

County of Hawai'i

Department of Public Works

Building Division

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Hilo, HI 96720

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RESIDENTIAL BUILDING PLAN REVIEW GUIDELINE

Application Number: _____ Owner: _____

- Hawai'i County Code Chapter 5 (HCC)
- 2006 International Residential Code, (Chapters 1-10, 12-23, Appendix G & H)

The numbered items on the following pages are associated with the above referenced codes, as adopted and amended by the County of Hawai'i . This checklist is intended to provide basic, helpful information only, and shall not be construed as an all-inclusive list of code requirements.

In order to aid with the transition from the 1991 Uniform Building Code to the 2006 International Residential Code, substantial code changes or differences between the 1991 UBC and the 2006 IRC codes are in contained within .. The State & County of Hawai'i amendments to the codes may be found at www.Hawaii county.gov. The Energy Code and resources may be researched at the Hawai'i County Code Section 5-84 and <http://publicecodes.cyberregs.com/icod/iecc/index.htm>.

The issuance or granting of a permit or approval of plans, specifications and computations shall not be construed to be a permit for, or an approval of, any violation of any of the provisions of the County of Hawai'i Building Code or any other ordinance of the County of Hawai'i . Structural elements not conforming to this code shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Permits presuming to give authority to violate or cancel the provisions of the codes and ordinances of the County of Hawai'i shall not be valid. See HCC Chapter 5-19 for exceptions.

Counter hours are from 7:45 a.m. to 3:30 p.m. Monday through Friday (Clerical staff do not accept applications Wednesday afternoons in Hilo or Thursday afternoons in Kona). Meetings may be scheduled by appointment with plans examiners from 7:45 a.m. to 4:30 p.m. to answer permit or code related questions. Additional information will be made available at the Online Public Portal at www.papaaukahi.Hawaii county.gov.



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PERMITS

Refer to the Residential Building Permit Guidelines or Section 5-19 of the Hawai'i County Code. Contact a Building Division office to answer any questions 961-8331 (Hilo) or 323-4720 (Kona).

FLOOR PLAN

1. **ROOM IDENTIFICATION:** HCC Sec 5-20
Each room and its intended use must be clearly shown, labeled, and dimensioned by the applicant on the plans for plan review purposes.

- A. Dwellings must indicate provisions for living, sleeping / bedroom, eating / dining, cooking / kitchen and sanitation / bathroom. (R202 Definitions)
Efficiency Dwelling Units are defined in HCC Sec. 310.3.8.
- B. Accessory Spaces such as decks, lanai, carport/garage should be labeled and areas summarized separately from living spaces.
- C. Bathrooms must contain a water closet, lavatory and either a bathtub or shower.
- D. Detached portions should be labeled by use (bathroom, bedroom, etc.). Note that access to a bathroom or water closet is not allowed by going through another sleeping room when more than one sleeping room is provided. Similarly, a bedroom cannot be accessed by only going through a bathroom or water closet compartment.
- E. An office established in a dwelling for other than personal use may be restricted by the Zoning Code. Please consult the Planning Department when establishing an office in a residence.

2. **EGRESS WINDOWS:** IRC Section R31 0.1 . HCC 5-71 31 0.3.4 Basements, habitable attics, and every sleeping room shall have at least one operable emergency escape and rescue opening. (Habitable attic is an attic area with an occupiable floor area of 70 square feet and ceiling height of at least 7 feet over minimum area of 35 square feet.) Windows shall have a minimum net clear open able area of 5.7 square feet. **Exceptions: Glass jalousie blade windows may be used for emergency escape or rescue.** The minimum clear opening height shall be 24", and the minimum clear opening width shall be 20".

The window shall have a finished sill height at 44" or less above the floor. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys, tools, or special knowledge. Window wells shall be provided when egress windows have a finished sill height below the adjacent ground elevation. The well shall allow the window to be fully opened and provide a minimum accessible net clear opening of 9 square feet, with a minimum dimension of 36". Window wells with a vertical depth of more than 44" shall be equipped with a permanent ladder or steps. See Page 25, *Emergency Egress/Rescue Opening*, for additional information.

3. **SMOKE ALARMS:** IRC Section R313 & HCC 5-71 310.3.10. A smoke alarm listed in accordance with UL217 shall be installed in each sleeping room, including each bedroom, bonus room, habitable attic or loft, and other habitable rooms that could potentially be sleeping rooms that contain an intervening door that can be closed to separate the room from areas otherwise provided with smoke alarms, as well as outside each separate sleeping area in the immediate vicinity of the bedrooms, and each additional story of the dwelling including basements (but excluding crawl spaces and uninhabitable attics.) In dwelling units with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level. When more than one smoke alarm is required to be installed within an individual dwelling unit, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual unit. **Alterations, repairs and additions shall be equipped with smoke alarms located as required for new dwellings, except work performed only on the outside, or plumbing or mechanical work only. Interconnection and hardwiring is not required in existing buildings if the alterations do not result in the removal of wall or ceiling finishes unless there is a basement, attic, or crawl space which could provide access for hardwiring and interconnection without removing the interior finish.**

Note: Habitable rooms such as dens, libraries and home offices that are provided with built in features that establish the specific use of the room as something other than for sleeping, and do not contain clothes closets, need not be considered a sleeping room.



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4. **SAFETY GLAZING:** IRC Section R308.4 & Table R308.3 All glass located in an area considered hazardous must be safety glazed:

1. Glazing in swinging doors except jalousies.
2. Glazing in fixed and sliding panels of sliding door assemblies and panels in sliding and bifold closet door assemblies.
3. Glazing in storm doors.
4. Glazing in all unframed swinging doors.
5. Glazing in doors and enclosures for hot tubs, whirlpools, saunas, steam rooms, bathtubs and showers. Glazing in any part of a building wall enclosing these compartments where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface.
6. Glazing, in an individual fixed or operable panel adjacent to a door where the nearest vertical edge is within a 24-inch (610 mm) arc of the door in a closed position and whose bottom edge is less than 60 inches (1524 mm) above the floor or walking surface.
7. Glazing in an individual fixed or operable panel, other than those locations described in Items 5 and 6 above, that meets all of the following conditions:
 - 7.1. Exposed area of an individual pane larger than 9 square feet (0.836 m²).
 - 7.2. Bottom edge less than 18 inches (457 mm) above the floor.
 - 7.3. Top edge more than 36 inches (914 mm) above the floor.
 - 7.4. One or more walking surfaces within 36 inches (914 mm) horizontally of the glazing.
8. All glazing in railings regardless of an area or height above a walking surface. Included are structural baluster panels and nonstructural infill panels.
9. Glazing in walls and fences enclosing indoor and outdoor swimming pools, hot tubs and spas where the bottom edge of the glazing is less than 60 inches (1524 mm) above a walking surface and within 60 inches (1524 mm) horizontally of the water's edge. This shall apply to single glazing and all panes in multiple glazing.
10. Glazing adjacent to stairways, landings and ramps within 36 inches (914 mm) horizontally of a walking surface when the exposed surface of the glass is less than 60 inches (1524 mm) above the plane of the adjacent walking surface.
11. Glazing adjacent to stairways within 60 inches (1524 mm) horizontally of the bottom tread of a stairway in any direction when the exposed

surface of the glass is less than 60 inches (1524 mm) above the nose of the tread.

Exceptions: Guardrail or handrail complies with R312 and the glass is more than 18" from the railing, or a solid wall or panel extends 34" to 36" above walking surface and top of wall can withstand same forces as a guard.

5. **NATURAL LIGHT & VENTILATION** HCC 5-71 Sec 310.3.5. All habitable rooms shall be provided with aggregate-glazing area of not less than ten percent (10%) of the floor area of such rooms, except for rooms which have artificial light capable of average illumination of 6 foot-candles at a height of 30" above floor level. An adjoining room may be considered under certain conditions of R303.2. Ventilation shall be provided by openings of not less than five percent (5%) (5 sq. ft. min.) of the floor area or whole house ventilation systems designed and installed as specified in Sections M1507 or 310.3.5(c). Bathrooms, water closet compartments, laundry rooms and similar rooms shall be provided with natural ventilation by means of openable exterior openings not less than 1-1/2 square feet. See Items 90-97.
6. **EXHAUST FANS:** IRC Section M1507, Source specific exhaust ventilation is required in each kitchen, bathroom, water closet, laundry room, indoor swimming pool, spa, and other rooms where water vapor or cooking odor is produced. Exhaust fans providing source specific ventilation shall have a minimum fan flow rating not less than 50 cfm at 0.25 inches water gauge for bathrooms, laundries, or similar rooms and 100 cfm at 0.25 inches water gauge for kitchens. The air removed by every mechanical exhaust system shall be discharged outdoors. Air shall not be exhausted into an attic, soffit, ridge vent, or crawl space.
7. **CLOTHES DRYERS:** IRC Sections M1502, 439.3 & G2439.5. Clothes dryer exhaust ducts shall terminate outside the building at least 3 feet away from any openings and be equipped with a backdraft damper. Exhaust ducts shall be constructed of minimum 0.016-inch-thick rigid metal ducts, having smooth interior surfaces with joints running in the direction of air flow. Ducts shall not be connected with sheet metal screws or other fasteners which could obstruct the flow. **Exhaust ducts shall be supported at 4' intervals and secured in place.** Approved (UL 2158A) transition duct of not more than 8' in length may be used within a dwelling, provided



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they are not concealed within construction. Duct length shall not exceed a total combined vertical and horizontal length of 25' from the connection of the transition duct from the dryer to the outlet terminal. The maximum length of the duct shall be reduced in accordance with 1502.6 or the manufacturer's instructions may prevail if the instructions are provided to the inspector at the time of the framing inspection. No screens shall be installed at the duct termination. Where the duct is concealed within the building construction, the equivalent length of the exhaust duct shall be identified on a permanent label or tag located within 6' of the exhaust duct connection.

M1502.6 Dryer Exhaust Duct Fitting Equivalent Per ASHRAE	
Exhaust Duct Fitting Type	Equivalent Length
4" radius mitered 45° elbow	2' 6"
4" radius mitered 90° elbow	5'
6" radius smooth 45° elbow	1'
6" radius smooth 90° elbow	1' 9"
8" radius smooth 45° elbow	1'
8" radius smooth 90° elbow	1' 7"
10" radius smooth 45° elbow	9'
10" radius smooth 90° elbow	1' 6"

8. **RANGE HOOD:** IRC Section M1503, M1901 & HCC Sec 5-71, 310.3.12. The vertical distance between the cooking top of a domestic range and unprotected combustible material shall be 30" or more. Reduced clearances may be permitted in accordance with the listing and labeling of the range hoods or appliances. Commercial cooking equipment shall not be installed within dwelling units; cooking appliances shall be listed and labeled as household-type appliances for domestic use.
9. **WATER CLOSET CLEARANCES:** HCC Sec 5-71, 310.3.5(d). Water closets shall be located in a clear space not less than 30" in width, and not closer than 15" from the center of the fixture to a wall or other side barrier such as a tub. The clear space in front of the water closet shall be at least 24". The ceiling height at the front of the water closet shall be at least 6'8" high, and the ceiling height above the fixture shall be such that the fixture is capable of being used for its intended purpose. When a dwelling contains two or more bedrooms, access to or from a common bathroom (or water closet compartment), shall be arranged such that it is not necessary to travel thru another bedroom to a bathroom *nor* access to bedrooms thru a bathroom (or water closet compartment).
10. **SHOWER AREAS:** IRC P2708. Showers shall have a minimum dimension of 32"x32" minimum clearance and 24" in front of the

opening, and at least 6'-8" clearance above the shower floor or tub. A non-absorbent wall finish shall be provided to a height of not less than 6 feet above the shower floor.

