

## **CHAPTER 5**

### **BUILDING**

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**Article 5. Adoption of the International Energy Conservation Code.**

- Section 5-84. International Energy Conservation Code adopted.

**CHAPTER 5****BUILDING****Article 1. General Provisions.****Section 5-1. Title and purpose.**

- (a) This chapter shall be known as the “building code,” may be cited as such, and will be referred to herein as “this code.”
- (b) The purpose of this code is to provide minimum standards to safeguard life or limb, health, property and public welfare by regulating and controlling the design, construction, quality of materials, use and occupancy, location and maintenance of all buildings and structures within this jurisdiction and certain equipment specifically regulated herein.

(2012, ord 12-27, sec 2.)

**Section 5-2. Scope.**

The provisions of this code shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, maintenance, removal and demolition of every building or structure or any appurtenances connected or attached to such buildings or structures within the County inland of the shoreline high-water line, except work located primarily in a public way, public utility towers, bridges, and poles, mechanical equipment not specifically regulated in this code, and hydraulic flood control structures.

(2012, ord 12-27, sec 2.)

**Section 5-3. International Building Code adopted.**

- (a) The “International Building Code, 2006 Edition” as copyrighted and published in 2006 by the International Code Council, Incorporated, as it is adopted and amended by Chapter 180 of Title 3, of the Hawai‘i Administrative Rules entitled “State Building Code” (the “HAR”), as such chapter may be amended or superseded from time to time, (the “IBC”) is hereby adopted by reference as set forth in this chapter, subject to the amendments set forth in article 3 and article 4 of this chapter. Copies of the “International Building Code, 2006 Edition” and amendments thereto shall be available for public inspection at the department of public works and the office of the county clerk.
- (b) Chapter 1 of the IBC, relating to Administration, is hereby excluded from adoption and shall be of no force or effect, with the exception of:
  - (1) Section 104.9 (Approved materials and equipment);
  - (2) Section 104.10 (Modifications); and
  - (3) Section 104.11 (Alternative materials, design and methods of construction and equipment).

- (c) The appendices to the IBC shall not apply unless specifically adopted by Chapter 180 of the Hawai'i Administrative Rules or by this chapter, as provided in article 4 of this chapter.
    - (1) Appendices of the IBC adopted, as provided in article 4, division 1 of this chapter:
      - (A) Appendix C, Group U-Agricultural Buildings; and
      - (B) Appendix I, Patio Covers.
    - (2) Appendices added to the IBC, as provided in article 4, division 2 of this chapter:
      - (A) Appendix L, Factory-Built Housing;
      - (B) Appendix M, Thatch Material on Exterior of Buildings - Protection Against Exposure Fires;
      - (C) Appendix U, Hawai'i Hurricane Sheltering Provisions for New Construction;
      - (D) Appendix W, Hawai'i Wind Design Provisions for New Constructions; and
      - (E) Appendix X, Indigenous Hawaiian Architecture Structures.
- (2012, ord 12-27, sec 2.)

**Section 5-4. Definitions.**

As used in this code, unless otherwise specified:

“Administrative Authority” means the director of the department of public works, or the director’s authorized representative(s).

“Assistant” means the authorized representative(s) of the administrative authority.

“Owner-builder” means owners or lessees of property who build or improve structures on their property for their own use, or for use by their immediate family. This definition shall not preempt owner-builder by exemption as defined by section 444-2.5, Hawai'i Revised Statutes.

(2012, ord 12-27, sec 2.)

**Section 5-5. Reference to the State of Hawai'i Building Code Title 3, Chapter 180 of the Hawai'i Administrative Rules, International Building Code; conflicting provisions.**

If any provisions of this code conflict with or contravene provisions of the State of Hawai'i Building Code that have been incorporated by reference, the provisions of this code shall prevail as to all matters and questions arising out of the subject matter of that provision.

(2012, ord 12-27, sec 2.)

**Section 5-6. Existing structures.**

- (a) Buildings in existence at the time of the adoption of this code may have their existing use or occupancy continued if such use or occupancy was legal at the time of the adoption of this code, provided such continued uses do not constitute a hazard to the general safety and welfare of the occupants and the public.

- (b) Additions, Alterations and Repairs. When additions, alterations or repairs within any twelve-month period exceeds fifty percent of the replacement value of an existing building or structure, such building or structure shall be made to conform to the requirements for new buildings or structures.
- (1) Additions, alterations and repairs not exceeding fifty percent of the replacement value of an existing building or structure and complying with the requirements for new buildings or structures may be made to such building or structure within any twelve-month period without making the entire building or structure comply. The new construction shall conform to the requirements of this code for new building of like area, height and occupancy. Such building or structure, including new additions, shall not exceed the areas and heights specified in this code.
  - (2) Alterations or repairs, not exceeding twenty-five percent of the value of an existing building or structure, which are non structural and do not affect any member or part of the building or structure having required fire resistance, may be made with the same materials of which the building or structure is constructed.
  - (3) Exceptions:
    - (A) The installation or replacement of glass in hazardous locations, as specified in Section 2406, shall be as required for new installations.
    - (B) Without limitation to the prescribed percentages, the building official may require reengineering analysis, documentation or inspections to assure the structural integrity or safety of the existing structure.

(2012, ord 12-27, sec 2.)

**Section 5-7. Reserved.**

(2012, ord 12-27, sec 2.)

**Section 5-8. Reserved.**

(2012, ord 12-27, sec 2.)

**Section 5-9. Reserved.**

(2012, ord 12-27, sec 2.)

**Article 2. Administration and Enforcement.**

**Division 1. Administration.**

**Section 5-10. Department having jurisdiction.**

Unless otherwise provided for by law, the department of public works shall have jurisdiction over and administer all matters covered by this code.

(2012, ord 12-27, sec 2.)

**Section 5-11. Duties of the Administrative Authority.**

The administrative authority shall maintain public office hours necessary to efficiently administer the provisions of this code and amendments thereto and shall perform the following duties:

- (1) Shall enforce the provisions of this code and shall have authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such policies and procedures shall not have the effect of waiving requirements specifically provided for in this code;
  - (2) Require submission of, examine, and check plans and specifications, drawings, descriptions, and diagrams necessary to show clearly the character, kind, and extent of work covered by applications for a permit, and upon approval, shall issue the permit applied for;
  - (3) Administer and enforce the provisions of this code in a manner consistent with the intent thereof and shall inspect all plumbing and drainage work authorized by any permit to assure compliance with provisions of this code or amendments thereto, approving or condemning said work in whole or in part as conditions require;
  - (4) Issue upon request a certificate of approval for any work approved by the administrative authority;
  - (5) Condemn and reject all work done or being done or materials used or being used which do not in all respects comply with the provisions of this code and amendments thereto;
  - (6) Order changes in workmanship and materials essential to obtain compliance with all provisions of this code;
  - (7) Investigate any construction or work regulated by this code and issue such notices and orders as provided in this code; and
  - (8) Keep a complete record of all essential transactions.
- (2012, ord 12-27, sec 2.)

**Section 5-12. Compliance with this code and other laws.**

Any approval or permit issued pursuant to the provisions of this code shall comply with all applicable requirements of this code. The granting of a permit or variance under this code does not dispense with the necessity to comply with any law, ordinance, regulation or any other provision of the Hawai'i County Code to which a permittee may also be subject.

- (1) "Wherever in this code reference is made to the ICC Electrical Code, means the Hawai'i County Code, Chapter 9, Electrical."
- (2) "Wherever in this Code reference is made to the International Fuel Gas Code, the provisions in the International Fuel Gas Code shall be deemed only guidelines and not mandatory."

- (3) “Wherever in this Code reference is made to the International Mechanical Code, the provisions in the International Mechanical Code shall be deemed only guidelines and not mandatory.”
- (4) “Wherever in this code reference is made to the International Plumbing Code, means the Hawai‘i County Code, Chapter 17, Plumbing.”
- (5) “Wherever in this Code reference is made to the International Property Maintenance Code, the provisions in the International Property Maintenance Code shall be deemed only guidelines and not mandatory.”
- (6) “Wherever in this code reference is made to the International Fire Code, means the Hawai‘i County Code, Chapter 26, Fire Code.”
- (7) “Wherever in this code reference is made to the International Energy Conservation Code, as adopted by the County of Hawai‘i.”
- (8) Other Laws. Any provisions of this code to the contrary notwithstanding, the following shall be at all times in full force and effect, and in situations of conflicting requirements, the stricter shall be complied with:
  - (A) Hawai‘i Revised Statutes;
  - (B) Rules and regulations of the State Department of Land Utilization;
  - (C) Ordinance of the County of Hawai‘i;
  - (D) Rules and regulations of the Planning Department;
  - (E) Subdivision rules and regulations adopted pursuant to the subdivision chapter of the County Code;
  - (F) Rules and regulations of the County Department of Water Supply;
  - (G) Public health regulations, State Department of Health;
  - (H) Rules and regulations of the State Department of Labor and Industrial Relations;
  - (I) Fire Chapter of the County Code;
  - (J) Airport zoning regulations of the State Director of Transportation;
  - (K) All materials specified in this code shall not contain asbestos.

(2012, ord 12-27, sec 2.)

**Section 5-13. Adoption of rules.**

The administrative authority may adopt rules pursuant to chapter 91, Hawai‘i Revised Statutes, necessary for the purposes of this code.

(2012, ord 12-27, sec 2.)

**Section 5-14. Right of entry.**

Upon presentation of proper credentials, the administrative authority or such person’s assistants may enter at reasonable times any building or premises in the County to perform any duty imposed by this code, provided that such entry shall be made in such a manner as to cause the least possible inconvenience to the persons in possession. An order of a court authorizing such entry shall be obtained in the event such entry is denied or resisted.

(2012, ord 12-27, sec 2.)

**Section 5-15. Deputies.**

- (a) In accordance with the prescribed procedures and with the approval of the administrative authority, the building official shall have the authority to appoint technical officers, inspectors, plan examiners and other personnel necessary to support this code enforcement agency. The building official may deputize such inspectors or employees as may be necessary to carry out the functions of this code enforcement agency. Such employees shall have powers as delegated by the building official.
- (b) The building official may deputize volunteers to temporarily carry out functions of the code enforcement agency in the event of a major natural disaster.
- (2012, ord 12-27, sec 2.)

**Section 5-16. Limited liability of authorized personnel.**

The authorized personnel charged with the enforcement of this code, acting in good faith and without malice in the discharge of the duties required by this code or other pertinent law or ordinance shall not thereby be rendered personally liable for damages that may accrue to persons or property as a result of an act or by reason of an act or omission in the discharge of such duties. A suit brought against the authorized personnel because of such act or omission performed by the authorized personnel in the enforcement of any provision of this code or other pertinent laws or ordinances implemented through the enforcement of this code shall be defended by the County until final termination of such proceedings, and any judgment resulting there from shall be assumed by the County.

(2012, ord 12-27, sec 2.)

**Section 5-17. Reserved.**

(2012, ord 12-27, sec 2.)

**Section 5-18. Reserved.**

(2012, ord 12-27, sec 2.)

**Division 2. Permits.****Section 5-19. Permit required.**

- (a) No person, firm, or corporation shall erect, construct, enlarge, alter, repair, move, convert, or demolish any building or structure in the County, or cause the same to be done, without first obtaining a separate building permit for each building or structure from the building official; provided that one permit may be obtained for a dwelling and its accessories, such as fence, retaining wall, pool, storage and garage structures.

- (b) Permits will be further required for, but not limited to, the following:
- (1) All Television/Radio Communication Towers, etc., not regulated by the Public Utility Commission.
  - (2) Complete new installations of all solar water heating systems, or the complete replacement of existing system with all new components, or relocating of panels from roof to ground or vice versa, along with plumbing and electrical permits.
  - (3) Construction or renovation of Handicap Accessible routes from parking lot to building or from building to building on a lot.
  - (4) Water tanks or catchments intended for potable/household use, regardless of height or size. For additional requirements where water tank or catchment systems are used as means of fire protection, see Chapter 26 of the Hawai'i County Code.
  - (5) Retaining walls four feet and higher. Stepped or terraced retaining walls 8'-0" of each other are considered to be one wall when determining wall height.

**EXCEPTIONS:** A permit is not required for:

- (1) Work located primarily in a public way, public utility towers, bridges, and poles, mechanical equipment not specifically regulated in this code, and hydraulic flood control structures.
- (2) Temporary structures used during the construction of a permitted structure, temporary buildings, platforms, and fences used during construction or for props for films, television or live plays and performances.
- (3) Re-roofing work with like material and installation of siding to existing exterior walls which will not affect the structural components of the walls for Groups R-3 and U Occupancies.
- (4) Temporary tents or other coverings used for private family parties or for camping on approved campgrounds.
- (5) Television and radio equipment (i.e. antennas, dishes) accessory to R-1 and R-3 Occupancies. Supports or towers for television and radio equipment 6'-0" or less in height.
- (6) Awnings projecting up to 4 feet and attached to the exterior walls of buildings of Group R-3 or U Occupancy; provided that the awnings do not violate the provisions for "yards" in Chapter 25 (Zoning) of the Hawai'i County Code.
- (7) Standard electroliers not over 35 feet in height above finish grade.
- (8) Installation of wallpaper or wall covering which are exempted under the provisions of Section 801.1, Interior Finishes, Chapter 8, IBC.
- (9) Repairs which involve only the replacement of component parts of existing work with similar materials for the purpose of maintenance, and which do not aggregate over \$4,000 in valuation in any twelve-month period, and do not affect any electrical or mechanical installations.
- (10) Painting and decorating.
- (11) Installation of floor covering.

- (12) Cabinet work for R-3 Occupancy and individual units of R-1 and U Occupancies which are not regulated (under Section 310.3.12 Cooking Unit Clearances of this code). Wall mounted shelving not affecting fire resistance or structural members of wall. This is dealing with clearances to cabinets and range clearance to combustible.
  - (13) Work performed under the jurisdiction of Federal Government and/or located in Federal property.
  - (14) Swimming pools for one and two-family dwelling units less than 24" in depth.
  - (15) Department of Transportation, Harbors, - section 266-2, Hawai'i Revised Statutes.
  - (16) Fences 6'-0" or less in height.
  - (17) Detached structures for animal shelters, storage sheds, towers, and similar uses not more than 6'-0" in height.
  - (18) One-story detached accessory structures used as tool and storage sheds, playhouses and similar uses, provided the floor area does not exceed a) 120 square feet (11 m<sup>2</sup>); b) does not exceed 600 square feet for agricultural zoned lands. (Building cannot be located within building setback as required by the Zoning, Chapter 25 of Hawai'i County Code. Verify setback requirements with the Planning Department).
  - (19) Detached decks or platforms less than 30" in height above grade. (Building cannot be located within building setback as required by the Zoning, Chapter 25 of Hawai'i County Code. Verify setback requirements with the Planning Department).
  - (20) Playground equipment, excluding assembly or similar waiting areas.
  - (21) Replacement of solar water heating components (i.e. panels, tanks) in the same location and of the same type, however; plumbing and/or electrical permits required.
  - (22) Wells and Reservoirs – Hawai'i Revised Statutes, chapter 178. Check requirements of other governmental agencies.
  - (23) Work performed under the jurisdiction or control of the State Department of Accounting and General Services (DAGS).
  - (24) Water tanks or catchment systems 5,000 gallons or less in size with a height to width ratio of not more than 2:1, to be used strictly for non-potable/household purposes such as agriculture, irrigation or stock, and that are independent of the potable/household system.
- (2012, ord 12-27, sec 2.)

**Section 5-20. Application for permit.**

To obtain a permit, the applicant shall first file an application therefore in writing on a form furnished by the building division for that purpose. Such application shall:

- (1) Identify and describe the work to be covered by the permit for which application is made.

- (2) Describe the land on which the proposed work is to be done by legal description, street address or similar description that will readily identify and definitely locate the proposed building or work.
- (3) Indicate the use and occupancy for which the proposed work is intended.
- (4) Be accompanied by construction documents and other information as required by section 5-25.
- (5) State the valuation of the proposed work.
- (6) Be signed by the applicant/owner, or the applicant's/owner's authorized agent to be consent to the permit application.
- (7) Give such other data such as but not limited to the following: Occupancy Group; Types of Construction; Major floor area; Accessible floor area; Setbacks; Distance to nearest building, etc.; other information as may be required by the building official.

(2012, ord 12-27, sec 2.)

**Section 5-21. Posting of building permit.**

Work requiring a permit shall not be commenced until the permit holder or an agent of the permit holder shall have posted, in a conspicuous place on the site, the building permit. The building permit shall be readily visible for the building official to identify and make all required inspections. Failure to comply with this provision shall subject the violator to a \$25 fine.

(2012, ord 12-27, sec 2.)

**Section 5-22. Expiration.**

- (a) Every permit issued by the building official under the provisions of this code shall expire by limitation and become null and void (i) three years after the date of issuance, or (ii) one hundred eighty days from the date of issuance if the building or work authorized by the permit is not commenced by such date. A permit shall expire if the building or work authorized by the permit is suspended or abandoned for a period of one hundred eighty days or more at any time after the work has commenced. In the event of strikes or other causes beyond the control of the builder, the building official may extend the aforementioned three year or one hundred eighty day periods. The extension of time granted shall be a reasonable length of time but in no case exceed six months. Requests for an extension must be made in writing to the building official. No exceptions will be allowed for building permits issued prior to the adoption of this code.
- (b) Upon expiration of a permit, all work shall cease and shall not be recommenced until a new permit is obtained. The building official may waive the requirements for submittal of plans and specifications in connection with a permit renewal if the work previously permitted remains the same, no amendments have been made to the building code affecting the work, and previously approved plans are still on file. When the building official determines that plans need not be submitted, the original plans, stamped and approved by the building official, shall be the renewed permit plans.

- (c) An owner-builder permit shall expire by limitation and become null and void five years after the date of issuance. If the building or work authorized by the permit is suspended or abandoned any time after the work has commenced, the building official, upon request, may suspend the permit expiration until such a time that the owner-builder is ready to re-commence building or work authorized by approved permit.

(2012, ord 12-27, sec 2.)

**Section 5-23. Reserved.**

(2012, ord 12-27, sec 2.)

**Section 5-24. Reserved.**

(2012, ord 12-27, sec 2.)

**Division 3. Construction Documents.**

**Section 5-25. Construction documents required.**

- (a) Two sets of plans and specifications shall be submitted for dwelling (R-3 Occupancy) and accessory structures for dwellings. Three sets of plans and specifications shall be submitted for all other occupancies.
- (b) Plans, specifications, engineering calculations, diagrams, soil investigation reports, code search, special inspection and structural observation programs and other data shall constitute the submittal documents and shall be submitted in one or more sets with each application for permit.
- (c) All plans and specifications relating to work which affects the public safety or health and for which a building permit is required shall be prepared, designed and stamped by a duly registered professional engineer or architect in accordance with chapter 464, Hawaii Revised Statutes. For residential (R-3 Occupancies) and accessory (U Occupancies) only, plans and specifications shall be designed and stamped by a professional architect or structural engineer when any of the following applies:
  - (1) Single story structure and more than 600 square feet of floor area for R-3 Occupancy.
  - (2) Single story or two-story structure of mixed occupancies (R-3 and U Occupancies) with more than 1,200 square feet of total floor area. Item #1 criteria applies.
  - (3) Structures of R-3 or U Occupancies that are three or more stories in height.
  - (4) Flood Zone.
  - (5) Structural members are concrete, masonry or steel.
- (d) All plans for retaining walls over 4 feet in height shall be designed and stamped by a professional architect or engineer in the structural or civil branches, pursuant to chapter 464, Hawaii Revised Statutes.

- (e) All plans for post and pier type construction with/without perimeter foundation walls of R-3 Occupancies shall be designed and stamped by a professional architect or structural engineer.
  - (f) All U Occupancies greater than 600 square feet shall be designed and stamped by a professional architect or structural engineer.
  - (g) All wood trusses of more than 24'-0" spans shall be designed and stamped by a professional architect or structural engineer. All pre-engineered trusses and metal trusses shall be designed and stamped by a professional architect or structural engineer.
  - (h) The building official may require plans, computations, and specifications to be prepared and designed by an engineer or architect licensed by the State of Hawai'i to practice as such. This requirement may be imposed when prescriptive requirements of the building code are not being adhered to.
- (2012, ord 12-27, sec 2.)

**Section 5-26. Package homes.**

In lieu of compliance with those provisions of section 5-25 pertaining to dwellings, model package homes (homes manufactured in a factory and ready to be assembled on the job site) may be pre-approved as follows by the Hawai'i County Department of Public Works-Building Division (DPW-Building Division).

- (1) Pre-approval shall be limited to three typical model home designs per manufacturer per year, with no revisions. Any revisions to the pre-approved plans will require submittal of the entire particular revised plans and documents for approval. Minimum square footage shall be 900 square feet and maximum square footage shall be 1,400 square feet living area (not including carport/garage). Maximum 2-car carport/garage may be included.
- (2) Pre-approval is good for one calendar year (January to December) for the calendar year in which approval is requested. All model pre-approved shall expire by December 31 of each calendar year.
- (3) When submitting for pre-approval, applicant shall submit six sets of complete working drawings and specifications along with package home seal and authorizing signature.
- (4) There shall be a one time plan review fee based on the actual valuation of the dwelling to be paid by the package model home manufacturer who is submitting the plans for pre-approval. Fees will be charged per model submitted, per section 5-35, table 1-A, item E. All other occupancies shall be based on valuation and the schedule below.
- (5) When submitting for building permit under pre-approved plans, the owner/contractor shall:
  - (A) Submit two sets of complete working drawings showing the pre-approved model number along with the manufacturer's wet seal and authorizing signature. DPW-Building Division will verify seal and signature.
  - (B) Obtain approvals from other approving department/agencies.

- (6) Approval from DPW-Building Division will be given within forty-eight hours.
- (7) Pre-approved construction drawings will not be required to be individually stamped by a duly registered engineer or architect in accordance with chapter 464, Hawai'i Revised Statutes.

(2012, ord 12-27, sec 2.)

**Section 5-27. Requirements for plans and specifications.**

- (a) Plans and specifications shall be drawn to scale upon substantial paper and shall be of sufficient clarity to indicate the nature and extent of the work proposed and show in detail that it will conform to the provisions of this code and all relevant laws, ordinances, rules and regulations. The first sheet of each set of plans shall give the tax map key number of the work site and the name and address of the owner and person who prepared the plans, along with occupancy and type of construction, and floor area computations. Plans shall include a plot plan showing the location of the proposed building and every existing building on the property. The following information shall be included in the code search information which will be part of the plans submitted, that is the basis of the building design which includes but is not limited to the following: Type of Construction; Occupancy; Basic Allowable Floor Areas; Separation for Mixed Occupancy; etc. In lieu of detailed specifications, the building official may approve references on the plans to a specific section or part of this code or other ordinances or laws.
- (b) Computations, stress diagrams, and other data sufficient to show the correctness of the plans, shall be submitted when required by the building official.
- (c) All plans other than R-3 and U occupancies shall have on the plans information of occupancy, type of construction, floor area computations, allowable area increases, separation wall if used, fire resistive substitution, fire sprinkler, exits, etc. Information shall show code search information for building design.

(2012, ord 12-27, sec 2.)

**Section 5-28. Issuance of permits.**

- (a) The application, plans and specifications filed by an applicant for a permit shall be reviewed by the building official. Plans shall be reviewed by any other appropriate department of the County and the State to verify compliance with laws and ordinances under their jurisdiction. If the building official finds that the work described in an application for a permit and the plans, specifications and other data filed therewith conform to the requirements of this code and other pertinent laws and ordinances, and the fees have been paid, the building official shall issue a permit therefore to the applicant; provided that no permit shall be issued for the moving of any building or structure or portion thereof which has deteriorated or has been damaged to an extent greater than fifty percent of the cost of replacement (new) of such building or structure.

**Exception.** The Building Division will waive the requirements of plan and specification review by the building official of pre-approved R-3 Occupancy package model homes previously approved by the department of public works.

- (b) When the building official issues the permit, the building official shall endorse in writing or stamp on all sets of plans and specifications "REVIEWED." Such reviewed plans and specifications shall not be changed, modified, or altered without authorization from the building official, and all work shall be done in accordance with the approved plans.
- (c) The building official may issue a permit for the construction of part of the building or structure before the entire plans and specifications for the whole building or structure have been submitted or approved, provided adequate information and detailed statements have been filed complying with all pertinent requirements of this code. The holder of such permit shall proceed at the holder's own risk without assurance that the permit for the entire building or structure will be granted.
- (d) The building permit shall be posted in a conspicuous place on the site during the progress of work.
- (e) No permit issued shall authorize any person or contractor to do work upon any phase of the building, structure or project unless specifically identified in the permit application, including any attachment or amendments thereto, as the contractor or subcontractor designated to do that particular phase of work.
- (f) If there is a change in the designation of any contractor for any phase of work subsequent to the issuance of a permit, the permittee shall submit the change in writing to the building official requesting approval of the change, and include a non-refundable payment of \$25 for the transferring of the building permit.

(2012, ord 12-27, sec 2.)

**Section 5-29. Reserved.**

(2012, ord 12-27, sec 2.)

