a width equal to the width of the studding.
5. Window and Door Openings
 - (i) Inner studs on jambs shall extend in one piece from header to bearing and shall be nailed to outer studs.
 - (ii) Headers for usual loading conditions shall be not less than two 2" x 4" pieces on edge for spans not exceeding 3' 6" and two 2" x 6" pieces on edge for spans not exceeding 4' 6". Larger openings shall be trussed.
 - (iii) Headers supporting concentrated loads other than joists, or subjected to other unusual loading conditions shall be designed by a registered architect or engineer.
6. Sheathing shall be wood T. & G. or shiplap not less than $\frac{5}{8}$ " thick or other material acceptable to C.M.H.C. as detailed in Section 25.
7. Twelve pound or better tarred or asphalted felt or other approved building paper, lapped 4" at joints, shall cover the exterior sheathing of all wood frame walls. This sheathing paper shall not be a vapour barrier.

(c) Plank Frame Construction

1. Plank walls shall not exceed three storeys in height. In walls three storeys high the thickness of the planks, exclusive of any sheathing, shall be not less than three inches.

2. Other plank walls shall have a thickness of not less than two inches in all parts exclusive of sheathing if sheathing is used, and not less than three inches in all parts if sheathing is omitted.
3. All structural members shall be framed together with dove-tailed joints or other joints of equivalent strength.
4. Where sheathing is used it shall comply with requirements of Section 23 (b) 6.
5. Building paper as described in Section 23 (b) 7 shall be applied each side of the sheathing. An additional layer of similar building paper should be applied to the inner side of all plank frames.
6. Every exterior wall of plank construction shall have an exterior wall covering meeting the requirements of Section 22 or 23 (d).

(d) *Acceptable Exterior Finish*

1. Cement stucco applied as described in Section 43.
2. Siding, other than wood, or asbestos cement shingles shall be an approved type laid in accordance with the manufacturer's specifications. The distance between finished grade and lower edge of such siding or shingles shall be not less than 12". Metal flashing shall be installed over the heads of door and window openings. Mastic caulking compound shall be applied to the vertical joint between the siding or shingles and door or window frames.
3. (i) Wood siding shall be not less than No. 1 and No. 2 common white pine, No. 2 clear or clear A western red cedar, Douglas fir, western hemlock and western spruce. Equivalent grades in other suitable wood will be acceptable.
(ii) The exposed portion of any piece of wood siding shall be not less than 3/16" thick at any point.
4. Where shingles are used, the grade known as Clear Walls in Eastern Cedar, and No. 3 Grade XXXXX in Western Red Cedar or better grades shall be used. Such coverings or facings shall be laid according to the following table.

Shingle Length	Maximum Exposure	
	Single Course	Double Course
16	6" to 7½"	8" to 12"
18	6" to 8½"	8" to 14"
24	8" to 11"	12" to 16"

Where double course shingle finish is to be employed, the under course may be of a lower grade than stated above if such is recommended by the manufacturer.

5. Plywood used as an exterior finish shall comply with requirements of Section 26 (d).

(e) *Floor Framing*

1. Beams shall be structural steel, solid wood, built-up wood or reinforced concrete. Steel beams shall rest on steel bearing plates of sufficient strength to safely distribute imposed loads to supporting structural parts. Structural parts supporting other beams shall be of sufficient size and strength to distribute safely the imposed loads.

Masonry supporting the end of a beam shall provide bearing for at least the end 6'' length of the beam.

The ends of beams which frame into masonry walls below the outside finish grade shall receive a good brush or dip coat of approved wood preservative.

2. Wood joist sizes and spacing shall be determined from the floor joist table given below. The joists in the principal floors should be spaced not more than 16'' on centres. Joists shall be bridged with 1½'' x 2'' or 1'' x 4'' diagonal cross bridging one row to each span over 7' 0'' and up to 12' 0'', in width, and two rows in spans over 12' 0''.

Floors constructed with steel joists or reinforced concrete joists shall be designed by a registered architect or engineer.

MAXIMUM SPANS FOR FLOOR JOISTS

Spruce, Hemlock, White or Red Pine					
.....	12'' o.c.	14'' o.c.	16'' o.c.	18'' o.c.	20'' o.c.
2'' x 6''.....	9' 0''	8' 6''	8' 0''	7' 0''	6' 0''
2'' x 7''.....	11' 6''	10' 6''	10' 0''	9' 0''	8' 0''
2'' x 8''.....	13' 0''	12' 6''	12' 0''	11' 0''	10' 0''
2'' x 9''.....	14' 6''	13' 6''	12' 6''	12' 0''	11' 9''
2'' x 10''.....	16' 0''	15' 3''	14' 3''	13' 3''	12' 9''

Douglas Fir					
.....	12'' o.c.	14'' o.c.	16'' o.c.	18'' o.c.	20'' o.c.
2'' x 6''.....	10' 0''	9' 6''	9' 0''	8' 0''	7' 0''
2'' x 7''.....	12' 0''	11' 6''	11' 0''	10' 0''	9' 6''
2'' x 8''.....	14' 0''	13' 6''	12' 9''	12' 3''	11' 9''
2'' x 9''.....	15' 9''	15' 0''	14' 3''	13' 9''	13' 3''
2'' x 10''.....	17' 9''	16' 9''	16' 3''	15' 6''	14' 9''

3. Floor joists shall be supported for their full depth: on top of a wood beam; on metal joist hangers hung over the wood beam; on a ledger board or by approved mechanical connectors. Ledgers shall be not less than 2" x 4" spiked to the sides of the wood beams with at least 2 nails for each joist supported. Joists shall not be notched over any such support.

The end bearing of wood joists supported on steel beams shall be not less than 3 lineal inches. Wood joists set into the side of steel beams shall project at least 1/2" above the top of such steel beams.

4. Floor joists supported by exterior frame walls shall bear on 1" x 6" ribbons let into the faces of the studs. Joists bearing on ribbons shall be securely nailed to sides of studs.

5. Floor joists framing into masonry walls shall have not less than 4" end bearings. The ends of floor joists which frame into masonry walls below the outside finish grade shall receive a good brush or dip coat of approved wood preservative.

Joists or beams framing into a masonry party wall or fire wall, shall be separated from the opposite side of the wall and from the ends of joists or beams entering the opposite side of the wall by 4" of masonry. Joists entering 8" masonry shall be staggered on opposite sides, and separated from each other by at least 4" of masonry.

6. Floor joists shall be doubled under all partitions which run parallel to the floor joists. Doubled joists shall be separated and blocked at 4' intervals where piping or duct work occurs. Headers and trimmers shall be doubled except that headers 4' or less in length may be of single thickness provided the header is supported in approved metal joist hangers or connectors. Ends of headers receiving more than 4 tail beams shall be supported in metal joist hangers.

7. Ceiling joist sizes and spacing shall be determined from the table given below. In no case shall ceiling joist spacing exceed 20" o.c.

MAXIMUM SPANS FOR CEILING JOISTS

Spruce, Hemlock, White or Red Pine					
	12" o.c.		16" o.c.		20" o.c.
2" x 4"	10' 0"		9' 0"		8' 0"
2" x 5"	13' 0"		12' 6"		11' 6"
2" x 6"	15' 0"		13' 6"		12' 6"
2" x 7"	17' 0"		15' 9"		14' 3"
2" x 8"	19' 0"		18' 0"		16' 0"

Douglas Fir

.....	12" o.c.	.....	16" o.c.	.....	20" o.c.
2" x 4".....	11' 0"	.....	10' 0"	.....	9' 0"
2" x 5".....	13' 3"	.....	12' 6"	.....	11' 6"
2" x 6".....	16' 9"	.....	15' 3"	.....	14' 3"
2" x 7".....	19' 3"	.....	17' 6"	.....	16' 0"
2" x 8".....	22' 0"	.....	20' 0"	.....	19' 0"

Sizes given above are nominal. Standard finished sizes are acceptable.

(f) Interior Stud Bearing Partitions

1. Size, spacing and assembly methods (except sheathing and building paper) described in Section 23 (b) shall govern construction of interior bearing partitions.
2. Studs shall not be cut more than $\frac{1}{2}$ their depth to receive piping or duct work.
3. Steel angle ties shall be installed to support joists when plates are cut for piping or duct work.

(g) Roof Framing

1. Flat Roofs

- (i) Ceiling joists supporting a flat roof or a roof of flat pitch shall be as required for floor joists of equal span. See Table Section 23 (e) 2. Such joists shall be bridged as for floor joists.
- (ii) A flat pitched roof may be obtained by either of the following:
 - By applying cant strips to the upper edges of roof joists;
 - By erecting dwarf walls consisting of 2" x 4" plates at top and bottom and 2" x 4" struts.
- (iii) The details of design of dwarf walls for roof support shall be prepared by a registered architect, engineer or other person acceptable to C.M.H.C.