11. **CHIMNEYS & FIREPLACES:** IRC Chapter 10. Factory-built chimneys and fireplaces shall be tested in accordance with UL 127, listed and labeled, and shall be installed and terminated in accordance with the manufacturer's installation instructions. Masonry or concrete fireplaces shall be constructed in accordance with IRC Chapter 10.
12. **FIREPLACE HEARTH EXTENSION:** IRC Section 1001.10. An approved noncombustible hearth must extend at least 16" from the front of, and at least 8" beyond each side of the fireplace opening. Where the fireplace opening is 6 square feet or larger, the hearth extension shall extend at least 20" in front of, and at least 12" beyond each side of the fireplace opening.
13. **CLEARANCE TO COMBUSTIBLES:** IRC Section 1003.18, 1001.11. When masonry chimneys are built within a structure, a 2" clearance to combustible material is required. When a chimney is placed on the exterior of the structure, a 1" clearance is allowed. Combustible material shall not be placed within 6" of fireplace opening. No combustible material placed within 12" of the fireplace opening (such as mantles or decorative fireplace surrounds) shall project more than 1/8" of each 1" clearance from the opening. See IRC Chapter 10 for additional requirements.
14. **COMBUSTION AIR:** IRC Section M1701.1. Solid-fuel- burning appliances shall be provided with combustion air in accordance with the appliance manufacturer's installation instructions. Oil-fired appliances shall be provided with combustion air in accordance with NFPA 31. The requirements for combustion and dilution air for gas-fired appliances shall be in accordance with Chapter 24. Fireplaces shall comply with Section 1001.
15. **APPLIANCE LOCATIONS:** IRC Section G2406.2. Fuel burning appliances shall not be installed in a sleeping room, bathroom, toilet room, or closet. *Exception: direct vent appliances (see IRC Section G2406.2 for additional exceptions).*
16. **PROTECTION OF APPLIANCES:** IRC Section M1307.3. Appliances located in a garage or carport or any other location subject to vehicle damage shall be protected by approved barriers.



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Appliances having an ignition source shall be elevated so that the source of ignition is at least 18" above the floor in garages and in any room that opens to the garage. Appliances designed to be fixed in position shall be fastened or anchored in an approved method.

17. **WATER HEATER:** IRC Section M1307.2. Water heaters shall be anchored or strapped to resist horizontal displacement due to earthquake motion. Strapping shall be at points within the upper one-third and lower one-third of the appliance and shall be at least 4" away from the controls. Where water heaters are installed in locations where leakage of the tank or connections can cause damage, a watertight pan of corrosion-resistant materials shall be installed beneath the water heater with a minimum 3/4" diameter drain to an approved location. Temperature and pressure relief valves shall be drained to outside, except that replacement water heaters shall only be required to provide a drain pointing downward from the relief valve to extend between 2' and 6" from the floor with no additional floor drain. Drain may not be trapped and must terminate no more than 2' or less than 6" from the ground and shall not be threaded. . All electric hot water heaters shall be placed on an R-10 pad when located in an unheated space or on a concrete floor. A thermal expansion (compression) tank shall be installed on water heater tanks.
18. **L.P.G. (PROPANE) APPLIANCES:** IRC Appendix A prohibits appliances from being installed in a hazardous location, which is any location considered to be a fire hazard for flammable vapors, dust, combustible fibers or other highly combustible substances. L.P.G. (heavier than air) containers shall not be installed in a basement, cellar, pit, under-floor space, below grade or similar location where heavier-than-air gas might collect. L.P.G. tanks shall be installed in accordance with NFPA 58 and Chapter 38 of the 2006 International Fire Code. L.P.G. standard shall be NFPA 58.

Typical LPG Tank Setbacks

L.P.G. Tank Size (ga)	Required Setback from Buildings and property lines
< 125	zero, with conditions*
125 to 500	10 feet
500 to 2000	25 feet

*Minimum 5 feet to property lines; building openings; sources of ignition; ventilation air intakes; openings into direct-vent appliances.

19. **MANUFACTURER'S SPECS:** IRC M1307.1. The manufacturer's operating and installation instructions shall remain attached to the appliance until final

inspection.

20. **BACKFLOW PREVENTORS:** UPC Section 603.4.7. Potable water outlets with hose attachments other than water heater drains and clothes washer connections shall be protected by a listed non-removable hose bibb type backflow preventer, or atmospheric vacuum breaker. All cross connections between potable water sources and other systems, such as landscape irrigation systems, hydronic-radiant heating systems, swimming pools, etc. shall be equipped with backflow preventers in accordance with UPC Section 603.
21. **GARAGE / DWELLING DOOR:** IRC Section R302.5.1. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and residence shall be equipped with solid wood doors not less than 1-3/8 inches in thickness, solid or honeycomb core steel doors not less than 1-3/8 inches thick, or 20-minute fire-rated doors.
22. **GARAGE/DWELLING SEPARATION GARAGE FLOOR:** IRC Section R309.2 The garage shall be separated from the residence and its attic area by not less than 1/2" gypsum board applied to the garage side, including garages located less than 3' from a dwelling unit on the same lot. Garages beneath habitable rooms shall be separated from all habitable rooms above by not less than 5/8" Type X gypsum board. Structural members supporting the horizontal separation shall be protected by minimum 1/2" gypsum board (this includes all bearing walls, posts, columns, etc.). Ducts in the garage and ducts penetrating the walls or ceilings separating the dwelling from the garage shall be constructed of a minimum No.26 gage sheet steel or other approved material and shall have no openings in the garage. Openings around vents, pipes, ducts, cables, and wires shall be fireblocked with an approved material to resist the passage of flame and products of combustion. The garage floor shall be of concrete or other approved noncombustible material, and shall be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway. A carport (open on at least 2 sides) may have a floor surface of asphalt.
23. **SEPARATION BETWEEN DWELLING UNITS:** IRC Section R317 Walls and floors separating dwelling units in two-family dwellings shall not be less than 1-hr fire-resistance construction when tested in accordance with ASTM E 119 or UL



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263. Fire-resistant-rated floor-ceiling and wall assemblies shall extend to and be tight against the exterior walls, and wall assemblies shall extend from the foundation to the underside of the roof sheathing. Wall assemblies need not extend through attic spaces when the ceiling is protected by 5/8" Type X gypsum board, an attic draft stop is provided above and along the wall assembly, and the structural frame supporting the ceiling is protected by not less than 1/2" gypsum board. Townhouses shall be separated by either a 1-hour fire-resistance-rated wall assembly at **each** townhouse, or a common 2-hour fire-resistance-rated wall assembly between townhouses, with no plumbing, ducts, or vents in the cavity, tested in accordance with E119 or UL 263. See R302 for details of fire-resistant-rated construction.

24. **FIRE-RESISTANCE OF EXTERIOR WALLS:**

IRC Section R302.1 Table R302.1. **1-hr fire-resistive construction is required within 5 feet of property lines. Openings are not permitted at less than 3' and are limited between 3' and 5'. Projections are allowed to be protected with 1-hour fire-resistance rated construction on the underside when the projection is between 2' and 5' from the property line.** Unprotected, detached garages shall be at least 3 feet away from other residential or accessory buildings.

25. **FLOOR AREA:** IRC Section R304 & HCC 5071, 310.3.7 & 310.3.8. Dwelling units shall have at least one habitable room with not less than 120 square feet of floor area. Other habitable rooms except kitchens shall have an area of not less than 70 square feet with a minimum dimension of 7' in one direction.

26. **MINIMUM CEILING HEIGHTS:** HCC Sect 5-71, 310.3.7 & 310.3.8. Habitable spaces shall have a ceiling height of not less than 7 feet 6 inches. Beams and girders spaced not less than 4 feet on center may project not more than 6 inches below the required ceiling height. Ceilings in Kitchens, halls, bathrooms, toilet compartments, and basements without habitable spaces may have a ceiling height of 7'-0" with beams projecting to within 6'-6" of the finished floor. Bathrooms shall have minimum ceiling height of 7'-0" at the front clearance areas of fixtures. If any room in a building has a sloping ceiling, the prescribed ceiling height for the room is required in only on half of the area thereof. No portion of the room measuring less than 5 feet from the finished floor to the finished ceiling shall be included in any computation of the minimum area thereof.

27. **ATTIC ACCESS:** IRC Section R807.1.

Attics which exceed 30 square feet and have a vertical height of 30" or more as measured from the top of the ceiling framing member to the underside of the roof framing members must be provided with an access opening of not less than 22" x 30" and located in a hallway, corridor, or readily accessible location.

When the access is located in the ceiling, minimum unobstructed headroom in the attic space shall be 30" at some point above the access measured vertically from the bottom of the ceiling framing members. Attics containing appliances shall be provided with an opening and a clear and unobstructed passageway large enough to allow removal of the largest appliance and with an opening with a minimum dimension of 20" by 30" and maximum passageway of 20' long measured from the opening to the appliance. See M1305.1.3 for additional details.

28. **DOORS & EXITS:** IRC Section R311.2. **At least one egress door shall be provided in each dwelling unit. The egress door shall be a minimum clear width of 32" when measured between the face of the door and the stop (usually a 36" door) and clear height of 78", and that can be opened without the use of a key, tool or special knowledge.**

29. **LANDINGS:** IRC Section R311.3. There shall be a floor or landing on each side of exterior doors with dimensions of at least 36" measured in the direction of travel, and at least the width of the door served. The floor or landing shall be not more than 1.5" lower than the threshold of the doorway, except doors may have the landing up to 7 3/4" below the level of the threshold provided the door does not swing over the landing (*except that screen and storm doors may*); OR, a landing is not required if the door is not the main exit and there are two or fewer risers. An *interior* door may open at the top of a flight of stairs provided the door does not swing over the top step.

Exterior balconies may have a landing less than 36" when the balcony is less than 60 s.f. and only accessible from a door. Exterior landings may have a slope not to exceed 2% (1" in 48"). There shall be a floor or landing at the top and bottom of each stairway, except that a floor or landing is not required at the top of an interior flight of stairs if a door does not swing out over the stairs. The width of the landing shall be the same width as the stairs and 36" long.

30. **GUARDS:** IRC Section R312 & R613.2.



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Porches, balconies or raised floor surfaces located more than 30" above the floor or grade below shall have guards not less than 36" in height, including areas enclosed with insect screening, except where guards are required at the open side of stairs, the height may be reduced to 34" above the stair nosing. Guardrails shall be designed such that a sphere 4" in diameter cannot pass through, except the triangular opening between a riser, tread and the bottom rail of the guard may be of such size that a sphere 6" cannot pass through.

- 31. **HANDRAILS:** IRC Section R311.7.7 & 311.8.3. All stairways with 4 or more risers and ramps with exceeding a slope of 1:12 (8.33%) shall have at least one handrail. Such handrails shall be placed not less than 34" or more than 38" above the nosing of the treads. Handrails for stairways shall be continuous for the full length of the flight from a point directly above the top riser to a point directly above the lowest riser of the flight or the full length of a ramp. The handgrip portion of the handrail shall not be less than 1-1/4" or more than 2-1/4" (maximum 2" if circular) in cross-sectional dimension, and shall be of a "graspable" shape. (see Page 27 for handrails) There shall be a space of not less than 1-1/2" between the wall and the handrail; however, the handrail shall not project more than 4-1/2" into the required stair width. Handrail ends shall be returned or shall terminate in a newel post or safety terminals.
- 32. **STAIRWAYS:** IRC Section R311.7. Private dwelling stairways shall not be less than 36" in width and shall have a headroom clearance of not less than 6 feet 8 inches measured vertically from the sloped plane adjoining the tread nosing, or landing surfaces. (See Item 39 for spiral stairways.)
- 33. **STAIR RISE & RUN:** IRC Section 311.7.4. Maximum riser height shall be 7-3/4 inches and the minimum tread depth shall be 10 inches. The greatest riser height may not exceed the smallest by more than 3/8 inch. The radius curvature at the leading edge of the tread shall be no greater than 9/16 inch. A nosing not less than 3/4 inch but not more than 1-1/4 inches nosing shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than 3/8 inch between two stories, including the nosing at the level floors and landings. Exception: A nosing is not required where the tread depth is a minimum of 11 inches. Open risers are permitted, provided that the opening between treads does not permit the passage of a 4-inch diameter sphere.

