



Ordinance 2006-91 Exhibit A



Amendments to the:  
**2006 International Building Code**

**Section 101.1 Title.** Insert:[name of jurisdiction] as “Pima County”.

**Section 101.4 Referenced codes.** REVISE section by DELETING the paragraph and REPLACING it with the following:

The other codes listed in Sections 101.4.1 through 101.4.11, as locally amended, and referenced elsewhere in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference.

**Section 101.4.1 Electrical.** REVISE section by INSERTING the words “Chapter 12” after “*Electrical Code*”.

**Section 101.4.4 Plumbing.** REVISE section by DELETING the last sentence.

**Section 101.4.6 Fire prevention.** REVISE section by DELETING the paragraph and REPLACING it with the following:

The provisions of the *International Fire Code* shall apply whenever referenced in this code or as deemed necessary by the Building Official. Enforcement of the Fire Code shall, however, be relegated to the fire jurisdiction having authority or to the designated responding fire department.

ADD new section 101.4.8 to read:

**Section 101.4.8 Wildland-urban interface.** The provisions of the *International Wildland-Urban Interface Code* shall apply to areas designated Rural Forest Village under the Pima County Comprehensive Plan and areas encircled thereby.

ADD new section 101.4.9 to read:

**Section 101.4.9 Outdoor lighting.** The provisions of the Pima County Outdoor Lighting Code shall apply to all new and major additions to land uses, development, buildings, and structures.

ADD new section 101.4.10 to read:

**Section 101.4.10 Existing buildings.** The provisions of the *International Existing Building Code* shall apply when approved by the Building Official.

ADD new section 101.4.11 to read:

**Section 101.4.11 Performance engineering.** The provisions of the *International Code Council Performance Code* shall apply when approved by the Building Official.

**104.10 Modifications.** REVISE section by ADDING the following to the end of the paragraph: Requests for modification shall be appealed to the Building Official as follows:

1. The applicant shall file a written appeal on the form provided by the Building Official and accompanied by a non-refundable fee (refer to the fee schedules adopted by the jurisdiction by separate ordinance).

2. Adequate information shall be provided by the applicant to fully describe the conditions in question.
3. The appeal will be considered by the Building Official within five (5) business days of receipt.
4. If an appeal is denied by the Building Official, the appellant must comply with the decision or may appeal to the Board of Appeals pursuant to Section 112 of this Code.

**Section 105.1 Required.** REVISE section by ADDING the following to the end of the paragraph: The provisions of this Code apply to regulated equipment and structures or improvements thereto to be constructed by owners themselves or jointly with duly licensed contractors, on all property in the unincorporated area of Pima County, east of the easterly boundary of the Tohono O'odham Reservation. Buildings intended for assembly, commercial or industrial purposes shall comply with this Code, regardless of location unless exempted by State law.

Owners, builders, or authorized agents of buildings in otherwise exempted areas may, of their own volition, place themselves under the jurisdiction of this code by making application for and obtaining permits prior to construction.

**Section 105.1.1 Annual permit.** REVISE section by ADDING the following to the end of the paragraph:

The applicant for the registered plant annual permit shall be an architect registered in the State of Arizona and who shall be directly responsible for compliance with this code with respect to all work which would otherwise require a permit. This person will need to be approved by the Building Official. All new applications need to be accompanied by a complete set of plans of affected buildings with a scope of work and operations section clearly outlined. Annual registered plant permits shall not be granted for buildings or facilities not currently operating under a valid certificate of occupancy.

Fees for annual permits shall expire on December 31<sup>st</sup> of each year and will need to be renewed and approved for registered plant status to be maintained. The permit will be suspended if the registered and approved applicant becomes no longer employed by the registered plant. If this occurs, the plant will need to notify the Building Official and call for immediate inspection on any ongoing work until such time that a replacement registrant is approved by the Building Official. Annual permits may be revoked at any time by the Building Official when failing to comply with requirements.

A summary report of all work done under the registered plant registration shall be prepared by the registered architect and submitted annually to the Building Official. Work conducted under the registered plant annual permit may be reviewed and inspected by the Building Official while the work is in progress or on an annual basis.