2. Pitch Roofs

Double rafters and trimmers shall be used around all dormers and other large roof openings. Hips and valley members shall be increased in size as required to carry the roof load. Dwarf partitions with continuous sills and caps, or collar ties not less than 2" x 4" spaced the same centres as roof rafters, and not located in the upper third of the rafter length, may support rafters, or the roof rafters may be trussed.

- 3. Collar ties in unfinished attics may be 1" x 5" provided a continuous 1" x 4" strip is nailed at right angles to and on the underside of these collar ties. Such collar ties shall be located within the middle third of the rafter span.
- 4. Rafters shall be notched over not less than 2" x 4" rafter plates securely spiked to the ceiling joists or notched over the wall plate supporting the ceiling joists.

MAXIMUM SPAN FOR ROOF RAFTERS (SLOPING ROOFS)

Spruce, Hemlock, etc.			Douglas Fir		
.....	16" o.c.	20" o.c.	.....	16" o.c.	20" o.c.
2" x 4".....	6' 0"	5' 6"	2" x 4".....	7' 3"	6' 9"
2" x 5".....	8' 0"	7' 6"	2" x 5".....	9' 0"	8' 6"
2" x 6".....	10' 0"	9' 3"	2" x 6".....	11' 0"	10' 3"
2" x 8".....	13' 0"	12' 3"	2" x 8".....	14' 6"	13' 9"

Note—The span of the rafters is to be taken on the slope.

(h) *Miscellaneous Rough Carpentry*

- 1. Overhanging cantilevered construction: Bay windows, overhanging floors, and all projections carrying floor and roof loads which are not supported directly by a foundation shall be fully detailed on the drawings submitted with the application.
- 2. The space between the joists of the upper floor under the dwarf partitions shall be filled in with solid bridging and a vapour barrier applied at this point.
- 3. All attic spaces shall be ventilated to the outside air by screened louvers. The unobstructed or net area of such louvers shall be not less than 1/300 of the horizontal projection of the roof area. Vents shall be located to provide cross-ventilation. Screening shall be other than ferrous metal not more than 16 nor less than 8 mesh per inch.
 - (i) Gable end vents shall be as near the ridge as possible.
 - (ii) Hip roofs shall have a vent at each end of the ridge. If the ridge length is less than 5' 0", a single vent shall be installed near the summit to provide one half the required ventilating area; complementary vents at the eaves shall supply the balance of the required ventilating area.
 - (iii) The spaces between all roof joists in flat roof construction shall be vented by continuous screened openings at opposite ends of the spaces.

4. Traps to attics or roof spaces shall be not less than 28" x 28".
5. Fire stops shall be provided in partitions and stud walls to cut off completely all openings between basement and each upper storey.
6. Furring for support of plaster base shall be not less than 1" x 2" spaced not more than 16" o.c., or as recommended by manufacturer of plaster base.

24. ROUGH CARPENTRY MATERIALS

(a) Lumber

1. Framing, such as joists, studs, beams, etc. shall be No. 3 Common for White Pine; No. 3 (Quebec 4ths) for Eastern Spruce; "Merchantable" for Red Pine; No. 2 Common for Douglas Fir, Western Hemlock, Western Red Cedar, and Western Spruce; or equivalent grades of Jack Pine, Eastern Hemlock, Eastern Cedar and other species.
2. Sheathing, Sub-flooring:
Yard Lumber may be used for wall and roof sheathing and sub-flooring provided that no grade of such lumber shall be below No. 5 Common for White Pine; No. 4 (Quebec 5ths) for Eastern Spruce; No. 1 Cull for Red Pine; No. 3 Common for Douglas Fir, Western Hemlock, Western Red Cedar, and Western Spruce; or equivalent grades of Jack Pine, Eastern Hemlock, Eastern Cedar and other species.
3. Plank Wall lumber shall be not inferior to grades in Section 24 (a) 2.

(b) Alternate Types of Exterior Wall Sheathing

The following materials may be used as exterior sheathings over frame construction providing the frame is assembled and the sheathings are applied as detailed in Section 25:

1. Fibre board
2. Gypsum board
3. Plywood

25. EXTERIOR WALL SHEATHING, APPLICATION REQUIREMENTS FOR ALTERNATE TYPES

(a) Quality of Sheathing

1. Types of acceptable fibre board may be determined upon application to C.M.H.C. or the lending institutions; minimum permissible thickness is $\frac{1}{2}$ ".

2. Gypsum sheathing shall be not less than $\frac{1}{2}$ " nominal thickness and shall otherwise comply with A.S.T.M. specifications C79-42. All such sheathing shall have square edges.
3. Plywood shall be not less than 5/16" thick "Exterior" type.

(b) *Frame Construction*

1. In stud wall construction, studs shall be spaced at not more than 16" on centres. Headers not less than 2" x 4" shall be carefully fitted between studs in such a manner as to provide a nailing bearing for all edges of alternate types of sheathing described in Section 24 (b).
2. In stud wall frames to be sheathed with fibre insulating board or gypsum sheathing board, all walls at each corner shall be provided with 1" x 4" diagonal braces let into the faces of the studs. This bracing shall extend across not less than three studs and where possible shall extend through the full height of the wall for each storey. Intermediate diagonal bracing similar to the foregoing shall be installed where the horizontal distance between corner bracing members exceeds 15 ft. When openings occur near corners, 1" x 4" knee braces shall be let into the studs at an angle of 45° to the studs. Knee braces shall be installed above and below such openings and shall extend across as many studs as possible.
3. (i) When an exterior wall is to be faced with masonry veneer, all ties required for such masonry shall be fastened through the sheathing to the studs.
 (ii) When wood or asbestos shingles are applied over an alternate type of sheathing, not less than 1" x 2" nailing strips, spaced as required, shall be nailed through the sheathing to the studs.
 (iii) Wood siding shall be nailed through the sheathing to the studs.
 (iv) Where the exterior finish is stucco, furring strips shall be nailed through the sheathing to the studs.

(c) *Building Papers*

1. The exterior face of alternate types of sheathing shall be covered with an acceptable building paper weighing not less than 12 lbs. per square. This building paper shall be permeable to water vapour and shall have a diffusance co-efficient (expressed in gm. per 24 hours per square metre per mm. Hg. vapour pressure) of not less than 2.0.

2. Where an alternate type of exterior sheathing material is used, an acceptable vapour barrier shall be provided between the interior faces of the studs and the exposed interior face of the wall.

(d) Application of Alternate Sheathing Types

1. No imperfect or damaged sheet shall be erected. Any sheet which becomes damaged after erection shall be removed and replaced with a sound sheet.
2. 2" common wire nails shall be used for securing alternate types of wall sheathing. Spacing of nails for each type shall be as follows:
 - (i) Fibre insulating board shall be nailed to studs every 3" along all edges. Nails shall not be spaced more than 6" apart along intervening studs and headers.
 - (ii) Gypsum sheathing shall be nailed to studs every 4" along all edges. Nails shall not be spaced more than 8" apart along intervening studs and headers.
 - (iii) Plywood sheathing shall be nailed to studs every 6" along all edges. Nails shall not be spaced more than 12" apart along intervening studs and headers.

26. DOUGLAS FIR PLYWOOD

(a) Quality

Plywood shall be manufactured to meet requirements for "Exterior" and "Interior" types listed in U.S. Commercial Standard CS45-48.

(b) Identification

Plywood shall bear the manufacturer's markings and identification visible for site inspection. Obliteration of such marking prior to site inspection may be considered just cause for rejection of the material.

(c) Usage

1. Only "Exterior" type plywood shall be used for exterior finish, other exposed exterior uses, sheathing of exterior walls and roofs, sub-flooring, counter tops and kitchen or bathroom dados or other locations exposed to free moisture.
2. "Interior" type plywood may be employed in locations other than those listed in (c) 1.

(d) Application of Exterior Finish

1. Plywood for exterior wall finish shall be "Exterior" type not less than $\frac{1}{4}$ " thick.

2. When applied to sheathed wood framing the plywood shall be nailed to furring strips not less than $\frac{3}{8}$ " x $1\frac{1}{4}$ ". The furring strips shall be placed over the building paper and sheathing and nailed through both to the studding. Nails shall be 2" common either cement coated, galvanized, cadmium plated or otherwise treated with rust-proof coating; the nails shall be spaced not more than 6" o.c. along edges and 12" o.c. at intermediate bearings.
3. All edges of every panel shall be coated prior to erection with a paint filler, consisting of 100 lbs. of paste white lead, $1\frac{3}{4}$ gallons of raw linseed oil and 1 pint of dryer or alternatively an approved sealer recommended by the plywood manufacturer.
4. All joints or intersections shall conform to details recommended by the Douglas Fir Plywood Association.

(e) *Roof Sheathing*

Roof sheathing shall be not less than $\frac{5}{16}$ " when rafters are spaced not more than 16" o.c. and $\frac{3}{8}$ " when rafters are spaced from 16" to 20" o.c. Panels shall be placed with their lengths across the rafters and with panel ends bearing on rafters. Nails shall be 2" common either cement coated, galvanized, cadmium plated or otherwise treated with rust-proof coating; the nails shall be spaced not more than 6" o.c. along edges and 12" o.c. at intermediate bearings.