**Section 5-30. Reserved.**

(2012, ord 12-27, sec 2.)

**Division 4. Fees.****Section 5-31. Permit fees.**

A permit shall not be valid until the fees prescribed by law have been paid, nor shall an amendment to a permit be released until the addition fee, if any, has been paid.

- (1) The fee for each permit shall be as set forth in section 5-35, Table 1A – BUILDING PERMIT FEES.
- (2) The determination of value or valuation under any of the provisions of this code shall be made by the building official. The valuation to be used in computing the permit fees shall be the total value of all construction work for which the permit is issued, as well as all finish work, painting, roofing, electrical, plumbing, heating, air conditioning, elevators, fire-extinguishing systems and any other permanent work or permanent equipment.
- (3) When work for which a permit is required by this code has commenced without obtaining said building permit, the fees specified shall be doubled, but the payment of such double fee shall not relieve any person from fully complying with the requirements of this code in the execution of the work nor from any other penalties prescribed in this code.

(2012, ord 12-27, sec 2.)

**Section 5-32. Refunds.**

Refunds for permits shall be made in accordance with section 2-12 of the Hawaii County Code.

(2012, ord 12-27, sec 2.)

**Section 5-33. Compliance with Hawai'i Revised Statutes.**

Identity of Licenses. It shall be unlawful for any permittee to perform or allow to be performed, any work covered by the permit issued in violation of chapter 444, Hawai'i Revised Statutes, relating to the licensing of contractors.

(2012, ord 12-27, sec 2.)

**Section 5-34. Exemption.**

- (a) The County, all agencies of the County, and contractors with the County, shall be exempted from the requirement of paying any permit fees.
- (b) Habitat for Humanity Hilo and Habitat for Humanity Kona shall be exempt from the requirement of paying any permit fee. This exemption shall not apply to penalty fees when required under this chapter.

(2012, ord 12-27, sec 2.)

## Section 5-35. Table 1-A.

TABLE 1-A – BUILDING PERMIT FEES	
Fees shall be as follows:	
A. County of Hawai'i, Department of Public Works, Building Division pre-approved single-family dwelling package model homes or single family dwelling with architect or structural engineer stamp 900 s.f. - 1,100 s.f. (living area only with one car or two car carport).	\$150
B. County of Hawai'i, Department of Public Works, Building Division pre-approved single-family dwelling package model homes or single-family dwelling with architect or structural engineer stamp 1,101 s.f. - 1,400 s.f. (living area only with one car or two car carport).	\$200
C. Dwellings over 1,401 s.f. including all single-family model homes with no minimum s.f. requirement which is part of a development. (To include all enclosed areas under roof except for areas listed under "D").	\$20 per 100 sq. ft. or fraction thereof
D. Carport, garages, porches, patios or lanais and detached U structures.	\$10 per 100 sq. ft. or fraction thereof
E. All other occupancies shall be based on valuation and the schedule below:	
\$0 to \$500	\$10
\$501 to \$2,000	\$10 for the first \$500 plus \$1.50 for each additional \$100 or fraction thereof, to and including \$2,000
\$2,001 to \$25,000	\$32.50 for the first \$2,000 plus \$7.50 for each additional \$1,000 or fraction thereof, to and including \$25,000.
\$25,001 to \$50,000	\$205 for the first \$25,000 plus \$6 for each additional \$1,000 or fraction thereof, to and including \$50,000.
\$50,001 and up	\$355 for the first \$50,000 plus \$3 for each additional \$1,000 or fraction thereof.

(2012, ord 12-27, sec 2.)

**Section 5-36. Fees for extra and courtesy inspections.**

- (a) A fee of \$50 shall be assessed upon the permittee or requestor for each extra inspection made. "Extra inspection" means a requested or scheduled inspection wherein the work to be inspected is not complete or ready for inspection.
  - (b) A fee of \$50 shall be assessed upon the requestor or property owner for each courtesy inspection made. "Courtesy inspection" means a requested inspection wherein no permit has been issued or for general requirements regarding the health, safety, or welfare of people.
  - (c) The administrative authority has the authority to waive inspection fees.
- (2012, ord 12-27, sec 2.)

**Section 5-37. Reserved.**

(2012, ord 12-27, sec 2.)

**Section 5-38. Reserved.**

(2012, ord 12-27, sec 2.)

**Section 5-39. Reserved.**

(2012, ord 12-27, sec 2.)

**Division 5. Inspections.****Section 5-40. Inspections.**

- (a) All construction or work for which a permit is required shall be subject to inspection by the building official. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of this code or of any other ordinance. Inspections presuming to give authority to violate or cancel the provisions of this code or of any other ordinances shall not be valid.
- (b) It shall be the duty of the permit applicant to cause the work to remain accessible and exposed for inspection purposes. Neither the building official nor the County shall be liable for any expense entailed in the removal or replacement of any material required to allow inspection.
- (c) A survey of the lot may be required by the building official to verify that the structure is located in accordance with the approved plans.

(2012, ord 12-27, sec 2.)

**Section 5-41. Inspection requests.**

- (a) Whenever any work regulated by this chapter, or any portion thereof, is ready for inspection, the building official shall be notified by the permit holder that same is ready for inspection. The notice shall be in writing on forms furnished by the authority having jurisdiction, by e-mail to the area inspectors or may be faxed or by telephone at the option of the building official. The notice shall be filed with the department not less than forty-eight hours and not more than seventy-two hours before any such inspection is desired.

- (b) The building official shall proceed to inspect the same or to make inspection arrangements or notify the contractor of a reschedule within forty-eight hours, not including weekends or holidays, after receipt of such notice. When work conforms in all respects with the provisions of this chapter, a notice granting authority to proceed with installations shall be given.
  - (c) No permitted work shall be covered or concealed until forty-eight hours have expired after a scheduled inspection or until the building official has approved the installation and given permission to cover or conceal the same. If the permitted work is covered or concealed without an inspection, the licensed contractor will provide verification that the concealed work complies with all the provisions of this chapter in a letter stamped and signed by an architect or structural engineer licensed in the State of Hawai'i. Should the building official condemn any of said work or equipment as not being in accordance with the provisions of this chapter, notice in writing to that effect shall be given to the permit holder engaged in the work or posted at the jobsite.
  - (d) Within a reasonable time thereafter, the work or equipment shall be altered or removed as required, and necessary changes shall be made so that all such work and equipment may fully comply with the provisions of this chapter before further work is connected on or with the condemned work or equipment. In default, the general contractor or owner builder shall be liable to the penalties provided in this chapter, and any and every owner, contractor or other person engaged in construction of the building or structure, or otherwise, covering or allowing to be covered such portion of work or equipment, or removing any notice not to cover same placed thereon by the building official shall likewise be liable to the penalties provided for in this chapter.
  - (e) Owner builders will be required to have inspections, unless done by a licensed contractor or certified by licensed architects/engineers.
- (2012, ord 12-27, sec 2.)

**Section 5-42. Required inspections.**

The building official, upon notification from the permit holder or the permit holder's agent, shall make the following inspection and shall either approve that portion of the construction as completed or shall notify the permit holder or the permit holder's agent if the same fails to comply with this code:

- (1) Footing and foundation inspections shall be made after excavations for footings are complete and any required reinforcing steel is in place. For concrete foundations, any required forms shall be in place prior to inspection. Materials for the foundation shall be on the job, except where concrete is ready mixed in accordance with ASTM C 94, the concrete need not be on the job.
- (2) Concrete slab and under-floor inspections shall be made after in-slab or under-floor reinforcing steel and building service equipment, conduit, piping accessories and other ancillary equipment items are in place, but before any concrete is placed or floor sheathing installed, including the subfloor.

- (3) Framing inspections shall be made after the roof deck or sheathing, all framing, fireblocking and bracing are in place and pipes, chimneys and vents to be concealed are complete and the rough electrical, plumbing, heating wires, pipes and ducts are approved.
- (4) Lathing inspections, to be made after all lathing and gypsum board, interior and exterior, in construction required to be fire-resistive is in place but before any plastering is applied or before gypsum board joints and fasteners are taped and finished.

**Exception:** Lath and gypsum board installed in Group R, Division 3 and Group U Occupancies.

(2012, ord 12-27, sec 2.)

**Section 5-43. Final inspection.**

The final inspection shall be made after all work required by the building permit is completed.

(2012, ord 12-27, sec 2.)

**Section 5-44. Special inspections.**

For special inspections, see Section 1704 and 1707.

(2012, ord 12-27, sec 2.)

**Section 5-45. Certificate of occupancy.**

- (a) Certificate Requirement. No building or structure shall be used or occupied, and no change in the existing occupancy classification of a building or structure or portion thereof shall be made until the building official has issued a certificate of occupancy therefor as provided herein. Issuance of a certificate of occupancy shall not be construed as an approval of a violation of the provisions of this code or of other ordinances of the jurisdiction.

**Exception:** Group R, Division 3 and Group U occupancies will not be issued a certificate of occupancy.

- (b) Certificate Issuance. After the building official inspects the building or structure and finds no violations of the provisions of this code or other laws that are enforced by the department of public works, the building official shall issue a certificate of occupancy that contains the following:
  - (1) The building permit number.
  - (2) The address of the structure.
  - (3) The name and address of the owner.
  - (4) A description of that portion of the structure for which the certificate is issued.
  - (5) A statement that the described portion of the structure has been inspected for compliance with the requirements of this code for the occupancy and division of occupancy and the use for which the proposed occupancy is classified.
  - (6) The name of the building official.
  - (7) The edition of the code under which the permit was issued.

- (8) The use and occupancy, in accordance with the provisions of chapter 3.
- (9) The type of construction as defined in chapter 6.
- (10) The design occupant load.
- (11) If an automatic sprinkler system is provided, whether the sprinkler system is required.
- (12) Any special stipulations and conditions of the building permit.
- (c) Temporary Certificate. The building official is authorized to issue a temporary certificate of occupancy before the completion of the entire work covered by the permit, provided that such portion or portions shall be occupied safely. The building official shall set a time period during which the temporary certificate of occupancy is valid.
- (d) Revocation. The building official is authorized to, in writing, suspend or revoke a certificate of occupancy or completion issued under the provisions of this code wherever the certificate is issued in error, or on the basis of incorrect information supplied, or where it is determined that the building or structure or portion thereof is in violation of any ordinance or regulation or any of the provisions of this code.  
(2012, ord 12-27, sec 2.)

**Section 5-46. Reserved.**  
(2012, ord 12-27, sec 2.)

**Section 5-47. Reserved.**  
(2012, ord 12-27, sec 2.)

### **Division 6. Substandard and Unsafe Buildings.**

**Section 5-48. Substandard buildings.**

Any building or portion thereof in which there exists any of the following listed conditions to an extent that it endangers the life, limb, health, property, safety or welfare of the public or the occupants thereof shall be deemed and hereby is declared to be a “substandard building:”

- (1) Inadequate sanitation shall include but not limited to the following:
  - (A) Lack of, or improper water closet, lavatory, bathtub or shower in a dwelling unit.
  - (B) Lack of, or improper water closets, lavatories, and bathtubs or showers in a hotel.
  - (C) Lack of, or improper kitchen sink in a habitable building.
  - (D) Lack of hot and cold water to basins, sinks, tubs and showers in R-1 Occupancies.
  - (E) Lack of hot and cold water to basins, sinks, tubs and showers in a dwelling unit or efficiency living unit.
  - (F) Lack of, or improper operation of required ventilating equipment.
  - (G) Lack of minimum amounts of natural light and ventilation required by this code.

- (H) Room area or space dimensions less than the minimum required by this code.
  - (I) Lack of required lighting.
  - (J) Dampness of habitable rooms as determined by the Health Department.
  - (K) Infestations of insects, vermin or rodents as determined by the health officer.
  - (L) General dilapidation or improper maintenance.
  - (M) Lack of connection to required sewage disposal system.
  - (N) Lack of adequate garbage and rubbish storage and removal facilities as determined by the health officer.
- (2) Structural hazards shall include but not be limited to the following:
- (A) Deteriorated or inadequate foundations.
  - (B) Defective or deteriorating flooring or floor supports.
  - (C) Flooring or floor supports of insufficient size to carry imposed loads with safety.
  - (D) Members of walls, partitions or other vertical supports that split, lean, or buckle due to defective material or deterioration.
  - (E) Members of walls, partitions or other vertical supports that are of insufficient size to carry imposed loads with safety.
  - (F) Members of ceiling, roofs, ceiling and roof supports, or other horizontal members which sag, split, or buckle due to defective material or deterioration.
  - (G) Members of ceilings, roofs, ceiling and roof supports, or other horizontal members that are of insufficient size to carry imposed loads safely.
  - (H) Fireplaces or chimneys that separate, bulge or settle due to defective material or deterioration.
  - (I) Fireplaces or chimneys which are of insufficient size or strength to carry imposed loads with safety.
- (3) Presence of a nuisance including:
- (A) Any public nuisance known at common law or in equity jurisprudence.
  - (B) Any attractive nuisance which may prove detrimental to children whether in a building or on the premises of a building. This includes any unfenced man-made swimming pools, abandoned wells, shafts, or basements; any structurally unsound fences; and any debris or vegetation affecting the structural stability of structures.
  - (C) Whatever is dangerous to human life or is detrimental to health, as determined by the health officer.
  - (D) Overcrowding a room with occupants.
  - (E) Insufficient ventilation or illumination.
  - (F) Inadequate or unsanitary sewage or plumbing facilities.
  - (G) Uncleanliness, as determined by the health officer.
  - (H) Whatever renders air, food or drink unwholesome or detrimental to the health of human beings, as determined by the health officer.

- (4) Faulty weather protection, which shall include but not be limited to, the following:
  - (A) Deteriorating, crumbling or loose plaster.
  - (B) Deteriorating or ineffective waterproofing of exterior walls, roof, foundations, or floors, including broken windows or doors.
  - (C) Defective or lack of weather protection for exterior wall covering, including lack of paint, weathering due to lack of paint or other approved protective covering.
  - (D) Broken, rotted, split or buckled exterior wall covering or roof coverings.
- (5) Inadequate Maintenance. Any building or portion thereof which is determined to be an unsafe building in accordance with this code.
- (6) Inadequate Exits. All buildings or portions thereof not provided with adequate exit facilities as required by this code except those buildings or portions thereof whose exit facilities conformed with all applicable laws at the time of its construction and which have been adequately maintained. When an unsafe condition exists through lack of, or improper location of exits, additional exits may be required to be installed.
- (7) Any building or portion thereof that is not being occupied or used as intended or permitted.

(2012, ord 12-27, sec 2.)

**Section 5-49. Unsafe buildings.**

All substandard buildings which are structurally unsafe or not provided with adequate egress, or which constitute a fire hazard, or are otherwise dangerous to human life, or which in relation to existing use constitute a hazard to safety, health or public welfare by reason of inadequate maintenance, dilapidation, obsolescence, fire hazard or abandonment, as specified in this code or any other effective ordinance are, for the purpose of this chapter, “unsafe buildings.”

(2012, ord 12-27, sec 2.)

**Section 5-50. Examination of buildings or structures reported dangerous or damaged.**

The building official shall examine or cause to be examined every building or portion thereof appearing to the building official to be or having been reported as dangerous or damaged.

(2012, ord 12-27, sec 2.)

**Section 5-51. Buildings found to be unsafe; Notice to owner.**

- (a) Whenever the building official has examined or caused to be examined any building and has determined that such building is an unsafe building:
- (1) The building official shall commence proceedings to cause the repair, rehabilitation, vacating, removal and/or demolition of the building;
  - (2) Such building shall automatically be deemed and are hereby declared to be a public nuisance;
  - (3) The building official shall give to the owner of such building written notice of violation in accordance with section 5-59 and as further described below; and
  - (4) The building official shall cause to be posted at each entrance to the buildings ordered vacated a notice to read: "DO NOT ENTER. UNSAFE TO OCCUPY. DEPARTMENT OF PUBLIC WORKS. COUNTY OF HAWAII."
- (b) The notice required by subsection (a)(3) above shall require the owner or person in charge of the building or premises, to commence the required repairs or improvements or demolition and removal of the building or structure or portions thereof within forty-eight hours, and to complete all such work within ninety days from date of notice, provided that the building official may provide for more time for completion if deemed reasonably necessary. The notice shall also require the building or portion thereof to be vacated forthwith and not reoccupied until the required repairs and improvements are completed, inspected, and approved by the building official.
- (c) The notice required by subsection (a)(4) above shall remain posted until the required repairs, demolition or removal are completed. Such notice shall not be removed without written permission of the building official, and no person shall enter the building except for the purpose of making the required repairs or of demolishing the building.

(2012, ord 12-27, sec 2.)

**Section 5-52. Restricted use signs.**

In the event of a major natural disaster, the building official may post "Restricted Use" placards at each entrance to a building or portion of a building if an inspection warrants such posting. Entry or occupancy in a building or portion of a building posted with a "Restricted Use" placard shall be limited to the restrictions stated on the placard. Placards shall not be removed or altered unless authorized by the building official.

(2012, ord 12-27, sec 2.)

**Section 5-53. Action upon noncompliance.**

In case the owner shall fail, neglect, or refuse to comply with the notice to repair, rehabilitate, or demolish and remove a building or portion thereof, the building official may order the owner of the building prosecuted as a violator of the provisions of this code.

(2012, ord 12-27, sec 2.)

**Section 5-54. Remedies cumulative.**

Nothing contained herein shall be construed to limit or restrict the building official from instituting, on behalf of the County, any other legal or equitable proceedings, in addition to those specified herein, to obtain compliance with the notice to repair, rehabilitate, or to demolish and remove said building or structure or portion thereof, and to recover the cost of such work from owner to attach a lien to the property. The remedies provided in this code shall be cumulative and not exclusive.

(2012, ord 12-27, sec 2.)

**Section 5-55. Reserved.**

(2012, ord 12-27, sec 2.)

**Section 5-56. Reserved.**

(2012, ord 12-27, sec 2.)

**Section 5-57. Reserved.**

(2012, ord 12-27, sec 2.)

**Division 7. Violations, Enforcement, and Penalties.****Section 5-58. General provisions.**

- (a) It shall be unlawful for any person, firm, corporation to erect, construct, enlarge, alter, repair, move, improve, remove, convert or demolish, equip, use, occupy, or maintain any building or structure or cause or permit the same to be done in violation of this code.
- (b) Failure to comply with any provision of this code, any rule adopted pursuant to this code, or with conditions imposed as part of any permit or variance from the provisions of this code, shall constitute a violation of this code.

(2012, ord 12-27, sec 2.)

**Section 5-59. Notice of violation.**

- (a) Whenever the administrative authority determines that there exists a violation of any provision of this code, the administrative authority shall serve a notice of violation upon the parties responsible for the violation, which may include, but shall not be limited to the owner and any lessee of the property where the violation is located, to make the building or portion thereof comply with the requirements of this code. Such notice of violation shall include:
  - (1) The date of the notice;
  - (2) The name and address of the person noticed, and the location of the violation;
  - (3) The section number of the ordinance, code or rule which has been violated;
  - (4) The nature of the violation; and
  - (5) The deadline for compliance with the notice.

- (b) Proper service of such notice shall be by personal service, registered mail, or certified mail upon the owner of record, provided, that if such notice is by registered mail or certified mail, the designated period within which the owner or person in charge is required to comply with the order of the building official shall begin as of the date the owner or person in charge receives such notice.

(2012, ord 12-27, sec 2.)

**Section 5-60. Administrative enforcement.**

- (a) If the administrative authority determines that any person, firm or corporation is not complying with a notice of violation, the administrative authority may have the party responsible for the violation served, by mail or delivery, with an order pursuant to this division.
- (b) Contents of the Order.
  - (1) The order may require the parties responsible for the violation, including but not limited to the owner/lessee of the property where the violation is located, to do any or all of the following:
    - (A) Correct the violation within the time specified in the order;
    - (B) Pay a civil fine not to exceed \$1,000 in the manner, at the place and before the date specified in the order;
    - (C) Pay a civil fine not to exceed \$1,000 per day for each day in which the violation persists, in the manner and at the time and place specified in the order.
  - (2) The order shall advise the party responsible for the violation that the order shall become final thirty calendar days after the date of its delivery. The order shall also advise that the administrative authority's action may be appealed to the board of appeals.
- (c) Effect of Order; Right to Appeal. The provisions of the order issued by the administrative authority under this section shall become final thirty calendar days after the date of the delivery of the order. The party responsible for the violation may appeal the order to the board of appeals as provided by section 5-67 below. The appeal must be received in writing on or before the date the order becomes final. However, an appeal to the board of appeals shall not stay any provision of the order.
- (d) Judicial Enforcement of Order. The administrative authority may institute a civil action in any court of competent jurisdiction for the enforcement of any final order issued pursuant to this section. Where the civil action has been instituted to enforce the civil fine imposed by such final order, the administrative authority need only show that the notice of violation and order were served, that a civil fine was imposed, the amount of the civil fine imposed, and that the fine imposed has not been paid.

(2012, ord 12-27, sec 2.)

**Section 5-61. Penal enforcement.**

- (a) General Provisions. The provisions of this section are in addition to any other applicable remedy or penalty provided by law.
- (b) In case the parties responsible for violating any provisions of this code fail, neglect, or refuse to comply or correct a violation, the administrative authority may submit the matter to the proper authority for penal enforcement.
- (c) Any person, firm or corporation violating any provisions of this code shall, upon conviction, be deemed guilty of a petty misdemeanor and each person so convicted shall be deemed guilty of a separate offense for each and every day or portion thereof during which any violation of any provision of this code is committed, continued or permitted; and upon conviction of any such violation, such person shall be punishable by a fine of not more than \$1,000, or by imprisonment for not more than thirty days, or by both fine and imprisonment.
- (d) Any officer or inspector designated by the administrative authority, who has been deputized by the chief of police as a special officer for the purpose of enforcing the provisions of the building, plumbing, electrical or housing codes (hereinafter referred to as "authorized personnel"), pursuant to section 803-6, Hawai'i Revised Statutes, may arrest without warrant alleged violators by issuing a summons or citation in accordance with the procedure specified in this section. Nothing in this section shall be construed as barring such authorized personnel from initiating prosecution by warrant or such other judicial process as is permitted by statute or rule of court.
- (e) Any authorized personnel designated by the administrative authority, upon making an arrest for a violation of the building, plumbing, electrical or housing codes, may take the name and address of the alleged violator and shall issue to the violator in writing a summons or citation hereinafter described, notifying the violator to answer the complaint to be entered against the violator at a place and at a time provided in the summons or citation.
- (f) There shall be provided for use by authorized personnel a form of summons or citation for use in citing violators of the building, plumbing, electrical or housing codes which does not mandate the physical arrest of such violators. The form and content of such summons or citation shall be as adopted or prescribed by the administrative judge of the district court and shall be printed on a form commensurate with the form of other summonses or citations used in modern methods of arrest, so designed to include all necessary information to make the same valid within the laws and regulations of the State of Hawai'i and County of Hawai'i.
- (g) In every case when a citation is issued, the original of the same shall be given to the violator; provided, that the administrative judge of the district court may prescribe by giving to the violator a copy of the citation and provide for the disposition of the original and any other copies.
- (h) Every citation shall be consecutively numbered and each copy shall bear the number of its respective original.

(2012, ord 12-27, sec 2.)

**Section 5-62. Injunctive action.**

The County may maintain an action for an injunction to restrain or remedy any violation of the provisions of this code and may take any other lawful action to prevent or remedy any violation.  
(2012, ord 12-27, sec 2.)

**Section 5-63. Reserved.**

(2012, ord 12-27, sec 2.)

**Section 5-64. Reserved.**

(2012, ord 12-27, sec 2.)

**Division 8. Variances and Appeals.****Section 5-65. Variances.**

Whenever strict application of any provision of this code, except for the provisions relating to materials, methods of construction, equipment, fixtures, devices, or appliances, would result in practical difficulty or unnecessary hardship that would deprive the owner of the reasonable use of the land or building involved, the owner may petition the board of appeals for a variance from the provision. In granting a variance, the board of appeals shall prescribe any conditions that it deems to be necessary or desirable. No variance from the strict application of this code shall be granted by the board of appeals unless it finds that all of the following are present:

- (1) That there are special circumstances or conditions applying to the land or building for which the variance is sought, which circumstances or conditions are peculiar to such land or building and do not apply generally to lands or buildings in the neighborhood or surrounding property, and that the circumstances or conditions are such that the strict application of the provisions of this code would deprive the applicant of the reasonable use of the land or building;
- (2) That the granting of the variance is necessary for the reasonable use of the land or building and that the variance granted is the minimum variance that will accomplish this purpose; and
- (3) That the granting of the variance will be consistent with the intent and purpose of this code, and will not be injurious to persons or property, will not create additional fire hazards, and otherwise will not be detrimental to the public welfare. In making its determination, the board of appeals shall take into account the character, use and type of occupancy and construction of adjoining buildings, buildings on adjoining lots, and the building or land involved.

(2012, ord 12-27, sec 2.)