The following work is not to be covered within the scope of the annual permit and shall require separate permitting:

1. Any work creating a different occupancy group for all or any portion of a building.
2. Any work creating a different building type for all or any portion of a building.
3. Any work which adds, alters, removes or penetrates required fire walls or barriers, exit courts, exit passageways or horizontal exits.
4. Any work which provides for the relocation of more than five sprinkler heads.
5. Any work which modifies load bearing structures.

**Section 105.2 Work exempt from permit (Building).** REVISE item number 1 to REPLACE “120 square feet (11m<sup>2</sup>)” with “200 square feet (18.58m<sup>2</sup>).”

REVISE item number 6 by DELETING the fragment “Sidewalks and driveways...” and REPLACING it with “Decks and non-structural flatwork...”

REVISE the Building section by ADDING new items number 14 to 18 as follows:

14. Any work accomplished under the auspices of and owned and controlled by the United States of America or the State of Arizona.
15. Amusement devices or structures located on a site for no more than 30 calendar days.
16. Devices used in manufacturing, processing, or fabricating normally considered as involved in industrial plants.
17. Tents or membrane structures provided the area does not exceed 400 square feet or 900 square feet if a minimum of two sides are open.
18. Re-roofing of existing buildings with similar materials regardless of value.

**Section 105.2 Work exempt from permit (Electrical).** REVISE the Electrical section by ADDING a new fourth paragraph section to read:

**Other items:**

1. Power for amusement devices and carnival rides in place on a site for less than 30 calendar days and not connected to a utility company’s facilities.
2. Repair or replacement of fixed motors and transformers of the same type and rating in the same location.
3. Temporary decorative lighting.
4. Repair or replacement of current-carrying parts of any switch, contactor, control device, or overcurrent device of the required capacity in the same location.
5. Electrical wiring, devices, appliances, apparatus or equipment operating at less than 25 volts and not capable of supplying more than 50 volt-amps of energy.

**Section 105.2 Work exempt from permit (Mechanical).** REVISE the Mechanical section by ADDING new item number 8 as follows:

8. Replacement of evaporative coolers with like coolers.

**Section 105.2 Work exempt from permit (Agricultural).** REVISE section by ADDING new paragraphs following the Plumbing section as follows:

**Agricultural Buildings:**

*Agricultural buildings* are exempt from Building Codes permitting requirements per A.R.S. § 11-865(A)(1). This section does not, however, exempt *Agricultural buildings* from permitting requirements for site outdoor lighting per ARS § 11-251(35).

*Agricultural buildings* containing separated uses, as defined by the Building Code, where the construction incidental to agriculture only occupies a portion of a mixed use building, shall be provided with an exemption only for those construction portions incidental to agriculture. Those construction portions not incidental to agriculture shall not only require Building Codes permitting, but may require a rated occupancy separation from the exempt portion per the Building Code.

*Agricultural buildings* are structures incidental to “Farming, dairy, agriculture, viticulture, horticulture, stock or poultry raising” [A.R.S. § 11-865(A)(1)]. This includes structures for the storage of equipment

and materials incidental to the operation of agriculture such as tractors, combine harvesters and feed for the exclusive use of dairy or production animals. The definition, however, does not include any exemption for general animal care and housing facilities such as kennels, aviaries and riding stables. This means that buildings of an agricultural character (i.e.: pole barns or silos), are not eligible for *agricultural buildings* status if their use does not qualify for the exemption. The test for whether a building is an *agricultural building* depends on the use to which the building is put. The question is not determined by the physical similarity of the use of the building to uses done by farmers in other situations. The test is whether the particular building, or portion of a building, is used as part of, or incidental to, an agricultural function or whether it is used as part of an independent activity. Furthermore, to qualify for exempt status, *agricultural buildings* need to be located on *agricultural real property* as defined by A.R.S. §42-12151. In addition, *agricultural real property* classification will require that “the primary use of the property is as agricultural land...” along with the other caveats listed in A.R.S. §42-12152.

**Section 105.3 Application for Permit.** REVISE section by ADDING a new item 8 to read:

8. Identify the name of the person or contractor who will perform the work. When a licensed contractor is required by A.R.S., identify the license number or, in the alternative, state the exemption of A.R.S. § 32-1121 claimed which exempts the requirement for a licensed contractor to do the proposed work.