(f) *Sub-Flooring*

1. Plywood shall be 5-ply not less than $\frac{1}{2}$ " thick if finish wood flooring is $\frac{3}{4}$ " thick, and not less than $\frac{5}{8}$ " thick if finish flooring is less than $\frac{3}{4}$ " thick.
2. Plywood shall be applied lengthwise across joists spaced not more than 16" o.c. with ends of panels bearing on joists. Nails not less than $2\frac{1}{4}$ " common shall be spaced 6" at edge bearings and 12" at intermediate supports.

(g) *Interior Wall Finish*

1. Plywood shall be not less than $\frac{1}{4}$ " thick.
2. $\frac{1}{4}$ " plywood shall be supported on studding spaced not more than 16" o.c. and all edges shall be supported by studs or headers. $1\frac{1}{2}$ " finishing or casing nails shall be spaced 6" apart at edges and 12" apart at intermediate supports.

27. HARDWOOD PLYWOOD

Hardwood plywood shall be manufactured and graded in accordance with the specifications of the Canadian Hardwood Plywood Association. Thickness, veneer and glue grades shall be specified for each intended use.

28. BUILDING PAPERS

Building Papers shall be water and air resistant and have a vapour diffusance coefficient (expressed in gm. per 24 hours per square metre per mm. Hg. vapour pressure) not less than 2.0.

Acceptable Building Papers may be determined upon application to C.M.H.C. or to the lending institutions.

29. CHIMNEYS AND FLUES

(a) Flues for Central Heating Plants

1. General Construction Requirements:

- (i) All chimneys shall be designed and their construction supervised by a registered architect, engineer, or other acceptable authority.
- (ii) No chimney shall carry any load except its own weight and such load shall be transmitted to the supporting construction in a manner to prevent the shearing, cracking or falling off of any part of the chimney. Every chimney shall be completely supported by masonry or reinforced concrete, or by construction having a fire resistive rating of at least 4 hours. Supports, foundations, and footings for chimneys shall be designed and constructed to carry the chimney without detrimental settlement or deflection sufficient to cause cracking of chimney walls or flue linings.
- (iii) Chimneys shall be constructed of masonry or reinforced concrete. All materials entering into the construction of any chimney shall meet the requirements for "Materials for flues, furnace casings", as given in C.S.A. Specification No. A54-1940 entitled, "Standard Specification for the Procedure for Fire Tests on Building Construction and Materials."
- (iv) Every chimney shall extend at least 3' above the highest point at which it comes in contact with the roof of a building, and at least 2' higher than any ridge, parapet wall, or roof structure within 10' of the chimney.
- (v) All fire brick lining shall be laid in fireclay mortar or approved high temperature cement.
- (vi) Flue linings shall consist of formed units of fireclay or of other suitable refractory clays adapted to withstand reasonably high temperatures and flue gases, and having a softening point not lower than 1994° F. Flue linings shall not be less than $\frac{3}{8}$ " in thickness and shall be built in as the outer walls of the chimney are constructed. All joints and spaces

between the masonry and lining shall be thoroughly slushed and grouted full as each masonry course is laid. Only cement mortar shall be used in flue settings. Cracked, broken, or otherwise defective linings shall not be used. Flue linings shall start from a point not less than 4" below the lowest point of smoke pipe intakes, except as required for flues serving high pressure steam boilers.

2. Flues Serving High Pressure Steam Boilers

A chimney serving a high pressure boiler shall have walls of masonry or reinforced concrete at least 8" thick, providing that stone masonry shall not be less than 12" thick. In addition such a chimney shall be lined with not less than 4" of firebrick starting at least 2' below the flue inlet and extending at least 25' above the flue inlet.

3. Flues Serving Low Pressure Boilers

Every chimney flue serving a low pressure steam boiler shall have masonry walls at least 8" thick or reinforced concrete at least 6" thick and shall be provided with a flue lining.

(b) *Incinerator Flues*

1. For non-fuel-fired incinerators in which the grate area of the combustion chamber is 9 square feet or less, the chimney walls shall be at least $3\frac{3}{4}$ inches thick and shall be lined with fireclay flue lining. Not more than three service openings shall be installed in such a chimney. This type of chimney shall not be used in structures more than 3 storeys high.
2. For a non-fuel-fired incinerator in which the grate area of the combustion chamber exceeds 9 square feet, the chimney flue shall be constructed of unit masonry not less than 8 inches thick, the inner course of which shall be not less than 4 inches of firebrick for a height of not less than 25 feet above the roof of the combustion chamber.
3. For a fuel-fired incinerator, the primary purpose of which is to dispose of garbage, cleanings, sweepings, and miscellaneous refuse, the chimney flue shall be as required for a non-fuel-fired incinerator with a grate area exceeding 9 square feet, but shall be lined to a height of at least 35 feet above the combustion chamber.
4. Any incinerator may be connected to a flue serving a medium or high heat appliance provided that the appliance and the incinerator are in the same storey and at approximately the same level, and provided further that an approved breeching is employed to make the connection, and provided finally that the area of the chimney flue is at least four times that of the incinerator breeching.

5. Every flue serving an incinerator shall terminate in a substantial spark arrester.

(c) Flues (excepting those for Central Heating Plants or Incinerators)

1. There shall be a separate flue for each furnace, stove, fireplace or other heating unit. Flues shall be lined with glazed clay tile and surrounded with not less than 4" of masonry, with all horizontal joints between the tile and brickwork broken or if tile lining is omitted, flues shall be built with brick or solid masonry 8" in thickness, and the brick shall be hard burned, set in cement and lime mortar with joints pointed flush. Gas flues shall be in the form of pipe with bell and spigot, screw, or other equally gas-tight joints, or they shall be in the form of special flue blocks or flue linings of clay or concrete built into a masonry wall. Such blocks or linings shall be laid with full mortar joints. The materials employed in forming any gas flue shall be incombustible and corrosion-resistant. The types, thickness and arrangement shall obviate temperatures in excess of 160° F. on adjacent combustible materials. No sheet metal flue shall be permitted. Where gas flues extend through combustible walls or partitions, they shall have a full one-inch air space between their exterior walls and any combustible material. No sand and lime brick or sand and lime block shall be used in the construction of any chimney, tile-lined or otherwise.
2. Fireplace flues shall be not less than 8½" x 13" outside if rectangular nor 10" inside diameter if round. Flues for other heating units shall be not less than 8½" x 8½" outside nor 7½" inside diameter; such flues shall have a cast iron clean-out door set at least 3' 0" below the smoke pipe inlet.
3. In masonry chimneys containing three or more flues, each group of two flues shall be separated from the other single or group of flues by brick withes not less than 3¾" wide. Where two flues are grouped without withes, the joints in the respective flue linings shall be staggered.
4. No wood joists or beams shall be built into or rest on brickwork forming any chimney. Nor shall any floor framing be within 2" of any chimney or within 4" of the back of any fireplace.
5. A stone, concrete or metal cap, with an adequate drip, shall be applied to the top of each chimney.
6. Every chimney shall extend at least 3' above the highest point at which it comes in contact with the roof of a building, and at least 2' higher than any ridge, parapet wall, or roof structure within 10' of the chimney.

7. Vents from gas burning and jacket hot-water heaters may connect into the heating flues, provided the connection is below the breeching.
8. No chimney shall be corbelled more than 8" from any wall. Corbelling shall start at a point not less than 2' below the bottom of the floor joists, except that where corbelling occurs above the first storey it shall not project to an extent of more than 4" on the face of any wall and then only if it projects to an equal extent on both sides of the wall. Brick corbelling shall be bonded to concrete block foundation walls.
9. No flue shall be offset to a greater angle than 30 degrees from the vertical. An offset shall not reduce the effective area of a flue.
10. Flues may be located in a chimney in a common or party wall.

30. FIREPLACES

(a) Requirements for any Fireplace Burning Solid Fuels

1. The back and sides of every fireplace shall be constructed of clay or shale brick, or cut or cast stone at least 8 inches thick or of rubble or hollow clay or concrete units at least 12 inches thick. Walls of hollow units shall be at least two units thick with joints staggered. All fireplace walls shall be lined with firebrick or other approved material, or alternatively the minimum wall thicknesses shall be increased 4 inches. Fire-brick shall be laid in fireclay mortar or high-temperature cement. Where the firebrick lining has a minimum thickness of 4 inches, it may be included as part of the required minimum wall thickness.
2. Every fireplace shall be connected to a chimney flue through a smoke chamber and damper. Ash dumps shall empty into enclosed chambers of incombustible material provided with metal clean-out doors.
3. Every fireplace shall have a hearth projecting at least 16 inches from the chimney breast and extending at least 8 inches beyond each side of the fireplace opening. Support for such hearths shall be provided either by masonry trimmer arches haunched against a trimmer joist, or by masonry or reinforced concrete construction corbelled or cantilevered from the chimney or otherwise carried by approved fire-resistive construction. The minimum thickness of incombustible material composing the hearth and its supports shall be 6 inches.
4. No wood shall be placed within 8 inches of the jambs or 12 inches of the top or arch of any fireplace opening.