**Section 5-66. Appeals regarding alternative materials and methods of construction.**

Any person denied the use of new or alternate materials, methods of construction, equipment, fixtures, devices, or appliances by the administrative authority, may, within thirty days after the administrative authority's decision, appeal the decision to the board of appeals. In considering an appeal, the board may require any reasonable test of the proposed material, method of construction, equipment, fixture, device, or appliance, and the appellant shall pay all expenses necessary for the test. The board of appeals may affirm the decision of the administrative authority or it may reverse the decision if it finds:

- (1) That the new or alternate materials, methods of construction, equipment, fixtures, devices, or appliances meet standards established by this code;
- (2) That permitting the requested use will not jeopardize the safety of persons or property; and
- (3) That the requested use will not be contrary to the intent and purpose of this code.

(2012, ord 12-27, sec 2.)

**Section 5-67. Other appeals.**

Any person aggrieved by the decision of the administrative authority in the administration or application of this code, other than that prescribed in sections 5-65 and 5-66, may, within thirty days after the date of the administrative authority's decision, appeal the decision to the board of appeals. The board of appeals may affirm the decision of the administrative authority, or it may reverse or modify the decision if the decision is:

- (1) In violation of this code or other applicable law;
- (2) Clearly erroneous in view of the reliable, probative, and substantial evidence on the whole record; or
- (3) Arbitrary, or capricious, or characterized by an abuse of discretion or clearly unwarranted exercise of discretion.

(2012, ord 12-27, sec 2.)

**Section 5-68. Rules; Adoption by board of appeals.**

The board of appeals shall adopt rules pursuant to chapter 91, Hawai'i Revised Statutes, necessary for the purposes of this article.

(2012, ord 12-27, sec 2.)

**Section 5-69. Reserved.**

(2012, ord 12-27, sec 2.)

**Section 5-70. Reserved.**

(2012, ord 12-27, sec 2.)

**Article 3. Installation Requirements.****Section 5-71. Amendments to adopted International Building Code.**

The International Building Code, 2006 Edition, adopted and incorporated by reference into this code as provided in section 5-3 of this chapter, shall be subject to the amendments hereinafter set forth.

- (1) Amending Section 202. Section 202 is amended by adding the following definitions:

“BUILDING. A building is any structure used or intended for supporting any use or occupancy. The term shall include but not be limited to any structure mounted on wheels such as a trailer, wagon or vehicle which is parked and stationary for any 24-hour period, and is used for business or living purposes; provided, however, that the term shall not include a push cart or push wagon which is readily movable and which does not exceed 25 square feet in area, nor shall the term include a trailer or vehicle, used exclusively for the purpose of selling any commercial product therefrom, which hold a vehicle license and actually travels on public or private streets.

BUILDING OFFICIAL is the director of the County department of public works or the director's authorized deputy.

CARPORT is a private garage which is at least 100 percent open on one side and with 50 percent net openings on another side or which is provided with an equivalent of such openings on two or more sides.

A private garage which is 100 percent open on one side and 25 percent open on another side with the latter opening so located to provide adequate cross ventilation may be considered a carport when approved by the building official.

EXISTING BUILDING is a building for which a legal building permit has been issued, or one which complied with this Code in effect at the time the building was erected.

FAMILY shall be as defined in the Zoning Code except that a nursing, care home, or other similar facility with not more than five patients may be considered a family under this code.

FIRE CODE. The State Fire Code as adopted by the State Fire Council.”

- (2) Amending Section 308.2. Section 308.2 is amended to read as follows:

“**308.2 Group I-1.** This occupancy shall include buildings, structures or parts thereof housing more than 16 persons, on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment that provides personal care services in an assisted living facility.

The residents participate in fire drills, are self starting, and may require some physical assistance from up to one staff to reach a point of safety in an emergency situation. Facilities with residents who require assistance by more than one staff member, are not self starting, who are bedridden beyond 14 days, or require intermittent nursing care beyond 45 days, shall reside on the first floor in all Type III, IV, and V construction, or shall be classified as Group I-2.

A facility such as the above with five or fewer persons shall be classified as a Group R-3 or shall comply with the International Residential Code in accordance with Section 101.2. A facility such as above, housing at least six and not more than 16 persons, shall be classified as Group R-4.”

- (3) Amending Section 308.3. Section 308.3 is amended to read as follows:

“**308.3 Group I-2.** This occupancy shall include buildings and structures used for personal, medical, surgical, psychiatric, nursing or custodial care on a 24-hour basis of more than five persons who are not capable of self-preservation. This group shall include, but not be limited to, the following:

- Hospitals
- Nursing homes (both intermediate-care facilities and skilled nursing facilities)
- Mental hospitals
- Detoxification facilities

Specialized Alzheimer’s Facilities or areas  
 Assisted Living Facilities (with residents beyond group I-1  
 limitations for capability)

A facility such as the above with five or fewer persons shall  
 be classified as Group R-3 or shall comply with the  
 International Residential Code in accordance with Section  
 101.2.”

- (4) Amending Section 310.1. Section 310.1 is amended to read as follows:

**“310.1 Residential Group R.** Residential Group R includes,  
 among others, the use of a building or structure, or a portion  
 thereof, for sleeping purposes when not classified as an  
 Institutional Group I or when not regulated by the  
 International Residential Code in accordance with Section  
 101.2. Residential occupancies shall include the following:

**R-1** Residential occupancies where the occupants are  
 primarily transient in nature, including:

- Boarding houses (transient)
- Hotels (transient)
- Motels (transient)

**R-2** Residential occupancies containing sleeping units or  
 more than two dwelling units where the occupants are  
 primarily permanent in nature, and facilities providing  
 personal care services that have residents that are capable of  
 self evacuation in an emergency situation, including:

- Apartment houses
- Boarding houses (not transient)
- Convents
- Dormitories
- Facilities providing personal care services (with residents  
 that are capable of self evacuation)
- Fraternities and sororities
- Hotels (nontransient)
- Monasteries
- Motels (nontransient)
- Vacation timeshare properties

Facilities providing personal care services with 16 or fewer  
 occupants are permitted to comply with the construction  
 requirements for Group R-3.

**R-3** Residential occupancies where the occupants are primarily permanent in nature and not classified as Group R-1, R-2, R-4 or I including:

Buildings that do not contain more than two dwelling units.

Adult facilities that provide accommodations for five or fewer persons of any age for less than 24 hours.

Child care facilities that provide accommodations for five or fewer persons of any age for less than 24 hours.

Congregate living facilities with 16 or fewer persons.

Adult and child care facilities that are within a single-family home are permitted to comply with the International Residential Code in accordance with Section 101.2.

**R-4** Residential occupancies shall include buildings arranged for occupancy as assisted living facilities including more than five but not more than 16 occupants, excluding staff.

Residents shall meet the ability to evacuate requirements and other limitations as required in Group I-1.

Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code, or shall comply with the International Residential Code.”

- (5) Amending Section 310.2. The definition of “Personal Care Service” in Section 310.2 is amended to read as follows:

“PERSONAL CARE SERVICE. The care of residents who do not require chronic or convalescent, health, medical or nursing care. Personal care involves responsibility for the safety of the resident while inside the building. The types of facilities providing personal care services shall include, but not be limited to, the following: assisted living facilities, residential care facilities, halfway houses, group homes, congregate care facilities, social rehabilitation facilities, alcohol and drug abuse centers and convalescent facilities.”

- (6) Amending Section 310.2. The definition of “Residential Care/Assisted Living Facilities” in Section 310.2 is amended to read as follows:

“ASSISTED LIVING FACILITIES. A building or part thereof housing persons, on a 24-hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment which provides personal care services and are licensed by the State.”

- (7) Adding Section 310.3. Section 310.3 is added as an interim provision until the International Residential Codes are adopted, to read as follows:

**310.3.1 Dwellings and Lodging Houses.** Congregate residences (each accommodating 10 persons or less).

**310.3.2 Construction, Height and Allowable Area.** Buildings or parts of building classed Group R because of the use or character of the occupancy shall be limited to the types of construction set forth in Table 503 and shall not exceed allowable height as allowed by the IBC.

**310.3.3 Location on Property.** For fire-resistive protection of exterior walls and openings, as determined by location on property, see Section 503, Section 601, Section 704, Section 705 and Section 715 of the IBC.

**310.3.4 Access and Exit Facilities and Emergency Escapes.** Exits shall be provided as specified in Chapter 10.

Access to, and egress from, buildings required to be accessible shall be provided as specified in Chapter 11.

Basements in dwelling units and every sleeping room below the fourth story shall have at least one operable window or door approved for emergency escape or rescue which shall open directly into a public street, public alley, yard or exit court. The units shall be operable from the inside to provide a full clear opening without the use of separate tools.

All escape or rescue windows shall have a minimum net clear openable area of 5.7 square feet. The minimum net clear openable height dimension shall be 24 inches. The minimum net clear openable width dimension shall be 20 inches.

When windows are provided as a means of escape or rescue they shall have a finished sill height of not more than 44 inches above the floor.

Bars, grilles, grates or similar devices may be installed on emergency escape or rescue windows or doors, provided:

- (1) The devices are equipped with approved released mechanisms which are openable from the inside without the use of a key or special knowledge or effort; and
- (2) The building is equipped with smoke detectors installed in accordance with Section 310.3.10.

**Exceptions:**

- (1) Glass jalousie blade windows and fixed glass may be used for emergency escape or rescue.
- (2) Escape or rescue windows in Group R, Division 1 Occupancies opening into an exterior exit balcony serving more than two dwelling units or hotel guest rooms shall have a finished sill height not more than 68 inches above the floor.

**310.3.5 Light, Ventilation and Sanitation.**

(a) **General.** For the purpose of determining the light or ventilation required by this section, any room may be considered as a portion of an adjoining room when half of the area of the common wall is open and unobstructed and provides an opening of not less than one tenth of the floor area of the interior room or 25 square feet, whichever is greater.

Exterior openings for natural light or ventilation required by this section shall open directly onto a public way or a yard or court located on the same lot as the building.

**Exceptions:**

- (1) Required windows may open into a roofed porch where the porch:
  - (A) Abuts a public way, yard or court; and
  - (B) Has a ceiling height of not less than 7 feet; and
  - (C) Has a longer side at least 65 percent open and unobstructed.
- (2) Skylights.

(b) **Light.** Guest rooms and habitable rooms within a dwelling unit or congregate residence shall be provided with natural light by means of exterior glazed opening with an area not less than one tenth of the floor area of such rooms with a minimum of 5 square feet.

(c) **Ventilation.** Guest rooms and habitable rooms within a dwelling unit or congregate residence shall be provided with natural ventilation by means of an openable exterior opening with an area of not less than one twentieth of the floor area of such rooms with a minimum of 5 square feet.

In lieu of required exterior opening for natural ventilation, a mechanical ventilating system may be provided. Such system shall be capable of providing two air changes per hour in all guest rooms, dormitories, habitable rooms and in public corridors. One fifth of the air supply shall be taken from the outside.

Bathrooms, water closet compartments, laundry rooms and similar rooms shall be provided with natural ventilation by means of openable exterior openings with an area not less than one twentieth of the floor area of such rooms with a minimum of 1½ square feet.

In lieu of required exterior openings for natural ventilation in bathrooms containing a bathtub or shower or combination thereof, laundry rooms and similar rooms, a mechanical ventilation system connected directly to the outside capable of providing five air changes per hour shall be provided. The point of discharge of exhaust air shall be at least 3 feet from any opening into the building. Bathrooms which contain only a water closet or lavatory or combination thereof, and similar rooms may be ventilated with an approved mechanical recirculating fan or similar device designed to remove odors from the air.

(d) **Sanitation.** Every building shall be provided with at least one water closet. Hotels or subdivisions thereof where both sexes are accommodated shall contain at least two separate toilet facilities which are conspicuously identified for male or female use, each of which contains at least one water closet. The water closet stool shall be located in a clear space not less than 30 inches in width. The clear space in front of the water closet stool shall not be less than 24 inches.

Dwellings shall be provided with a kitchen equipped with a kitchen sink. Dwelling units, congregate residences and lodging houses shall be provided with a bathroom equipped with facilities consisting of a water closet, lavatory and either a bathtub or shower. Each sink, lavatory and either a bathtub or shower shall be equipped with hot and cold running water necessary for its normal operation.

No dwelling or dwelling unit containing two or more guests rooms shall have room arrangements such that access to a bathroom or water closet compartment intended for use by occupants of more than one sleeping room can be had only by going through another sleeping room, nor shall room arrangements be such that access to a sleeping room can be had only by going through another sleeping room or a bathroom or water closet compartment.

### **310.3.6 Yards and Courts.**

(a) **Scope.** This section shall apply to yards and courts having required windows opening therein.

(b) **Yards.** Yards shall not be less than 3 feet in width for one-story and two-story buildings. For buildings more than two stories in height, the minimum width of the yard shall be increased at the rate of 1 foot for each additional story. For buildings exceeding 14 stories in height, the required width of the yard shall be computed on the basis of 14 stories.

**(c) Courts shall not be less than 3 feet in width.**

Courts having windows opening on opposite sides shall not be less than 6 feet in width. Courts bounded on three or more sides by the walls of the building shall not be less than 10 feet in length unless bounded on one end by a public way or yard. For buildings more than two stories in height, the court shall be increased 1 foot in width and 2 feet in length for each additional story. For buildings exceeding 14 stories in height, the required dimensions shall be computed on the basis of 14 stories.

Adequate access shall be provided to the bottom of all courts for cleaning purposes. Every court more than two stories in height shall be provided with a horizontal air intake at the bottom not less than 10 square feet in area and leading to the exterior of the building unless abutting a yard or public way. The construction of the air intake shall be as required for the court walls of the building, but in no case shall be less than one-hour fire resistive.

**310.3.7 Room dimensions.**

**(a) Ceiling Heights.** Habitable space shall have a ceiling height of not less than 7 feet 6 inches except as otherwise permitted in this section. Kitchens, halls, bathrooms and toilet compartments may have a ceiling height of not less than 7 feet measured to the lowest projection from the ceiling. Where exposed beam ceiling members are spaced at less than 48 inches on center, ceiling height shall be measured to the bottom of these members. Where exposed beam ceiling members are spaced at 48 inches or more on center, ceiling height shall be measured to the bottom of the deck supported by these members, provided that the bottom of the members is not less than 7 feet above the floor.

If any room in a building has a sloping ceiling, the prescribed ceiling height for the room is required in only one half 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.

If any room has a furred ceiling, the prescribed ceiling height is required in two thirds the area thereof, but in no case shall the height of the furred ceiling be less than 7 feet.

(b) **Floor Area.** Dwelling units and congregate residences shall have at least one room which shall have 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. Efficiency dwelling units shall comply with the requirements of Section 310.3.8.

(c) **Width.** Habitable rooms other than kitchen shall not be less than 7 feet in any dimension.

### **310.3.8 Efficiency Dwellings Units.**

An efficiency dwelling unit shall conform to the requirements of the code except as herein provided:

- (1) The unit shall have a living room of not less than 220 square feet of superficial floor area. An additional 100 square feet of superficial floor area shall be provided for each occupant of such unit in excess of two.
- (2) The unit shall be provided with a separate closet.
- (3) The unit shall be provided with a kitchen sink, cooking appliance and refrigeration facilities, each having a clear working space of not less than 30 inches in front. Light and ventilation conforming to this code shall be provided.
- (4) The unit shall be provided with a separate bathroom containing a water closet, lavatory and bathtub or shower.

### **310.3.9 Shaft and Exit Enclosures.**

Exits shall be enclosed as specified in Section 1020. Elevator shafts, vent shafts, dumbwaiter shafts, clothes chutes and other vertical openings shall be enclosed and the enclosure shall be as specified in Section 707.

### **310.3.10 Smoke Detectors.**

(a) **General.** Dwelling units, congregate residences and hotel or lodging house guest rooms that are used for sleeping purposes shall be provided with smoke detectors. Detectors shall be installed in accordance with the approved manufacturer's instructions.

(b) **Additions, alterations or repairs to Group R Occupancies.** When the valuation of an addition, alteration or repair to a Group “R Occupancy sleeping room exceeds \$1,000 and a permit is required, or when one or more sleeping rooms are added or created in existing Group R Occupancies, smoke detectors shall be installed in accordance with subsections (c), (d), and (e) of this section.

(c) **Power Source.** In new construction, required smoke detectors shall receive their primary power from the building wiring when such wiring is served from a commercial source and shall be equipped with a battery backup. The detector shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection. Smoke detectors may be solely battery operated when installed in existing buildings; or in buildings without commercial power; or in buildings which undergo alterations, repairs or additions regulated by subsection (b) of this section.

(d) **Location within dwelling units.** In dwelling units, a detector shall be installed in each sleeping room and at a point centrally located in the corridor or area giving access to each separate sleeping area. When the dwelling unit has more than one story and in dwellings with basements, a detector shall be installed on each story and in the basement. In dwelling units where a story or basement split into two or more levels, the smoke detector shall be installed on the upper level, except that when the lower level contains a sleeping area, a detector shall be installed on each level. When sleeping rooms are on an upper level, the detector shall be placed at the ceiling of the upper level in close proximity to the stairway. In dwellings units where the ceiling height of a room open to the hallway serving the bedrooms exceeds that of the hallway by 24 inches or more, smoke detectors shall be installed in the hallway and in the adjacent room. Detectors shall sound an alarm audible in all sleeping areas of the dwelling unit in which they are located.

(e) **Location in efficiency dwelling units, congregate residences and hotels.** In efficiency dwelling units, hotel suites and in hotel and congregate residences sleeping rooms, detectors shall be located on the ceiling or wall of the main room or each sleeping room. When sleeping rooms within an efficiency dwelling unit or hotel suite are on an upper level, the detector shall be placed at the ceiling of the upper level in close proximity to the stairway. When actuated, the detector shall sound an alarm audible within the sleeping area of the dwelling unit, hotel suite or sleeping room in which it is located.

**310.3.11 Fire Alarm Systems.** Fire alarm systems shall comply with the Fire Code and be approved by the fire chief.

**310.3.12 Cooking Unit Clearance.**

(a) **Minimum Vertical Clearance.** There shall be a minimum vertical clearance of not less than 30 inches between the cooking top of domestic oil, gas, and electric ranges and the underside of unprotected combustible material above such ranges. When the underside of such combustible material is protected with insulated millboard of at least  $\frac{1}{4}$  inch thick covered with sheet metal of not less than 0.021 inch thick (No 28 U.S. gauge) or a metal ventilating hood, the distance shall be not less than 24 inches.

(b) **Minimum Horizontal Clearance.** The minimum horizontal clearance from edge of the burner head(s) of top (or surface) cooking unit to combustible walls extending above the cooking surface shall be not less than 12 inches.

**Exception:** Walls of combustible materials to be installed within 12 inches of a cooking unit shall be provided with protection equivalent to  $\frac{1}{2}$ -inch gypsum wallboard covered with laminated plastic. The height of the laminated plastic shall be 12 inch minimum.

(c) **Alternate Materials.** Where alternate materials other than as specified in subsections (a) and (b) are used as approved by the building official, the surface of such material shall have a smooth nonabsorbent finish.”

- (8) Amending Section 403.8. Section 403.8 is amended to read as follows:
- “**403.8 Fire command station.** Fire command stations shall comply with the Fire Code and be approved by the fire chief.”
- (9) Adding Section 419.4. Section 419.4 is added to read as follows:
- “**419.4 Group I-1 Assisted Living Facilities.** Group I-1 Assisted Living Facilities shall comply with the provisions of Sections 419.4.1 and 419.4.2.
- 419.4.1 Building Story Limitations.** Buildings shall not exceed one story in Type VB construction, two stories in Types IIB, III, IV, and VA construction, and three stories in Type IIA construction, including any allowable automatic sprinkler increases. Other construction type limitations on stories shall be limited by the provisions of Chapter 5.
- 4.19.4.2 Group I-1 Smoke Barriers.** Group I-1 occupancies shall be provided with at least one smoke barrier in accordance with Section 709. Smoke barriers shall subdivide every story used by residents for sleeping or treatment into at least two smoke compartments. Each compartment shall have not more than 16 sleeping rooms, and the travel distance from any point in a smoke compartment to a smoke barrier door shall not exceed 150 feet (45,720 mm). At least 10 square feet (0.93 m<sup>2</sup>) of refuge area per resident shall be provided within the aggregate area of corridors, treatment rooms, or other low hazard common space rooms on each side of each smoke barrier.”
- (10) Amending Section 903.2.5. Section 903.2.5 is amended to read as follows:
- “**903.2.5 Group I.** An automatic sprinkler system shall be provided throughout buildings with Group I fire area.”
- (11) Amending Section 903.2.7. Section 903.2.7 is amended to read as follows:
- “**903.2.7 Group R.** An automatic sprinkler system installed in accordance with Section 903.3 shall be provided throughout all buildings with a Group R fire area.
- Exception:** R-3 residential occupancies.”

- (12) Amending Section 911.1. Section 911.1 is amended to read as follows:

**“911.1 Features.** Where required by other sections of this code, a fire command center for fire department operations shall be provided and shall comply with the Fire Code and be approved by the fire chief.”

- (13) Amending Section 1008.2. Section 1008.2 is amended to read as follows:

**“1008.2 Gates.** Gates serving the means of egress system shall comply with the requirements of this section. Gates used as a component in a means of egress shall conform to the applicable requirements for doors.

**Exceptions:**

- (1) Horizontal sliding or swinging gates exceeding the 4-foot (1219 mm) maximum leaf width limitation are permitted in fences and walls surrounding a stadium.
  - (2) Security gates may be permitted across corridors or passageways in school buildings if there is a readily visible durable sign on or adjacent to the gate, stating ‘THIS GATE IS TO REMAIN SECURED IN THE OPEN POSITION WHENEVER THIS BUILDING IS IN USE’. The sign shall be in letters not less than one inch high on a contrasting background. The use of this exception may be revoked by the building official for due cause.”
- (14) Repealing and Replacing Chapter 11. Chapter 11 is deleted in its entirety and replaced to read as follows:

**“Chapter 11 - Accessibility**

**1101 Scope.** Buildings or portions of buildings shall be accessible to persons with disabilities in accordance with the following regulations:

- (1) For construction of buildings or facilities of the State and County Governments, compliance with section 103-50, Hawai‘i Revised Statutes, administered by the Disability and Communication Access Board, State of Hawai‘i.
- (2) Americans with Disabilities Act, administered and enforced by the U.S. Department of Justice.

- (3) Fair Housing Act, administered and enforced by the U.S. Department of Housing and Urban Development.
- (4) Other pertinent laws relating to disabilities shall be administered and enforced by agencies responsible for their enforcement.

Prior to the issuance of a building permit, the owner (or the owner’s representative, professional architect, or engineer) shall submit a statement that all requirements, relating to accessibility for persons with disabilities, shall be complied with.”

- (15) Adding Section 1203.2.2. Section 1203.2.2 is added to read as follows:

**“1203.2.2 Unvented Attic Spaces.** The attic space shall be permitted 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.”

- (16) Amending Section 1603.3. Section 1603.3 is amended to read as follows:

**“1603.3 Live loads posted.** Where the live loads for which each floor or portion thereof of a commercial or industrial building is or has been designed to exceed 100 psf (4.80 kN/m<sup>2</sup>), such design live loads shall be conspicuously posted by the owner in that part of each story in which they apply, using durable signs. It shall be unlawful to remove or deface such notices.”

- (17) Amending Section 1611.1. Section 1611.1 is amended to read as follows:

“**1611.1 Design rain loads.** Each portion of a roof shall be designed to sustain the load of rainwater that will accumulate on it if the primary drainage system for that portion is blocked plus the uniform load caused by water that rises above the inlet of the secondary drainage system at its design flow. The design rainfall rate shall be based on the 100-year 1-hour rainfall rate indicated in Figure 1611.1 as published by the National Weather Service or on other rainfall rates determined from approved local weather data.”

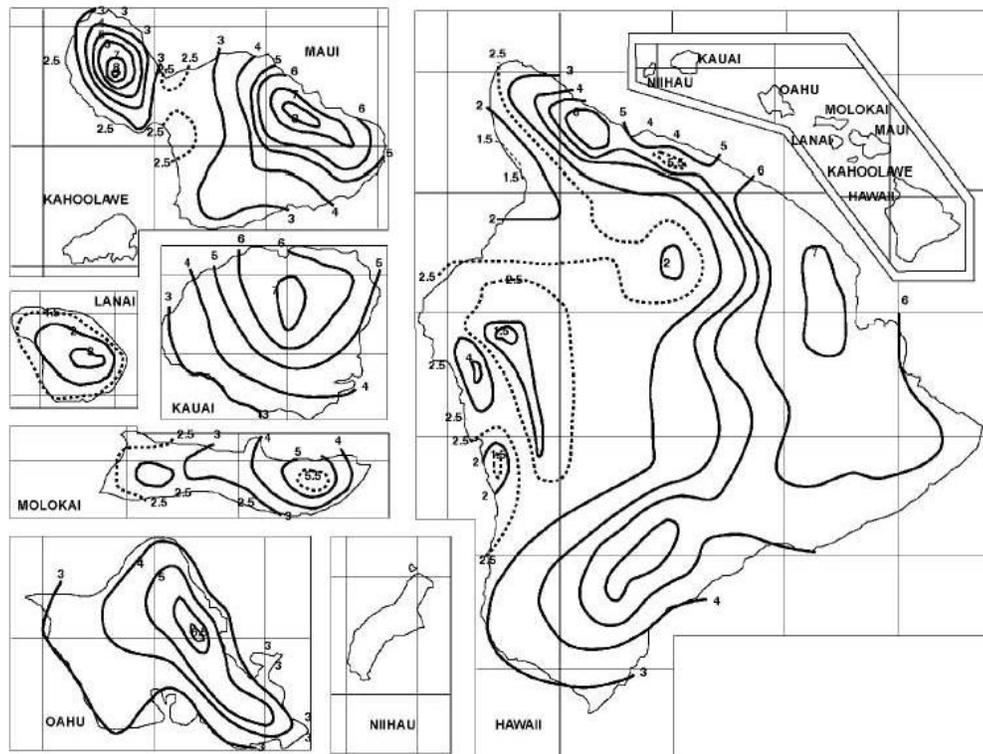


FIGURE 1611.1—continued  
100-YEAR, 1-HOUR RAINFALL (INCHES) HAWAII

For SI: 1 inch = 25.4 mm.