**Section 105.3.2 Time limitation of application.** REVISE section by DELETING the phrase fragments “180 days” and “90 days” and respectively REPLACING these with “365 days” and “180 days”.

**Section 105.5 Expiration.** REVISE section by DELETING all occurrences of the phrase fragment “180 days” and REPLACING them with “365 days”. In addition the last sentence shall be deleted and replaced with the following:

The extension shall be requested in writing, prior to permit expiration and with justifiable cause demonstrated. Permit reinstatements and associated fees shall conform to the procedure on file with the Building Official.

**Section 106.3.2 Previous approvals.** REVISE section by DELETING the phrase fragment “180 days” and REPLACING it with “365 days”.

**Section 106.3.4.1 General.** REVISE section by ADDING new text between the existing first and second paragraph to read:

An engineer or architect registered in the State of Arizona shall be required for all design work with the exception of *International Residential Code* structures meeting prescriptive provision of the code.

**Exception:** Electrical services exceeding 400 amperes, single phase or 225 amperes, three phase, or where the fault current exceeds 10,000 amperes, shall require a registrant.

ADD new section 108.3.1 to read:

**Section 108.3.1 Model plans.** When two or more buildings, structures, or systems of regulated equipment are built without substantial modifications, as defined by the Building Official, an applicant may apply for a model plan permit valid for three years. This permit shall be charged plan review fees with additional fees for each exterior design elevation. The number and type of accepted revisions/options per model plan shall be as determined by the Building Official.

A model plan approved by a jurisdiction having an Intergovernmental Agreement with Pima County may be accepted for approval by the Building Official and assessed an administrative fee of 25 percent of the building plan review fee.

**Section 108.4 Work commencing before permit issuance.** REVISE section by ADDING a new sentence at the end of the paragraph to read:

The additional fee shall be at least equal to the required permit fee.

**Section 110.1 Use and occupancy.** REVISE section by ADDING a second paragraph to read:

A valid certificate of occupancy shall be required for all buildings, excluding *International Residential Code* structures, currently in use within the jurisdiction. This includes structures placed in operation prior to being subject to building codes regulations.

**110.2 Certificate issued.** REVISE section by ADDING a new sentence at the end of the section to read:

**Exception:** Approved final inspections for *International Residential Code* and group “U” occupancy structures shall constitute the certificate of occupancy.

ADD new section 110.3.1 to read:

**110.3.1 Occupancy bonds required.** Written assurance of compliance with this code, with the condition of temporary occupancy granted by the Building Official, and with the temporary occupancy time limit shall consist of a cash deposit or a performance bond in the penal sum of one thousand dollars (\$1,000.00) or the amount equal to one percent (1%) of the value determined pursuant to Section 108.3, whichever is greater but not to exceed ten thousand dollars (\$10,000.00), payable to the jurisdiction and executed by a surety company qualified to execute surety bonds in the State. Each bond shall be joint and several and conditioned that the principal in the bond will faithfully conform to this code for which the temporary occupancy authorization is to be issued. The principal and surety named in such bond shall be jointly and severally bound unto the jurisdiction, and to any and every other person aggrieved or damaged by any breach of the condition of the bond. The bond shall not be void upon any recovery or recoveries totaling less than the whole penalty but may be used and recovered upon from time to time until the whole penalty is exhausted. The term of the obligation of such bond shall be for a period that the authorization is outstanding and may be held for thirty days thereafter when required by the Building Official, except that if at the expiration of said thirty days, the jurisdiction has reason to believe that there is an action or claim impending or that there is a legal action pending which relates to the bond, the jurisdiction shall retain the bond until final disposition of such matter or matters.

**Exception:** owner built/owner occupied single family dwellings.

ADD new section 111.1.1 to read:

**111.1.1 Service conductors.** All service conductors, power and communication, shall be installed underground for all new construction. The requirement for underground conductors may be waived by the Building Official where:

1. Existing buildings on the block are served with overhead conductors or where a lot to be constructed upon is one of three or fewer abutting vacant lots making up less than 40 percent of the total acreage of the block (not including street or right-of-way) or where a vacant area is less than 60,000 square feet.
2. The installation, when compared to the use of overhead conductors, would create a hazard or not be feasible. A feasibility study will be required at the time the request for waiver is made.