- 34. **STAIRWAY ILLUMINATION** R311.7.8, R303.6.1. All interior and exterior stairways shall be provided with a means to illuminate the stairs, including the landings and treads. Interior stairways shall be provided with a light located in the immediate vicinity of each landing of the stairway that provides at least 1 foot candle of illumination measured at the center of treads and landings. A wall switch shall be provided at each floor level where the stairway has six or more risers. Exterior stairways shall be provided with an artificial light source located in the immediate vicinity of the top landing of the stairway. Exterior stairways providing access to a basement from the outside grade level shall be provided with an artificial light source located in the immediate vicinity of the bottom landing of the stairway. The illumination of exterior stairways shall be controlled from inside the dwelling unit.
- 35. **USABLE SPACE UNDER STAIRS:** IRC Section R302.7. The walls and soffits of enclosed usable space under stairs shall be protected on the enclosed side by not less than 1 layer of 1/2" gypsum board.
- 36. **WINDING STAIRWAYS:** IBC 1009.3.1 Winding stairways shall have minimum tread depth of 6" and a minimum tread depth of 10" measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walk line.
- 37. **SPIRALSTAIRWAYS:** IRC Section 311.7.9.1. Spiral stairs must provide a clear walking area measuring at least 26" from the outer edge of the supporting column to the inner edge of the handrail. The tread run must be at least 7 1/2" at the point 12" from where the tread is the narrowest. The rise must be sufficient to provide 6'-6" headroom, and each riser shall not exceed 9 1/2 inches.



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STRUCTURAL

1. **MIN. CONCRETE FOOTING SIZE:** IRC Section R403.1, R403.1.3.

- Supporting 1 floor: minimum 6" by 12".
- Supporting 2 floors: minimum 6" x 15".
- Supporting 3 floors: minimum 8" x 23".

All exterior walls shall be supported on continuous footings or other approved structural systems of sufficient design to accommodate all loads and to transmit the resulting loads to the supporting soil within the limitations determined from the characteristics of the soil. Footings shall be supported on undisturbed natural soil or engineered fill. As a minimum standard, see *Prescriptive Foundation Requirements*, on Page 17.

2. **MIN. CONCRETE FOOTING REINFORCEMENT:**

IRC Section 403.1.3. At least two #4 bars are required for all continuous concrete footings. As a minimum standard, see *Prescriptive Foundation Requirements* on Page 17. **(Vertical bars shall be tied in place at the time of the footing inspection. Wet setting of vertical bars will not be approved.)**

3. **MIN. CONCRETE FOUNDATION WALL SIZE:**

IRC Section 404.1.2, Walls that exceed 8 feet in height or have more than 4 feet of unbalanced fill and no permanent lateral support at the top of the wall, must be designed, signed and sealed by a Licensed State of Hawai'i Design Professional.

4. **MIN CONCRETE FOUNDATION REINFORCEMENT:**

IRC Section R404. Steel reinforcement shall have minimum yield strength of 60,000 psi (Grade 60). As a minimum standard, see *Prescriptive Foundation Requirements* on Page 19.

5. **MINIMUM FOOTING DEPTH:**

IRC Section R403.1.4. All exterior footings shall be placed at least 12" below the undisturbed ground. Interior footings supporting bearing or bracing walls and cast monolithically with a slab on grade shall extend to a depth of not less than 12" below the top of slab.

6. **SLAB ON GRADE FLOOR:**

IRC R403.1.3.2 IRC R309.3. Foundations must extend at least 6" above finish grade. Monolithic foundations shall have footings at least 12" wide, be at least 12" below grade, extend at least 6" above finish grade, and shall have at least two #4 bars at the bottom of the footing and one #4 bar located within 7 inches of the top of the slab. See Page 19, *Foundation*

Requirements, for additional information. Garage or carport floor surfaces shall be sloped to a drain or toward the main vehicle entry doorway.

7. **FOUNDATION ANCHORAGE:**

IRC Section R403.1.6 & R602.11. Anchor bolts shall be not less than 1/2" diameter, embedded at least 7", and spaced no more than 6' apart. (4' if over 2 stories). There shall be a minimum of 2 bolts per piece (sill plate), with a bolt located within 12" of each end of each piece. 3" x 3" x 0.229" thick hot dipped galvanized plate washers, and nuts shall be tightened on each bolt to the plate. If foundation anchor straps are used instead of anchor bolts, they shall be spaced no more than 4' apart (3' if over 2 stories).

8. **DAMP-PROOF FOUNDATION WALLS:**

IRC Section R406 Exterior foundation walls that retain earth and enclose habitable or usable spaces located below grade shall be damp-proofed in accordance with IRC R406.1 or waterproofed in accordance with IRC 406.2, from the top of the footing to the finished grade by approved methods and materials. All joints in membrane waterproofing shall be lapped and sealed with an adhesive compatible with the membrane.

9. **PIER PADS & COLUMNS:**

IRC Section R407.3. Concrete pier footings shall have a depth to width ratio not to exceed 2:1, or, shall have #4 bars located each direction spaced not more than 12" on center. (Rebar must be in place upon inspection.) Positive connections shall be provided to prevent lateral displacement at both the top and bottom of columns.

10. **FOOTING/PIER SETBACK FROM SLOPE:**

IRC Section R403.1.7 The placement of buildings and structures on or adjacent to slopes steeper than 1 unit vertical in 3 units horizontal (33.3%) slope shall conform to Sections R403.1.7.1 through R403.1.7.4. (See also IRC Figure R403.1.7.1) Footings must be embedded in material sufficient to provide vertical and lateral support for the footing without detrimental settlement.

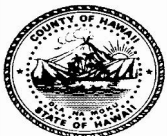
11. **CHIMNEY FOUNDATION:**

IRC Section R1001.2 and R1003 Masonry chimneys shall be supported on foundations of solid masonry or concrete at least 12 inches thick, at least 6 inches beyond each side of the exterior dimensions of the chimney, be at least 12" below grade, and on natural undisturbed earth or engineered fill. Reinforcement shall conform to the requirements set forth in Table R1003.2 and IRC Figure R1001.1.



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12. **FOUNDATION VENTILATION:** IRC Section R408.2. Minimum net area of ventilation openings shall not be less than 1 square foot for each 300 square feet of under-floor space area. One such ventilating opening shall be within 3 feet of each corner of the building except one side of the building is permitted to have no ventilation openings. Ventilation openings shall be covered for their height and width with materials identified in IRC R408.2 such that the openings are not larger than ¼ inch.
13. **PROTECTION AGAINST DECAY:** IRC Section 402 & HCC 5-71 (28) Amending the 2006 IBC Section 2303.1.8 & (30) Amending the 2006 IBC Section 2304.11 Where required by this section, protection from decay and termites shall be provided by the use of naturally durable or preservative-treated wood. Where structural lumber of wood frame buildings or structures are supported directly on the ground by a concrete slab, or concrete and/or masonry foundation Formosan subterranean termite protection shall be provided by either chemically treating the soil beneath and adjacent to the building or structure by a Hawai'i licensed pest control operator, or stainless steel termite barrier, or other termite protection measures approved by the Building Official. All soil treatment, stainless steel termite barrier, and termite protection measures shall be installed according to manufacturer's recommendations for control of Formosan subterranean termites. Wood supporting permanent buildings and structures, which is in direct soil contact or is embedded in concrete or masonry in direct contact with earth shall be treated to the appropriate commodity specification of AWWA Standard U1. Wood in direct soil contact but not supporting any permanent buildings or structures shall be treated to the appropriate commodity specification of AWWA Standard U1 for ground contact. (Note: All fasteners used in pressure treated lumber [sills, joists to sill, rim joist to sill, etc.] shall be hot dipped galvanized, stainless steel, silicon bronze or copper.)
14. **POSTS, POLES AND COLUMNS:** IRC Section R319.1.2, R317.1.4. Columns and posts supporting permanent structures that are embedded in concrete or in direct contact with the ground or embedded in concrete exposed to the weather shall be approved pressure treated wood suitable for ground contact use. Posts or columns which are exposed to weather, or are located in basements or cellars, shall be supported by piers or metal pedestals projecting 1 inch above the floor (and 6" above exposed earth) and shall be separated by an approved impervious moisture barrier, or must be of pressure treated wood, or wood of natural resistance to decay. Posts or columns in enclosed crawl spaces located within the periphery of the building, supported by concrete piers or metal pedestals shall be greater than 8 inches from exposed ground and must be separated by a moisture barrier or be of pressure treated wood.
15. **GIRDERS ENTERING MASONRY OR CONCRETE WALL:** IRC Section R319.1(4) Ends of wood girders entering concrete or masonry walls must have a minimum clearance of ½ inch on tops, sides and ends, or shall be of an approved species and grade of lumber pressure treated or decay resistant heartwood of redwood, black locust, black walnut or cedars.
16. **POST-BEAM CONNECTIONS/FASTENING:** IRC R301, R407.3, R502.9. Where posts and beam or girder construction is used to support framing, positive connections shall be provided to ensure against uplift and lateral displacement. The construction of buildings and structures shall result in a system that provides a complete load path capable of transferring all loads from their point of origin through the load resisting elements to the foundation.
17. **SPECIFY WOOD SPECIES & GRADES:** IRC Sections R502.1, R602.1 Load-bearing dimension lumber for joists, beams, girders, studs, plates and headers shall be identified by a grade mark of a lumber grading or inspection agency that has been approved by an accreditation body that complies with DOC PS 20. In lieu of a grade mark, for wood locally milled, a certificate of inspection issued by a lumber grading or inspection agency meeting the requirements of this section may be accepted.
18. **FLOOR FRAMING:** IRC Sections R502.3, R502.6, R502.6.1, R502.7 The ends of each joist, beam or girder shall have not less than 1-1/2" of bearing on wood or metal or not less than 3" on masonry or concrete. Joists framing from opposite sides over a bearing support shall lap a minimum of 3 inches and shall be nailed together with a minimum three 10d face nails. Joists shall be supported laterally at each end and at each intermediate support



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by full-depth solid blocking not less than 2" nominal thickness; or by attachment to a header, band, or rim joist; or shall be otherwise provided with lateral support to prevent rotation. See IRC Tables R502.3.1(1) & (2) for floor joist spans, R502.5(1) & (2) for girder spans, and R502.3.3 (1) & (2) for cantilever spans. A load path for lateral forces shall be provided between floor framing and braced wall panels located above or below a floor.