Source: National Weather Service, National Oceanic and Atmospheric Administration, Washington D.C.

- (18) Amending Table 1613.5.6(1). Table 1613.5.6(1) is amended to read as follows:

**TABLE 1613.5.6(1)**  
**SEISMIC DESIGN CATEGORY BASED ON**  
**SHORT-PERIOD RESPONSE ACCELERATIONS**

VALUE OF $S_{DS}$	Occupancy Category		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \leq S_{DS} < 0.33g$	B	B	C
$0.33g \leq S_{DS} < 0.50g$	C	C	D
$0.50 \leq S_{DS} < 0.60g$	C	D	D
$0.60g \leq S_{DS}$	D	D	D

- (19) Amending Table 1613.5.6(2). Table 1613.5.6(2) is amended to read as follows:

**TABLE 1613.5.6(2)**  
**SEISMIC DESIGN CATEGORY BASED ON**  
**1-SECOND PERIOD RESPONSE ACCELERATION**

VALUE OF $S_{DI}$	Occupancy Category		
	I or II	III	IV
$S_{DI} < 0.067g$	A	A	A
$0.067g \leq S_{DI} < 0.133g$	B	B	C
$0.133g \leq S_{DI} < 0.20g$	C	C	D
$0.20g \leq S_{DI} < 0.25g$	C	D	D
$0.25g \leq S_{DI}$	D	D	D

- (20) Amending Section 1702. The definition of “Structural Observation” in Section 1702 is amended to read as follows:

“STRUCTURAL OBSERVATION. Structural Observation defined in accordance with Hawaii Administrative Rules of the Department of Commerce and Consumer Affairs, Title 16, Chapter 115, implementing Hawaii Revised Statutes chapter 464. Structural observation does not include or waive the responsibility for the inspection required by Section 109, 1704 or other sections of this code.”

- (21) Amending Section 1704.1. Section 1704.1 is amended to read as follows:

**“1704.1 General.** Where application is made for construction as described in this section, the owner or the registered design professional in responsible charge acting as the owner’s agent shall employ one or more special inspectors to provide inspections during construction on the types of work listed under Sections 1704 and 1707. The special inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the building official, for inspection of the particular type of construction or operation requiring special inspection. These inspections are in addition to the inspections specified in Section 109.

**Exceptions:**

- (1) Special inspections are not required for work of a minor nature or as warranted by conditions in the jurisdiction as approved by the building official.
  - (2) Special inspections are not required for building components unless the design involves the practice of professional engineering or architecture as defined by applicable state statutes and regulations governing the professional registration and certification of engineers or architects.
  - (3) Unless otherwise required by the building official, special inspections are not required for occupancies in Group R-3 as applicable in Section 101.2 and occupancies in Group U that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.”
- (22) Amending Section 1704.1.1. Section 1704.1.1 is amended to read as follows:
- “1704.1.1 Statement of special inspections.** The construction drawings shall include a complete list of special inspections required by this section.”

- (23) Amending Section 1704.1.2. Section 1704.1.2 is amended to read as follows:

**“1704.1.2 Report requirement.** Special inspectors shall keep records of inspections. The special inspector shall furnish inspection reports to the owner, and licensed engineer or architect of record. Reports shall indicate that work inspected was done in conformance to approved construction documents. Discrepancies shall be brought to the immediate attention of the contractor for correction, then, if uncorrected, to the licensed engineer or architect of record and to the building official. The special inspector shall submit a final signed report to the owner and licensed engineer or architect of record, stating whether the work requiring special inspection was, to the best of the inspector’s knowledge, in conformance to the approved plans and specifications and the applicable workmanship provisions of this code. Prior to the final inspection required under Section 109.3.10, the licensed engineer or architect of record shall submit a written statement verifying receipt of the final special inspection reports and documenting that there are no known unresolved code requirements that create significant public safety deficiencies.”

- (24) Repealing Section 1705. Section 1705 is deleted in its entirety.

- (25) Amending Section 1709. Section 1709 is amended to read as follows:

**“1709 Structural Observations.** Structural observations shall be performed in accordance with Hawai‘i Revised Statutes, chapter 464, section 5, administered and enforced by the department of commerce and consumer affairs.”

- (26) Amending Section 1808.2.7. Section 1808.2.7 is amended to read as follows:

**“1808.2.7 Splices.** Splices shall be constructed so as to provide and maintain true alignment and position of the component parts of the pier or pile during installation and subsequent thereto and shall be of adequate strength to transmit the vertical and lateral loads and moments occurring at the location of the splice during driving and under service loading. Splices occurring in the upper 10 feet (3048 mm) of the embedded portion of the pier or pile shall be capable of resisting at allowable working stresses the moment and shear that would result from an assumed eccentricity of the pier or pile load of 3 inches (76 mm), or the pier or pile shall be braced in accordance with Section 1808.2.5 to other piers or piles that do not have splices in the upper 10 feet (3048 mm) of embedment.”

- (27) Adding Section 2104.1.9. Section 2104.1.9 is added to read as follows:

**“2104.1.9 Cleanouts.** Cleanouts shall be provided for all grout pours over 5 feet 4 inches in height. Special provisions shall be made to keep the bottom and sides of the grout spaces, as well as the minimum total clear area required by ACI 530.1-05/ASCE 6-05/TMS 602-05 clean and clear prior to grouting.

**Exception:** Cleanouts are not required for grout pours 8 feet or less in height providing all of the following conditions are met:

- (1) The hollow masonry unit is 8-inch nominal width or greater with specified compressive strength  $f_m$  less than or equal to 1,500 psi;
- (2) Fine grout is used complying with ASTM C-476 minimum compressive strength of 2,500 psi; and
- (3) Special Inspection is provided.”

- (28) Amending Section 2303.1.8. Section 2303.1.8 is repealed and replaced in its entirety to read as follows:

**“2303.1.8 Preservative-treated wood.** Structural lumber, including plywood, posts, beams, rafters, joists, trusses, studs, plates, sills, sleepers, roof and floor sheathing, flooring and headers of new wood-frame buildings and additions shall be:

- (1) Treated in accordance with AWPA Standard U1 (UC1 thru UC4B) for AWPA Standardized Preservatives, all marked or branded and monitored by an approving agency. Incising is not required, providing that the retention and penetration requirements of these standards are met.
- (2) For SBX disodium octaborate tetrahydrate (DOT), retention shall be not less than 0.28 pcf B<sub>2</sub>O<sub>3</sub> (0.42 pcf DOT) for exposure to Formosan termites. All such lumber shall be protected from direct weather exposure as directed in AWPA UC1 and UC2.
- (3) For structural glued-laminated members made up of dimensional lumber, engineered wood products, or structural composite lumber, pressure treated in accordance with AWPA U1 (UC1 thru UC4B) or by Light Oil Solvent Preservative (LOSP) treatment standard as approved by the building official. Water based treatment processes as listed in paragraphs 1 and 2 are not allowed to be used on these products unless specified by a structural engineer for use with reduced load values and permitted by the product manufacturer.
- (4) For structural composite wood products, treated by non-pressure processes in accordance with AWPA Standard U1 (UC1, UC2 and UC3A) or approved by the building official.

**2303.1.8.1 Treatment.** Wood treatment shall include the following:

- (1) A quality control and inspection program which meets or exceeds the current requirements of AWPA Standards M2-01 and M3-03;

- (2) Inspection and testing for the treatment standards as adopted by this code shall be by an independent agency approved by the building official, accredited by the American Lumber Standards Committee (ALSC) and contracted by the treating company;
- (3) Field protection of all cut surfaces with a preservative, which shall be applied in accordance with AWPAs Standard M-4-02 or in accordance with the approved preservative manufacturer's ICC-Evaluation Services report requirements.

**2303.1.8.2 Labeling.** Labeling shall be applied to all structural lumber 2 inches or greater nominal thickness, with the following information provided on each piece as a permanent ink stamp on one face or on a durable tag permanently fastened to ends with the following information:

- (1) Name of treating facility;
- (2) Type of preservative;
- (3) AWPAs use category;
- (4) Quality mark of third party inspection agency;
- (5) Retention minimum requirements; and
- (6) Year of treatment.

All lumber less than 2 inches in nominal thickness, shall be identified per bundle by means of a label consisting of the above requirements. Labels measuring no less than 6 inches by 8 inches shall be placed on the lower left corner of the strapped bundle.

**2303.1.8.3 Moisture Content of Treated Wood.** When wood pressure treated with a water-borne preservative is used in enclosed locations where drying in service cannot readily occur, such wood shall be at a moisture content of 19 percent or less before being covered with insulation, interior wall finish, floor covering or other material.”

- (29) Amending Section 2304.9.5. Section 2304.9.5 is amended to read as follows:

**“2304.9.5 Fasteners in non-borate-preservative-treated and fire-retardant-treated wood.** Fasteners for preservative-treated and fire-retardant-treated wood, other than Borate (SBX, ZB) or LSOP treatments as approved in Section 2303.1.8 Preservative-Treated Wood, shall be of hot dipped zinc-coated galvanized steel, stainless steel, silicone bronze or copper. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A 153.

**Exception:** Fasteners other than nails, timber rivets, wood screws and lag screws shall be permitted to be of mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum.

Fastenings for wood foundations shall be as required in AF&PA Technical Report No. 7.”

- (30) Amending Section 2304.11. Section 2304.11 is amended to read as follows:

**“2304.11 Protection against decay and termites.**

**2304.11.1 General.** Where required by this section, protection from decay and termites shall be provided by the use of naturally durable or preservative-treated wood.

**2304.11.2 Wood used above ground.** Structural lumber installed above ground shall be preservative-treated wood in accordance with Section 2303.1.8.

**2304.11.2.1 Soil Treatment and Termite Barriers.**

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.

**2304.11.3 Wood in Ground Contact.** 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 AWPA Standard U1.

Wood in direct soil contact but not supporting any permanent buildings or structures shall be treated to the appropriate commodity specification of AWPA Standard U1 for ground contact.

**2304.11.4 Retaining Walls.** Wood in retaining or crib wall shall be treated to AWPA Standard U1.

**2304.11.5 Wood and Earth Separation.** Where wood is used with less than 6-inch vertical separation from earth (finish grade), it shall be treated for ground-contact use.

Where planter boxes are installed adjacent to wood frame walls, a 2-inch-wide (51 mm) air space shall be provided between the planter and the wall. Flashings shall be installed when the air space is less than 6 inches (152 mm) in width. Where flashing is used, provisions shall be made to permit circulation of air in the air space. The wood-frame wall shall be provided with an exterior wall covering conforming to the provisions of section 2304.6.

**2304.11.6 Under-Floor Clearance for Access and Inspection.** Minimum clearance between the bottom of floor joists or bottom of floors without joists and the ground beneath shall be 24 inches; the minimum clearance between the bottom of girders and the ground beneath shall be 18 inches.

**Exception:** Open slat wood decks shall have ground clearance of at least 6 inches for any wood member.

Accessible under-floor areas shall be provided with a minimum 18 inch-by 24 inch access opening, effectively screened or covered. Pipes, ducts and other construction shall not interfere with the accessibility to or within under-floor areas.

**2304.11.7 Wood used in retaining walls and cribs.** Wood installed in retaining or crib walls shall be preservative treated in accordance with AWWPA U1 (Commodity Specifications A or F) for soil and fresh water use.

**2304.11.8 Weather Exposure.** All portions of timbers (over 5-inch nominal width) and glued-laminated timbers that form structural supports of a building or other structure shall be protected by a roof, eave, overhangs, flashings, or similar coverings.

All wood or wood composite panels, in weather-exposed applications, shall be of exterior type.

**2304.11.9 Water Splash.** Where wood-frame walls and partitions are covered on the interior with plaster, tile or similar materials and are subject to water splash, the framing shall be protected with approved waterproof paper conforming to section 1404.2.

**2304.11.10 Pipe and Other Penetrations.** Insulations around plumbing pipes shall not pass through ground floor slabs. Openings around pipes or similar penetrations in a concrete or masonry slab, which is in direct contact with earth, shall be filled with non-shrink grout, BTB, or other approved physical barrier.”

- (31) Amending Section 2308.1. Section 2308.1 is amended to read as follows:

“**2308.1 General.** The requirements of this section are intended for conventional light-frame construction. Other methods are permitted to be used, provided a satisfactory design is submitted showing compliance with other provisions of this code. Interior nonload-bearing partitions, ceilings and curtain walls of conventional light-frame construction are not subject to the limitations of this section. Alternatively, compliance with AF&PA WFCM shall be permitted subject to the limitations therein and the limitations of this code.”

- (32) Amending Section 2701.1. Section 2701.1 is amended to read as follows:
- “**2701.1 Scope.** This chapter governs the electrical components, equipment and systems used in buildings and structures covered by this code. Electrical components, equipment and systems shall be designed and constructed in accordance with the provisions of the National Electrical Code, NFPA 70.”
- (33) Amending Section 2901.1. Section 2901.1 is amended to read as follows:
- “**2901.1 Scope.** The provisions of this chapter and the Uniform Plumbing Code shall govern the erection, installation, alteration, repairs, relocation, replacement, addition to, use or maintenance of plumbing equipment and systems. Plumbing systems and equipment shall be constructed, installed and maintained in accordance with the Uniform Plumbing Code and adopted amendments. Private sewage disposal systems shall conform to the International Private Sewage Disposal Code.”
- (34) Amending Section 3001.1. Section 3001.1 is amended to read as follows:
- “**3001.1 Scope.** This chapter shall be a guideline and governs the design, construction, installation, alteration and repair of elevators and conveying systems and their components. If this chapter conflicts with another applicable law of the jurisdiction, then said applicable law shall prevail over this chapter.”
- (35) Amending Section 3109.3. Section 3109.3 is amended to read as follows:
- “**3109.3 Public swimming pools.** Public swimming pools shall be completely enclosed by a fence at least 4 feet (1219 mm) in height or a screen enclosure. Openings in the fence shall not permit the passage of a 4-inch-diameter (102 mm) sphere. The fence or screen enclosure shall be equipped with self-closing and self-latching gates.
- EXCEPTION:** Swimming, dipping, or wading pools located on the premises of a hotel are not required to be enclosed.”

(36) Amending Section 3405.1. Section 3405.1 is amended to read as follows:

**“3405.1 Conformance.** The installation or replacement of glass shall be as required by Chapter 24 for new installations.”

(37) Amending Section 3410.3.2. Section 3410.3.2 is amended to read as follows:

**“3410.3.2 Compliance with other codes.** Buildings that are evaluated in accordance with this section shall comply with the State Fire Code.”

(2012, ord 12-27, sec 2.)

**Section 5-72. Reserved.**

(2012, ord 12-27, sec 2.)

**Section 5-73. Reserved.**

(2012, ord 12-27, sec 2.)

**Article 4. Adoption, Amendment, and Addition of Appendices.**

**Division 1. Appendices of International Building Code Adopted.**

**Section 5-74. Appendices not applicable.**

Provisions in the appendices of the International Building Code, 2006 Edition, shall not apply unless specifically adopted.

(2012, ord 12-27, sec 2.)

**Section 5-75. Appendices adopted.**

The following appendices of the IBC are hereby adopted and incorporated by reference herein and made a part of this code, subject to the amendments hereinafter set forth in this article:

- (1) Appendix C, Group U-Agricultural Buildings; and
- (2) Appendix I, Patio Covers.

(2012, ord 12-27, sec 2.)

**Section 5-76. Amendments to Appendix C; Group U – Agricultural Buildings.**

Section C101, General, is amended by adding the following:

**“C101.2 Horticulture buildings.** Buildings and structures of Group U Occupancy for horticultural use with covering of wire screen, cheesecloth, or non-rigid plastic sheets are not required to conform to the requirements of Chapters 4-9, 11-26, 28, 30, 31, 34 and 35 of this code when located in areas zoned for agricultural use and not part of any other structure.

**C101.3 Fences.**

**C101.3.1 General.** Fences shall be constructed in accordance with this code and all applicable County and State regulations.

**C101.3.2 Barbed or razor wire fences.** Barbed or razor wire shall not be used for construction of any fence.

**Exceptions:**

(a) Barbed or razor wire may be used in fences enclosing the following premises, provided that barbed or razor wire shall be placed along or above the height of 6 feet from the ground, subject to the approval of the fire department:

- (1) Any “public utility” as defined in section 269-1, Hawai‘i Revised Statutes;
- (2) Premises in industrial zoned districts and used for storage or handling of hazardous materials, and premises zoned I-2 or I-3, intensive or waterfront industrial districts which are used for industrial purposes and are not adjacent to premises used for other purposes;
- (3) Zoos for keeping animals and birds for public view or exhibition;
- (4) Jails, prisons, reformatories, and other institutions which are involved in law enforcement or military activities where security against entry is an important factor.

(b) Barbed wire may be used in premises used for pasturing cattle or raising swine or to keep pigs or other wild animals out.

**Section C101.3.3 Construction barrier.** See Section 3306 for fences allowed during construction or demolition.”

(2012, ord 12-27, sec 2.)

**Section 5-77. Reserved.**

(2012, ord 12-27, sec 2.)

**Division 2. Appendices Added to the International Building Code.**

**Section 5-78. Appendices added to International Building Code.**

The following appendices are hereby added to the International Building Code and made a part of this code, as set forth in full in this article:

- (1) Appendix L, Factory-Built Housing;
  - (2) Appendix M, Thatch Material on Exterior of Buildings – Protection Against Exposure Fires;
  - (3) Appendix U, Hawai'i Hurricane Sheltering Provisions for New Construction;
  - (4) Appendix W, Hawai'i Wind Design Provisions for New Constructions; and
  - (5) Appendix X, Indigenous Hawaiian Architecture Structures.
- (2012, ord 12-27, sec 2.)

**Section 5-79. Appendix L; Factory-built Housing.**

Appendix L is added to read as follows:

**“APPENDIX L  
FACTORY-BUILT HOUSING**

**SECTION L101  
APPLICABILITY**

**L101.1 Purpose.** These provisions are applicable to the design, construction, installation and transportation of factory-built housing (FBH) within the County. Unless otherwise specified this article shall be applicable only to FBH which is sold or offered for sale to first users as defined below.

**Exception:** Manufactured homes manufactured and certified in accordance with the Manufactured Home Construction and Safety Standards as promulgated by the United States Department of Housing and Urban Development. Foundation, exterior stairs, additions and accessory structures shall comply with Article 1, Adoption of the International Building Code and International Residential Code for One- and Two-Family Dwellings.

All provisions of the building, housing, electrical and plumbing codes shall be applicable unless indicated otherwise in this article.

**L101.2 Definitions.** The following terms are defined for specialized use within this article:

“Factory-built housing” means any structure or portion thereof designed primarily for residential occupancy by human beings, which is either entirely prefabricated or assembled at a place other than the building site.

“First user” means a person, firm or corporation who initially installs FBH within this State. A person who subsequently purchases an installed FBH is not a first user within the meaning of this definition.

“Insignia of approval” means a tag, tab, stamp, label or other device issued by the building official to indicate compliance with the statutes and these rules.

“Installation” means the assembly of FBH on site and the process of affixing FBH to land, a foundation or an existing building.

“Manufacture” means the process of making, fabricating, constructing, forming or assembling a product from raw, unfinished or semi-finished materials to produce FBH.

“Site” means the parcel of land on which FBH is installed.

**L101.3 Building permit required.** No person shall install FBH or cause the foregoing to be done without first obtaining a building permit from the building official for each FBH.

**L101.4 Building permit fee.** A fee for each building permit as set forth in section 5-35 of this chapter, shall be paid to the building official. The fee shall be based on the valuation of the building in place complete including the cost of carport, fences, walls, etc.

**L101.5 Insignia of approval.**

(a) FBH manufactured in this County which is sold or offered for sale to first users within this County shall bear the insignia of approval issued by the building official indicating that the FBH is in compliance with this article.

(b) FBH manufactured outside the county shall bear the insignia of approval issued by any governmental or inspectional agency approved by the building official.

**L101.6 Performance of plumbing and electrical work.**

(a) All electrical and plumbing work performed within this state shall comply with State of Hawai'i contracting and licensing laws and regulations.

(b) All electrical and plumbing work to be performed at the factory outside of this state must be accomplished:

- (1) By licensed electricians or plumbers, respectively, of the county in which the factory is located, if the manufacturer does not submit a quality control manual which is approved by the building official; or
- (2) Under the supervision of a licensed supervising electrician or master plumber, respectively, of the county in which the factory is located, if the manufacturer submits a quality control manual which is approved by the building official.

**L101.7 Plans and specifications.**

(a) For each model of FBH, three sets of plans and specifications shall be submitted and approval obtained prior to fabrication.

(b) With each application for a building permit, three sets of installation plans and specifications including the plot plan shall be submitted.

(c) Preparation of plans and observation of construction shall be by a professional architect or structural engineer licensed in the State of Hawai'i.

**L101.8 Inspections.**

(a) FBH manufactured outside of the County shall be inspected by an approved third party inspectional agency.

(b) The building official may make periodic in-plant inspections to verify that the FBH produced comply with the plans as approved by the building official.

(c) Special inspectors shall be hired as required by the building code. Once construction has been completed, the special inspector shall submit a final signed special inspection report along with a copy of the third party inspection worksheet showing special inspection done at the manufacturing plant.

**L101.9 Manufacturer's label.** A manufacturer's label on a metal plate showing the manufacturer's name, serial number of the building, manufacture date, design load criteria, and third party inspection stamp shall be securely fastened on the FBB.

**L101.10 Transporting Factory-Built Housing.** The transportation of FBH shall be governed by the provisions of the County and State traffic codes."

(2012, ord 12-27, sec 2.)

**Section 5-80. Appendix M; Thatch Material on Exterior of Buildings - Protection Against Exposure Fires.**

Appendix M is added to read as follows:

**“APPENDIX M  
THATCH MATERIAL ON EXTERIOR OF BUILDINGS; PROTECTION  
AGAINST EXPOSURE FIRES**

**SECTION M101  
GENERAL**

**M101.1 General.** Thatched materials used on the roof on a building shall be protected by manually operated sprinkler heads, with adequate water supply, pipe size, and sprinkler head spacing in accordance with sprinkler system requirements set forth in this section.

Thatched materials used on the wall of a building shall be protected by manually operated outside sprinklers. Size and spacing of sprinklers and pipe size shall be in accordance with Chapter 7, “Outside Sprinklers and Protection Against Exposure Fires,” of the National Fire Codes of the National Fire Protection Association. Controls shall be set forth in this section.

**SECTION M102  
APPLICABILITY**

**M102.1 Applicability.** Thatched material on the exterior of buildings shall be permitted only upon buildings located in areas zone for resort (V Resort-Hotel by the Planning Department) uses which primarily service the tourist trade when approved by the building official.

The thatched material permitted in this section shall be used for decorative purposes on the roof or wall of buildings. The building, independent of the thatched material, shall comply with all applicable provisions of this appendix.

When thatched material is used as permitted in this section, and an appropriate permit is obtained therefore, outside sprinklers for protection against exposure fires shall be required as hereinafter provided.

**SECTION M103  
SPRINKLER**

**M103.1 General.** Sprinklers shall be located at the high point of the roof. Upright or pendant sprinklers shall be used for gable roofs. Sidewall sprinklers shall be used for shed roofs.

**M103.2 Spacing of Sprinklers.** The maximum width of roof with one row of sprinklers shall be as follows:

Roof Slope	Orifice Size (In inches)	Width of Roof
1:3 or greater	3/8	15'
1:3 or greater	1/2	20'
1:3 or greater	17/32	25'
Less than 1:3	3/8	10'
Less than 1:3	1/2	15'
Less than 1:3	17/32	20'

Maximum spacing of sprinklers on branch lines (along ridge) shall be as follows: 3/8- inch orifice – 6 feet; 1/2-inch orifice – 8 feet; 17/32-inch orifice – 10 feet.

Conical roofs may be protected with one sprinkler at the apex if the diameter of the roof does not exceed the width of roof referred to in this section.

Where the width of a roof exceeds the width allowed for one row of sprinklers, as provided in the table in this section, two or more rows of sprinklers shall be required. The rows of sprinklers shall be placed such that the entire roof area is protected.