ADD new section 111.2.1 to read:

**111.2.1 Temporary service bonds required.** Written assurance of compliance with this code and temporary connection time limit shall consist of a cash deposit or a performance bond in the penal sum of one thousand dollars (\$1,000.00) or the amount equal to one percent (1%) of the value determined pursuant to Section 108.3, whichever is greater but not to exceed ten thousand dollars (\$10,000.00), payable to the jurisdiction and executed by a surety company qualified to execute surety bonds in the State. Each bond shall be joint and several and conditioned that the principal in the bond will faithfully conform to this code for which the temporary connection authorization is to be issued. The principal and surety named in such bond shall be jointly and severally bound unto the jurisdiction, and to any and every other person aggrieved or damaged by any breach of the condition of the bond. The bond shall not be void upon any recovery or recoveries totaling less than the whole penalty but may be used and recovered upon from time to time until the whole penalty is exhausted. The term of the obligation of such bond shall be for a period that the authorization is outstanding and may be held for thirty days thereafter when required by the Building Official, except that if at the expiration of said thirty days, the jurisdiction has reason to believe that there is an action or claim impending or that there is a legal action pending which relates to the bond, the jurisdiction shall retain the bond until final disposition of such matter or matters.

**Exception:** owner built/owner occupied single family dwellings.

ADD new section 111.2.2 to read:

**111.2.2 Construction power.** Construction power is a privilege granted under the jurisdiction for convenience during construction. Construction power may be from either temporary power poles or through the permanent power panel. Each 120 Volt circuit used for construction power shall be GFCI protected. Construction power may be revoked at anytime upon cause by the Building Official.

**Section 308.2 Group I-1.** REVISE section by DELETING all occurrences of the number “16” and REPLACING them with “10”.

**Section 310.1 Residential Group R.** REVISE section by DELETING all text in paragraphs R-4 and REPLACING with the following:

R-4 Residential occupancies shall include buildings arranged for occupancy as residential care/assisted living facilities including more than five but not more than **10** occupants, excluding staff, who because of age, mental or physical disability, or other reasons, live in a supervised residential environment which provides care licensed by Arizona Department of Health Services. Group R-4 occupancies shall meet the requirements for construction as defined for Group R-3, except as otherwise provided for in this code.

**Section 903.2.2 Group E.** REVISE section by DELETING all text and REPLACING with the following: An automatic fire sprinkler system shall be provided throughout all Group E Occupancies.

**Exception:** One story buildings when each room used for instruction has at least one exit door directly to the outside at ground level, and when rooms used for assembly purposes have at least one-half of the required exits directly to the exterior ground level, an automatic sprinkler system need not be provided.

**Section 903.2.3.2 Group F-1.** REVISE section by REPLACING the word “three” with the word “two”.

**Section 903.2.6.2 Group M.** REVISE section by REPLACING the word “three” with the word “two”.

**Section 903.2.8.2 Group S-1.** REVISE section by REPLACING the word “three” with the word “two”.

**Section 903.2.10.1 Stories and basements without openings.** REVISE section by DELETING the first paragraph and REPLACING it with the following:

An automatic sprinkler system shall be installed throughout every story of all buildings where the floor area exceeds 1500 square feet, and all basements regardless of size, where there is not provided at least one of the following types of exterior openings:

**Section 903.2.10.3 Buildings more than 55 feet in height.** REVISE section by DELETING all text and REPLACING it with the following:

An automatic sprinkler system shall be installed throughout all buildings more than two stories or with a floor level having an occupant load of 30 or more that is located 55 feet or more above the lowest level of fire department vehicle access.

**Exception:** Open parking garages.

ADD new section 903.2.10.4 to read:

**Section 903.2.10.4 Special amusement buildings.** Special amusement buildings shall be equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1. When the special amusement building is temporary, the sprinkler water supply shall be of an approved temporary means.

**Exception:** An automatic sprinkler system is not required where the total floor area of a temporary amusement building is less than 1,000 square feet and the travel distance from any point to an exit is less than 50 feet.

**Section 903.3.1.1.1 Exempt locations.** REVISE section by DELETING item 4.

**Section 903.3.1.2.1 Balconies.** REVISE section by DELETING all text following the first sentence.

**Section 904.11.2 System interconnection.** REVISE section by DELETING the period at the end of the first sentence and ADDING the following:

“and to all electrical receptacles located within the perimeter of the protected exhaust hood.”