19. **BEARING PARTITIONS:** IRC Section 502.4. Joists under parallel bearing partitions shall be of adequate size (as a beam) to support the load. Double joists, sized to adequately support the load, that are separated to permit the installation of piping or vents shall be full-depth, solid-blocked with lumber not less than 2 inches in nominal thickness spaced not more than 4 feet on center. Bearing partitions perpendicular to joists shall not be offset from supporting girders, walls or partitions more than the joist depth unless such joists are of sufficient size to carry the additional load(s).
20. **UNDER-FLOOR CLEARANCE:** HCC 5-71 (30) When floor joists or the bottom of a wood structural floor are located within 24" or wood girders are located within 18" to the exposed ground in crawl spaces or unexcavated area located within the periphery of the building foundation, all components of the floor assembly shall be pressure treated wood or wood of natural resistance to decay, including all posts, beams or girders, joists and sub-floor. The under-floor grade shall be cleaned of all vegetation and organic material. All wood forms used for placing concrete and construction materials shall be removed before the building is occupied
21. **UNDER-FLOOR ACCESS:** IRC Section 408.4. & HCC 5-71 (30) Access shall be provided to all under-floor spaces. Access openings through the floor shall be a minimum of 18" x 24". Openings through a perimeter wall shall be at least 16" x 24". When any portion of the through wall access is below grade, an areaway of not less than 16" x 24" shall be provided. The bottom of the areaway shall be below the threshold of the access opening. Through wall access openings shall not be located under a door to the residence. Under-floor spaces containing appliances shall be provided with an unobstructed passageway large enough to remove the largest appliance but not less than 30" high by 22" wide, nor more than 20' long from the opening to the appliance. A level service

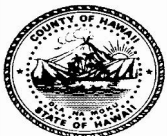
space of at least 30" by 30" shall be provided at the front or service side of the appliance. See M1305.1.4 for details of mechanical equipment access.

22. **FRAMING:** IRC Sections 602.3.1, 602.3.2, 602.3.3, 602.3.4, 602.6 & 602.9. Studs shall be a minimum No. 3, standard or stud grade lumber, except that utility studs may be used for bearing studs not supporting a floor above or nonbearing studs. Utility grade studs shall not be spaced more than 16" on center, support more than a roof and ceiling, or exceed 8' in height for exterior and load bearing walls. The size, height, and spacing of all other wood-framing studs shall be in accordance with Table R602.3(5). (Maximum 10 feet in Seismic Design Category D₂.) Studs shall be placed with their wide dimension perpendicular to the wall. Wood stud walls shall be capped with a double top plate installed to provide overlapping at corners and intersections with bearing partitions. End joints shall be offset at least 24". Studs shall have full bearing on a nominal 2" or larger plate or sill having a width at least equal to the width of the studs. Where joists, trusses, or rafters are spaced more than 16" o.c. and the bearing studs are spaced 24" o.c. such members shall bear within 5" of the studs beneath.

Cutting and notching: May not exceed 25% of the stud width in bearing or exterior walls and may not exceed 40% of a single stud width in non-bearing partitions.

Bored or drilled holes: The diameter of the resulting hole may not exceed 40% of the stud width, can be no closer than 5/8" to the edge of the stud, and may not be located in the same section as a cut or notch. See IRC Section R602.6 for exceptions. See IRC Figures R602.6(1), R602.6.2(2), and R602.6.1 for additional details.

Foundation Cripple walls, IRC Section R602.9: Foundation cripple walls shall be framed of studs not less in size than the studding above. When exceeding 4'-0" in height, such walls shall be framed of studs having the size required for an additional story. Cripple walls with a stud height less than 14" shall be sheathed on at least one side with a wood structural panel that is fastened to both the top and bottom plates in accordance with Table R602.3(1) or the cripple walls shall be constructed of solid blocking. Cripple walls in



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Seismic Design Category D₂ shall be supported on continuous foundations.

23. **WALL BRACING:** IRC Section 602.10. All braced walls and cripple wall bracing in Seismic Design Category D₂ shall be constructed in accordance with IRC Table R602.10.1, (2), and (3) and Sections R602.10 and R602.11. Typically braced wall panels require nailing patterns of 6" o.c. along all panel edges. All sheathing joints must be over studs (vertically) or solid blocking (horizontally).
- Braced wall panels shall begin no more than 12'-6" from each end of a braced wall line. If the braced wall panel is not located at the corner, then a 24" panel is required at the corner (in addition to the 4' BWP within 8') or, a hold down device is required at the end of the braced wall panel end nearest the corner. See IRC R601.10.11.1
 - Spacing of interior braced wall lines shall not exceed 25 feet apart (except to accommodate up to one room up to 900 square feet, an increase to 35' is allowed – adjustment factors will apply, See IRC R602.10.11.1).
 - Braced wall lines may have offsets, out of plane of up to 4'0".
 - In one-story buildings, braced wall panels shall be supported on continuous foundations at intervals not exceeding 50 feet. In two-story buildings all interior braced wall panels shall be supported on continuous foundations. (See exceptions in IRC Section R602.10.9.)
 - Interior braced wall panels shall be fastened to both the floor and roof framing in accordance with Table R602.3(1) (typically 3-16d @ 16" o.c.)
 - Cripple walls shall be braced as braced wall panels in accordance with IRC R602.10.11.4 and Tables R602.10.11.3. A cripple wall greater than 4' shall be designated as the first story wall for purposes of designating the wall bracing requirements (R602.10.6.1).
 - Where "stepped foundations" occur, See IRC Section R602.11.3 for additional requirements such as plate strapping, cripple wall height limitations, etc.
 - See the attached "Braced Wall Panel" and "Alternate Braced Wall Panel" details for typical construction requirements.

24. **OPENINGS IN EXTERIOR & INTERIOR WALLS (HEADERS):** IRC Section R602.7. Headers shall

be provided over each opening in interior and exterior bearing walls. Headers shall be sized to support the load above in accordance with IRC Tables R502.5(1) and R502.5(2), or as designed to support the loads as specified in IRC Table R301.5. Alternately, wood structural box headers may be used in accordance with IRC Section R602.7.1, Table R602.7.2 and Figure R602.7.2. Each end of all headers shall have at least 1.5" of full-width bearing.

25. **FIRE-BLOCKS & DRAFT-STOPS:** IRC Sections R602.8, R502.12. Fire-blocking & Draft-stopping shall be installed to cut off all concealed vertical and horizontal draft openings and shall form an effective fire barrier between stories and between a top story and the roof space. Fire-blocking shall be provided in concealed spaces of wood stud walls and partitions: vertically at the ceiling and floor levels; horizontally at intervals not exceeding 10 feet; and at all interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings, as well as stair stringers at the top and bottom of the run and openings around vents, pipes and ducts at ceiling and floor levels. Fire-blocking materials shall consist of materials listed in IRC Section R602.8.1. Loose-fill insulation material shall not be used as a fire-block unless specifically tested in the form and manner intended. Fire-blocking of chimneys and fireplaces shall be in accordance with IRC Section R1001.16. When there is usable space both above and below a concealed space of a floor/ceiling assembly, draft-stops shall be installed so that the area of the concealed space does not exceed 1000 square feet. Draft-stopping materials shall consist of materials listed in Section R502.12.1. All fire-blocking and draft-stopping shall be in place prior to requesting a framing inspection.

26. **SIDING TYPE** IRC Section R703.3, R703.4, R703.5, R703.8, R703.9, R703.10, Table R703.4. Exterior wall coverings shall be installed, attached and flashed in accordance with the provisions of IRC Section R703 and the siding manufacturer's installation instructions. **Please note that masonry wall coverings exceeding 3" in thickness require an engineered design in Seismic Design Category D₂ or E (most of Hawai'i County). See #67**



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27. **WEATHER RESISTIVE BARRIER:** IRC Sections R701.2, R703.2, R703.4 R703.8, R703.9.1. Products sensitive to adverse weather shall not be installed until adequate weather protection for the installation is provided. Exterior sheathing shall be dry before applying exterior cover. The exterior wall envelope shall be designed and constructed to provide a water-resistant barrier behind the exterior veneer. Asphalt-saturated felt or other approved weather resistant material such as house wrap, shall be applied over the sheathing of all exterior walls except where panel siding with shiplap joints or other approved weather resistive methods are used. Such felt or house wrap material shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2". Approved corrosion-resistive flashing shall be provided in all exterior walls in such a manner as to prevent entry of water into the wall or the building structural framing components. The flashing shall extend to the surface of the exterior wall finish and shall be installed to prevent water from reentering the exterior wall envelope. Approved corrosion-resistant flashings shall be installed at exterior window and door openings; at the intersection of chimneys or other masonry construction, with frame or stucco walls, with projecting lips on both sides under stucco copings; under and at the ends of masonry, wood or metal copings and sills; continuously above all projecting wood trim; where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction; at wall and roof intersections; and at built-in gutters.
28. **ANCHORED STONE AND MASONRY VENEER:** IRC Section R301.2.2.3.2. *ENGINEERING REQUIRED* Buildings with anchored stone and masonry veneer shall be designed in accordance with accepted engineering practice except where the masonry veneer has a maximum actual thickness of 3 inches as permitted within the limitations of IRC Section R703.7, Exception 2.
29. **SIDING / EARTH SEPARATION:** IRC Section R319. Wood siding, sheathing and wall framing on the exterior of the building used within 6" of earth shall be pressure treated wood or wood of natural resistance to decay as identified in item #13 of this checklist.
30. **DECKS & EXTERIOR STAIRS:** IRC Section R319, R502.2.2. & HCC 5-71 (28)

Amending the 2006 IBC Section 2303.1.8 & (30) Amending the 2006 IBC Section 2304.11 Pressure treated wood shall be used for those portions of exposed wood members subject to wind driven rain, such as within a covered porch, that form the structural supports of buildings, balconies, porches or similar appurtenances, including all joists, beams, girders, decking and posts, poles and columns. Treatment must be applied by manufacturer, see item #13 of this check-list. Ledger boards fastened to a wall shall be properly flashed and positively connected. Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads as applicable. Such attachment shall not be accomplished by the use of toe nails or nails subject to withdrawal.

31. **WOOD TRUSSES:** IRC Section R502.11, R802.10. Wood trusses shall be designed in accordance with approved engineering practice. Engineering data and installation specifications, including the type of roofing to be used, shall be available on site at framing inspection. Trusses shall be supported laterally at points of bearing by solid blocking to prevent rotation and lateral displacement, and braced in accordance with the individual truss design drawings. Truss members shall not be cut, notched, drilled, spliced or otherwise altered in any way without the specific approval of a registered design professional (structural calculations required). Alterations resulting in the addition of load (e.g., HVAC equipment, water heaters, etc.) that exceed the design load shall not be permitted without specific engineering justifying the design.
32. **RAFTERS:** IRC Section R802.3, R802.8 Rafters shall be framed to ridge board or to each other with a gusset plate as a tie. The ridge board shall be at least 1" nominal thickness, and all valley or hip rafters shall be at least 2" nominal thickness. Rafter ties shall be placed not more than 4' on center. See IRC Tables 802.5.1(1) through 802.5.1(8) for allowable spans. When the depth-to-thickness ratio exceeds 5 to 1 the roof rafters and ceiling joists shall be provided lateral support at points of bearing to prevent rotation.
33. **RAFTER OPENINGS:** IRC Section R802.9. When the header joist span does not exceed 4',



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the header joist may be a single member the same size as the ceiling joist or rafter. Single trimmer joists may be used to carry a single header joist that is located within 3' of the trimmer joist bearing. Trimmer and header rafters shall be doubled and of sufficient size to support all loads when the span of the header exceeds 4'. Approved hangers shall be used when the span exceeds 6'. Tail joists over 12' long shall be supported at the header by framing anchors or on ledger strips not less than 2" x 2".