**M103.3 Areas Protected.** Each area (zone) of thatched material that is separated from another thatched area by an open space of 20 feet or more or by incombustible construction of 20 feet or more shall be considered a separate area (zone).

Risers to each separate zone shall not be less than that shown in subsection M103.5, Riser and Pipe Size, except as modified as follows:

- (1) More than one zone may be protected by one valve, if the supply is adequate.
- (2) If one area (zone) is larger than can be protected with the existing supply, the zones can be subdivided into subzones if the following criteria are met: An area of at least 800 square feet is protected by the subzone control valve; there is at least a 10 percent overlap in coverage of adjoining subzones; and operation of the manual control valves will automatically transmit an alarm to the fire department.

**M103.4 Water Supply.** The sprinkling system shall have a separate connection to the water main in the street, to an approved automatic fire-extinguishing system supply line, to a wet standpipe supply line, or to a domestic supply of adequate size. The water supply required shall be determined from either of the following:

- (1) Flow per sprinkler for the largest zone, with residual pressure at the highest sprinkler at 15 pounds per square in with all heads operating, shall be as follows:

Orifice Size (In inches)	Gallons Per Minute
3/8	15
1/2	20
17/32	25

- (2) The flow shall be hydraulically calculated so as to discharge at least 0.11 gallons per minute per square foot of surface area to be sprinkled.

**M103.5 Riser and Pipe Size.** Pipe sizes shall be determined from the flow as calculated in subsection M103.4, Water Supply. However, no pipe less than one inch in size shall be used. The following table may be used in conjunction with this flow calculated for the selection of pipe or riser sizes.

Orifice Size (In inches)	Pipe or Riser Size							
	1"	1-1/4"	1-1/2"	2"	2-1/2"	3"	3-1/2"	4"
	No. of Sprinklers							
3/8	3	4	7	11	21	37	40	40
1/2	2	3	5	8	15	27	40	40
17/32	1	2	4	6	11	19	30	38

**M103.6 Number of Sprinklers Served.** The number of sprinklers on a branch line shall not exceed six. Center feet shall be used for six or more sprinklers. The number of sprinklers under control of each control valve shall not exceed forty. At the location of each valve, there shall be a drain connection and a ¼-inch valve test connection to accommodate pressure gauge.

**M103.7 Material Installed Above Grade.** Piping shall be galvanized steel schedule 40 with galvanized malleable iron fittings or hard drawn copper with silver solder fittings. Pipes shall be securely fastened to the structure.

Valves shall be manual type approved and listed by the Underwriters' Laboratories or by other approved testing agencies. Valves shall be installed outdoors and so located as to be readily accessible in case of fire. Signs indicating the use of valves shall be conspicuously posted.

**M103.8 Local Alarm.** Any one system with 20 or more sprinklers under control of one valve shall be complemented with a local fire alarm, either electrically or mechanically operated."

(2012, ord 12-27, sec 2.)

**Section 5-81. Appendix U; Hawai‘i Hurricane Sheltering Provisions for New Construction.**

Appendix U is added to read as follows:

**“APPENDIX U  
HAWAI‘I HURRICANE SHELTERING PROVISIONS FOR NEW  
CONSTRUCTION**

**Section U101. Community Storm Shelters.**

Chapter 4 is amended by adding Section 421 to read as follows:

**“SECTION 421  
COMMUNITY STORM SHELTERS**

**421.1 General.** In addition to other applicable requirements in this code, community storm shelters and the following specific Occupancy Category IV buildings shall be constructed in accordance with ICC/NSSA-500:

- (1) Designated earthquake, hurricane or other emergency shelters.
- (2) Designated emergency preparedness, communication, and operation centers and other facilities required for emergency response.

**421.1.1 Scope.** This section applies to the construction of storm shelters constructed as separate detached buildings or constructed as safe rooms within buildings for the purpose of providing safe refuge from storms that produce high winds, such as hurricanes. Such structures shall be designated to be hurricane shelters.

**421.2 Definitions.** The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

**COMMUNITY STORM SHELTER.** A building, structure, or portions(s) thereof, constructed in accordance with ICC 500-08 ICC/NSSA Standard on the Design and Construction of Storm Shelters and designated for use during a severe wind storm event such as a hurricane.”

**Section U102. Hawai'i Residential Safe Room.**

Chapter 4 is amended by adding Section 422 to read as follows:

**“SECTION 422  
HAWAI'I RESIDENTIAL SAFE ROOM**

**422.1 Performance-Based Design Criteria.** The Residential Safe Room shall meet the minimum performance specifications of Sections 422.1.1 through 422.9, and the owner of the Residential Safe Room shall comply with Section 422.10.

**422.1.1 Intent and Scope.** The intent of the Residential Safe Room is to temporarily provide an enhanced protection area that is either: (1) fully enclosed within a dwelling or within an accessory structure to a residence; or (2) a separate structure outside of the dwelling that meets standards pursuant to 422.1.2.1 or 422.1.2.2. All Residential Safe Rooms shall be designed and constructed to withstand the wind pressures, windborne debris impacts, and other requirements of this section.

**422.1.2 Alternative Standards.**

- (1) **Manufactured Safe Room Designs Subject to Approval.** A manufactured safe room or safe room kit may be substituted if documentation is submitted and approved by the building official. The safe room shall be engineered, tested, and manufactured to meet or exceed the criteria of this section.
- (2) **FEMA 320 Shelter Designs Permitted.** It shall be permissible to build FEMA Shelters of up to 64 square feet of floor area with walls up to 8 feet long that are built in accordance with construction details of FEMA 320.

**422.2 Site Criteria.** Residential Safe Rooms shall not be constructed within areas subject to stream flooding, coastal flooding or dam failure inundation within any of the following areas:

- (1) FEMA Special Flood Hazard Areas (SFHA) subject to rainfall runoff flooding or stream or flash flooding;
- (2) Coastal zones “V” or “A” identified in the Flood Insurance Rate Map (FIRM) issued by FEMA for floodplain management purposes, in which the flood hazard are tides, storm surge, waves, tsunamis, or a combination of these hazards; and
- (3) Areas subject to dam failure inundation as determined by the Department of Land and Natural Resources.

**422.3 Maximum Occupancy.** The safe room is permitted to be used for a maximum occupancy based on at least 15 square feet per person with a maximum of 8 persons in a room of up to 128 square feet of floor area.

**422.4 Provisions for Exiting.** The room shall be equipped with an inward-swinging door and an impact-protected operable window suitable for a means of alternative exiting in an emergency.

**422.5 Design for Dead, Live, Wind, Rain, and Impact Loads.**

**422.5.1 Structural Integrity Criteria.**

- (1) The safe room shall be built with a complete structural system and a complete load path for vertical and lateral loads caused by gravity and wind.
- (2) The building that the safe room is built within shall be assumed to be destroyed by the storm and shall not be taken as offering any protective shielding to the safe room enclosure.
- (3) The ceiling structure and wall shall be capable of supporting a superimposed debris load of the full weight of any building floors and roof above, but not less than 125 psf.

- (4) The safe room enclosure shall be capable of simultaneously resisting lateral and uplift wind pressures corresponding to a 160 mph 3-second peak gust, determined in accordance with ASCE Standard 7, Minimum Design Loads for Buildings and Other Structures, calculated using load and importance Factors of 1.0. The site exposure factor shall be based on exposure C. The gust factor and the directionality factor shall be taken as 0.85. Topographic wind amplification caused by mountainous terrain shall be considered in accordance with the building code. Internal pressure shall be determined in accordance with ASCE – 7.
- (5) The safe room shall be anchored to a foundation system capable of resisting the above loading conditions.

**422.5.2 Windborne Debris Impact Protection of Building Enclosure Elements.** The entire enclosure of the safe room, including all walls, ceilings, and openings, fixed or operable windows, and all entry doors into the safe room, shall meet or exceed Level D requirements of ASTM E 1996 (Table 422.5-1). Any wall or ceiling penetration greater than 4 square inches shall be considered an opening.

**Exception:** Electrical outlet boxes and interior lighting switches not penetrating more than 2.5-inches into the interior wall surface and a plumbing piping or conduit not greater than 1.5-inch in diameter shall be exempted from this requirement.

**422.5.3 Cyclic Pressure Loading of Glazing and Protective Systems.** Impact protective systems shall meet the ASTM E 1996 cyclic pressure requirement for the loading given in Table 422.5-1.

**Table 422.5-1  
Windborne Debris Protection and Cyclic Pressure  
Criteria for Residential Safe Rooms**

ASTM E 1996 Missile Level Rating	Debris Missile Size	Debris Impact Speed	Enclosure Wall Ceiling, and Floor Cyclic Air Pressure Testing - maximum inward and maximum outward pressures
D	2 x 4 weighing 9.0 lb. +/- 0.25 lb., and with min. length 8 ft. +/- 4-inch	50 ft./sec. or at least 34 mph	35 psf inward 45 psf outward

**422.6 Ventilation.** The room shall be naturally ventilated to allow the enclosure to have approximately one air change every 2 hours. This requirement may be satisfied by 12 square inches of venting per occupant. There shall be at least two operable vents. The vents shall be protected by a cowling or other device that shall be impact tested to comply with ASTM E 1996 Level D. Alternatively, the room shall be evaluated to determine if the openings are of sufficient area to constitute an open or partially enclosed condition as defined in ASCE 7.

**422.7 Communications.** The safe room shall be equipped with a phone line and telephone that does not rely on a separate electrical power outlet. Alternatively, a wireless telephone shall be permitted to rely on an Uninterruptible Power Supply (UPS) battery device.

**422.8 Construction Documents.** Construction documents for the Residential Safe Room shall be directly prepared by a Hawaii licensed professional structural engineer.

**422.9 Special Inspection.** The construction or installation of the safe room shall be verified for conformance to the drawings in accordance with Chapter 17.

**422.10 Notification.** The owner of the safe room shall notify the State Department of Defense and county civil defense agency of the property's Tax Map Key or Global Positioning System coordinates."

**Section U102. State and County-owned Public High Occupancy Buildings - Design Criteria for Enhanced Hurricane Protection Areas.**

Chapter 4 is amended by adding Section 423 to read as follows:

**“SECTION 423  
STATE AND COUNTY-OWNED HIGH OCCUPANCY BUILDINGS - DESIGN  
CRITERIA FOR ENHANCED HURRICANE PROTECTION AREAS**

**423.1 Intent.** The purpose of this section is to establish minimum life safety design criteria for enhanced hurricane protection areas in high occupancy state- and county-owned buildings occupied during hurricanes of up to Saffir Simpson Category 3.

**423.2 Scope.** This section shall apply to state- and county-owned buildings which are of Occupancy Category III and IV defined by Table 1604.5 and of the following specific occupancies:

- (1) Enclosed and partially enclosed structures whose primary occupancy is public assembly with an occupant load greater than 300.
- (2) Health care facilities with an occupant load of 50 or more resident patients, but not having surgery or emergency treatment facilities.
- (3) Any other state- and county-owned enclosed or partially enclosed building with an occupant load greater than 5,000.

- (4) Hospitals and other health care facilities having surgery or emergency treatment facilities.

**Exception:** Facilities located within flood zone V and flood zone A that are designated by the owner to be evacuated during hurricane warnings declared by the National Weather Service, shall not be subject to these requirements.

#### **423.3 Site Criteria.**

**423.3.1 Flood and Tsunami Zones.** Comply with ASCE 24-05, Flood Resistant Design and Construction, based on provisions for Occupancy Category III.

- (1) Floor slab on grade shall be 1.5 foot above the Base Flood Elevation of the county's flood hazard map, or at higher elevation as determined by a modeling methodology that predicts the maximum envelope and depth of inundation including the combined effects of storm surge and wave actions with respect to a Category 3 hurricane.
- (2) Locate outside of V and Coastal A flood zones unless justified by site-specific analysis or designed for vertical evacuation in accordance with a method approved by the building official. When a building within a V or Coastal A zone is approved, the bottom of the lowest structural framing member of any elevated first floor space shall be 2 feet above the Base Flood Elevation of the county's flood hazard map, or at higher elevation as determined by a modeling methodology that predicts the maximum envelope and depth of inundation including the combined effects of storm surge and wave actions with respect to a Category 3 hurricane.
- (3) Locate outside of Tsunami evacuation zones unless justified by site-specific analysis or designed for vertical evacuation in accordance with a method approved by the building official.

**423.3.2 Emergency Vehicle Access.** Provide at least one route for emergency vehicle access. The portion of the emergency route within the site shall be above the 100-year flood elevation.

**423.3.3 Landscaping and Utility Laydown Impact**

**Hazards.** Landscaping around the building shall be designed to provide standoff separation sufficient to maintain emergency vehicle access in the event of mature tree blowdown. Trees shall not interfere with the functioning of overhead or underground utility lines, nor cause laydown or falling impact hazard to the building envelope or utility lines.

**423.3.4 Adjacent Buildings.** The building shall not be located within 1,000 feet of any hazardous material facilities defined by Table 1604.5. Unanchored light-framed portable structures shall be not permitted within 300 feet of the building.

**423.4 Enhanced Hurricane Protection Area Program Requirements.**

**423.4.1 Applicable Net Area.** At least 50 percent of the net square feet of a facility shall be constructed to qualify as an enhanced hurricane protection area. The net floor area shall be determined by subtracting from the gross square feet the floor area of excluded spaces, exterior walls, columns, fixed or movable objects, equipment or other features that under probable conditions cannot be removed or stored during use as a storm shelter.

**423.4.2 Excluded spaces.** Spaces such as mechanical and electrical rooms, storage rooms, attic and crawl spaces, shall not be considered as net floor area permitted to be occupied during a hurricane.

**423.4.3 Occupancy Capacity.** The occupancy capacity shall be determined by dividing the net area of the enhanced hurricane protection area by 15 square feet net floor area per person.

**423.4.4 Toilets and hand washing facilities.** Provide a minimum of 1 toilet per 50 enhanced hurricane protection area occupants and a minimum of 1 sink per 100 enhanced hurricane protection area occupants, as determined per Section 423.4.3, located within the perimeter of the enhanced hurricane protection area. These required toilet and hand-washing facilities are not in addition to those required for normal occupancy and shall be included in the overall facility fixture count.

**423.4.5 Accessibility.** Where the refuge occupancy accommodates more than 50 persons, provide an ADA-accessible route to a shelter area at each facility with a minimum of 1 wheelchair space for every 200 enhanced hurricane protection area occupants determined per Section 423.4.3.

#### **423.5 Design Wind, Rain, and Impact Loads.**

**423.5.1 Structural Design Criteria.** The building Main Wind Force Resisting System and structural components shall be designed per ASCE 7 for a 115 mph minimum peak 3-second gust design speed with a load factor of 1.6, and an Importance Factor for Occupancy Category III. Topographic and directionality factors shall be the site-specific values determined per Appendix W. Design for interior pressure based on the largest opening in any exterior facade or roof surface.

**423.5.2 Windborne Debris Missile Impact for Building Enclosure Elements.** Exterior glazing and glazed openings, louvers, roof openings and doors shall be provided with windborne debris impact resistance or protection systems conforming to ASTM E1996-05 Level D, i.e., 9 lb. 2 X 4 @ 50 fps (34 mph).

**423.5.3 Cyclic Pressure Loading of Impact Resistive Glazing or Windborne Impact Protective Systems.** Resistance to the calculated maximum inward and outward pressure shall be designed to conform to ASTM E1996-05.

**423.5.4 Windows.** All unprotected window assemblies and their anchoring systems shall be designed and installed to meet the wind load and missile impact criteria of this section.

**423.5.5 Window Protective Systems.** Windows may be provided with permanent or deployable protective systems, provided the protective system is designed and installed to meet the wind load and missile impact criteria and completely covers the window assembly and anchoring system.

**423.5.6 Doors.** All exterior and interior doors subject to possible wind exposure and/or missile impact shall have doors, frames, anchoring devices, and vision panels designed and installed to resist the wind load and missile impact criteria or such doors, frames, anchoring devices, and vision panels shall be provided with impact protective systems designed and installed to resist the wind load and missile impact criteria of this section.

**423.5.7 Exterior envelope.** The building enclosure, including walls, roofs, glazed openings, louvers and doors, shall not be perforated or penetrated by windborne debris, as determined by compliance with ASTM E1996-05 Level C.

**423.5.8 Parapets.** Parapets shall satisfy the wind load and missile impact criteria of the exterior envelope.

**423.5.9 Roofs.**

**423.5.9.1 Roof Openings.** Roof openings (e.g., HVAC fans, ducts, skylights) shall be provided with protection for the wind load and missile impact criteria of Sections 423.5.2 and 423.5.3.

**423.5.9.2 High Wind Roof Coverings.** Roof coverings shall be specified and designed according to the latest ASTM Standards for high wind uplift forces.

**423.5.9.3 Roof Drainage.** Roofs shall have adequate slope, drains and overflow drains or scuppers sized to accommodate 100-year hourly rainfall rates in accordance with Section 1611.1, but not less than 2-inches per hour for 6 continuous hours.

**423.6 Ventilation.**

**423.6.1 Mechanical ventilation.** Mechanical ventilation as required per the International Mechanical Code. Air intakes and exhausts shall be designed and installed to meet the wind load and missile impact criteria of Sections 423.5.2 and 423.5.3.

**423.6.2 HVAC Equipment anchorage.** HVAC equipment mounted on roofs and anchoring systems shall be designed and installed to meet the wind load criteria. Roof openings for roof-mounted HVAC equipment shall have a 12-inch-high curb designed to prevent the entry of rain water.

**423.7 Standby Electrical System Capability.** Provide a standby emergency electrical power system per Chapter 27 and NFPA 70 Article 700 Emergency Systems and Article 701 Legally Required Standby Systems, which shall have the capability of being connected to an emergency generator or other temporary power source. The emergency system capabilities shall include:

- (1) An emergency lighting system,
- (2) Illuminated exit signs,
- (3) Fire protection system(s), alarm and sprinkler, and
- (4) Minimum mechanical ventilation for health/safety purposes.

**423.7.1 Emergency Generator.** When emergency generators are pre-installed, the facility housing the generator, permanent or portable, shall be an enclosed area designed to protect the generators from wind and missile impact. Generators hardened by the manufacturer to withstand the area's design wind and missile impact criteria shall be exempt from the enclosed area criteria requirement.

**423.8 Quality assurance.****423.8.1 Information on Construction Documents.**

Construction Documents shall include design criteria, the occupancy capacity of the enhanced hurricane protective area, and Project Specifications shall include opening protection devices. Floor plans shall indicate all enhanced hurricane protection area portions of the facility and exiting routes there from. The latitude and longitude coordinates of the building shall be recorded on the construction documents.

**423.8.2 Special Inspection.** In addition to the requirements of Chapter 17, special inspections shall include at least the following systems and components:

- (1) Roof cladding and roof framing connections.
- (2) Wall connections to roof and floor diaphragms and framing.
- (3) Roof and floor diaphragm systems, including collectors, drag struts and boundary elements.
- (4) Vertical windforce-resisting systems, including braced frames, moment frames and shear walls.
- (5) Windforce-resisting system connections to the foundation.
- (6) Fabrication and installation of systems or components required to meet the impact-resistance requirements of Section 1609.1.2.

**Exception:** Fabrication of manufactured systems or components that have a label indicating compliance with the wind-load and impact-resistance requirements of this code.

**423.8.3 Quality Assurance Plan.** A construction quality assurance program shall be included in the Construction Documents, including:

- (1) The materials, systems, components and work required to have special inspection or testing by the building official or by the registered design professional responsible for each portion of the work.
- (2) The type and extent of each special inspection.
- (3) The type and extent of each test.
- (4) Additional requirements for special inspection or testing for seismic or wind resistance.
- (5) For each type of special inspection, identification as to whether it will be continuous special inspection or periodic special inspection.

**423.8.4 Peer Review.** Construction Documents shall be independently reviewed by a Hawai'i-licensed Structural Engineer. A written opinion report of compliance shall be submitted to State Civil Defense, the Building Official, and the owner.

**423.9 Maintenance.** The building shall be periodically inspected every three years and maintained by the owner to ensure structural integrity and compliance with this section. A report of inspection shall be furnished to State Civil Defense.

**423.10 Compliance Re-certification when Altered, Deteriorated, or Damaged.** Alterations shall be reviewed by a Hawai'i-licensed structural engineer to determine whether any alterations would cause a violation of this section. Deterioration or damage to any component of the building shall require an evaluation by a Hawai'i-licensed structural engineer to determine repairs necessary to maintain compliance with this section.”

(2012, ord 12-27, sec 2.)

**Section 5-82. Appendix W; Hawai‘i Wind Design Provisions for New Constructions.**

Appendix W is added to read as follows:

**“APPENDIX W  
HAWAI‘I WIND DESIGN PROVISIONS FOR NEW CONSTRUCTIONS**

**W101 Revisions to Chapter 16.** When Appendix W is adopted, wind design shall be in accordance with Chapter 16 as amended by Sections W101.1 through W101.10.

**W101.1 Revisions to Section 1603.1.** Section 1603.1 is amended to read as follows:

**“1603.1 General.** Construction documents shall show the size, section, and relative locations of structural members with floor levels, column centers and offsets dimensioned. The design loads and other information pertinent to the structural design required by Sections 1603.1.1 through 1603.1.8 shall be indicated on the construction documents.

**Exception:** Construction documents for buildings constructed in accordance with the conventional light-frame construction provisions of Section 2308 shall indicate the following structural design information:

- (1) Floor and roof live loads.
- (2) Ground snow load,  $P_g$ .
- (3) Basic wind speed (3-second gust) and Effective wind speed  $V_{eff}$  (3-second gust), miles per hour (mph)(km/hr) and wind exposure.
- (4) Seismic design category and site class.
- (5) Flood design data, if located in flood hazard areas established in Section 1612.3.”

**W101.2 Revisions to Section 1603.1.4.** Section 1603.1.4 is amended to read as follows:

**“1603.1.4 Wind Design Data.** The following information related to wind loads shall be shown, regardless of whether wind loads govern the design of the lateral-force-resisting system of the building:

- (1) Basic wind speed (3-second gust), miles per hour (km/hr),  $V$ , and effective windspeed  $V_{eff}$ .
- (2) Wind importance factor  $I$ , and building category.

- (3) Wind exposure, if more than one wind exposure is utilized, the wind exposure for each applicable wind direction shall be indicated.
- (4) The applicable internal pressure coefficient.
- (5) Components and cladding. The design wind pressures in terms of psf (kN/m<sup>2</sup>) used for the design of exterior components, and cladding not specifically designed by the registered design professional.”

**W101.3 Revisions to Section 1609.1.1.** Section 1609.1.1 is amended to read as follows:

**“1609.1.1 Determination of wind loads.** Wind loads on every building or structure shall be determined in accordance with Chapter 6 of ASCE 7. Minimum values for Directionality Factor,  $K_d$ , Velocity Pressure Exposure Coefficient,  $K_z$ , and Topographic Factor,  $K_{zt}$ , shall be determined in accordance with Section 1609. The type of opening protection required, the basic wind speed and the exposure category for a site is permitted to be determined in accordance with Section 1609 or ASCE 7. Wind shall be assumed to come from any horizontal direction and wind pressures shall be assumed to act normal to the surface considered.

**Exceptions:**

- (1) Subject to the limitations of Section 1609.1.1.1, the provisions of SBCCI SSTD 10 shall be permitted for applicable Group R-2 and R-3 buildings.
- (2) Subject to the limitations of Section 1609.1.1.1, residential structures using the provisions of the AF &PA WFCM.
- (3) Designs using NAAMM FP 1001.
- (4) Designs using TIA/EIA-222 for antenna-supporting structures and antennas.”

**W101.4 Revisions to Section 1609.1.2.** Section 1609.1.2 is amended to read as follows:

**“1609.1.2 Protection of openings.** In wind-borne debris regions, glazing in building shall be impact-resistant or protected with an impact-resistant covering meeting the requirements of an approved impact-resisting standard or ASTM E 1996 and of ASTM E 1886 referenced therein as follows:

- (1) Glazed openings located within 30 feet (9144 mm) of grade shall meet the requirements of the Large Missile Test of ASTM E 1996.
- (2) Glazed openings located more than 30 feet (9144 mm) above grade shall meet the provisions of the Small Missile Test of ASTM E 1996.

**Exceptions:**

- (1) Wood structural panels with a minimum thickness of 7/16 inch (11.1 mm) and a maximum panel span of 8 feet (2438 mm) shall be permitted for opening protection in one- and two-story buildings. Panels shall be precut so that they shall be attached to the framing surrounding the opening containing the product with the glazed opening. Panels shall be secured with the attachment hardware provided. Attachments shall be designed to resist the components and cladding loads determined in accordance with the provisions of ASCE 7. Attachment in accordance with Table 1609.1.2 is permitted for buildings with a mean roof height of 33 feet (10,058 mm) or less where wind speeds do not exceed 130 mph (57.2 m/s).
- (2) Glazing in Occupancy Category I buildings as defined in Section 1604.5, including greenhouses that are occupied for growing plants on a production or research basis, without public access shall be permitted to be unprotected.
- (3) Glazing in Occupancy Category II, III or IV buildings located over 60 feet (18,288 mm) above the ground and over 30 feet (9,144 mm) above aggregate surface roofs located within 1,500 feet (458 m) of the building shall be permitted to be unprotected.