**Section 1011.2 Sign illumination.** REVISE section by ADDING the following sentence to the end of the first paragraph:

Floor level exit signs, when exit signs are required, additional approved low-level exit signs which are internally or externally or self-illuminated shall be provided in all interior corridors serving guest rooms of hotels in Group R-1 occupancies.

ADD new Section 1610.1.1 to read:

**Section 1610.1.1 Presumptive active pressure:** For typical unsaturated soils in Pima County, a presumptive active lateral pressure of 35 psf per foot of depth may be used without a geotechnical report. Level backfill is assumed with this active pressure. Surcharges shall be applied as necessary.

**Section 1704.5 Masonry construction.** REVISE section by DELETING Exception 2 and REPLACING with the following.

**Exception 2:** Nonessential facilities designed in accordance with Section 2107 with allowable masonry stresses reduced by one half and the maximum value of  $f'_m$  limited to 1500 psi for concrete or clay masonry. The following limitations shall apply to this exception:

1. The unsupported height (or length)-to-thickness ratio of a building wall shall not exceed 20.
2. The soil retaining height for a retaining wall shall not exceed 4'-0" measured from the top of footing for an 8-inch-thick wall or 6'-0" for a 12-inch-thick wall.
3. The height-to-thickness ratio shall not exceed 10 for a cantilevered masonry fence or combination masonry fence and retaining wall as measured from the top of footing to the top of

wall. If a combination retaining/fence wall consists of more than one wall thickness, the smallest thickness shall be used in determining the height-to-thickness ratio.

Any portion or portions of a structure in which the design masonry stresses exceed one half the allowable masonry stresses, shall require Special Inspection for that portion or portions of the structure.

**Section 1802.2.6 Seismic design category C.** DELETE this section in its entirety.

ADD new section 1804.2.1 to read:

**Section 1804.2.1 Presumptive passive pressure.** For typical unsaturated soils in Pima County, a presumptive lateral load-bearing capacity (passive pressure) of 250 psf per foot of depth may be used without a geotechnical report.

ADD NEW section 1804.3.2 to read:

**Section 1804.3.2 Presumptive coefficient of friction:**

For typical unsaturated soils in Pima County, a presumptive coefficient of friction of 0.30 for lateral sliding resistance may be used without a geotechnical report. Friction resistance may be used in conjunction with passive pressure to resist sliding forces.

**Section 1805.2 Depth of footings.** REVISE section by DELETING the first sentence and REPLACING it with the following:

The minimum depth of footings below the undisturbed ground surface shall be 12 inches for 1000 psf maximum allowable foundation pressure and minimum 18 inches for maximum allowable foundation pressure values of Table 1804.2.

**Section 1805.5 Foundation walls.** REVISE section by RETAINING the first sentence and DELETING the remainder of the section, subsections and tables 1805.5(1) through 1805.5(5).

ADD new section 1901.2.1 to read:

**Section 1901.2.1 Allowable stress design.** Structural concrete may be designed in accordance with ACI 318-99 Appendix A: Alternate design method.

**Section 1910.1 General.** REVISE section by ADDING the following after the first sentence in exception 5:

In the absence of a geotechnical report, vapor barriers are not required provided a minimum 4 inch aggregate base course is installed beneath the on-grade slab.

## EARTHEN STRUCTURES

**Table 720.1(2).** REVISE table by ADDING the following:

Material	Item	Construction	4 hour	3 hour	2 hour	1 hour
1a Earthen Walls	1a – 1.1	Solid wall construction utilizing earth as the structural wall	14	12	10	8

DELETE Sections 2109.8 through 2109.8.4.7 Except: **Table 2109.8.3.1 Allowable shear on bolts in adobe masonry**, which shall be renumbered **Table 2114.6.B**.

ADD new section 2114 to read:

**Section 2114 Earthen structures.**

**Section 2114.1 General.** Earthen structures with any site condition may be designed with accepted engineering practice for earthen wall structures and with the provisions of this section.

**Section 2114.1.1 Earthen materials.** This section shall establish minimum standards for safety for construction of earthen materials structures, collectively known as adobe, burnt adobe, rammed earth, and hydraulic pressed unit construction.