(b) Imitation Fireplaces

1. Fireplaces for gas heaters shall not be constructed in imitation of standard fireplaces unless they conform in all respects, including chimney flues, to standard fireplaces. Gas space heaters may be installed in recesses not more than 6 inches in depth, provided such recesses are constructed entirely of incombustible materials.
2. Electrical fireplaces may be constructed provided the recess is lined on sides, back, and top with at least one inch of incombustible material. No flue or vent shall enter such recess.

31. WINDOWS

(a) Frames

1. Wood frames shall be not less than No. 2 Common White Pine or No. 2 Clear Douglas Fir.
2. Frames of materials other than wood may be employed if declared eligible by C.M.H.C.

(b) Sash

1. Materials:
 - (i) Wood window sash, etc., shall be made of White Pine No. 3 cuts and better, No. 2 Clear and better Western Red Cedar, or of wood of equal quality and grading $1\frac{3}{8}$ " minimum thickness.
 - (ii) Sash of materials other than wood may be employed if declared eligible by C.M.H.C.
2. Method of Hanging:
 - (i) Double hung sash shall be fitted with approved spiral, spring or other balances.
 - (ii) No casement windows other than in basements shall open in, unless designed to an approved detail.
3. Blinds or shutters are optional.
4. Approved metal or other weatherstripping should be employed.

32. DOORS

(a) Public Exit Doors

1. A single exit door shall be 3' 0" wide. If two or more exit doors are hung in one opening, each door shall have a minimum width of 28".
2. Required exit doors and frames shall comply with requirements of Section 7 (e).

(b) Public storage, laundry, recreation and service areas shall be provided with doors 3' 0" wide.

(c) *Doors in Housing Units*

1. Door Widths:

- (i) Front and service entrance doors to housing units shall be not less than 2' 10" wide.
- (ii) Bathroom doors shall be not less than 2' 0".
- (iii) Clothes closet doors shall be not less than 2' 0".
- (iv) Other room doors shall be not less than 2' 6".

2. Front and service entrance doors shall comply with requirements of Section 7 (e).

3. Doors in Housing Unit Interiors:

The choice of material to be used and the type of door is left with the owner. The minimum thickness of all interior doors to rooms, closets, etc., shall be 1 $\frac{3}{8}$ ".

(d) *Door Frames*

- 1. Frames within housing units which do not form part of an exit closure giving access to public exits, shall be not less than No. 2 Common White Pine or No. 2 Clear Douglas Fir.
- 2. Frames for doors referred to in Section 32 (a) (b) and (c) 2 shall conform to applicable requirements of Section 7 (e).
- 3. Steel door frames shall be prime painted with a rust inhibitive paint before erection or otherwise treated to prevent corrosion.

33. EXTERIOR WOOD TRIM

Material used in outside wood trim shall be not less than No. 2 Common White Pine, No. 2 Clear Douglas Fir, Western Hemlock or Western Red Cedar, or equivalent grades of other suitable woods.

34. STAIRWAYS

(a) *Headroom*

- 1. Public stairs, minimum headroom 7' 0".
- 2. Private stairs, minimum headroom 6' 4".

(b) *Width*

1. Public Stairs:

- (i) Width of any public stairs shall be determined by the number of persons for which sleeping accommodation is intended to be provided. Each standard bedroom shall be considered to accommodate two persons. Each combination room intended to include room for sleeping shall be considered to accommodate two persons.

- (ii) The aggregate number of persons shall not be accumulative from floor to floor.
- (iii) Minimum permissible width of any exit stairs shall be 36", into which width handrails only may project, providing that greater widths shall be required, as follows:

<i>No. of Persons which may be given Sleeping Accommodation</i>	
1st floor	Floors above or below 1st floor
44" for..... 50- 99 persons	30-59 persons
66" for..... 100-149 persons	60-89 persons

- (iv) No exit stairs shall become narrower in the direction of progress towards the exit opening to the exterior of an apartment house.

2. Private Stairways:

- (i) Main stairs shall be not less than 36" wide clear of all projections except handrails which may project not more than 2".
- (ii) The clear width of stairs to attic storage space and basement which are not part of an exit, may be not less than 30". Exit stairs shall be not less than 36" wide.

(c) Handrails

Handrails shall be provided for stairs as follows:

- 1. All stairs shall have walls or substantial balusters or guards on each side. Continuous handrails shall be placed on at least one side of every stair less than 44" in width.
- 2. Stairs 44" or more in width shall have handrails on both sides.

(d) Treads

All stairs shall have runs which are not less than 9" per step exclusive of nosing.

(e) Risers

Riser heights shall be the same in any stairs which provide a continuous route from one floor to another.

- 1. Public Stairs excepting service stairs shall have riser heights not in excess of 7¾". There shall be not less than 2 nor more than 18 risers in a flight.
- 2. All other stairs shall have riser heights not in excess of 8". For private basement stairs not giving access to habitable rooms in the basement, a maximum riser height of 9" is permitted.

(f) Winders

- 1. Winders are not permissible on required public stairs.

2. In private stairs winders will be permitted on one 90° turn only and shall consist of two angled risers with three winding treads.

(g) *Landings*

The length and width of landings shall be not less than the width of stairways in which they occur, provided that in a straight run, the distance between risers on a landing shall not be required to exceed 44". A landing is required at the top of any stair run having a door which swings toward a stair.

(h) *Construction*

Public Stairways:

- (i) When treads or landings are of stone, masonry or ceramic material, they shall be supported under their entire area by solid steel plates at least $\frac{1}{8}$ " thick. When stairs are of incombustible construction, for example, steel or reinforced concrete, such treads and landings may be solidly supported for their entire length and width by the material of which the stairs are constructed. Treads and landings shall present a skid-proof surface.
- (ii) Public Stairs constructed of combustible materials shall have their undersides protected by not less than 1" of gypsum or cement plaster on metal lath, or approved equivalent. Stairs shall be carried by not less than three stringers per flight with a minimum effective depth of $3\frac{1}{2}$ ". Full bearing shall be provided at each end of a flight.

35. FLOORING

(a) *Sub-Floor*

1. Sub-flooring shall be laid over all combustible floor construction.
2. Materials for sub-flooring may be $\frac{3}{4}$ " tongued and grooved or shiplap boards laid diagonally, or plywood described in Section 26.
3. Substantial blocking shall be used to support all wood sub-flooring at the boundaries of all floor areas. Where the sub-floor is plywood and finish such as asphalt tile, linoleum or similar finish is applied direct, joints at the plywood edges not supported by the floor joists shall be carefully blocked by sound pieces cut between the floor joists.
4. Preparation of sub-flooring to receive finish other than wood.
 - (i) Plywood, or approved fibreboard shall be laid over diagonal sheathing as a base for linoleum, asphalt, rubber tile or similar flooring product.
 - (ii) Concrete base may be used for linoleum, asphalt, rubber tile and similar floor if it is trowelled to a smooth, level

surface. This concrete base may be placed over combustible or incombustible materials. Concrete base shall be used for ceramic and quarry tile, and terrazzo.

(b) Building Paper

1. Dry asbestos paper weighing 14 pounds to the square shall be used between finish wood flooring and wood sub-floor erected on combustible construction where such floors separate one housing unit from another.
2. Building paper should be used between wood sub-floor and wood finish floor when the floor does not form a separation between two living units.
3. Paper of suitable type and weight shall be used under resilient flooring — linoleum, asphalt and rubber tiles — as required by the manufacturer of such finish floor. This is in addition to requirements of (b) 1. above.

(c) Finish Flooring

1. Material Types and Grades:

- (i) Birch, maple, beech and oak matched flooring No. 2 grade or better, and edge grain clear Douglas fir No. 2 matched flooring, are acceptable for uses indicated in Section 35 (c) 2.
- (ii) Linoleum, asphalt tile, rubber tile, cork tile and flooring of similar nature may be used in any private, public or work space excepting boiler rooms, maintenance work shops or similar areas where unusually severe conditions might occur.
- (iii) Ceramic tile, quarry tile or terrazzo should be used in public washrooms, and in laundries, slop sinks and janitor's closets and similar areas where unusual moisture conditions may exist.
- (iv) Concrete floors shall be used in boiler equipment, storage and maintenance workshop areas, service areas and built-in garages.

2. Finished Wood Flooring:

- (i) Wood floors placed over wood sub-flooring shall be not less than $\frac{3}{8}$ " thick if hardwood, and shall be not less than $\frac{3}{4}$ " if of Douglas fir.
- (ii) Wood floors placed over wood sleepers on incombustible construction shall be not less than $\frac{3}{4}$ " thick.
- (iii) Douglas Fir shall not be used for finish flooring in public spaces or in kitchens.
- (iv) Finished wood flooring shall not be used in bathrooms, water closets, laundry or slop sink areas.