- (4) Glazing in Occupancy Category II and III buildings that can receive positive external pressure in the lower 60 feet (18,288 mm) shall be assumed to be openings unless such glazing is impact-resistant or protected with an impact-resistant system.

**Exception:** Glazing in Occupancy Category III buildings defined by Table 1604.5 of the following occupancies shall be provided with windborne debris protection:

- (a) Covered structures whose primary occupancy is public assembly with an occupant load greater than 300.
- (b) Health care facilities with an occupant load of 50 or more resident patients, but not having surgery or emergency treatment facilities.
- (c) Any other public building with an occupant load greater than 5,000.

**1609.1.2.1 Building with openings.** Where glazing is assumed to be an opening in accordance with Section 1609.1.2, the building shall be evaluated to determine if the openings are of sufficient area to constitute an open or partially enclosed building as defined in ASCE 7. Open and partially enclosed buildings shall be designed in accordance with the applicable provisions of ASCE 7. Partially enclosed Occupancy R-3 buildings shall also include a residential safe room in accordance with Section 422, Hawai'i Residential Safe Room.

**1609.1.2.2 Louvers.** Louvers protecting intake and exhaust ventilation ducts not assumed to be open that are located within 30 ft (9,144 mm) of grade shall meet requirements of an approved impact-resisting standard or the Large Missile Test of ASTM E 1996.

**TABLE 1609.1.2  
WIND-BORNE DEBRIS PROTECTION FASTENING SCHEDULE  
FOR WOOD STRUCTURAL PANELS <sup>a,b,c</sup>**

FASTENER TYPE	FASTENER SPACING		
	Panel span ≤ 4 feet	4 feet < Panel span ≤ 6 feet	6 feet < Panel span ≤ 8 feet
No. 6 screws	16"	12"	9"
No. 8 screws	16"	16"	12"

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 0.454 kg,  
1 mile per hour = 1.609 km/h.

- a. This table is based on a maximum wind speed (3-second gust) of 130 mph and mean roof height of 33 feet or less.
- b. Fasteners shall be installed at opposing ends of the wood structural panel. Fasteners shall be located a minimum of 1 inch from the edge of the panel.
- c. Fasteners shall be long enough to penetrate through the exterior wall covering a minimum of 1.75 inches into wood wall framing; a minimum of 1.25 inches into concrete block or concrete; or into steel framing by at least three threads. Fasteners shall be located a minimum of 2.5 inches from the edge of concrete block or concrete.
- d. Where screws are attached to masonry or masonry/stucco, they shall be attached utilizing vibration-resistant anchors having a minimum withdrawal capacity of 490 pounds.”

**W101.4.1 Revisions to Section 1609.2.** Section 1609.2 is amended to read as follows:

“**1609.2 Definitions.** The following words and terms shall, for the purposes of Section 1609, have the meanings shown herein.

**HURRICANE-PRONE REGIONS.** Areas vulnerable to hurricanes defined as:

- (1) The U.S. Atlantic Ocean and Gulf of Mexico coasts where the basic wind speed is greater than 90 mph (40 m/s) and
- (2) Hawai‘i, Puerto Rico, Guam, Virgin Islands and American Samoa.

WIND-BORNE DEBRIS REGION. Portions of hurricane-prone regions that are within 1 mile (1.61 km) of the coastal mean high water line where the basic wind speed is 110 mph (48 m/s) or greater; or portions of hurricane-prone regions where the basic wind speed is 120 mph (53 m/s) or greater.”

**W101.5 Revisions to Section 1609.3.** Section 1609.3 is amended to read as follows:

**“1609.3 Basic wind speed and Topographic and Directionality Factors.** The basic wind speed, in mph, for the determination of the wind loads shall be determined by Figure 1609.

Special wind regions near mountainous terrain and valleys are accounted within the Topographic Factor defined in Section 1609.3.3. Wind speeds derived from simulation techniques shall only be used in lieu of the basic wind speeds given in Figure 1609 when, (1) approved simulation or extreme-value statistical-analysis procedures are used (the use of regional wind speed data obtained from anemometers is not permitted to define the hurricane wind speed risk in Hawai‘i) and (2) the design wind speeds resulting from the study shall not be less than the resulting 700-year return period wind speed divided by  $\sqrt{1.6}$ .”

**W101.6 Addition of Section 1609.3.2.** Section 1609.3.2 is added to read as follows:

**“1609.3.2 Effective basic wind speed conversion.** For Section 2308.10.1, the provisions of ASCE Section 6.4, and the exceptions permitted under Section 16099.1.1, the basic wind speed value used for determination of the wind loads, shall be the Effective Basic Wind Speed,  $V_{\text{eff}}$ , determined by Figure 1609.1.1.1, which adjusts the basic wind speed for special topographic wind regions.”

**W101.7 Addition of Effective Wind Speed Contour  
Maps.** Figure 1609.1.1.1(a) is added as follows:

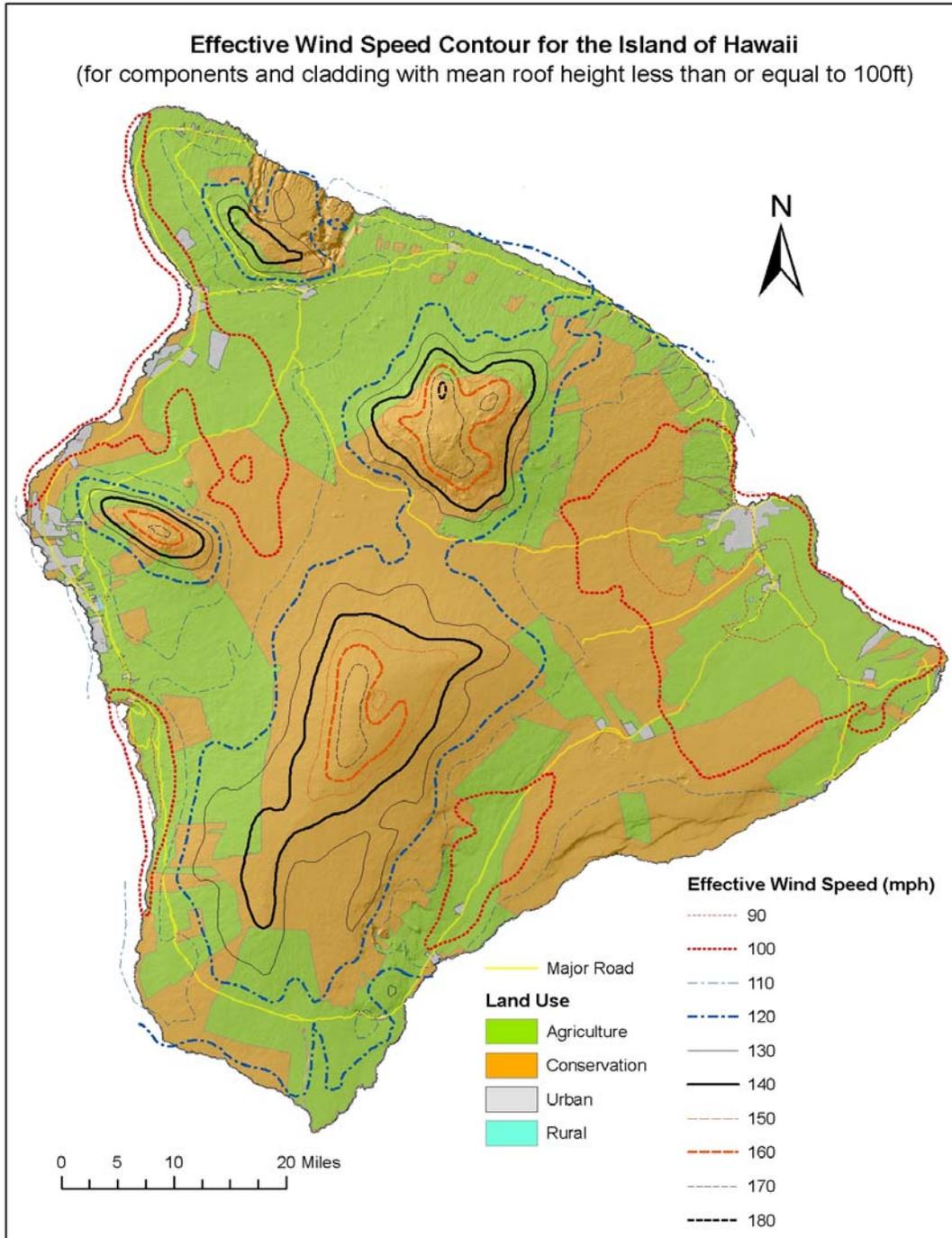


Figure 1609.1.1.1(a)  
County of Hawai'i Effective Basic Wind Speed,  $V_{eff}$ , for Components  
and Cladding for Buildings less than 100 ft. tall

**W101.8 Addition of Section 1609.3.3.** Section 1609.3.3 is added to read as follows:

**“1609.3.3 Topographic Effects.** Wind speed-up effects caused by topography shall be included in the calculation of wind loads by using the factor  $K_{zt}$ , where  $K_{zt}$  is given in Figure 1609.3.3(a).

**Exception:** Site-specific probabilistic analysis of directional  $K_{zt}$  based on wind-tunnel testing of topographic speed-up shall be permitted to be submitted for approval by the Building Official.”

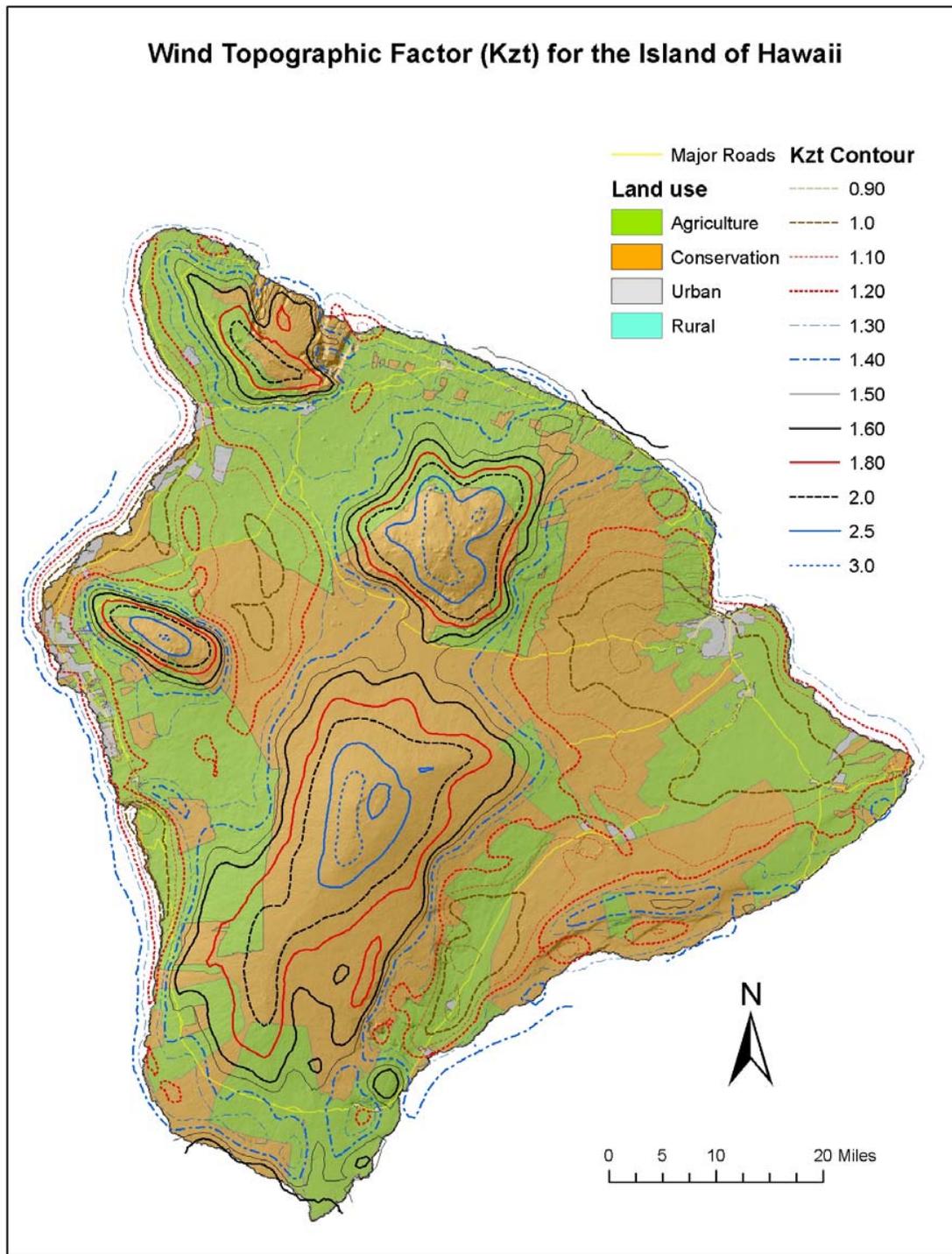


Figure 1609.3.3(a)  
County of Hawai'i Peak Gust Topographic Factor  $K_{zt}$

**W101.9 Directionality Factor.** Section 1609.3.4 is added to read as follows:

**“1609.3.4 Directionality Factor.** The wind directionality factor,  $K_d$ , shall be determined from Tables 1609.3.4(a) and 1609.3.4(b).

**Table 1609.3.4(a)(1)**  
 **$K_d$  Values for Main Wind Force Resisting Systems Sited in Hawai‘i County <sup>a,b</sup>**

Topographic Location on the Island of Hawai‘i	Main Wind Force Resisting Systems		Main Wind Force Resisting Systems with totally independent systems in each orthogonal direction		Biaxially Symmetric and Axisymmetric Structures of any Height and Arched Roof Structures
	Mean Roof Height less than or equal to 100 ft.	Mean Roof Height greater than 100 ft.	Mean Roof Height less than or equal to 100 ft.	Mean Roof Height greater than 100 ft.	
Sites in North Kohala, South Kohala, South Kona, South Hilo, and Puna Districts at an elevation not greater than 3000 ft.	0.65	0.70	0.70	0.75	0.85
All other sites	0.70	0.80	0.75	0.80	0.95

<sup>a</sup> The values of  $K_d$  for other non-building structures indicated in ASCE-7 Table 6-4 shall be permitted.

<sup>b</sup> Site-specific probabilistic analysis of  $K_d$  based on wind-tunnel testing of topography and peak gust velocity profile shall be permitted to be submitted for approval by the Building Official, but  $K_d$  shall have a value not less than 0.65.

**Table 1609.3.4(b)(1)**  
 **$K_d$  Values for Components and Cladding of Buildings Sited in Hawai‘i County <sup>a,b</sup>**

Topographic Location on the Island of Hawai‘i	Components and Cladding		
	Mean Roof Height less than or equal to 100 ft.	Mean Roof Height greater than 100 ft.	Occupancy Category IV Buildings and Structures
Sites in North Kohala, South Kohala, South Kona, South Hilo, and Puna Districts at an elevation not greater than 3000 ft.	0.65	0.70	0.75
All other sites	0.75	0.80	0.85

<sup>a</sup> The values of  $K_d$  for other non-building structures indicated in ASCE-7 Table 6-4 shall be permitted.

<sup>b</sup> Site-specific probabilistic analysis of  $K_d$  based on wind-tunnel testing of topography and peak gust velocity profile shall be permitted to be submitted for approval by the Building Official, but in any case subject to a minimum value of 0.65.”

**W101.10 Addition of Exposure category maps.** Section 1609.4.4 is added to read as follows:

**“1609.4.4 Exposure category maps.** Exposure categories are permitted to be determined using Figure 1609.4.4(a).

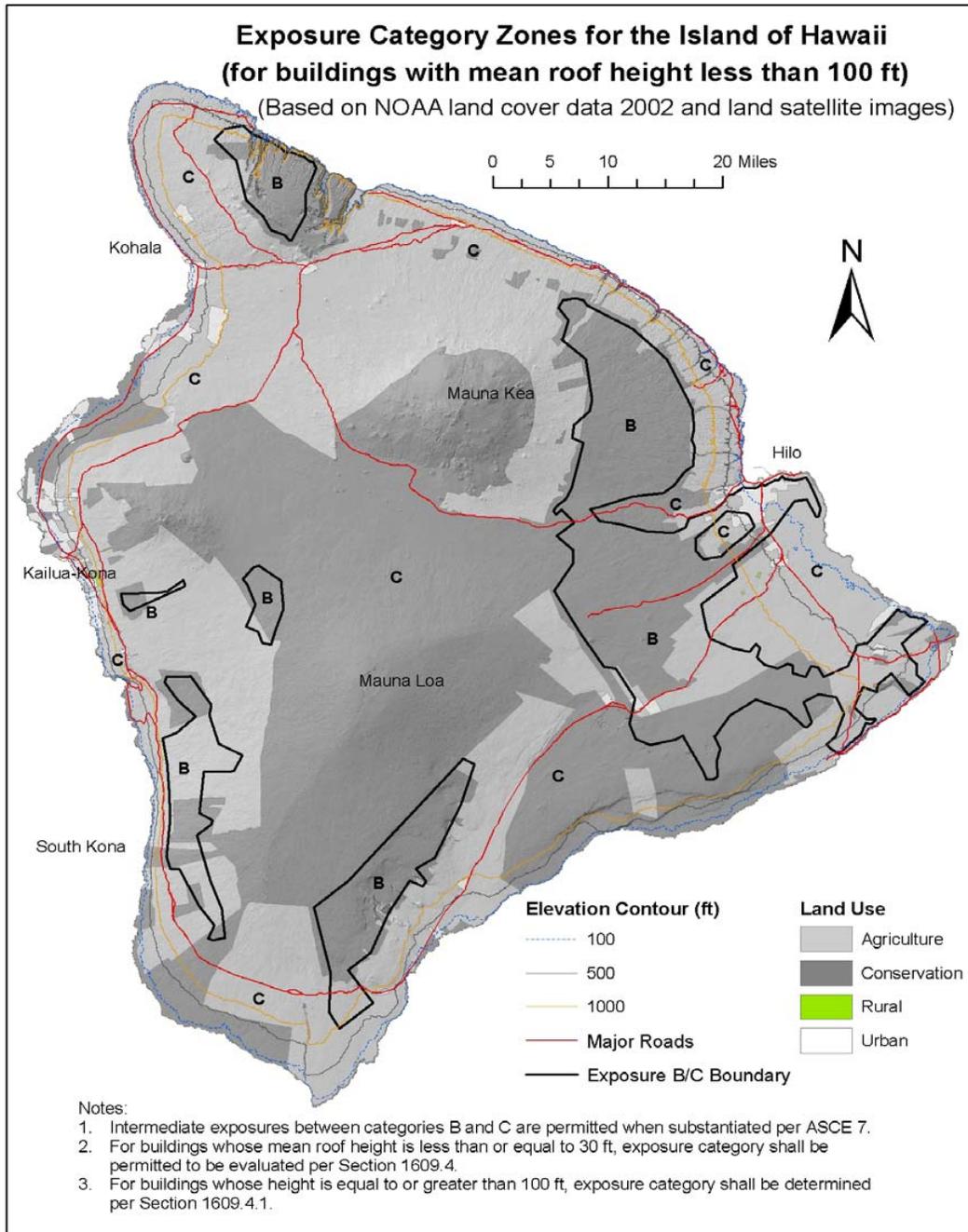


Figure 1609.4.4(a)  
 Exposure Category Zones for Hawai'i County

**W102 Revisions to Chapter 23.** When Appendix W is adopted, wood construction shall be in accordance with Chapter 23 as amended by Sections W102.1 and W102.2.

**W102.1 Revisions to Section 2308.2.1.** Section 2308.2.1 is amended to read as follows:

**“2308.2.1 Basic wind speed greater than 100 mph.**

Where the Effective Basic Wind Speed exceeds 100 mph, the provisions of the AF&PA WFCM, or the SBCCI SSTD 10 are permitted to be used.”

**W102.2 Revisions to Table 2308.10.1.** Table 2308.10.1 is amended to read:

**TABLE 2308.10.1  
REQUIRED RATING OF APPROVED UPLIFT CONNECTORS (pounds)<sup>a,b,c,d,e,f,g,h,i</sup>**

Effective Basic Wind Speed <sup>v</sup> <sub>eff</sub> , 3-sec gust	Roof Span (feet)							Overhangs (pounds/ft) <sup>d</sup>
	12	20	24	28	32	36	40	
85	-72	-120	-144	-168	-192	-216	-240	-38.55
90	-91	-152	-182	-213	-243	-274	-304	-43.22
100	-131	-218	-262	-305	-349	-392	-436	-53.36
110	-175	-292	-350	-409	-467	-526	-584	-64.56
120	-240	-400	-480	-560	-640	-720	-800	-76.83
130	-304	-506	-607	-708	-810	-911	-1012	-90.17

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 1.61 km/hr, 1 pound = 0.454 Kg, 1 pound/foot = 14.5939 N/m.

- a. The uplift connection requirements are based on a 30-foot mean roof height located in Exposure B. For Exposure C and for other mean roof heights, multiply the above loads by the adjustment coefficients below.

EXPOSURE	Mean Roof Height (feet)									
	15	20	25	30	35	40	45	50	55	60
B	1.00	1.00	1.00	1.00	1.05	1.09	1.12	1.16	1.19	1.22
C	1.21	1.29	1.35	1.40	1.45	1.49	1.53	1.56	1.59	1.62

For SI: 1 inch – 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 1.61 km/hr, 1 pound = 0.454 Kg, 1 pound/foot = 14.5939 N/m.

- b. The uplift connection requirements are based on the framing being spaced 24 inches on center. Multiply by 0.67 for framing spaced 16 inches on center and multiply by 0.5 for framing spaced 12 inches on center.
- c. The uplift connection requirements include an allowance for 10 pounds of dead load.

- d. The uplift connection requirements do not account for the effects of overhangs. The magnitude of the above loads shall be increased by adding the overhang loads found in the table. The overhang loads are also based on framing spaced 24 inches on center. The overhang loads given shall be multiplied by the overhang projection and added to the roof uplift value in the table.
  - e. The uplift connection requirements are based upon wind loading on end zones as defined in Figure 6-2 of ASCE 7. Connection loads for connections located a distance of 20 percent of the least horizontal dimensions of the building from the corner of the building are permitted to be reduced by multiplying the table connection value by 0.7 and multiplying the overhang load by 0.8.
  - f. For wall-to-wall and wall-to-foundation connections, the capacity of the uplift connector is permitted to be reduced by 100 pounds for each full wall above. (For example, if a 500-pound rated connector is used on the roof framing, a 400-pound rated connector is permitted at the next floor level down.)
  - g. Interpolation is permitted for intermediate values of basic wind speeds and roof spans.
  - h. The rated capacity of approved tie-down devices is permitted to include up to a 60-percent increase for wind effects where allowed by material specifications.
  - i.  $V_{eff}$  is given by Figure 1609.1.1.1.”
- (2012, ord 12-27, sec 2.)

**Section 5-83. Appendix X; Indigenous Hawaiian Architecture Structures.**  
Appendix X is added to read as follows:

**“APPENDIX X  
INDIGENOUS HAWAIIAN ARCHITECTURE STRUCTURES**

**SECTION X101  
GENERAL**

**X101.1 Scope.** The provisions of this appendix shall apply exclusively to Indigenous Hawaiian Architecture Structures. The purpose of these provisions is to acknowledge and establish procedures for designing and constructing indigenous Hawaiian architecture structures.

**X101.2 Publications incorporated by reference.** The following publications are incorporated by reference and made a part of these provisions. Where there is a conflict between Appendix X and the referenced documents, Appendix X shall prevail.

- (1) “Hawaiian Thatched House” (1971), by Russell A. Apple, published by the United States Department of the Interior,
- (2) “Hale Construction Standards” (2000), by Francis Sinenci and Bill Sides,

- (3) “The Hawaiian Grass House in Bishop Museum” (1988), by Catherine C. Summers, and
- (4) “Arts and Crafts of Hawaii, Section II, Houses” (1957) by Te Rangi Hiroa (Peter H. Buck)

**X101.3 Definitions.** For purposes of this appendix, the following words and terms shall have the meanings shown herein. Refer to Chapter 2 for general definitions.

**CERTIFIED HALE BUILDER.** Means a person who has obtained a certificate of completion for satisfactorily completing a course in Hawaiian hale construction from the University of Hawai‘i, or any of its community colleges, or as approved by the Building Official.

**GROUP OF STRUCTURES.** A group of indigenous Hawaiian architecture structures that are in close proximity to each other and have an aggregate floor area of 1,800 square feet or less.

**INDIGENOUS HAWAIIAN ARCHITECTURE STRUCTURE or HALE.** A structure that is consistent with the design, construction methods and uses of structures built by Hawaiians in the 1800’s, which uses natural materials found in the Hawaiian islands, and complies with this appendix and references.

**SEPARATION.** The clear distance between two structures.

**SETBACK.** The clear distance between a structure and a property line.

**SECTION X201  
MATERIAL REQUIREMENTS**

**X201.1 Hale Materials.** Hale shall be constructed using only materials grown and harvested in the State of Hawai‘i.

**X201.2 Wood Framing Material.** The wood members for the hale, such as posts and rafters, shall be, but not limited to hardwoods of unmilled, straight sections of trunks or branches of the following species:

- (1) Casaurina equisitatafolia (ironwood).
- (2) Prosopis-allid (kiawe).
- (3) Eucalyptus robusta (eucalyptus).