**Section 2114.1.2 Professional registration required.** Plans and specifications designed under the provisions of Section 2114 shall be prepared by a registered professional architect or engineer licensed in the state for which the project is to be constructed.

**Section 2114.2. Minimum thickness.** The minimum thickness of earthen structures shall be designed to limit tension to zero unless tensile reinforcement is provided. Walls shall be designed to meet forces prescribed by Chapter 16. The measurement of height of walls shall be the distance between points of lateral support. Wall thickness shall be measured from face to face of each wall with. The thickness of walls using raked joints shall be the surface to surface distance of the mortar joints. The withes of wall sections shall not be combined without cross bonding of the masonry units throughout the structural element. Cross bonding shall mean overlapping of not less than 1/3 of the dimension of the masonry units.

**Section 2114.3 Support conditions.** Earthen structures shall be supported on a solid concrete, solid masonry foundation system the width of which shall be not greater than 1/6 inch narrower than the earthen structure which it supports. Earthen structures shall not be less than 6 inches above adjacent grade.

**Section 2114.4 Corbeled wall elements.** The maximum corbeled projection beyond the face of the wall shall not be more than 4 inches. Such corbeled projections shall add additional thickness to the wall, the opposite face of the wall remaining plane with the primary wall plane.

**Section 2114.5 Moisture barrier.** A moisture barrier equal to 30 lb. asphalt impregnated building paper, or equivalent moisture resistant barrier, shall be installed between the supporting foundation and the earthen material.

**Section 2114.6 Allowable stresses.** Allowable compressive, tensile and shear stresses in earthen structures shall not exceed the values prescribed in Table 2114.6.A. In determining the stresses, the effects of all loads and conditions of loading and the influence of all forces affecting the design and strength of the several parts shall be considered. Bolt values shall not exceed those set forth in Table 2114.6.B.

**Section 2114.6.1 Combined units.** In walls composed of different kinds or grades of units, materials or mortars, the maximum stress shall not exceed the allowable stress for the weakest of the combination of units, materials and mortars of which the wall is composed. The net thickness of any facing unit of earthen materials used to resist stress shall not be less than 3 inches (76 mm).

When dissimilar materials, (e.g. concrete masonry or steel) is used to support earth wall construction, such elements shall be structurally isolated from other earth wall elements. The design shall recognize, with specific detailing, the effects shrinkage of the earth wall construction may have on the structural integrity of the structure.

<b>TABLE 2114.6.A</b>				
<b>ALLOWABLE STRESSES FOR EMPIRICAL DESIGN OF EARTHEN WALL STRUCTURES</b>				
<b>STRENGTH OF UNIT, GROSS AREA</b>	<b>ALLOWABLE STRESSES</b>			<b>NOTE 1</b>
	<b>GROSS CROSS-SECTIONAL AREA</b>			
Compression	300 psi	Normal Loading		30 psi
		Concentrated Loading		45 psi
Modulus of rupture	55 psi	Allowable tension without tensile reinforcing		0 psi
Shear	n.a.	With special inspection		8 psi
		Without special inspection		4 psi
Modulus of Elasticity	60,000 psi	Allowable Deflection		Less than 1/2%
For SI: 1 pound per square inch = 6.895 kPa.				
Notes:				
1.	Gross cross-sectional area shall be calculated on the actual rather than the nominal dimensions.			

**Table 2114.6.B** REFER to IBC Table 2109.8.3.1

**Section 2114.7 Lateral support.** Earthen walls shall be laterally supported in the vertical direction and at intersection with other earthen walls. Support at the top of the wall shall in accordance with one of the methods in Section 2114.7.1 or Section 2114.7.2..

**Section 2114.7.1 Bond beams.** A continuous bond beam system embedded in the earthen walls, designed to provide lateral support for the walls without the aid of additional bracing elements such as roof diaphragm. Bond beams of concrete or masonry shall be not less than the width of the wall minus 6 inches (xxx mm).

**Section 2114.7.1.1 Bond beam anchorage.** Bond beams shall be anchored to earthen walls at intervals of not over 48 inches (1219 mm) by a connection with shear strength of not less than the shear forces in both directions. The shear between a cast in place concrete bond beam and the earthen wall shall not exceed 1/8 the dead load at the base of the bond beam unless alternate attachment is provided compatible with the allowable stresses in Table 2114.4.A or 2114.4.B.