34. **CEILING JOISTS:** IRC Sections R802.4, R802.8, and R802.8.1 Ceiling joist spans shall be in accordance with IRC Tables R802.4(1) and R802.4(2) or specifically designed for applied loads. Rafters and ceiling joists having a depth-to-thickness ratio exceeding 5 to 1 shall be provided with lateral support at points of bearing to prevent rotation. Rafters and ceiling joists having a depth-to-thickness ratio exceeding 6 to 1 shall be supported laterally by solid blocking, diagonal bridging (wood or metal) or continuous 1" x 3" wood strip nailed across the rafter ceiling joists at intervals not exceeding 8'.

35. **ROOF SHEATHING:** IRC Section R803. Allowable spans for lumber used as roof sheathing shall conform to Table R803.1 Spaced lumber sheathing ("skip sheathing") is prohibited in Seismic Design Categories D₂ and E. Wood structural panels shall be identified by grade mark or certificate of inspection issued by an approved agency and shall comply with the grades and spans specified in Table R503.2.1.1(1).

36. **ROOF DRAINAGE & COVERING** IRC Section R801.3, R903, R904, R905. All structures shall have a controlled method of water collection and/or disposal from roofs (typically gutters). Water shall discharge to an approved collection or drainage system or to splash blocks where a drainage system is not required. Roofs that do not drain over edges shall have roof drains installed at the low point of the roof as well as overflow drains. See IRC R903.4. Roof slope shall be indicated on the plans and selected roof covering must be appropriate for the roof pitch. Roof coverings must be installed in accordance with the manufacturer's installation instructions. Flashing shall be installed at wall & roof intersections, at changes in roof slope or direction, and around roof openings. Where flashing is metal, the metal shall be corrosion-resistant with a minimum thickness of 0.019 inch (No. 26

galvanized sheet). Roof dead loads are limited to a maximum of 15 pounds per square foot unless the additional bracing provisions of R301.2.2.2.1 are provided.

37. **ATTIC VENTILATION:** IRC Section R806, HCC 5-71(15) Unvented Attic Spaces. Enclosed attics and rafter spaces shall have cross ventilation. For each separate space, the total net free ventilating area shall not be less than 1 to 150 of the area of the space ventilated, the total area is permitted to be reduced to 1 to 300, provided at least 50% and not more than 80% of the required ventilating area is located in the upper portion of the space to be ventilated at least 3' above eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents. Vent openings shall be provided with corrosion resistant wire mesh with 1/8" minimum to 1/4" maximum openings. A minimum of 1-inch airspace must be maintained between the insulation and the roof sheathing at the locations of the vents.

IBC Sec. 1203.2.2 has been added to allow attic space to be unvented when the design professional determines it would be beneficial to eliminate ventilation openings to reduce salt-laden air and maintain relative humidity 60 percent or lower to:

- (1) Avoid corrosion to steel components,
- (2) Avoid moisture condensation in the attic space, or
- (3) Minimize energy consumption for air conditioning or ventilation by maintaining satisfactory space conditions in both the attic and occupied space below."

38. **CHIMNEY HEIGHT:** IRC R1003.9, R1003.20. Chimneys shall extend at least 2' higher than any portion of a building within 10', but shall not be less than 3' above the highest point where the chimney passes through the roof. Chimneys shall be provided with crickets when the dimension parallel to the ridgeline is greater than 30" and does not intersect the ridgeline. The cricket and chimney shall be built & flashed according to Figure R1003.20 and Table R1003.20.

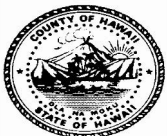


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GENERAL

1. **PREMISES IDENTIFICATION:** IRC Section R321.1. Addresses shall be provided in such a position as to be plainly visible and legible from the street or road fronting the property. Numerals shall be at least 4" high with ½" stroke and be conspicuously displayed on a contrasting background. If the building is not clearly visible from a named way of travel, the numerical designation (address) shall also be displayed near the main entrance to the property as well as at the driveway entrance that leads to the building. Property addresses shall be posted prior to requesting any inspections.
2. **APPROVED PLANS:** HCC Section 5-19 When the building official issues a permit, the construction documents shall be approved in writing, stamp, and signature. Work shall be done in accordance with the approved construction documents, any changes made during construction shall be resubmitted for approval. The building permit, inspection placard, and 1 set of approved construction documents must remain on the job site at all times until the completion of the project.
3. **HEATING:** IRC R303.8. Omitted
4. **SKYLIGHTS:** IRC R308.6. The following types of glazing may be used: 1) Laminated glass with a minimum .015" polyvinyl butyl interlayer for glass panes 16 sq. ft. or less in area located such that the highest point of the glass is not more than 12' above a walking surface or other accessible area; for higher or larger sizes, the minimum interlayer thickness shall be .030". 2) Fully tempered glass. 3) Heat-strengthened glass. 4) Wired glass. 5) Approved rigid plastics.
5. **INTERIOR FINISH:** IRC R315, R702.3.8, R702.4.2, and R702.5. Wall and ceiling finishes shall have a flame-spread classification of not greater than 200 and a smoke-developed index of not greater than 450, except for trims, handrails, door and window frames, and wallpaper. When gypsum is used as a base for tile or wall panels for tub/shower enclosures, water-resistant gypsum conforming to ASTM C 1396, C1178, or C1278 shall be used. Water resistant gypsum wallboard may not be used over a Class I or II vapor retarder in a shower or tub compartment, or on ceilings where frame spacing exceeds 12" on center for ½" or 16" for 5/8" gypsum board, or where there will be direct exposure to water, or in areas subject to continuous high humidity. Fiber-cement, fiber-mat reinforced cement, glass mat gypsum backers, or fiber-reinforced gypsum backers in compliance with ASTM C 1288, C 1325, C 1178, or C 1278 and installed in accordance with manufacturers recommendations shall be used as backers for wall tile in tub & shower areas and wall panels in shower areas. Wood veneer paneling and hardboard paneling shall be placed on wood or cold-formed steel framing spaced not more than 16" on center. Wood veneer and hardboard paneling less than ¼" nominal thickness shall have gypsum board backer at least 3/8" thick. Wood veneer paneling of at least ¼" nominal thickness shall conform to ANSI/HPVA HP-1, and hardboard paneling shall conform to CPA/ANSI A135.5.
6. **GYPSUM WALLBOARD FASTENING:** IRC 702.3.6 & Table R702.3.5. Screws for attaching gypsum board to wood framing shall be type W or Type S in accordance with ASTM C 1002 and shall penetrate the wood not less than 3/8".
 - 3/8" minimum from edge and ends for nails or screws.
 - Fastening (nails): 7" o.c. max. ceiling, 8" o.c. walls.
 - Fastening (screws): 12" o.c. ceiling, 16" o.c. walls when wall framing is 16" o.c., 12" when wall framing is 24" o.c.

Footnote e, Table R702.3.5: Type X gypsum wallboard for garage ceilings beneath habitable rooms shall be installed perpendicular to the ceiling framing and shall be fastened at 6" o.c. by minimum 1-7/8" 6d coated nails or equivalent drywall screws.
7. **NUMBER OF BUILDING STORIES:** IRC Sections R202. In accordance with the scope of the 2006 International Residential Code, (IRC) any building that exceeds 3 stories, must be built in accordance with the 2006 International Building Code (IBC). A building story is that portion of a building included between the upper surface of a floor and the upper surface of the floor or roof next above. The first "Story Above Grade" is the first story having its finished floor surface entirely above grade, except that a basement shall be considered as a story above grade where the finished surface of the floor above the basement is:
1) More than 6' above grade plane; 2) More than 6' above the finished ground level for more than 50% of the total building perimeter; or, 3) More than 12' above the finished ground at any level. The number of stories is the sum of the first story above grade plane plus all of the stories above.



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8. **HEIGHT OF BUILDING / GRADE PLANE:** IRC Section 202. The building height is the vertical distance from grade plane to the average height of the highest roof surface. The grade plane is a reference plane representing the average of the finished ground level adjoining the building at all exterior walls. Where the finished ground level slopes away from the exterior walls, (which is required) then the reference plane shall be established by the lowest points within the area between the building and the lot line, or, 6' from the building, whichever is less. See Chapter 25 of the Hawai'i County Code for height restrictions and measurement of height for certain areas or zones (Zoning Code).

9. **RETAINING WALLS:** IBC 1806.1, IRC R105.2, R404. Retaining walls that are not laterally supported at the top and that retain more than 24" of unbalanced fill shall be designed to ensure stability against overturning, sliding, excessive foundation pressure and water uplift. Retaining walls shall be designed for a safety factor of 1.5 against lateral sliding and overturning. Retaining walls that do not exceed 4' in height, measured from the bottom of the footing to the top of the wall, and that do not support a surcharge (load above) are exempt from permit requirements, but must still be constructed properly and must conform with the County of Hawai'i Zoning Code Setback requirements. A separate permit is required for construction of a retaining wall.

MECHANICAL

1. **EXHAUST FANS:** IRC Section M1507: Source specific exhaust ventilation is required in each kitchen, bathroom, water closet, laundry room, indoor swimming pool, spa, and other rooms where water vapor or cooking odor is produced. The minimum source specific ventilation effective exhaust capacity shall not be less than levels specified in Table M1507.3. Source specific ventilation systems shall be controlled by manual switches, dehumidistats, timers, or other approved means. Source specific ventilation system controls shall be readily accessible. Source specific ventilation ducts shall terminate outside the building. Exhaust ducts shall be equipped with back-draft dampers. All exhaust ducts in unconditioned spaces shall be insulated to a

minimum of R-4. Terminal elements shall have at least the equivalent net free area of the duct work. Terminal elements for exhaust fan duct systems shall be screened or otherwise protected from entry by leaves or other material. All fans shall provide the required flow when tested at 0.25 water gauge. Fans larger than the prescriptive sizes may be necessary to attain the required flow.

Table M1507.3 Minimum Required Exhaust Rates

	Laundry rooms or Bathrooms	Kitchens
Intermittently Operating	50 cfm	100 cfm
Continuous Operation	20 cfm	25 cfm

2. **WHOLE HOUSE FAN:** IRC Section M1508. Each dwelling unit shall be equipped with a whole house ventilation system, which shall be capable of providing the volume of outdoor air specified in Table M1508.2. Fans located 4 feet or less from the interior grill shall have a sone rating of 1.5 or less measured at 0.10" water gauge.

Table M1508.2 Minimum Ventilation Rates: (Continuously Operated Systems) (cfm)

Floor Area (ft ²)	Number of Bedrooms				
	0-1	2-3	4-5	6-7	>7
<1500	30	45	60	75	90
1501 – 3000	45	60	75	90	105
3001 – 4500	60	75	90	105	120
4501 – 6000	75	90	105	120	135
6001 – 7500	90	105	120	135	150
>7500	105	120	135	150	165

3. **WHOLE HOUSE VENTILATION SYSTEM CONTROLS:** IRC Section M1508. All ventilation system controls shall be readily accessible. Intermittently operated systems shall have a manual control, as well as an automatic control, such as a clock timer. The automatic control timer shall be set to operate the whole house fan system for at least 8 hours a day. A label shall be affixed to the control that reads "Whole House Ventilation (See Operating Instructions)." The installer shall provide the whole house ventilation system manufacturer's operation description and operating instructions.



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4. **VENTILATION DUCTS:** IRC Section M1507.3.3, M1508.5.3, M1508.7.3. All ventilation exhaust ducts shall be sized in accordance with Table M1508.6.2 and shall terminate outside the building. Exhaust ducts shall be equipped with back draft dampers and shall be insulated to a minimum of R-4 where passing through an unconditioned space.