3. Linoleum within a housing unit shall be not less than grade A. Linoleum when used in public corridors, passageways and

vestibules shall be not less than AA grade. Asphalt tile floors shall be $\frac{1}{8}$ " thick or better in private areas and $\frac{3}{16}$ " thick in public places.

36. INTERIOR TRIM

- (a) Steel trim shall be primed before installation with a rust inhibitive paint. Aluminum mouldings shall not be permitted to come in contact with masonry, plaster, mortar or concrete unless treated with a protective coating.
- (b) Wood trim shall be clean, sound stock suitable for receiving a good paint or varnish finish. Moisture content at time of installation should not exceed 12%. The choice of material is left with the owner.
- (c) Architraves around all door openings in walls and partitions; base and shoe mould around all walls; window stools and aprons at windows; suitable wood trim elsewhere for protection of plaster work, etc.; hook-rails and cupboard shelving, should be provided in accordance with the type and cost of the building being constructed.

37. KITCHEN STORAGE

- (a) Each kitchen shall have at least 24 lineal feet of shelf space not less than 11" deep for dishes and miscellaneous kitchen storage. Shelving higher than 6' 6" from finish floor shall not be considered in determining the required shelf space.
- (b) In addition to the above, complementary base cabinets and counter-top work space shall be provided.

38. MEDICINE CABINET, CLOSET SHELVING, ETC.

- (a) A built-in medicine cabinet with plate glass mirror in the door shall be provided over the basin in bathrooms.
- (b) A coat rod, hook rail and at least one shelf shall be installed in the entrance coat closet and all bedroom closets. At least four shelves shall be provided in the linen closet. Shelves shall be dressed material suitable for painting.

39. INSULATION

- (a) Exterior wall and ceiling construction, together with the insulation, shall provide an over-all heat transmission coefficient "U" not greater than 0.15.
- (b) Calculations shall be based on heat transmission co-efficients listed in the latest issue of "Heating, Ventilating and Air Conditioning Guide" published by the American Society of Heating and Ventilating Engineers or on co-efficients established by actual test at the National Research Council or other recognized laboratories.

40. VAPOUR BARRIERS

(a) Necessity

1. Vapour Barriers shall be used:

- (i) Wherever loose fill insulation is used.
- (ii) Wherever wool type batts which do not have the required vapour barrier qualities in the back or wrapping are used.
- (iii) Around windows, doors or openings, or where studs are not standard spacing.
- (iv) Where required for alternative types of sheathing.

2. Vapour Barriers should be used:

- (i) Where the insulating medium of exterior walls consists of an insulating plaster base.
- (ii) To reduce passage of vapour through joints between vapour barrier backed wool batts.

(b) Required Impermeability

The material used shall have a vapour diffusance coefficient "D" expressed in gm. per twenty-four hours, per square metre, per mm. Hg. not greater than 0.5.

(c) Types of Vapour Barriers

Approved types of vapour barriers may be ascertained from C.M.H.C. or from the lending institutions.

(d) Erection

Vapour barriers shall be applied as near as possible to the interior finish on exterior walls and top floor ceilings. All edges or joints shall be lapped and sealed. Horizontal joints shall be backed up with a plate or header. The barrier shall be brought up tight against electrical outlets, air registers, door and window frames, and other similar openings. Where lath requiring a plaster key is used, the barrier should be applied loosely to permit formation of a proper key. Vapour barrier paper backing on wool batts used between studs and ceiling joists shall be nailed or stapled to the inside face of the studding or the underside of ceiling joists. The adjoining flange shall be lapped over and nailed or stapled so that the joints are sealed.

A POORLY INSTALLED OR APPLIED VAPOUR BARRIER WILL FAIL TO FUNCTION EFFICIENTLY.

41. LATHING AND PLASTERING

(a) Interior Plastering

1. Plastering shall be at least three-coat work upon masonry walls, wood lath, gypsum plaster board or fibre board base. On these bases brown coat may be doubled back on scratch coat. Three-

coat work shall be applied on metal lath. The thickness shall be not less than $\frac{1}{2}$ " measured from the face of the lath.

2. Plastic quicklime, hydrated lime or calcined gypsum may be used for interior plastering. Quicklime shall not be used in any work until it has been slaked at least seven days. Hydrated lime putty shall stand at least twenty-four hours before mixing and using.

Lime plaster shall only be used on masonry or wood lath.

Hair or fibre shall not exceed three bushels per cubic yard of sand.

Mixes for scratch and brown coats shall be as follows:

Scratch Coat for Lath:

- 1 part lime to 3 parts sand by volume.
- 1 part gypsum plaster to 2 parts sand by weight.

Scratch Coat on Masonry:

- 1 part lime to 3 parts of sand by volume.
- 1 part gypsum plaster to 3 parts of sand by weight.

Brown Coat:

- 1 part lime to 3 parts of sand by volume.
- 1 part gypsum plaster to 2 parts of sand by weight.

3. The finishing coat shall be that generally known as Hard Finish made by using lime-putty or hydrated lime, gauged with not less than 25% (by volume) plaster of paris to produce a hard setting material capable of being trowelled to a smooth finish. Sand finished work may also be applied as a finishing coat. Cornices and decorative work shall be run or cast in plaster of paris on appropriate grounds.

(b) *Lath*

1. Wood lath shall be sound Pine, Douglas fir or comparable material set with joints broken every ten laths. Laths and plaster brown coat shall be taken down to the floor-line.
2. Wood fibre base sheets not less than $\frac{1}{2}$ " in thickness or gypsum plaster base sheets not less than $\frac{3}{8}$ " in thickness shall be of approved manufacture applied according to the manufacturer's directions.
3. Expanded metal lath shall be either painted or galvanized and shall weigh not less than 3 lbs. per square yard.
4. Other types of plaster base may be employed if declared eligible by C.M.H.C.

(c) Lathing

1. Lath shall be installed so that vertical joints do not occur on jamb studs in the first course above the heads of openings.
2. Corner beads shall be installed on all external corners.
3. Cornerites of metal lath or wire fabric shall be installed at all internal angles except where special clip systems are used for installing the lath and the manufacturers of such systems do not recommend cornerites. Minimum width of cornerites 5", applied $2\frac{1}{2}$ " on each surface of internal angles.
4. Metal lath shall be applied with lapped joints. Metal lath over solid wood surfaces shall be installed on furring strips or by the use of double-headed furring nails.

42. OTHER INTERIOR FINISH

Plaster Boards, Fibre Boards, Plywood, etc.: Ceiling and wall coverings shall be approved plaster board or fibreboard made expressly for wall coverings. The board shall be applied to furring or studding placed at 12" or 16" o.c. Joints shall be made as recommended by the manufacturer. Fibreboard shall be not less than $\frac{1}{2}$ " thick. Plaster board shall be not less than $\frac{3}{8}$ " thick.

Plywood shall conform with requirements of Sections 26 and 27.

Other types of wall covering may be used if declared eligible by C.M.H.C.

43. EXTERIOR PLASTERING (STUCCO)

- (a) Stucco shall be run either direct on concrete surfaces or on galvanized iron expanded (or other) metal lath weighing not less than 3 lbs. per sq. yard fastened to wood furrings $\frac{3}{8}$ " thick at 12" o.c. Stucco shall not be run direct on brick surfaces.
- (b) Flat or expanded metal lath shall be applied on not less than $\frac{3}{8}$ " furring strips at 12" o.c. over building paper on the sheathing.
- (c) Furring strips may be omitted if $\frac{3}{8}$ " galvanized, self-furring rib lath, weighing not less than 3 lbs. per sq. yd. is nailed with large headed galvanized nails to provide a $\frac{3}{8}$ " key for the stucco.
- (d) 16 gauge galvanized wire fabric or No. 20 gauge galvanized 1" x 1" loop wire applied to $\frac{3}{8}$ " x $\frac{7}{8}$ " furrings at 12" o.c. or nailed with flat head furring nails which will ensure the wire being held $\frac{3}{8}$ " from the sheathing may be used. Nails shall be spaced not more than 12" o.c.

- (e) Western Red Cedar lath, No. 2 or better grade, will be permitted for stucco work on Vancouver Island and the lower mainland coastal region of British Columbia. Other species of wood will not be acceptable for stucco lath.
- (f) Stucco shall be composed of a scratch coat made of 1 part Portland Cement, 3 parts sand and sufficient hydrated lime (10%) to make a workable mortar, and shall be pressed on to the wall to fill the space back of metal lath. It shall be well scratched and kept moist for two or three days. This coat shall be followed by a base coat of the same composition and left to set for a few days.
- (g) The finishing coat applied to this surface (which must be first moistened) shall be made of a Portland Cement hydrated lime mixture, coloured if required with mortar stains, or it shall be made with an approved brand of cement stucco rendering, coloured if required, having satisfactory water repellent qualities and applied according to the manufacturer's instructions.

44. BUILT-IN TOILET FITTINGS

- (a) A towel bar, soap holder and paper holder shall be built into each bathroom and toilet room in housing units.
- (b) Other fittings, such as glass shelves under medicine cabinets, tooth brush holders and grab bars should be installed.