- (4) *Psidium cattleianum* (strawberry guava).
- (5) *Metrosideros polymorpha* (ohia).
- (6) *Rizophora mangle* (mangrove).

**Exception:** *Ardisia elliptica* (inkberry) may be used only for roof purlins as an alternative to specified woods listed in Items 1 through 6.

**X201.3 Roofing and Siding.** Thatched roofing and siding materials for the hale may be any grass or leaf material grown and harvested in the State of Hawai‘i, to include but not be limited to pili, kualohia, pueo, kawelu, sugar-cane leaves, and ti leaves.

**X201.4 Cord.** Natural or synthetic cord used for lashing structural members of the hale shall be 400 pound test. Cord used for tying floating purlins and thatched materials shall be 100 pound test. All cord used on the hale shall be shades of green, tan, brown or black.

**X201.5 Metal Prohibited.** Metal shall not be used for the construction of the hale.

**SECTION X202  
SIZE AND LOCATION**

**X202.1 Height and Size Limitation.** Hale shall be one-story, detached structure(s) not to exceed 1,800 square feet. Hale shall not exceed the size indicated in Table X202.1.

**Table X202.1  
Maximum Size of Hale (feet)**

Hale Halawai	Hale Ku‘ai	Hale Noa	Hale Wa‘a
30 X 60	14 X 20	14 X 24	30 X 60

**X202.2 Zoning Requirements.** Hale shall comply with minimum yard requirements in chapter 25, Zoning Code, Hawai‘i County Code.

**X202.3 Minimum Separation.** The minimum separation between a hale and another structure shall be at least 10 feet for a one-story structure; 15 feet for a two-story structure; or a distance equal to the height of the hale, whichever is more. The minimum separation between two hale shall be at least 10 feet or a distance equal to the height of the taller hale.

**X202.4 Hale Noa.** Hale noa structures may only be constructed on property where a separate residence exists on the property.

**SECTION X203  
ALLOWABLE AND PROHIBITED USES**

**X203.1 Allowable uses.** To the extent permitted by other applicable law, allowable uses for hale structures shall be in accordance with Table X203.1.

**Table X203.1  
Allowable Use for Each Hale Type**

Use	Hale Halawai	Hale Ku'ai	Hale Noa	Hale Wa'a
Eating (ai)	Allowed	Allowed	Not permitted	Allowed
Assembling (halawai)	Allowed	Allowed	Not permitted	Allowed
Sleeping (moe)	Not permitted	Not permitted	Allowed	Not permitted
Retailing (e.g., fruits) (ku'ai)	Allowed	Allowed	Not permitted	Allowed
Storage (papa'a)	Not permitted	Allowed	Not permitted	Allowed

**X203.2 Prohibited Uses and Activities.** The following uses and activities shall be prohibited from occurring within or near the hale:

- (1) Cooking.
- (2) Open flames.
- (3) Generators.
- (4) Extension cords.
- (5) Electrical switches, fixtures, or outlets.
- (6) Plumbing faucets, fixtures, or drains.
- (7) Power tools.
- (8) No screen, mesh, plastic or any other similar material shall be attached to the hale.
- (9) Hale shall not be used as a food establishment as defined in the administrative rules adopted by the State of Hawaii, Department of Health.

**X203.3 Maintenance.** The hale shall be maintained by the owner to ensure structural integrity. Repairs for maintenance of the hale shall not require additional building permits.

**SECTION X301  
FIRE PROTECTION**

**X301.1 Fire Protection Classifications.** Fire protection for Indigenous Hawaiian architecture structures shall be as required in Table X301.1.

**Table X301.1  
Fire Protection Requirements Based on Setback**

CLASS	SETBACK REQUIREMENTS	FIRE PROTECTION REQUIREMENTS
A	<p>The structure (or a group of structures) is:</p> <ol style="list-style-type: none"> <li>1. Located at least 100 feet from any existing structure on the same or neighboring properties; and</li> <li>2. Located at least 100 feet from any property line, except as follows:                             <ol style="list-style-type: none"> <li>a. If the property line abuts a public way, the 100 feet minimum setback for that property line shall be reduced by the width of the public way,</li> <li>b. If the property line abuts the shoreline, the minimum setback for that property line shall be the shoreline setback, or</li> <li>c. For any hale ku'ai in the agricultural district that is less than 200 square feet, that is completely open on three sides, and that is used as an agricultural products stand and if the property line abuts a public way, the minimum setback for that property line shall be 15 feet.</li> </ol> </li> </ol>	<p>No fire protection is required for the structure.</p>
B	<p>The structure (or a group of structures) that conforms to applicable zoning setback requirements but does not satisfy Class A setback requirements.</p>	<p>Automatic fire sprinkler system shall be installed in accordance with design standards in Section X301.2. An electrical permit is required for fire sprinklers systems.</p>

**X301.2 Automatic Fire Sprinklers.** The design standards for automatic fire sprinklers for Class B indigenous Hawaiian architecture structures shall be in accordance with NFPA 13.

**Exception:** The design standards for automatic fire sprinklers for Class B indigenous Hawaiian architecture structures shall be permitted as follows:

- (1) 18 gallons per minute for a single head at 140 square feet maximum coverage of roof area.
- (2) 13 gallons per minute for each subsequent head at 140 square feet maximum coverage of roof area per head.
- (3) The minimum supply pressure at the base of the riser shall not be less than 40 pounds per square inch.
- (4) The minimum residual pressure at the highest sprinkler shall be not less than 12 pounds per square inch.
- (5) Sprinkler head spacing shall not exceed 14 feet.
- (6) Sprinkler heads shall be open type upright, pendent, or sidewall with 1/2-inch or 17/32-inch orifice and have a wax corrosion resistant coating.
- (7) The total number of sprinklers on a branch shall not exceed 6 heads.
- (8) The total number of sprinklers shall not exceed the quantity shown in the following table:

Piping Size	Number of Sprinklers
1 inch diameter	2 sprinklers
1¼ inch diameter	3 sprinklers
1½ inch diameter	5 sprinklers
2 inch diameter	10 sprinklers
2½ inch diameter	30 sprinklers
3 inch diameter	60 sprinklers

- (9) The above pipe schedule shall not apply to hydraulically designed systems.
- (10) The water density shall not be less than 0.10 gpm per square foot.
- (11) The source of water may be by domestic water meters, detector check meter, underground well, storage tank, swimming pool, ponds, etc., but must meet the design requirements for adequate pressure and duration.

- (12) Water supply shall be sufficient to provide 30 minutes duration.
- (13) If domestic water meters are used as the source of water for the fire sprinklers, without a storage tank and booster pump, the maximum number of heads shall not exceed the following table:

Size of Water Meter	Number of Sprinklers
5/8 inch water meter	1 sprinkler
3/4 inch water meter	2 sprinklers
1 inch water meter	3 sprinklers
1½ inch water meter	7 sprinklers
2 inch water meter	11 sprinklers
3 inch water meter	27 sprinklers

- (14) The piping material shall be hard drawn copper with silver solder or brazed fittings, or carbon steel with corrosion-resistant coatings. Plastic pipes shall not be allowed, except for below grade supply pipes.
- (15) Fire sprinkler system shall be actuated by smoke detectors located at the highest points of the roof and spaced as recommended by the manufacturer.
- (16) Flow control valves shall be either hydraulically or electrically operated with a manual override switch.
- (17) Where the width of a roof exceeds the width allowed for one row of sprinklers, two or more rows of sprinklers shall be placed such that the entire roof area is protected.
- (18) Prevailing wind direction shall be considered in the placement of sprinklers.
- (19) Deflectors for sprinklers shall be parallel with the roof surface or tilted slightly towards the peak of the roof.
- (20) Fire sprinklers system shall have a local alarm activated by a smoke detector.

**X301.3 Certification of Water Supply.** For any hale that requires fire protection pursuant to X301.1, the applicant shall provide a certification from a licensed engineer or a licensed C-20 contractor that the water supply for the fire sprinkler system has been tested and is capable of delivering the required fire flow for 30 minutes duration.

**X302 Smoke Alarm.** Any hale used for sleeping shall have an approved battery operated smoke alarm installed in the hale.

### **SECTION X401 DESIGN STANDARDS**

**X401.1 General Design standards.** All types of hale shall be designed and constructed in accordance with the standards set out in this section.

- (1) The minimum diameter size of all structural members shall be measured at the member's midpoint, except that the minimum diameter size of posts shall be measured at the smaller end. For structure sizes not specifically shown in the tables, the requirements in the next larger width size shall be applicable.
- (2) The specifications for structural members were estimated based on no wind loads. Hale shall be constructed to allow all thatching materials to separate from the structure prior to adding significant loads.
- (3) The mix formula for mortar specified in these rules shall be one part portland cement, four parts clean sand, and sufficient fresh water to make the mixture workable.
- (4) Every hale, except hale noa, shall have at least two sides completely open.
- (5) Lashing and thatching methods shall comply with illustrations found in "Arts and Crafts of Hawai'i" or "The Hawaiian Grass House in Bishop Museum."

**X402 Allowable Designs.** Hale shall be designed and constructed in accordance with the requirements in Sections 402.1 through 402.4.

**X402.1 Hale Halawai.** Each end of the Hale Halawai may be open or thatched. The ends may also be constructed with a thatched roof hip as an alternate design. Hale Halawai shall be designed in accordance with the following schematics and illustrations. Structural components for Hale Halawai shall meet the size and spacing requirements in Table X402.1(a). Foundations for Hale Halawai shall be designed in accordance with Table X402.1(b).

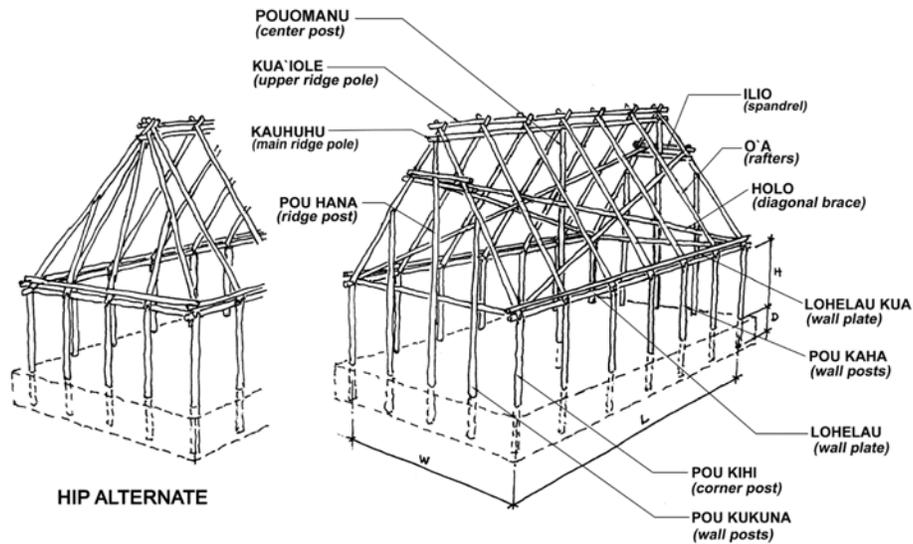


***HALE HALAWAI***  
Open End Style



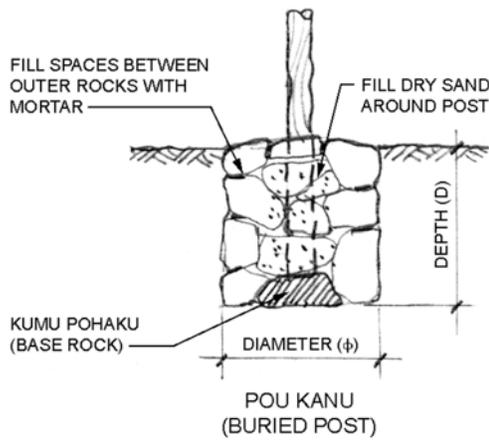
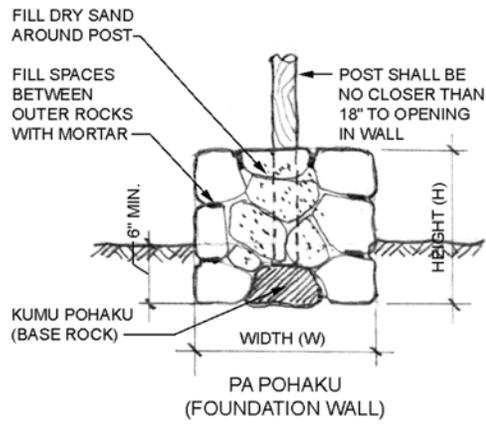
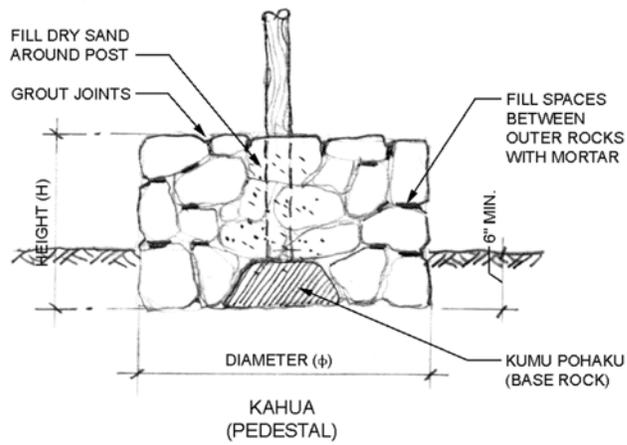
***HALE HALAWAI***  
Thatched End Style

FRAMING SCHEMATIC



**Table X402.1(a)**  
**Size and Spacing Requirements for Structural Components used**  
**in Hale Halawai**

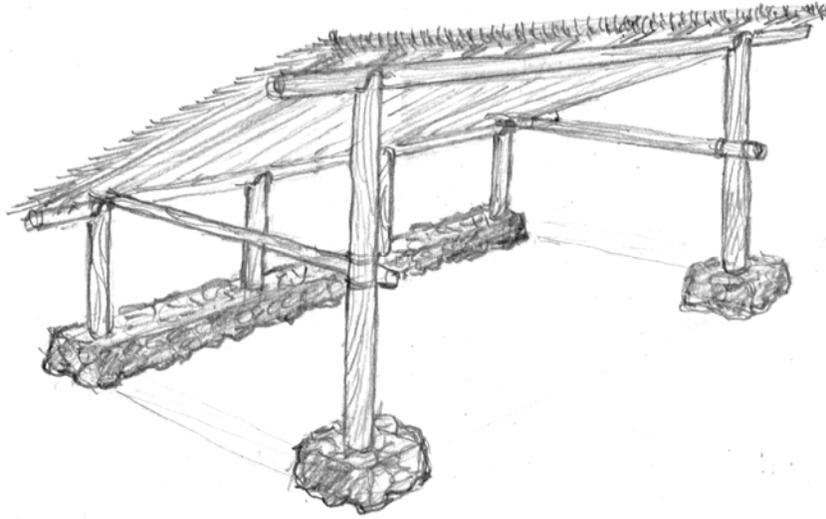
Size W x L x H	<i>Pou Kihū</i>	<i>Pou Kukuna &amp; Pou Kaha</i>	<i>Pou Hana</i>	<i>Pouomanu</i>	<i>O'a</i>	<i>Kuaiole &amp; Holo</i>	<i>Kauhuhu</i>	<i>Lohelau</i>	Maximum post spacing (feet)	Maximum rafter spacing (feet)
	Minimum Diameter (inches)									
12' x 20' x 7'	4	3½	4	4	3½	2½	3	3	5	3
14' x 24' x 7'	4	4	4½	4½	3½	2½	3	3½	5	3
24' x 30' x 7'	5	4½	4½	4½	4	2½	3	3½	5	3
25' x 50' x 7'	5½	5	5½	5½	4	2½	3	3½	5	3
30' x 60' x 7'	6	5½	6	6	4½	2½	3	4	5	3



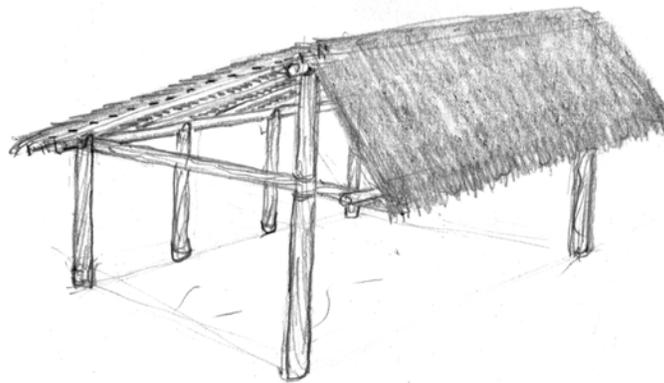
**Table X402.1(b)**  
**Foundation Design for Hale Halawai**

Size (W x L x H)	Foundation Type		
	Kahua Diameter x Height	Pa Pohaku Width x Height x Length	Pou Kanu Diameter x Depth
12' x 20' x 7'	3'6"φ x 24"H	2'6"W x 2'8"H x 4'0"L	30"φ x 2'8"D
14' x 24' x 7'	3'8"φ x 24"H	2'6"W x 2'8"H x 4'0"L	30"φ x 2'9"D
24' x 30' x 7'	4'0"φ x 30"H	3'0"W x 3'0"H x 4'0"L	36"φ x 3'0"D
25' x 50' x 7'	4'0"φ x 30"H	3'0"W x 3'0"H x 4'0"L	36"φ x 3'0"D
30' x 60' x 7'	4'0"φ x 30"H	3'0"W x 3'3"H x 4'0"L	36"φ x 3'3"D

**X402.2 Hale Ku'ai.** Hale Ku'ai shall be designed in accordance with the following schematics and illustrations. Structural components for Hale Ku'ai shall meet the size and spacing requirements in Table X402.2(a). Foundations for Hale Ku'ai shall be designed in accordance with Table X402.2(b).

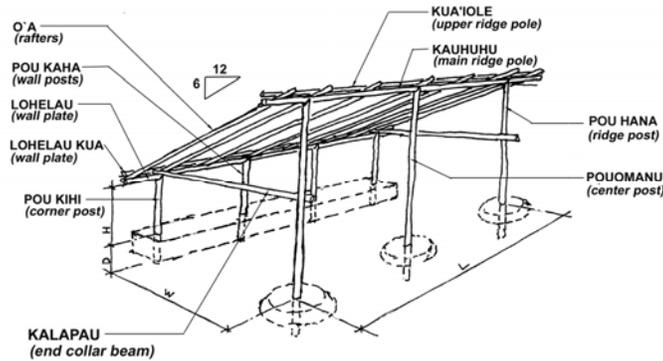


***HALE KU'AI***  
**SHED STYLE**

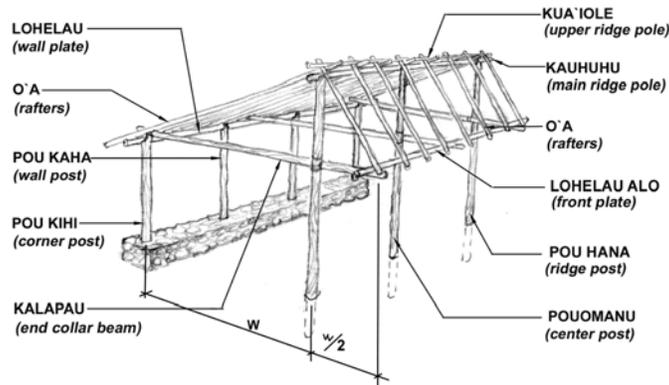


***HALE KU'AI***  
**GABLE STYLE**

**FRAMING SCHEMATIC 1**



**FRAMING SCHEMATIC 2**

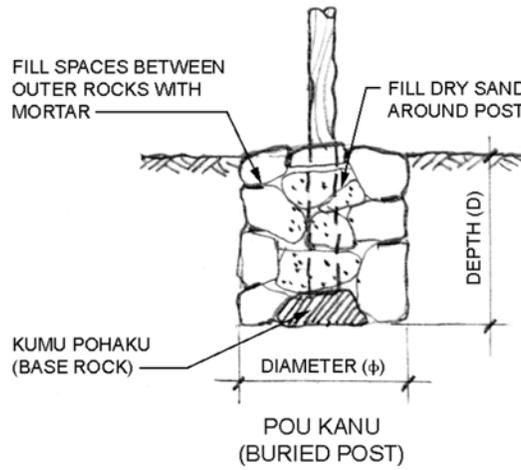
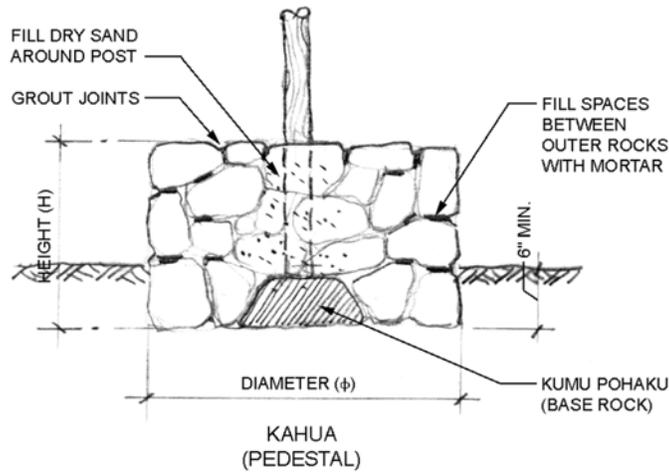


**Table X402.2(a)**  
**Size and Spacing Requirements for Structural Components used in Hale Ku'ai**

Size (W x L x H)	<i>Pou Kih</i> <sup>a</sup>	<i>Pou Kaha</i> <sup>a</sup>	<i>Pou Hana</i> <sup>b</sup>	<i>Pouo Manu</i> <sup>b</sup>	<i>O'a</i>	<i>Kuaiole &amp; Holo</i>	<i>Kauhuhu</i>	<i>Lohelau</i>	Maximum rafter spacing (feet)
	Minimum Diameter (inches)								
5' x 10' x 5'	4	3	3	4	3	2	3	2	4
9' x 12' x 5'	4	3	3	4	3	2	3½	2	4
12' x 16' x 5'	4½	3½	4	4	3½	2	4	2½	4
14' x 20' x 5'	4½	3½	4	4	3½	2½	4½	2½	4

<sup>a</sup> The maximum post spacing for pou kih and pou kaha is five feet.

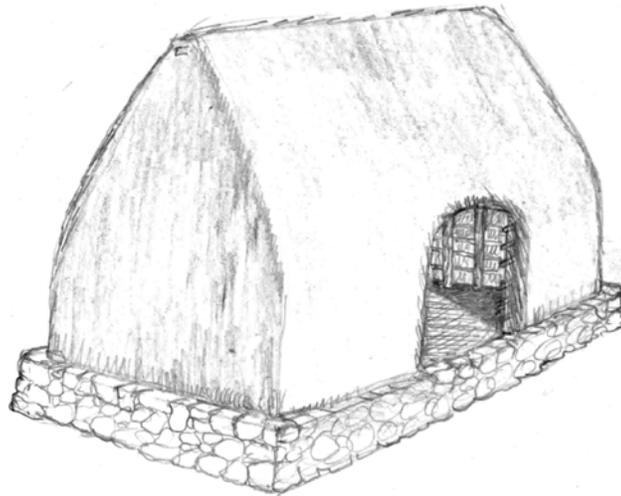
<sup>b</sup> The maximum post spacing for pou hana and pouomanu is twelve feet.



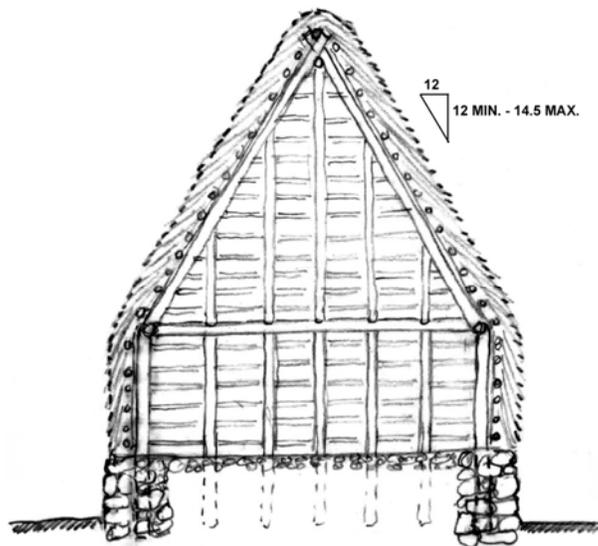
**Table X402.2(b)**  
**Foundation Design for Hale Ku'ai**

Size (W x L x H)	Foundation Type		
	Kahua Diameter x Height	Pa Pohaku Width x Height x Length	Pou Kanu Diameter x Depth
5' x 10' x 5'	3'0"φ x 24"H	2'6"W x 2'0"H x 4'0"L	30"φ x 2'6"D
9' x 12' x 5'	3'4"φ x 24"H	2'6"W x 2'0"H x 4'0"L	30"φ x 2'6"D
12' x 16' x 5'	3'6"φ x 24"H	2'6"W x 2'8"H x 4'0"L	30"φ x 2'8"D
14' x 20' x 5'	3'8"φ x 24"H	2'6"W x 2'8"H x 4'0"L	30"φ x 2'9"D

**402.3 Hale Noa.** Hale Noa shall have at least two openings. One opening shall be at least 3 feet wide and 5 feet high, and the other opening shall be at least 2 feet wide and 3 feet high. Hale Noa shall be designed in accordance with the following schematics and illustrations. Structural components for Hale Noa shall meet the size and spacing requirements in Table X402.3(a). Foundations for Hale Noa shall be designed in accordance with Table X402.3(b).