Table M1508.6.2
Prescriptive Supply Fan Duct Sizing

Supply Fan Tested CFM at 0.40" w.g.		
<u>Specified Volume from Table 408.1</u>	<u>Minimum Smooth Duct Diameter</u>	<u>Minimum Flexible Duct Diameter</u>
50-90 cfm	4 inch	5 inch
90-150 cfm	5 inch	6 inch
150-250 cfm	6 inch	7 inch
250-400 cfm	7 inch	8 inch

5. **WINDOW OR WALL PORTS:** IRC Section M1508.4.5. Outdoor air shall be distributed to each habitable room by individual outdoor air inlets. Individual room outdoor air inlets shall have a controllable and secure opening and be capable of a total opening area of not less than 4 square inches. Outdoor air inlets shall be located so as not to take air from within 10 feet of a plumbing vent opening, or an appliance vent outlet, or where it will pick up objectionable odors, fumes or flammable vapors.
6. **DISTRIBUTION:** IRC M1508.4.5. Where outdoor air supplies (*window or wall ports*) are separated from fan locations by doors, adequate air flow shall be ensured by undercutting doors or installing grilles or transoms. Doors shall be undercut to a minimum of 1/2" above the surface of the finished floor covering.
7. **MAKE-UP THROUGH FURNACE:** IRC M1508.5.1. Integrated forced-air ventilation systems shall distribute outdoor air to each habitable room through the forced-air system ducts. Integrated forced-air ventilation systems shall have an outdoor air inlet duct connecting a terminal element on the outside of the building to the return air plenum of the forced-air system, at a point within 4 feet upstream of the air handler. The outdoor air inlet duct connection to the return air stream shall be located upstream of the forced-air system blower and shall not be connected directly into a furnace cabinet to prevent thermal shock to the heat exchanger. The system will be equipped with a motorized damper connected to the automatic

ventilation control. The required flow rate shall be verified by field testing with a flow hood or a flow measuring station. The whole house ventilation system shall be controlled by a 24-hour clock timer with the capability of continuous operation, manual and automatic control. This control will control the forced air system blower and the automatic damper. The 24-hour timer shall be readily accessible. The 24-hour timer shall be capable of operating the whole house ventilation system without energizing the energy-consuming appliances. At the time of final inspection, the automatic control timer shall be set to operate the whole house system for at least 8 hours a day. A label shall be affixed to the control that reads "Whole House Ventilation (see operating instructions)."

8. **CONDENSATE DISPOSAL AND DRAIN SYSTEMS:** IRC Section M1411.3. Condensate from all cooling coils or evaporators shall be conveyed from the drain pan outlet to an approved place of disposal. Condensate shall not discharge into a street, alley or other areas where it would cause a nuisance. A secondary drain or auxiliary drain pan shall be required for each cooling or evaporator coil where damage to any building components will occur as a result of overflow equipment drain pan or stoppage in the condensate drain piping. Piping shall maintain a minimum horizontal slope in the direction of discharge of not less than 1/8 unit vertical in 12 units horizontal (1% slope).
9. **APPLIANCE ACCESS UNDERFLOOR:** IRC Section M1305.1.4. **Underfloor spaces containing appliances shall be provided with an unobstructed passageway large enough to remove the largest appliance but not less than 30" high by 22" wide, nor more than 20' long from the opening to the appliance.** A level service space of at least 30" by 30" shall be provided at the front or service side of the appliance. See M1305.1.4 for details of mechanical equipment access.



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SWIMMING POOLS, SPAS AND HOT TUBS

1. **Barrier Requirements:** Appendix G Outdoor swimming pools, including in-ground, above-ground or on-ground pool, hot tub or spa shall be surrounded by a minimum 48" high barrier. Openings in the barrier must not allow the passage of a 4" diameter sphere or, in the case of horizontal or diagonally spaced members, not exceed 1-3/4". Barriers may be masonry or stone walls that do not have indentations or protrusions that allow climbing. Where a wall or walls of a dwelling serve as part of the barrier, one of the following conditions shall be met:

1. The Pool shall be equipped with a powered safety cover; or
2. Doors with direct access to the pool through that wall shall be equipped with an alarm; or
3. Other means of protections, such as self-closing doors with self-latching devices, as approved by the building director.

Access gates shall comply with the requirements above and shall be equipped to accommodate a locking device. Pedestrian access gates shall open outward away from the pool and shall be self-closing and have a self-latching device. Gates other than pedestrian access gates shall have a self-latching device. Where the release mechanism of the self-latching device is located *less than* 54 inches from the bottom of the gate:

1. The release mechanism shall be located on the pool side of the gate at least 3 inches below the top of the gate; and
2. The gate and barrier shall have no opening larger than 1/2" inch within 18 inches of the release mechanism.



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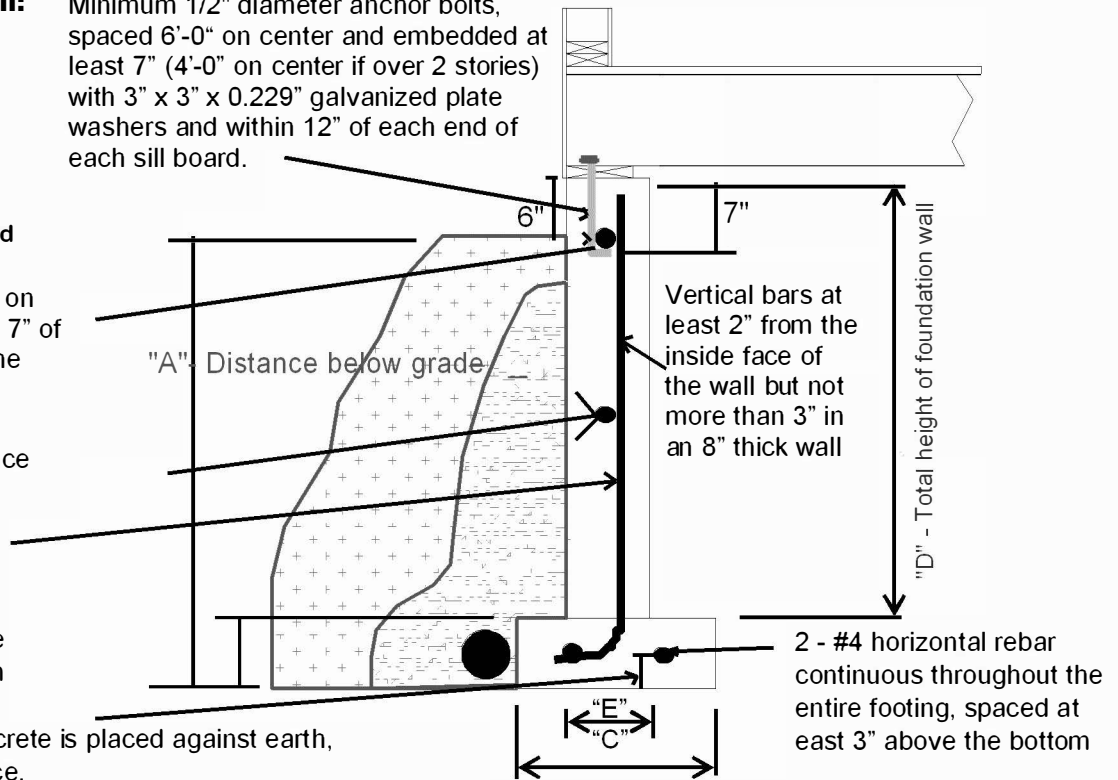
Prescriptive Foundation Details

For Typical Light Frame Constructed Buildings

Assumptions for this Detail:

- * Conventional light-frame construction
- * Wood or other light siding
- * 1500 psf soil bearing capacity
- * Group I, II, or III soils
- * Backfill no closer than 6" to top of wall
- * Walls must be laterally restrained at the top and bottom of wall
- #4 Horizontal bars spaced 18" on center. Top bar must be within 7" of the top of the wall to engage the anchor bolts
- Vertical bars spaced per the schedule below or in accordance with Table R401.1.1.1(5)
- Bars must be hooked at the connection with the footing

Minimum 1/2" diameter anchor bolts, spaced 6'-0" on center and embedded at least 7" (4'-0" on center if over 2 stories) with 3" x 3" x 0.229" galvanized plate washers and within 12" of each end of each sill board.



Reinforcement placed in concrete forms shall be at least 1-1/2" from edge where the concrete will be exposed to earth. Where concrete is placed against earth, there must be at least 3" clearance.

Minimum Requirements for Foundations Supporting Bearing Walls

Number of Floors Supported by Foundation	"E" Minimum Stem Wall Thickness	"A" Depth to Bottom of Footing	"B" Minimum Footing Thickness	"C" Minimum Footing Width	Minimum Footing Reinforcement
1	6"	12"	6"	12"	2 - #4 Bars Cont.
2	6"	12"	6"	15"	2 - #4 Bars Cont.
3	8"	12"	8"	23"	2 - #4 Bars Cont.

Minimum Wall Reinforcement (Grade 60 reinforcement steel)

Minimum Wall Thickness – (E)	Maximum Wall Height – (D)	Horizontal Reinforcement Steel	Vertical Reinforcement Steel*
6"	24"	1 - #4 Bar	#4 bars @ 48" o.c.
6"	36"	2 - #4 Bars @ 18" on center	#4 bars @ 48" o.c.
6"	60"	4 - #4 Bars @ 18" on center	#4 bars @ 48" o.c.
8"	48"	3 - #4 Bars @ 18" on center	#4 bars @ 48" o.c.
8"	72"	4 - #4 Bars @ 18" on center	#4 bars @ 48" o.c.



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8"	108"	6 - #4 bars @ 18" on center	#7 bars @ 36" o.c.
10"	108"	6 - #4 bars @ 18" on center	#6 bars @ 36" o.c.

- Additional options are available for your specific project. See IRC Section R404, as amended.