45. ROOFING

- (a) *Roof Designation*
 - 1. A flat roof shall be considered as a roof which does not slope more than 3" in 12".
 - 2. A flat pitch roof shall be considered as a roof which slopes more than 3" in 12" but less than 5" in 12".
 - 3. A pitch roof shall be a roof sloping not less than 6" in 12", except on Vancouver Island and the lower coastal region of the British Columbia Mainland where a pitch roof may slope not less than 5" in 12".
- (b) *Usage for Roof Covering Types*
 - 1. Gravel, crushed stone or crushed slag is permissible as surfacing on bituminous composition roof coverings on flat roofs only.

Construction of such roofing shall be not less than that required to meet the manufacturer's specification for a ten-year bonded roof.

2. Bituminous composition roof coverings should be nailed to the decks of all flat pitch roofs. Nailing is mandatory if the deck slopes more than 4" in 12".
3. Shingles of any material shall be used only on pitch roofs.
4. Metal roof coverings are acceptable on flat pitch and pitch roofs.

(c) Fire Resistive Roof Coverings

Any roof covering meeting the requirements for Class B covering as set forth in the latest "List of Inspected Fire Protection Equipment and Materials" published by Underwriters Laboratories Incorporated (U.S.A.), shall be accepted as a "fire-retardant" roof covering.

(d) Minimum Roof Surfaces Where Fire Resistance Is Not Mandatory

1. Flat Roofs

Any roof covering meeting the requirements for Class C covering as set forth in the latest "List of Inspected Fire Protection Equipment and Materials" published by Underwriters Laboratories Incorporated (U.S.A.), shall be accepted.

2. Flat Pitch Roofs

Flat pitch roofs shall be covered with not less than 16 oz. copper, 26 U.S. gauge galvanized copper bearing sheet metal, 14 oz. zinc, or 22 gauge (B & S) aluminum.

3. Pitch roofs shall be covered and left water-tight by the employment of one of the following materials laid in accordance with the manufacturer's directions.

(i) Sheet Metal Roofing

Sheet metal roofing shall be not less than 26 U.S. gauge galvanized copper-bearing sheet steel, 16 oz. copper, 14 oz. zinc or 22 B. & S. gauge aluminum. At least one layer of not less than 12 lb. building paper shall be laid between the roofing and sheathing.

(ii) Slate and Tile

Roofing slate, hard-burned tile or similar roof covering may be used. Valleys, hips and ridges shall be protected by not less than 26 U.S. gauge galvanized copper-bearing sheet steel, 16 oz. copper, 14 oz. zinc or 22 B. & S. gauge aluminum. At least one layer of not less than 12 lb. building paper shall be laid between the roofing and sheathing.

- (iii) Asphalt felt shingles shall weigh not less than 210 lbs. to 100 sq. ft. of roof surface. Valleys, hips and ridges shall be slate surfaced roof material as recommended by the shingle manufacturer, or sheet metal as described in clause (ii) preceding.
- (iv) Rigid asbestos-fibre Portland cement base shingles shall weigh not less than 250 lbs. per 100 sq. ft. of roof surface.
- (v) Wood Shingles Shall Meet the Following Requirements:

Grade	Thickness in Inches	Length	Maximum Exposure	Minimum Width	Maximum Width	Amount of Clear Butt
No. 1-5X.....	5/2	16"	5"	3"	14"	all clear
No. 2-5X.....	5/2	16"	5"	3"	14"	12"
No. 3-5X.....	5/2	16"	5"	2½"	14"	8"
Perfection						
No. 1 Grade.....	5/2¼	18"	5½"	3"	14"	all clear
No. 2 Grade.....	5/2¼	18"	5½"	3"	14"	12"
No. 3 Grade.....	5/2¼	18"	5½"	3"	14"	8"
Royals						
No. 1 Grade.....	4/2	24"	7½"	4"	14"	all clear
No. 2 Grade.....	4/2	24"	7½"	3"	14"	16"
No. 3 Grade.....	4/2	24"	7½"	3"	14"	10"
No. 1-3X.....	6/2	16"	4½"	3"	.....	all clear
Eastern Extras.....	5/2 1/8	16"	5"	3"	.....	all clear
Eastern Clears.....	5/2 1/8	16"	5"	3"	.....	7"

Thickness represented as 5/2 shall mean that 5 butts placed together shall measure not less than 2", etc. For first-class roofs, only shingles measuring 5 butts to 2" or thicker and conforming to grade specification for all clear shingles should be used.

The use of hot-dipped zinc coated copper or other rust-proof nails is recommended for the application of wood shingles.

46. SHEET METAL WORK

(a) Material

Copings, flashings, ornamental work, gutters and down spouts, etc., shall be not less than 26 U.S. gauge galvanized copper-bearing sheet steel, 14 oz. zinc, 4 lb. sheet lead, 16 oz. copper or 22 (B. & S.) gauge aluminum.

Building paper shall be placed under all flashings.

Nails, screws or other fastening devices shall be of the same material as the flashing or of a compatible material.

Aluminum shall not come in direct contact with masonry unless protected with a coating recommended by the manufacturer.

(b) Openings

1. Sheet metal shall be installed behind finish siding material and be turned down over outside edge of drip cap above heads of openings in wood frame walls.
2. Sheet metal or membrane water-proofing shall be installed above the heads and beneath the sills of openings in masonry veneered wood frame walls.
 - (i) Head flashing shall extend from front edge of lintel up and over top of lintel and up on sheathing under the building paper.
 - (ii) Sill flashing shall extend under masonry sill up on sheathing and under the wood sill.
 - (iii) Sheet metal or membrane water-proofing material shall be installed at heads and sills of openings in masonry walls.
 1. Head flashing shall extend from front edge of lintel up and over top of lintel through wall and be turned up at least 1" on inside surface.
 2. Sill flashing shall extend under and behind the masonry sill.
 - (iv) Sheet metal flashing shall be installed over the heads of openings in stuccoed wood frame walls. Flashing shall form a drip at the outside edge of the drip cap and extend over the cap and up behind the building paper beneath the stucco.

c) Intersections

1. Sheet metal flashing shall be installed at all horizontal and vertical intersections between stucco and other materials.
2. Intersections of roof and wall or roof and parapet shall be flashed. If walls are masonry or masonry veneer, sheet metal counter-flashing shall be installed.
 - (i) Use sheet metal flashing on sloping roofs.
 - (ii) Use sheet metal or material similar to roof covering on flat roofs. When sheet metal is not used, instal 45° cant strip on roof and wall intersections.

3. Masonry and wood intersections shall be flashed with sheet metal to completely separate wood from masonry or concrete.

(d) *Chimneys*

1. All chimney and roof intersections shall be flashed and counter-flashed with sheet metal.
2. Cricket or saddle covering shall be sheet metal or same material as roof covering. When other than sheet metal is used, the material shall be flashed and counter-flashed at the chimney with sheet metal.

47. PAINTING

- (a) Quality of ready mixed paints and other protective coatings, and materials used in mixing and thinning shall at least equal the specified requirements of the Canadian Government Specifications Board.
- (b) Ready mixed paint delivered in the original, unopened container should be used; the manufacturer's directions shall be followed exactly. Site mixed paint for exterior work may be prepared from white lead and zinc oxide pigments, linseed oil, turpentine, dryers and colours in oil.
- (c) Exterior woodwork to be stained shall be stained with two coats of creosote stain, or with oil stain followed by two coats of outside (spar) varnish.
- (d) Exterior walls finished with cedar shingles or rough cedar siding may be given two coats of creosote shingle stain or two coats of penetrating oil.

(e) *Interior Painting*

Wood paneling, trim, sash and doors including tops and bottoms shall be finished.

1. Nail holes, cracks and similar defects shall be puttied after prime coating.
2. If painted: minimum acceptable, one prime coat and two finish coats; if open grain wood, apply one coat filler before painting.
3. If stained: stain and one coat of varnish; or stain and one coat of wax. If smooth finish is desired on open grain wood use filler after staining.
4. If natural wood finish: two coats varnish; or two coats wax; or one coat varnish and one coat wax; or other approved finish applied in accordance with the manufacturer's directions.

- (f) Wood floors shall be sanded to a smooth level surface and finished as follows:
 - 1. Open grain wood, coat filler.
 - 2. Minimum finish, all wood floors:
 - (i) Two coats wax; or
 - (ii) Stain and two coats wax; or
 - (iii) One coat shellac, varnish or lacquer and one coat wax; or
 - (iv) Two coats varnish; or
 - (v) Two coats floor enamel and one coat wax; or
 - (vi) One coat sealer and two coats wax.
 - (vii) Flooring prefinished at the factory may be used.
- (g) Interior walls and ceilings should be decorated with any of the following to the owner's choice:
 - 1. Glue size tint
 - 2. Water paint
 - 3. Casein paint
 - 4. Resin emulsion paint
 - 5. Oil paint
 - 6. Wall paper

48. GLAZING

- (a) All sheet glass used in window sash, storm sash, or door lights, shall be not less than Grade B quality. Glass sizes and strengths shall be as follows:
 - 1. Sheet glass, single strength—(not less than 18 oz. per sq. ft.)