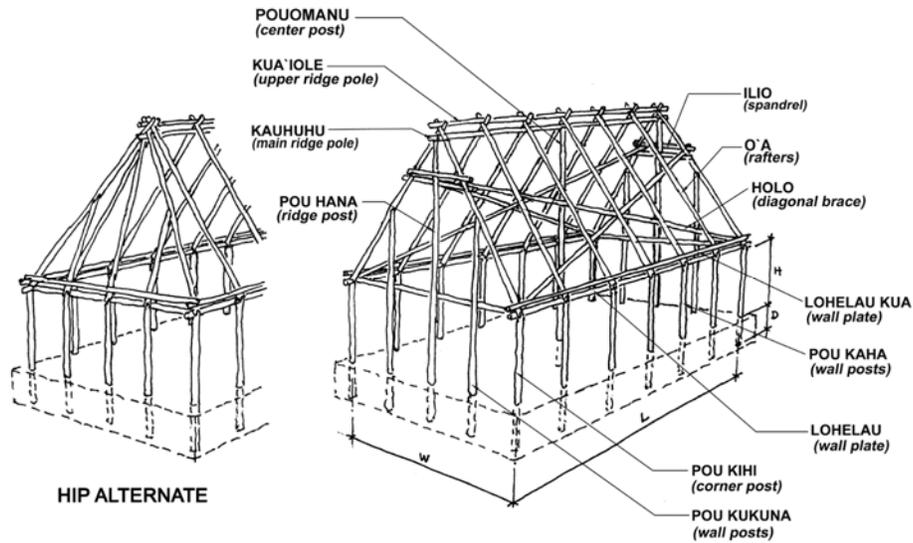


***HALE NOA***



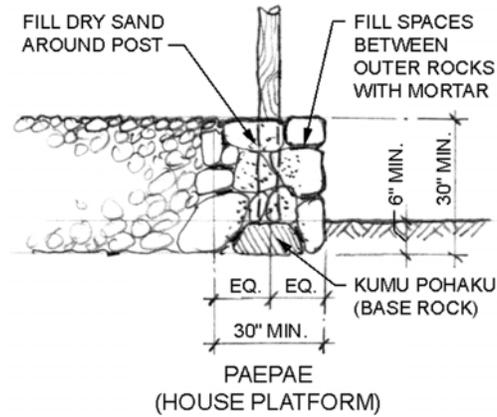
**SECTION VIEW**

FRAMING SCHEMATIC

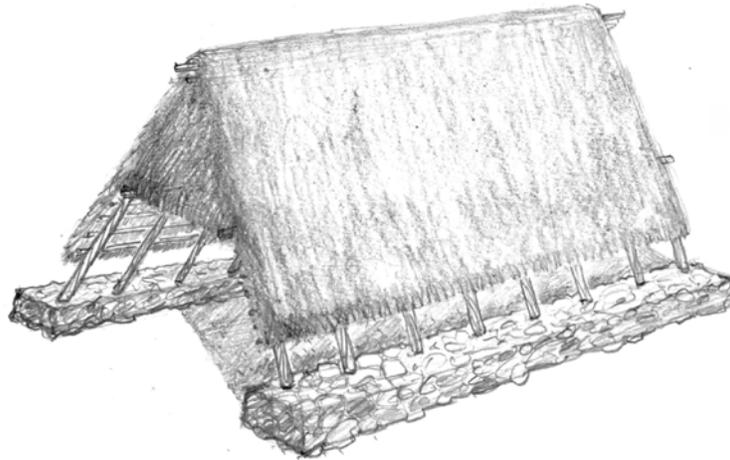


**Table X402.3(a)**  
**Size and Spacing Requirements for Structural Components used in Hale Noa**

Size W x L x H	<i>Pou Kihu</i>	<i>Pou Kukuna &amp; Pou Kaha</i>	<i>Pou Hana</i>	<i>Pouomanu</i>	<i>O'a</i>	<i>Kuaiole &amp; Holo</i>	<i>Kauhuhu</i>	<i>Lohelau</i>	Maximum post spacing (feet)	Maximum rafter spacing (feet)
	Minimum Diameter (inches)									
9' x 12' x 7'	3½	3	4	3	3	2½	3½	2½	6	4
12' x 20' x 7'	4	4½	4	3	3½	2½	3½	2½	6	4
4' x 24' x 7'	5½	4½	4	3	3½	2½	3½	3	6	4

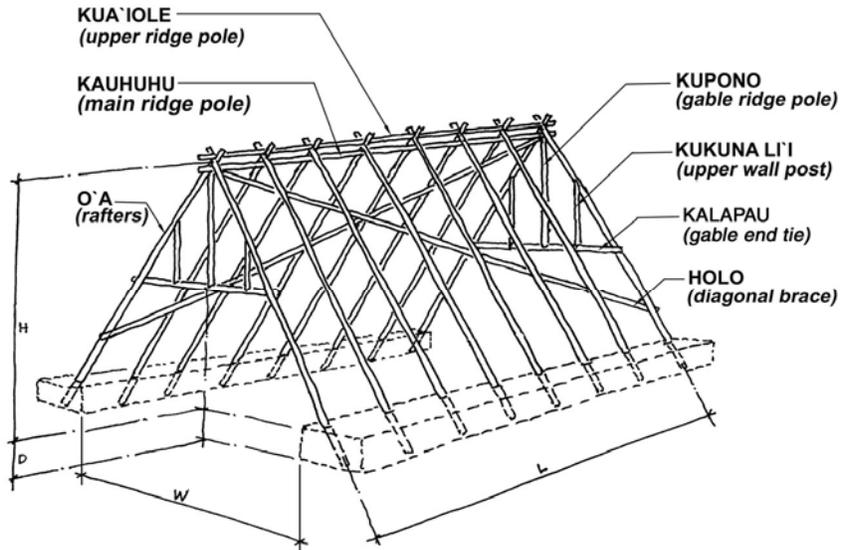


**402.4 Hale Wa'a.** Hale Wa'a shall be designed in accordance with the following schematics and illustrations. Structural components for Hale Wa'a shall meet the size and spacing requirements in Table X402.4.



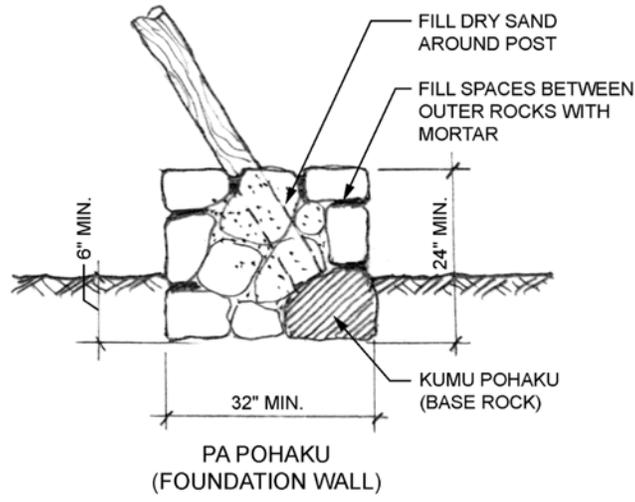
***HALE WA'A***

FRAMING SCHEMATIC



**Table X402.4**  
**Size and Spacing Requirements for Structural Components used in Hale Wa'a**

Size (W x L)	O'a	Kuaiole & Holo	Kauhuhu	Spacing between Rafters	Minimum ridge Height (H)
20' x 60'	4"	3"	4"	4' to 5'	22½'
25' x 60'	5"	3"	4"	4' to 5'	27½'
30' X 60'	5½"	3"	4"	4' to 5'	27½'



(2012, ord 12-27, sec 2.)

**Article 5. Adoption of the International Energy Conservation Code.**

**Section 5-84. International Energy Conservation Code adopted.**

The “2006 International Energy Conservation Code”, March 2007 Edition, published by the INTERNATIONAL CODE COUNCIL, INC., Publications, 4051 West Flossmoor Road, Country Club Hills, IL 60478-5795 is adopted by reference and made a part of this code, subject to the amendments hereinafter set forth in this article. Copies of the 2006 International Energy Conservation Code, March 2007 Edition, and amendments thereto shall be available for public inspection at the department of public works and the office of the county clerk.

- (1) Amending Section 101.1. Section 101.1 is amended to read:

**“Section 101.1 Title.** This code shall be known as the International Energy Conservation Code of the County of Hawai‘i, and shall be cited as such. It is referred to herein as ‘this code.’”

- (2) Amending Section 202. Section 202, General Definitions, is amended by adding a definition for “Fully Shaded Windows” to read:

**“FULLY SHADED WINDOWS.** Windows protected from direct solar heat gain by a projection factor of no less than 1.0.”

- (3) Amending Table 402.1.1. Table 402.1.1 is amended by amending Floor *R*-Value for Climate Zone 1 and adding footnote h to read:

**“TABLE 402.1.1  
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>a</sup>**

Climate Zone	Fenestration U-Factor	Skylight <sup>b</sup> U-Factor	Glazed Fenestration SHGC	Ceiling R-Value	Wood Frame Wall R-Value	Mass Wall R-Value	Floor R-Value	Basement <sup>c</sup> Wall R-Value	Slab <sup>d</sup> R-Value & Depth	Crawl Space Wall R-Value
1	1.20	0.75	0.40	30 <sup>h</sup>	13	3	0	0	0	0
2	0.75	0.75	0.40	30	13	4	13	0	0	0
3	0.65	0.65	0.40 <sup>e</sup>	30	13	5	19	0	0	5 / 13
4 except Marine	0.40	0.60	NR	38	13	5	19	10 / 13	10, 2 ft	10 / 13
5 and Marine 4	0.35	0.60	NR	38	19 or 13+5 <sup>g</sup>	13	30 <sup>f</sup>	10 / 13	10, 2 ft	10 / 13
6	0.35	0.60	NR	49	19 or 13+5 <sup>g</sup>	15	30 <sup>f</sup>	10 / 13	10, 4 ft	10 / 13
7 and 8	0.35	0.60	NR	49	21	19	30 <sup>f</sup>	10 / 13	10, 4 ft	10 / 13

For SI: 1 foot = 304.8 mm.

- a. *R*-values are minimums. *U*-factors and SHGC are maximums. R-19 shall be permitted to be compressed into a 2 × 6 cavity.
- b. The fenestration *U*-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
- c. The first *R*-value applies to continuous insulation, the second to framing cavity insulation; either insulation meets the requirement.

- d. *R*-5 shall be added to the required slab edge *R*-values for heated slabs.
  - e. There are no SHGC requirements in the Marine zone.
  - f. Or insulation sufficient to fill the framing cavity, *R*-19 minimum.
  - g. “13+5” means *R*-13 cavity insulation plus *R*-5 insulated sheathing. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least *R*-2.
  - h. The ceiling insulation alternative in Section 402.1.1.1 can be used as an equivalent alternative for *R*-30.”
- (4) Amending Section 402.1.1. Section 402.1.1 is amended by adding Section 402.1.1.1 to read:

**“402.1.1.1 Ceiling insulation alternative.** When Table 402.1.1 requires *R*-30 for insulation of ceiling areas, the following alternate methods of insulation and construction are acceptable:

- (1) The opaque portions of roof assemblies shall include at least one of the following:
  - (1.1) *R*-19 insulation between roof or ceiling framing members;
  - (1.2) Two inches of foam board insulation;
  - (1.3) A radiant barrier as provided in Subsection 5 and ventilation as provided in Subsection 4;
  - (1.4) A cool roof as provided in Subsection 6 and a radiant barrier as provided in Subsection 5; or
  - (1.5) Roof heat gain factor is less than 0.05 when calculated in accordance with Subsection 8.
- (2) For the purpose of this section, the following terms shall be defined as follows:
  - (2.1) NET FREE VENT AREA. Net free vent area means the total area through which air can pass in a screen, grille face or register.
  - (2.2) ROOF AREA. Roof area means attic floor area; or, if there is no attic, “roof area” means the horizontal projection of roof area measured from the outside surface of the exterior walls.
  - (2.3) GROSS AREA OF OPAQUE ROOF SURFACES. Gross area of opaque roof surfaces means the total surface of the roof assembly exposed to outside air or unconditioned spaces. The opaque roof assembly shall exclude skylight surfaces, service openings, and overhangs.

- (3) Plans shall indicate insulation type, thickness, and location; ventilation opening types, sizes and locations; radiant barrier location; and roof surface type as appropriate, depending on the option selected from Subsection 1.
- (4) For compliance with Subsection 1.3, additional ventilation of the space containing a radiant barrier shall be provided by at least one of the following:
  - (4.1) A baffled ridge vent installed in accordance with the manufacturer's instructions in addition to lower inlet openings to provide a total of no less than one square foot of net free vent area for each 300 square feet of roof area. No less than 30 percent of the total vent area shall be in either the ridge vent or the lower half of the ventilated space.
  - (4.2) A solar-powered exhaust fan that provides at least one cubic foot per minute of airflow for each square foot of roof area.
  - (4.3) Upper and lower vents with total net free vent area of at least one square foot for each 150 square feet of roof area. At least 30 percent of the total vent area shall be in the upper half of the ventilated space and at least 30 percent of the total vent area shall be in the lower half of the ventilated space.
- (5) For compliance with Subsections 1.3 or 1.4, a radiant barrier shall have an emissivity of no greater than 0.05 as tested in accordance with ASTM E-408. The radiant barrier shall be installed with the shiny side facing down and with a minimum air gap thickness of  $\frac{3}{4}$  inch below. The radiant barrier may be securely attached to the roof framing or may be laminated to the bottom of the roof sheathing.

A radiant barrier is a sheet of material with a low emissivity on at least one side that is used to reduce radiant heat transfer. Radiant barriers typically have a shiny metallic appearance.

- (6) For compliance with Subsection 1.4, a cool roof shall have an infrared emissivity of no less than 0.75 when tested in accordance with ASTM E-408 and a high solar reflectance. Alternatively, the corresponding Solar Radiance Index (SRI) for a cool roof can be used. The manufacturer's test results shall be acceptable for compliance. A cool roof has both a light color (high solar reflectance) and a high emissivity (can reject heat back to the environment). White painted surfaces and other smooth white coatings typically meet these requirements. Surfaces that do not meet the requirements include unpainted metal and metalized roof coatings (silver appearance).
- (7) At building sites higher than a 2,400-foot elevation, only Subsections 1.1 or 1.2 shall be acceptable for compliance.
- (8) For purposes of compliance with Subsection 1.5, the Roof Heat Gain Factor (RHGF) shall be calculated as described in Equation 8-1.

**Equation 8-1**

$$RHGF = U_r \times \alpha \times RB$$

Where:

RHGF = Roof Heat Gain Factor [Btu/ft<sup>2</sup>-h-°F]

$U_r$  = overall thermal transmittance value for the gross area of opaque roof surfaces [Btu/ft<sup>2</sup>-h-°F]

$\alpha$  = roof surface absorptivity. Between 0.3 and 1.0 [unitless]

RB = Radiant Barrier credit. Equals 0.33 if a radiant barrier is installed and 1.00 otherwise [unitless]. Radiant barrier installation must comply with subsection 8.1 to qualify for Radiant Barrier credit.

- (8.1) To qualify for the radiant barrier credit (RB) described in Subsection 8, the installation of the radiant barrier must meet the following criteria:
  - (8.1.1) The emissivity of the radiant barrier must be 0.10 or less. The manufacturer must provide test data or documentation of the emissivity as tested in accordance with ASTM E-408.

- (8.1.2) The radiant barrier must be securely installed in a permanent manner using one of the following installation methods:
- (8.1.2.1) The radiant barrier shall be draped with the shiny side facing down over the top cord of the truss before the roof deck is installed. A minimum air gap of  $\frac{3}{4}$  inch must be provided between the radiant barrier and the roof deck above at the center of the span. A minimum  $\frac{3}{4}$  inch air gap must also be provided between the radiant barrier and the ceiling or insulation below.
  - (8.1.2.2) The radiant barrier shall be stretched with the shiny side facing down between the top cords of the truss and stapled or otherwise secured at each side. A minimum air space of  $\frac{3}{4}$  inch above and below is required.
  - (8.1.2.3) For attic installations only, the radiant barrier shall be stapled or otherwise secured to the bottom surface of the top cord of the truss and draped below with the shiny side facing down. A minimum air space of  $\frac{3}{4}$  inch above and below is required.
  - (8.1.2.4) For open beam ceiling construction only, the radiant barrier shall be laid on top of the roof deck with the shiny side facing up and a minimum  $\frac{3}{4}$  inch air gap between the radiant barrier and the roofing material above. The roof slope must be greater than or equal to  $14^\circ$  from horizontal.

(8.1.3) At least one square foot of free area for ventilation shall be provided per 150 square feet of attic floor area, or in the case of vaulted or open-beam ceilings, per 150 square feet of ceiling area. In vaulted or open beam ceilings, the air space shall be vented with vent area approximately evenly distributed between the top and the bottom. In vaulted ceilings, vents shall be provided for each air space between rafters.”

(5) Amending Table 402.1.3. Footnote b is added to Table 402.1.3 to read:

**“TABLE 402.1.3  
EQUIVALENT *U*-FACTORS <sup>a</sup>**

Climate Zone	Fenestration <i>U</i> -Factor	Skylight <i>U</i> -Factor	Ceiling <i>U</i> -Factor	Frame Wall <i>U</i> -Factor	Mass Wall <i>U</i> -Factor	Floor <sup>b</sup> <i>U</i> -Factor	Basement Wall <i>U</i> -Factor	Crawl Space Wall <i>U</i> -Factor
1	1.2	0.75	0.035	0.082	0.197	0.064	0.360	0.477
2	0.75	0.75	0.035	0.082	0.165	0.064	0.360	0.477
3	0.65	0.65	0.035	0.082	0.141	0.047	0.360	0.136
4 except Marine	0.40	0.60	0.030	0.082	0.141	0.047	0.059	0.065
5 and Marine 4	0.35	0.60	0.030	0.060	0.082	0.033	0.059	0.065
6	0.35	0.60	0.026	0.060	0.06	0.033	0.059	0.065
7 and 8	0.35	0.60	0.026	0.057	0.057	0.033	0.059	0.065

- a. Nonfenestration *U*-factors shall be obtained from measurement, calculation or an approved source.
- b. Including framed floors and knee walls.”

(6) Amending Section 402.2.2. Section 402.2.2 is amended to read:

**“402.2.2 Ceilings without attic spaces.** Where Section 402.1.1 would require insulation levels above R-30 and the design of the roof/ceiling assembly does not allow sufficient space for the required insulation, the minimum required insulation for such roof/ceiling assemblies shall be R-19.”

(7) Amending Section 402.3.3. Section 402.3.3 is amended to read:

**“402.3.3 Glazed fenestration exemption.** Fully shaded windows, north-facing windows and up to 15 square feet (1.4 m<sup>2</sup>) of glazed fenestration per dwelling unit shall be permitted to be exempt from *U*-factor and SHGC requirements in Section 402.1.1.”

- (8) Amending Section 402.4.1. Section 402.4.1 is amended by adding Section 402.4.1.1 to read:

**“402.4.1.1. Non-conditioned building exemption.** Non-conditioned residential buildings are exempt from compliance with Section 402.4. The free-vent fenestration area of non-conditioned buildings shall be no less than 14 percent of the floor area. All interior doors shall be capable of being secured in the open position and ceiling fan stub-ins shall be provided to living areas and bedrooms.”

- (9) Amending Section 402.4.2. Section 402.4.2 is amended to read:

**“402.4.2 Fenestration air leakage.** Windows, skylights and sliding glass doors shall have an air infiltration rate of no more than 0.3 cfm per square foot (1.5 L/s/m<sup>2</sup>), and swinging doors no more than 0.5 cfm per square foot (2.6 L/s/m<sup>2</sup>), when tested according to NFRC 400 or AAMA/WDMA/CSA 101/I.S.2/A440 by an accredited, independent laboratory and listed and labeled by the manufacturer.

**Exceptions:**

- (1) Site-built windows, skylights and doors;
- (2) Jalousie windows shall not exceed 1.2 cfm per square foot (6.1 L/s/m<sup>2</sup>).”

- (10) Amending Section 403. Section 403 is amended by adding Section 403.7 to read:

**“403.7 Residential pools.** Residential pools shall be provided with energy conserving measures in accordance with Sections 403.7.1 through 403.7.3.

**403.7.1 Pool heaters.** All pool heaters shall be equipped with a readily accessible on-off switch to allow shutting off the heater without adjusting the thermostat setting. Pool heaters fired by liquid propane or natural gas shall not have continuously burning pilot lights.

**403.7.2 Time switches.** Time switches that can automatically turn off and on heaters and pumps according to a preset schedule shall be installed on swimming pool heaters and pumps.

**Exceptions:**

- (1) Where public health standards require 24-hour pump operation;
- (2) Where pumps are required to operate solar- and waste-heat-recovery pool heating systems.

**403.7.3 Pool covers.** Heated pools shall be equipped with a vapor retardant pool cover on or at the water surface. Pools heated to more than 90°F (32°C) shall have a pool cover with a minimum insulation value of R-12.

**Exception:** Pools deriving over 60 percent of the energy for heating from site-recovered energy or solar energy source.”

- (11) Amending section 503.2.9. Section 503.2.9 is amended by repealing section 503.2.9 in its entirety and replaced to read as follows:

**“503.2.9 Mechanical systems commissioning and completion requirements.**

**503.2.9.1 System commissioning.** Commissioning is a process that verifies and documents that the selected building systems have been designed, installed, and function according to the owner’s project requirements and construction documents. Drawing notes shall require commissioning and completion requirements in accordance with this section. Drawing notes may refer to specifications for further requirements. Copies of all documentation shall be given to the owner.

**503.2.9.1.1 Commissioning plan.** A commissioning plan shall include as a minimum the following items:

- (1) A detailed explanation of the original owner’s project requirements,
- (2) A narrative describing the activities that will be accomplished during each phase of commissioning, including guidance on who accomplishes the activities and how they are completed,
- (3) Equipment and systems to be tested, including the extent of tests,
- (4) Functions to be tested (for example calibration, economizer control, etc.),

- (5) Conditions under which the test shall be performed (for example winter and summer design conditions, full outside air, etc.), and
- (6) Measurable criteria for acceptable performance.

**503.2.9.1.2 Systems adjusting and balancing.** All HVAC systems shall be balanced in accordance with generally accepted engineering standards. Air and water flow rates shall be measured and adjusted to deliver final flow rates within 10 percent of design rates. Test and balance activities shall include as a minimum the following items:

- (1) Air systems balancing: Each supply air outlet and zone terminal device shall be equipped with means for air balancing in accordance with the requirements of Chapter 6 of the 2006 International Mechanical Code, International Code Council, Publications, 4051 West Flossmoor Road, Country Club Hills, IL. 60478-5795. Discharge dampers are prohibited on constant volume fans and variable volume fans with motors 10 hp (18.6 kW) and larger. Air systems shall be balanced in a manner to first minimize throttling losses then, for fans with system power of greater than 1 hp, fan speed shall be adjusted to meet design flow conditions.

**Exception:** Fan with fan motors of 1 hp or less.

- (2) Hydronic systems balancing: Individual hydronic heating and cooling coils shall be equipped with means for balancing and pressure test connections. Hydronic systems shall be proportionately balanced in a manner to first minimize throttling losses, then the pump impeller shall be trimmed or pump speed shall be adjusted to meet design flow conditions. Each hydronic system shall have either the ability to measure pressure across the pump, or test ports at each side of each pump.

**Exception:** Pumps with pump motors of 5 hp or less.”

(12) Amending Section 505.7. Section 505.7 is amended to read:

**“505.7 Electrical energy consumption. (Mandatory).** In buildings having individual dwelling or subtenant units, provisions shall be made to determine the electrical energy consumed by each tenant by separately metering individual dwelling and subtenant units. Tenants shall have ready physical access to meters. Meters shall display kWh consumption and be calibrated in accordance with ANSI C12.1-2008.”

(13) Amending Chapter 6. Chapter 6, Referenced Standards, is amended by adding the following specifications to the ANSI and ASTM categories, to read:

Standard reference number	Title	Referenced in code section number
<b>ANSI</b>		
C12.1-2008	Electric Meters Code for Electricity Metering	505.7
<b>ASTM</b>		
E 408-2008	Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection Meter Techniques	402.1.1.1 #5, 402.1.1.1 #6, 402.1.1.1 #8.1.1

(2012, ord 12-27, sec 2.)