TABLE R404.1.1(8)
REINFORCED CONCRETE FOUNDATION WALLS^{1,2}

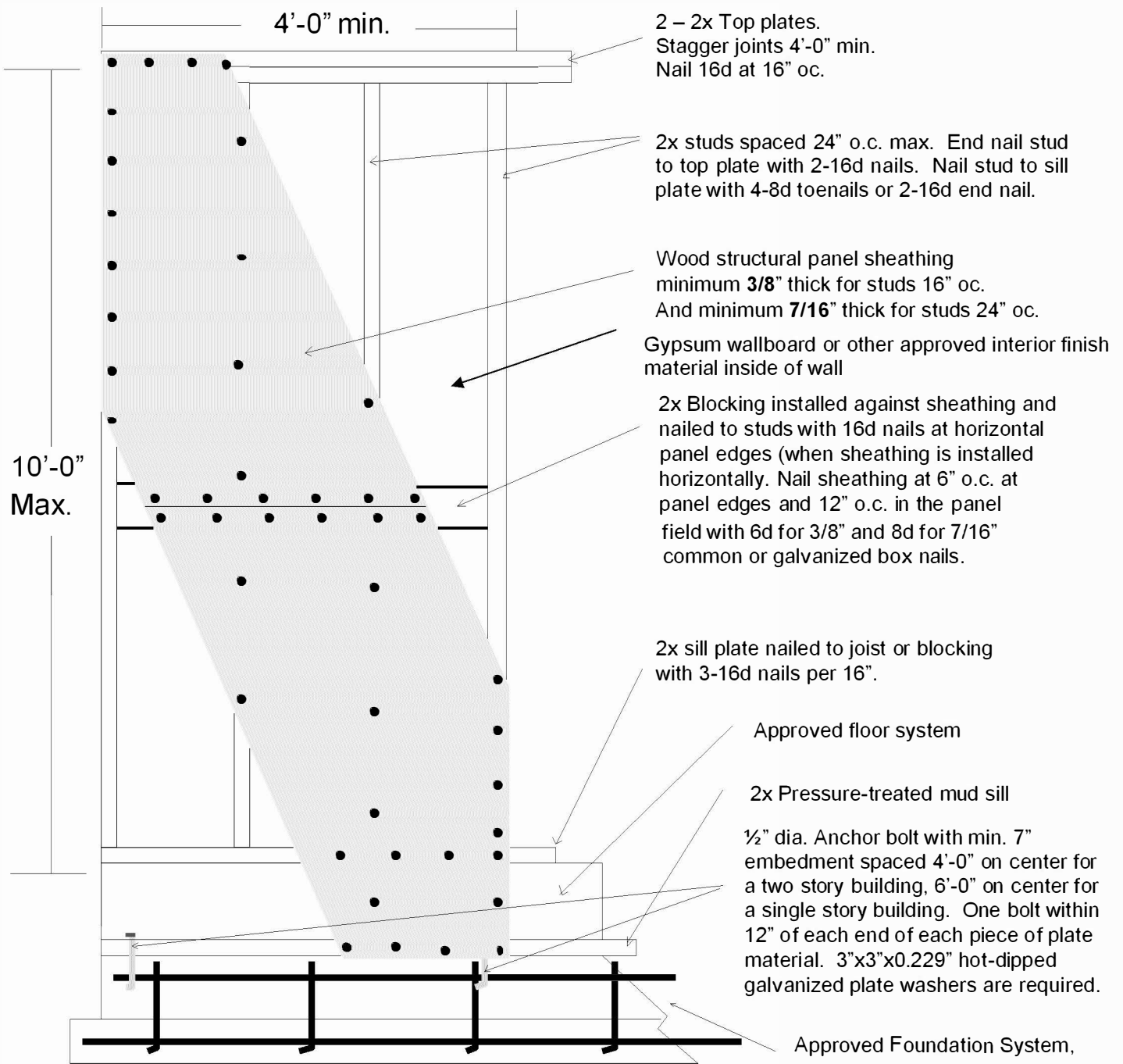
MAXIMUM WALL HEIGHT ^{3,5} (FEET)	MAXIMUM UNBALANCED BACKFILL HEIGHT ⁶ (FEET)	MINIMUM VERTICAL REINFORCEMENT SIZE AND SPACING ^{3,4}			
		ALL GROUP I, II AND III SOILS ⁵			
		MINIMUM WALL THICKNESS (INCHES)			
		5.5	7.5	9.5	11.5
5	4	#4@48"	#4@48"	#4@48"	#4@48"
	5	#4@48"	#4@48"	#4@48"	#4@48"
6	4	#4@48"	#4@48"	#4@48"	#4@48"
	5	#4@24"	#4@48"	#4@48"	#4@48"
	6	#5@24"	#4@48"	#4@48"	#4@48"
7	4	#4@36"	#4@36"	#4@48"	#4@48"
	5	#5@36"	#4@36"	#4@48"	#4@48"
	6	#6@36"	#5@36"	#4@36"	#4@48"
	7	#6@24"	#6@36"	#4@36"	#4@48"
8	4	#4@36"	#4@36"	#4@36"	#4@36"
	5	#5@36"	#4@36"	#4@36"	#4@36"
	6	#6@36"	#5@36"	#4@36"	#4@36"
	7	#6@24"	#6@36"	#5@36"	#4@36"
	8	DR	#6@24"	#6@36"	#4@36"
9	4	DR	#5@36"	#5@36"	#5@36"
	5	DR	#5@36"	#5@36"	#5@36"
	6	DR	#5@36"	#5@36"	#5@36"
	7	DR	#6@36"	#5@36"	#5@36"
	8	DR	#7@36"	#6@36"	#5@36"
	9	DR	DR	DR	DR
10	4	DR	DR	#5@36"	#5@36"
	5	DR	DR	#5@36"	#5@36"
	6	DR	DR	#5@36"	#5@36"
	7	DR	DR	#6@36"	#5@36"
	8	DR	DR	#7@36"	#6@36"
	9	DR	DR	DR	DR
	10	DR	DR	DR	DR

¹ Concrete shall have a specified compressive strength of not less than 2,500 psi at 28 days.
² "DR" means a design is required in accordance with ACI 318 or ACI 332.
³ Reinforcement bars shall have a minimum yield strength of 40,000 psi. (Grade 40)
⁴ Vertical reinforcement shall be placed nearest the inside face of the wall a distance d from the outside face (soil side) of the wall where d equals 4" for a 5.5" wall, 5.5" for a 7.5" wall, 7" for a 9.5" wall and 9" for a 11.5" wall. The reinforcement shall be placed within a tolerance of + - 1/2 inch. In no instance shall concrete cover for reinforcement be less than 1 inch from the inside face of the wall, nor less than 3 inches from the outside face of the wall.
⁵ Soil classes are in accordance with the United Soil Classification System. Refer to Table R405.1. Group IV soils require a design prepared by a registered design professional.
⁶ Unbalanced backfill height is the difference in height of the exterior and interior finish ground levels. Where there is an interior concrete slab, the unbalanced backfill height shall be measured from the exterior finish ground level to the top of the interior concrete slab.
⁷ Concrete stem walls not exceeding 5 feet in height, supporting less than 4 feet of unbalanced backfill, are exempt from the lateral bracing requirements of Section R404.1.
⁸ Concrete stem walls exceeding 5 feet in height, or supporting more than 4 feet of unbalanced backfill, shall comply with the lateral bracing requirements of Section R404.1. (All 10 foot high walls shall be braced in accordance with Table R404.1(1) as shown for 9' walls with 9' of unbalanced backfill.)



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Figure 4:
 Typical Prescriptive Braced Wall Panel
 (per IRC Section R602.10.2, Method WSP)

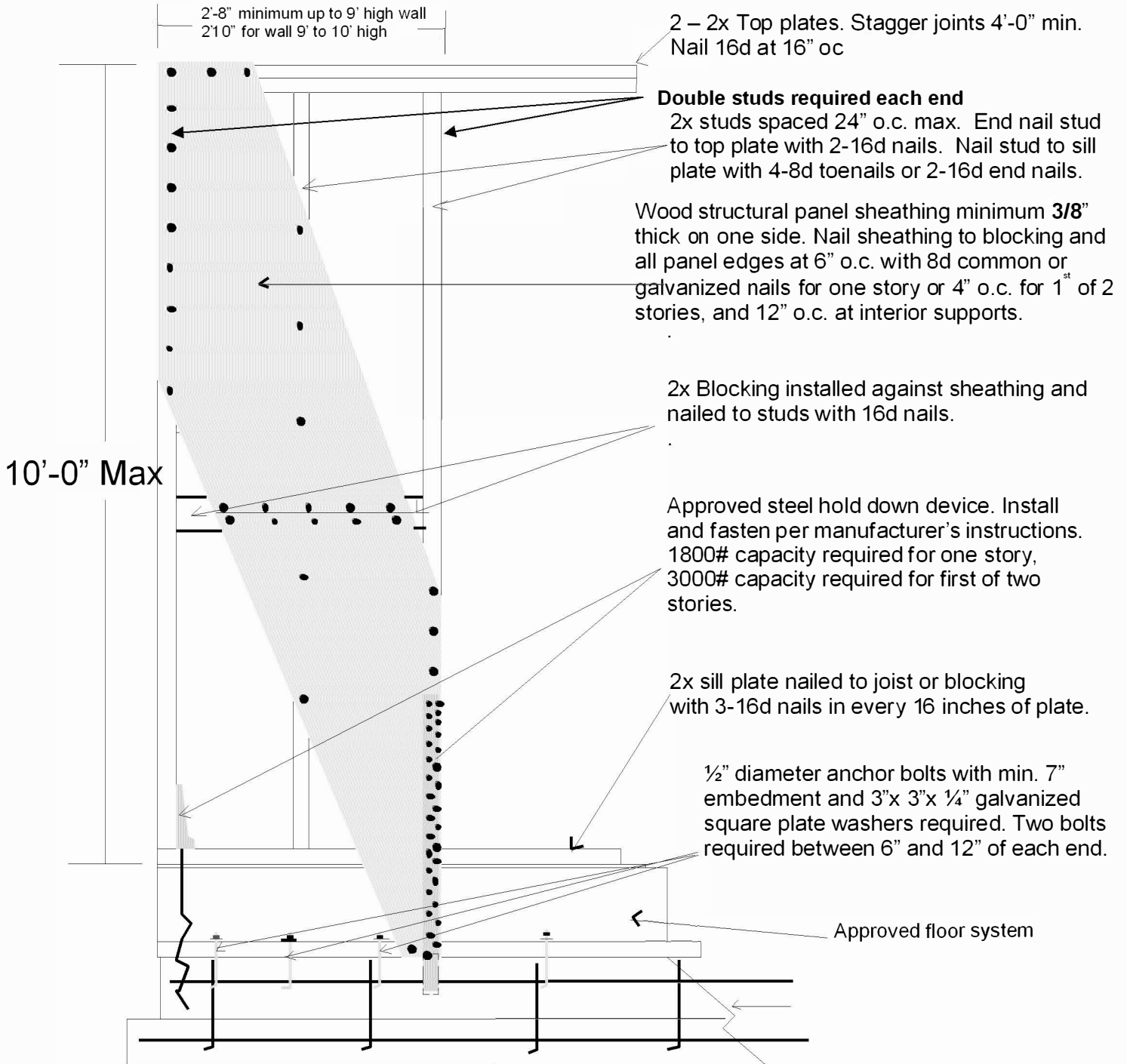


Braced wall panels (BWP or ABP) must be located at each end of each braced wall line. Or, IRC Section R602.10.1.4.1 allows the braced wall panel (BWP) to be located up to 8' from the end of the braced wall line, provided there is a hold down device at the end of the BWP nearest the end of the braced wall line. Additional options may also be available, See IRC 602.10 for more information.