	<i>Max. Height or Length</i>	<i>Max. Area Sq. Ft.</i>
Basement sash.....	16"	2
Storm sash.....	30"	5
Fixed wall sash.....	24"	4
Moving window sash.....	17"	2

(Single strength glass shall not be used in door lights).
 - 2. Double strength (not less than 26 oz. per sq. ft.)

	<i>Max. Height or Length</i>	<i>Max. Area Sq. ft.</i>
Fixed wall sash.....	48"	16
Moving window sash.....	42"	12
Door Lights.....	12"	1

3. For lights which are larger than the above or where extreme wind velocity is known to recur year after year, install plate or other type of glass guaranteed suitable for the purpose by the glass supplier.

(b) *Installation*

1. Glass shall be set in linseed oil putty, mastic glazing compound or an approved rubber strip.

Glass in doors shall be secured with wood stops; other glass may be face puttied with putty or mastic glazing compound.

Glass set in steel or metal frames shall be bedded in mastic glazing compound for the purpose.

Sprigs or glazing points shall be used to secure all glass bedded in putty or glazing compound.

2. Mirrors shall be installed on wood blocks.

Mirrors in doors shall be separated from the doors by felt cushions.

An air space shall be provided behind each mirror for ventilation.

- (c) The following items are optional, but if included shall be listed in the specifications: Mirrors in bedroom doors, bathroom or other locations; glass block, leaded glass, patent double glazing.

49. PLUMBING

(a) *Required Facilities*

1. Each housing unit shall be provided with at least one kitchen sink, one water closet, one lavatory and one bath tub.

2. Laundry facilities shall be provided either in each housing unit or grouped elsewhere in the building in a location conveniently accessible from each housing unit. If laundry facilities are provided in the housing units, a combination sink and laundry tray fixture or a separate double laundry tray shall be installed. If grouped laundry facilities are provided a double laundry tray shall be installed for each ten or less housing units. An automatic type of washing machine may be used in lieu of laundry trays.

A drying room or mechanical dryer shall be provided. Space for at least 50 lineal feet of clothes drying line should be provided in the drying room for each ten or less housing units.

3. If grouped laundry facilities are installed, a public water closet room equipped with at least one water closet and one lavatory shall be provided near the room housing the laundry facilities.

4. If a janitor's housing unit is not provided, a separate toilet room equipped with at least a water closet and lavatory shall be provided adjacent to the boiler room or other work-room.

(b) Fixtures Clearance

1. A distance of at least 1' 6" shall be provided between the front of the W.C. and the face of any other fixture or wall.
2. The W.C. or the wash basin may be located in a recess provided the recess is not less than 2' 6" wide.

(c) Water Supply and Distribution

1. Each apartment building shall be supplied with water from a public or community system acceptable to provincial authority. If such systems are not available a private source of potable water may be employed if provisions are made to have such water tested and approved by the provincial department of health at least three times each year. Water to be tested shall be drawn from the well immediately following the spring thaw, about the first of August and the first of January.
2. Piping for both cold and hot water shall be run to each kitchen sink, lavatory, bathtub and slop sink, as well as to grouped or individual laundry equipment. A cold water line shall be run to all W.C.'s.

(d) Sewage Disposal

1. All wastes from plumbing fixtures shall be water carried to the building sewer.
2. The building sewer shall discharge into a public sewerage system, where available.
3. The building sewer of an apartment building comprising not more than four housing units may discharge into a septic tank and disposal field if approval is obtained from provincial Department of Health.
4. Rain water leaders shall not be used as soil, waste or vent pipes.
5. If a private sewage disposal system is required for a project comprising more than four housing units it shall be considered as a special case requiring approval of C.M.H.C.

(e) Materials

1. Any building sewer shall be of cast iron, vitrified clay, bell and spigot concrete, acceptable asbestos-cement or tar impregnated cellulose fibre pipe.
2. Drain lines below basement floor shall be either extra heavy (XH) cast iron, medium weight cast iron, vitrified socketed

clay tile or tar impregnated cellulose fibre. If cast iron is used the joints shall be packed with oakum and caulked with lead or made with other materials acceptable to C.M.H.C.

3. Cold and hot water piping shall be not less than standard weight galvanized steel pipe, copper pipe or tubing or brass pipe, except in areas where corrosion is severe. In districts where the water supply is known to have a severe corroding effect on galvanized pipe, copper or brass tubing or piping, with copper or brass fittings shall be used. In such districts a copper alloy or other non-corrodible metal tank is recommended for domestic hot water.
4. Gas piping shall be not less than standard weight black steel pipe with black cast or malleable fittings.
5. Fittings shall be of the same materials as the pipe with which they are used. Under no circumstances shall iron fittings be used with copper pipe, or copper fittings with iron pipe.
6. Equipment and materials shall be new.

(f) *Authorities*

1. Generally, installation of plumbing systems in compliance with municipal requirements will be acceptable to C.M.H.C. with the proviso noted in items (f) 2 and 3 following.
2. In the absence of a municipal Building Code, Provincial plumbing regulations shall apply.
3. C.M.H.C. may require that all plumbing installations shall at least conform to the requirements of the National Building Code.

50. HEATING

(a) *General*

1. In any apartment building all habitable rooms shall be provided with suitable heating facilities capable of maintaining a minimum interior temperature of not less than 70° at outside design temperatures established by C.M.H.C. for the locality in which the project is located. Interior temperatures of other spaces shall be suitable to the function of such spaces.
2. The capacity of required heating systems shall be determined by computation in accordance with current engineering practice. For the purposes of this section, the manual approved by the Canadian Division of the American Society of Heating and Ventilating Engineers will be accepted as current engineering practice.

- 3. The installation and construction of required heating systems shall be in accordance with current engineering practice.
- 4. Adequate facilities shall be provided for economical delivery and handling of fuel and the products of combustion. Storage shall be provided for not less than one month's supply of fuel for the coldest anticipated weather.
- 5. Manufacturers' and installers' guarantees and service agreements shall be provided in writing. Operating and maintenance instructions shall be securely mounted and posted adjacent to the heating unit.
- 6. Heating equipment shall be complete and in operating condition and the distribution systems shall be balanced to be acceptable. Final acceptance will not be given until a trial test has been given the system in accordance to current engineering practice.

(b) Acceptable Heating Systems

- 1. Central hot water or steam heating systems should be employed for all apartment buildings.
- 2. Systems other than hot water and steam may be considered upon application to C.M.H.C.
- 3. Radiant panel systems of heating will be acceptable providing they are designed and construction is supervised by persons who have proven by experience their success with this method of heating. Warm air will be acceptable as a heat carrier in radiant panel heating provided that such air is completely confined to the duct system.

(c) Fire Safety Requirements for Heating Installations

- 1. Coal fired equipment should not be installed on any floor above the first floor.
- 2. Heaters, furnaces, boilers and plenum chambers shall not be located beneath combustible stair construction.
- 3. Equipment for fuel combustion shall be mounted on floors of incombustible material.
- 4. Clearances Between Heating Systems and Combustible Materials:
 - (i) Any portion of a heating system which may radiate heat from a surface 200° or warmer shall provide minimum

clearances from exposed combustible material in accordance with the following table:

Temperature of Radiating Surface	Clearances
200° — 400°	12"
400° — 600°	18"
600° — 1000°	36"
Any side with ash or fire door 48" clearance	

- (ii) Clearances between steam and hot water pipes may be less than prescribed in the preceding table providing clearance from combustible materials shall be not less than $\frac{1}{4}$ " for hot water pipes and not less than 1" for low pressure steam pipes.
 - (iii) All pipe and equipment coverings shall be incombustible.
5. No smoke pipe shall pass through any combustible material or combustible floor, roof, wall or partition.
 6. All gas or oil burning appliances shall be of a type inspected and approved by either the Canadian Standards Association or the Underwriters' Laboratories Incorporated, and shall bear the "approval label" of either one of these institutions.

51. DOMESTIC HOT WATER

(a) General

Every housing unit, public laundry and slop sink shall be provided with gravity or circulated domestic hot water at a temperature automatically maintained to a maximum of 140 degrees Fahrenheit at the storage tank.

(b) Hot Water Heaters

1. Any type of domestic hot water heater will be acceptable provided the requirements outlined elsewhere in this Section are satisfied and the equipment is approved by either the Canadian Standards Association or the Underwriters Laboratories, Incorporated.
2. Water heater recovery capacities for systems supplying three or more housing units shall be as follows, in U.S. gallons per hour raised through 100° F:

Living Units	Gallons Storage per Living Unit				
	0*	15	20	25	30
3	350	67.5	62.5	56	49
4	375	90	82.5	74	65
5	405	108	100	88	79
6	420	126	116	102	91
7	432	144	132	118	103
8	445	160	148	132	115
9	458	177	164	147	127
10	470	194	180	162	137
15	515	271	248	220	188
20	556	334	308	274	234
25	597	388	358	320	274
30	642	443	408	364	314
40	720	540	498	452	389

*0—Instantaneous or Tankless Heaters.

(c) *Storage Tanks*

1. A minimum storage capacity of 15 gallons per housing unit shall be provided in storage type systems.
2. Storage tanks shall be insulated with mineral wool, cellular asbestos or other materials acceptable to C.M.H.C.

(d) Combination relief and pressure valves shall be provided at storage tanks. Capacities of valves shall be sufficient to at least balance the recovery capacity of heaters.

(e) Fire safety requirements for domestic hot water supply installations shall be the same as the applicable requirements in Section 50 (c).

52. ELECTRICAL WORK

(a) *General*

1. All electrical installations shall at least conform to the Canadian Electrical Code and shall, in addition, satisfy provincial or municipal regulations in respect to electrical work.
2. Wiring installations shall be of sufficient capacity to provide, without overloading, electric energy for:
 - (i) required illumination.
 - (ii) efficient operation of appliances and equipment intended to be installed in the completed apartment building.
 - (iii) the use of radios, electric irons, heaters, heating pads and electric blankets, as may be permitted by the Provincial and Municipal authorities concerned.
3. All wiring shall be concealed. All materials and equipment shall be new.

(b) *Housing Unit Requirements*

- 1. Outlets:
 - (i) Ceiling fixtures shall be installed in kitchens, halls, dining rooms and bedrooms.
 - (ii) In bathrooms, wall fixtures shall be installed at mirror.
 - (iii) Convenience outlets:
 - 1. Living room shall be provided with one duplex outlet between all doors and between doors and fireplace, when separated sufficiently for placement of furniture.
 - 2. Minimum number of duplex outlets where ceiling fixtures are installed: at least one in a dining room or dining space; not less than two in each other habitable room.
 - 3. In rooms where ceiling fixtures are not required and not installed, minimum number, three duplex outlets.
 - 4. Special purpose outlets shall be installed for each unit of equipment such as electric ranges, water heaters, automatic washers and dryers, etc.
 - 5. Outlets should be provided in closets.
- 2. Switches:
 - (i) Each ceiling fixture shall be controlled by a wall switch.
 - (ii) When ceiling fixtures are not installed at least one outlet per habitable room shall be controlled by a wall switch.
 - (iii) Bathroom fixtures shall be controlled by a wall switch.
 - (iv) If a housing unit occupies space on more than one floor, at least one three-way switch shall be provided on each floor to control at least one light for stair illumination.
 - (v) Switches shall not be placed behind doors.

(c) *Service and Public Area Requirements*

- 1. Illumination of public and service areas shall be not less than the following:

	Watts per Square Foot of Floor Area
(i) Business Rooms	3
(ii) Storage Rooms	$\frac{1}{2}$
(iii) Work Rooms and Laundries	2
(iv) Garages	1
(v) Public Toilet Rooms	1
(vi) Public Hallways and Stairways	1

- (vii) Access to fire escape and other required exits shall be clearly marked by a red light or other approved device. Where an exit and its light or sign is not visible from every point in the hallway or undivided floor-area served, suitable directional signs shall be provided indicating the location of the exit.

Every exit in which it is possible to continue in the direction of exit travel past the point at which the exit leaves the building, shall be clearly marked to indicate the level and location at which the exit leaves the building.

2. Convenience Outlets:

- (i) Each public hallway and public stairs shall be provided with at least one duplex outlet.
- (ii) At least one duplex outlet should be installed for every two cars to be accommodated in garages.
- (iii) At least one duplex outlet shall be installed in each boiler room and janitor's work room.
- (iv) Grouped laundry equipment shall be serviced by outlets in accordance with the amount of equipment to be installed or liable to be installed by the tenants.

(d) Exterior Illumination

- 1. Each entrance to an apartment building shall be provided with an exterior lighting fixture.
- 2. At least one exterior lighting fixture shall be provided for each two garages.

- (e) Electrically operated equipment such as circulating pumps, fans, blowers, stokers, etc., shall be of a type inspected and approved by the Canadian Standards Association and shall bear the "approval label" of this Association. Location of such equipment shall be shown on the working drawings and the equipment clearly specified to indicate the type of rating of outlets servicing such equipment.

53. HARDWARE

- (a) Install hardware commensurate with class of housing. Allowance for finishing hardware shall be stated in specifications.
- (b) Exterior hardware material may be of bronze, brass or ferrous metals coated with zinc or cadmium or phosphate treated before painting.
- (c) Exit doors, including exit doors to each housing unit shall be hung on three pairs of butt hinges.

- (d) Public exit doors shall open from inside without the use of a key and shall be hinged to open outward.
- (e) Mail boxes of a type acceptable to Dominion Government Post Office Department shall be installed.
- (f) Electrically operated doors should be installed at main entrances giving access to public corridors.

54. GARAGES

(a) *Space Standards*

Space Standards for attached, detached and built-in garages are as follows:

A garage shall have a clear inside width of not less than 10' 0" between enclosing walls if one car is to be accommodated. If two or more cars are to be accommodated without a separating partition, the garage shall have a clear inside width of not less than 10' 0" for the first car, and 8' 0" for each additional car. The clear inside length of all garages shall be at least 20'. If a truck is to be accommodated, allowance shall be made for the added width or length required.

(b) *Foundations*

1. Foundation walls for detached garages may be either solid concrete or masonry units. The materials shall comply with strength and other relevant provisions of Sections 13 and 14. The thickness of concrete foundation walls beneath detached garages shall be not less than 8" and they shall be provided with footings constructed as described in Section 12. The depth of the footings shall be beneath the normal frost line. Floating slab foundations will be accepted where soil conditions permit, provided such foundations are designed by a registered architect or engineer to comply with site conditions.
2. The foundation between the apartment building and attached garage shall comply with foundation wall requirements for the apartment building proper.
3. The foundation beneath any portion of a built-in garage shall also comply with foundation wall requirements for the apartment building proper.

(c) *Construction*

Walls of attached and detached garages may be of frame or masonry construction.

1. If frame construction, wall studs, collar ties and rafters shall be spaced not more than 20" on centers. The wall studs shall be braced at all corners with either 1" x 4" diagonal bracing

let into the inside face of the studs or with braces the same size as the studs fitted diagonally between the studs. Rafters shall conform to requirements listed in Section 23.

2. If masonry walls are used, material and construction shall conform to requirements listed in Section 21.
3. Insulation need not be incorporated in wall or roof assemblies of attached or detached garages, but should be employed if the garages are to be heated during the winter months.
4. Doors shall be not less than $1\frac{3}{4}$ " thick for hinged types nor $1\frac{3}{8}$ " for rigid one-piece overhead types. The lintel or beam over garage doors shall be sufficiently strong to prevent deflection or sagging beyond 1/240 of the width of the opening.
5. Roofing material shall conform with the applicable requirements of Section 45.

(d) Built-In Garages

Construction of built-in garages shall have a fire resistive rating at least equal to the required fire separations throughout the apartment building proper, but in no case shall wall or roof assemblies in built-in garage construction have a fire resistive rating less than one hour.

55. GRADING AND PLANTING

(a) General

1. All front, side and rear yards shall be graded and sloped to provide drainage from buildings and covered with not less than 3" of top soil suitable for the type of landscaping proposed, except where paving is intended.
2. Grading shall provide reasonable freedom from erosion.

(b) Rough Grading

1. Where lawns and planting are required or intended and re-grading is necessary, the area shall be rough graded to proper levels to receive top soil. Other areas requiring to be graded, but not being planted shall be rough graded to the finished grade elevations.
2. Fills shall be free of debris.
3. Heavy equipment or vibrating compactors shall not be used over septic tanks or tile disposal fields.

- (c)* If the landscaping involves the collection of surface water, catch basins shall be installed and connected to carry such surface water from the site.

(d) *Finish Grading*

1. Debris shall be removed before commencement of rough and finish grading.
2. Finished grade elevations around buildings shall provide continuous slopes away from foundation walls.
3. The finished grade elevations of all unpaved areas shall provide continuous slopes of at least 6" in 25'.
4. When the steepness of slopes of unpaved areas is such as to produce erosion such slopes shall be protected by the use of sod, planting, retaining walls or other suitable measures.

56. SPECIAL EQUIPMENT

(a) Some items of special equipment are listed below. If any one of these or other items are included as part of the contract, the item should be included in the Specifications, accompanying the loan application. Describe in detail including type and size.

1. Oil burner installation. State type and manufacturer's name, catalogue number, capacity of tank, and if tank is to be placed inside the house or buried outside.
2. Refrigerator.
3. Kitchen Stove.
4. Dishwasher.
5. Water Softener.
6. Window Ventilator Fan.
7. Coal Chute.
8. Package Receiver.
9. Garbage Incinerator.
10. Decorative Wrought Iron Work.
11. Lighting Plant.
12. Water Pump.
13. Lightning Rods.
14. Elevators and Dumb Waiters.



_____ **Central**

_____ **Mortgage and**

_____ **Housing**

_____ **Corporation**