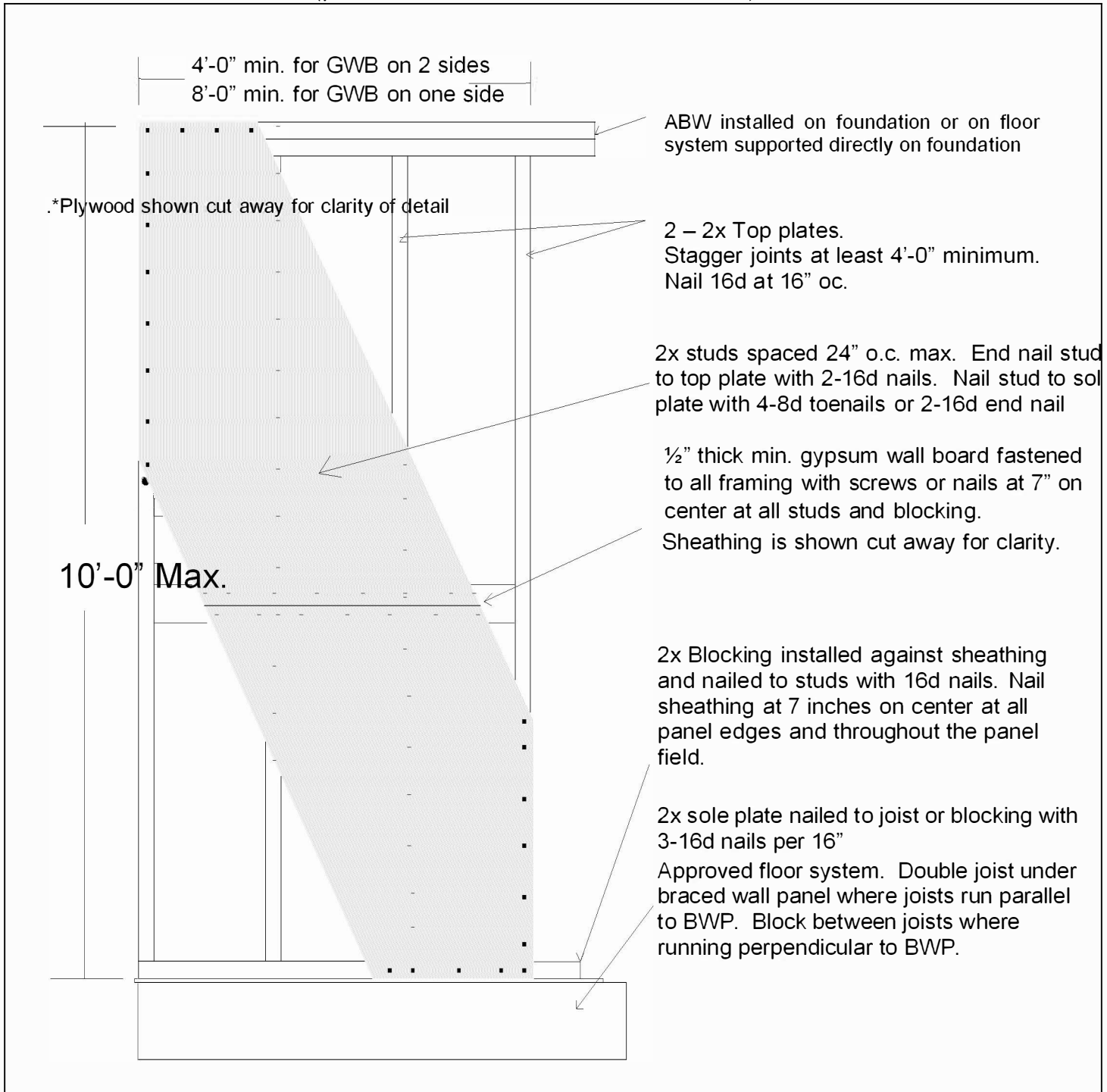
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Figure 6:
 Prescriptive Alternate Braced Wall Panel (ABW)
 (per IRC Section R602.3.2)



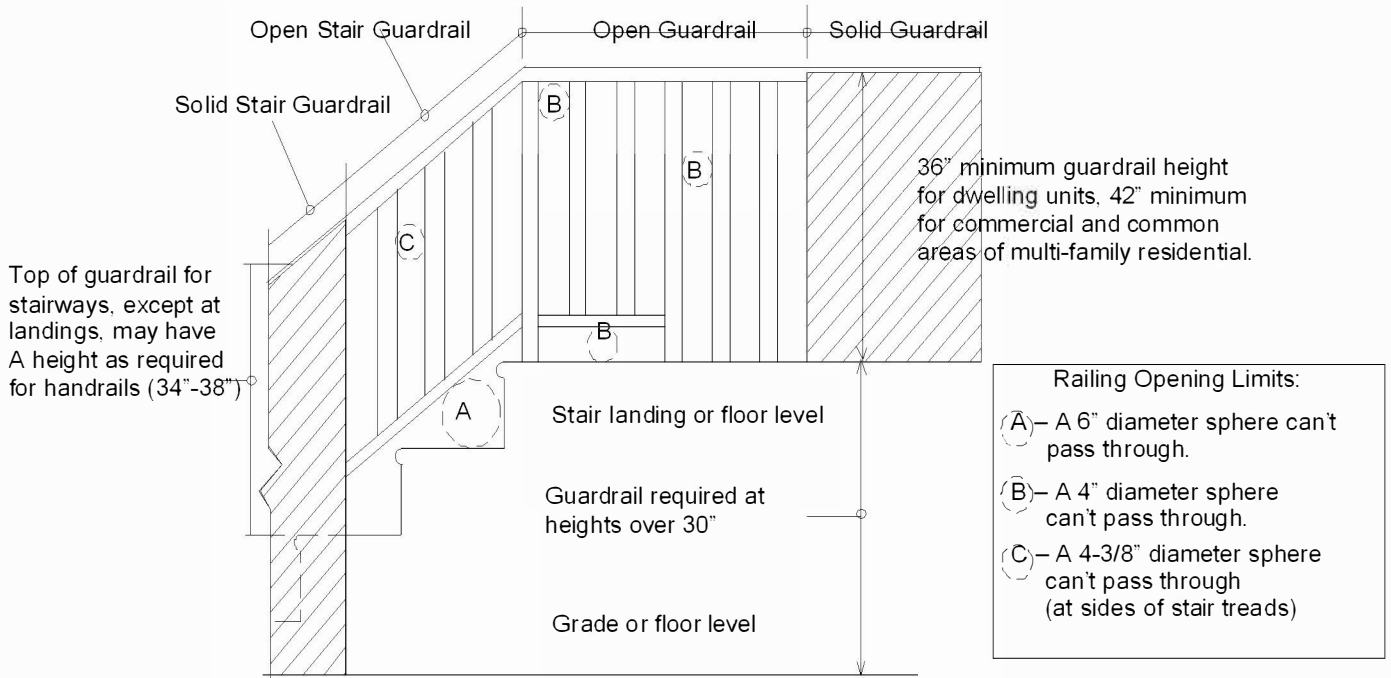
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Figure 5:
Prescriptive Interior Braced Wall Panel
 (per IRC Section R602.10.3, Method GB)

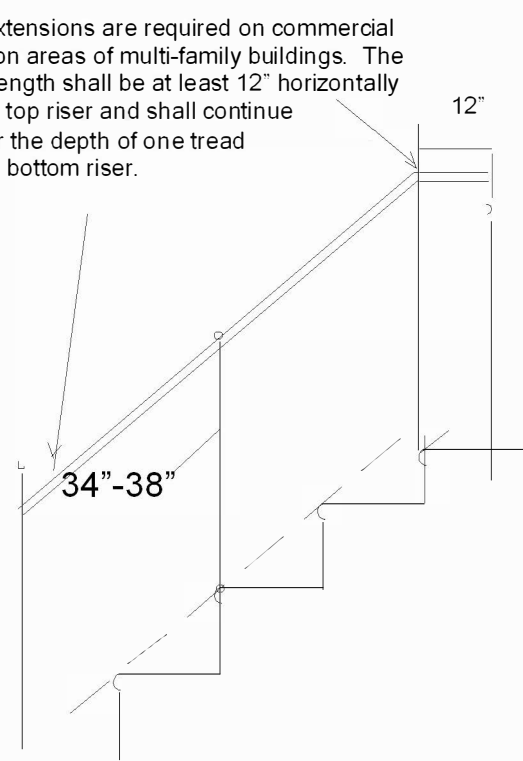


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Standard Construction Details Handrails and Guardrails IRC 311.5.8

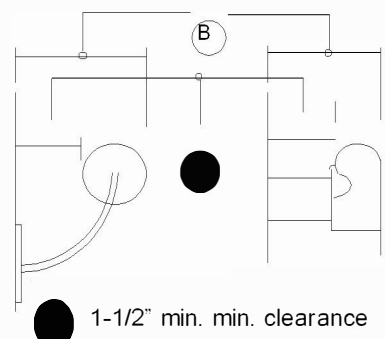
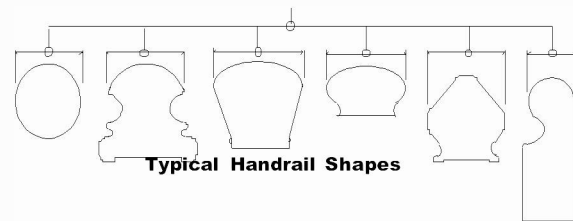


Handrail extensions are required on commercial and common areas of multi-family buildings. The extension length shall be at least 12" horizontally beyond the top riser and shall continue to slope for the depth of one tread beyond the bottom riser.



Handrail Height and Extensions

1-1/4" minimum – 2-1/4" maximum



Wall Clearance



Termination



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Emergency Egress/Rescue Opening

IRC Section R310.1

Fire Safety

Many fire deaths happen when people are asleep in their home. The Building & Fire Codes require that all sleeping rooms and basements have at least one openable door or window to allow occupants to escape, and rescue personnel wearing full gear to enter the building for rescue and firefighting.

Window Requirements

Egress windows must open directly into a public street, public alley, yard or exit court. The windows may exit to an interior exit court, provided the exit court has a passageway that provides exit to the public way. Egress windows MUST:

- Have a net clear openable area of 5.7 square feet;
- Have a net clear openable height dimension of 24";
- Have a net clear openable width dimension of 20";
- Have a finished sill height no higher than 44" above the floor; and
- Be operable from the inside without special knowledge, tools or effort

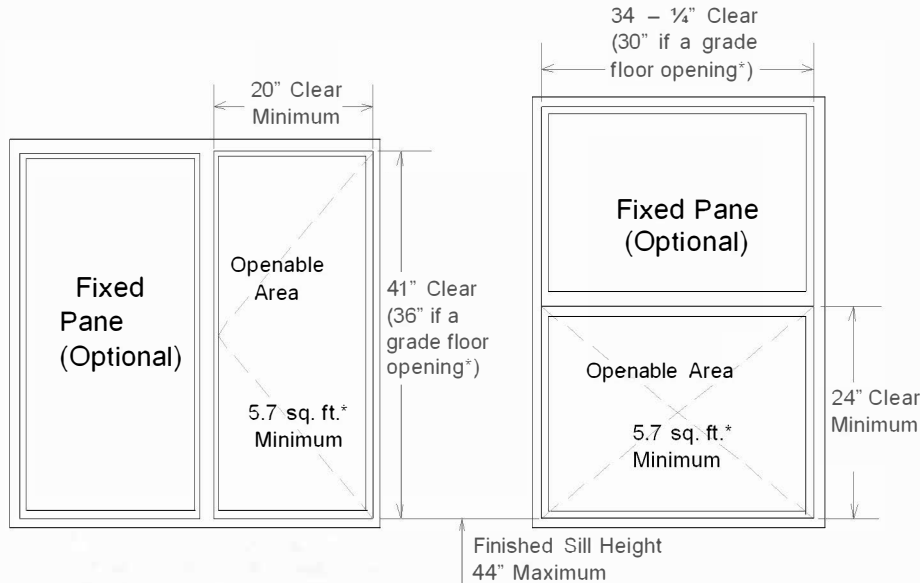
Bars, grates or grilles may be installed on egress Windows if they are equipped with approved release mechanisms that is openable from the inside without use of a key, special knowledge, or a force greater than that, which is required for normal operation of the escape & rescue opening.

Window Wells

Emergency escape windows are not required to have an escape route down to grade. However, any egress window below adjacent grade must have a window well.

Window wells must allow the window to be fully opened and provide a minimum net clear opening of 9 square feet and a minimum dimension of 36".

Window wells with a vertical depth of more than 44" must be equipped with a permanent ladder that is usable with the window in the fully open position. Ladder rungs shall have an inside width of at least 12", shall project at least 3" from the wall, and shall be spaced not more than 18" on center for the full height of the window well.



Minimum Width/Height Requirements (in.)

Width	20	20.5	21	21.5	22
Height	41	40	39.1	38.2	37.3
Width	22.5	23	23.5	24	24.5
Height	36.5	35.7	34.9	34.2	33.5
Width	25	25.5	26	26.5	27
Height	32.8	32.2	31.6	31	30.4
Width	27.5	28	28.5	29	29.5
Height	29.8	29.3	28.8	28.3	28.7
Width	30	30.5	31	31.5	32
Height	27.4	26.9	26.5	26.1	25.7
Width	32.5	33	33.5	34	34.25
Height	25.3	24.9	24.5	24.1	24



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