**Section 2114.7.2 Roof diaphragm.** A roof diaphragm complying with other provisions of this code adequate to provide lateral support may be used to brace earthen walls. Anchorage shall be tie beams as specified in Section 2114.7.2.2 or other anchorage methods of equal strength.

**Section 2114.7.2.1 Tie beams.** A tie beam is a beam built into the earthen wall for the purpose of anchoring the roof diaphragm and transferring the lateral perpendicular and parallel forces. Tie beams shall be provided for all earthen walls laterally braced by a roof diaphragm.

**Section 2114.7.2.2 Tie beam anchorage.** Tie beams shall be anchored to earthen walls at intervals of not over 48 inches (1219 mm) by a connection with shear strength of not less than the shear forces in both directions. The shear between a cast in place concrete or masonry tie beam and the earthen wall shall not exceed 1/8 the dead load at the base of the bond beam unless alternate attachment is provided compatible with the allowable stresses in Table 2114.4.A or 2114.4.B.

**Section 2114.8 Lintels.** Earthen walls over openings shall be supported by steel lintels, reinforced concrete or masonry lintels or earthen material arches designed to support load imposed. Lintels shall not be supported by rigid structural columns, frames or posts with rigidities greater than the earthen wall unless the design allows for the potential for differential settlements. Small openings less than 12" may be constructed without structural lintels.

**Section 2114.9 Shear walls.** Earthen walls subject to in-plane loads shall be designed to be tension free unless tensile reinforcement is provided. Solid panels less than 4 feet (1219 mm) shall not be considered shear walls.

**Section 2114.10 Opening jambs.** Portions of walls between openings shall be constructed with lengths of not less than 1 ½ times the thickness of the wall in which they occur.

**Section 2114.11 Freestanding piers.** Piers independent of earthen walls shall be designed to support vertical and horizontal loads unless braced by other elements of the structure. Tensile reinforcement shall be provided where tension occurs. When structural posts or columns are provided within the pier ties or attachments shall be provided to the earthen wall system to laterally secure it.

**Section 2114.11.1 Pier cap.** A solid concrete cap shall be provided at the top of load bearing piers under all concentrated loads. The cap shall cover not less than 50% of the top of the pier.

**Section 2114.12 Chases.** Chases and recesses in earthen walls shall not be deeper than one-third the thickness of the wall thickness. The maximum length of a horizontal chase or horizontal projection shall not exceed 4 feet (1219 mm), and shall have at least 8 inches (203 mm) of earthen construction in back of the chases and recesses and between adjacent chases or recesses and at least 12 inches (305 mm) between the chase and the jambs of openings.

Chases and recesses in earthen walls shall be designed and constructed so as not to reduce the required strength or required fire resistance of the wall and in no case shall a chase or recess be permitted within the required area of a pier. Earthen walls directly above chases or recesses wider than 16 inches (305 mm) shall be supported on noncombustible lintels.

**Section 2114.13 Stack bond.** When the earthen wall is constructed of units, (e.g. adobe brick), units shall not be laid in stack bond. Units shall, in all locations throughout the wall system, overlap the courses below by not less than one-third the dimension of the units.

Exception: Ornamental non-structural elements may be laid in stack bond if properly tied to the main structure.

**Section 2114.14 Metal reinforcement.** All walls shall be anchored at their intersections, at vertical intervals of not more than 16 inches (406 mm) with joint reinforcement of at least 9 gage when using earthen units (e.g. adobe block). Horizontal reinforcement shall be used throughout the wall system and be continuous at the intersections. Reinforcement used throughout the wall system shall be not more than 4 inches narrower than the wall thickness.

**Section 2114.15 Veneer.** All veneers using earthen materials shall be installed in accordance with this section. Such veneers shall be installed with a noncombustible foundation, over concrete masonry, a backing of wood or cold-formed steel and the veneer shall be not less than 4 inches (101 mm) or greater than 8 inches (203 mm) in thickness.

**Section 2114.15.1 Anchorage.** Earth units shall be anchored to the supporting wall with a corrosion-resistant veneer tie system mechanically attached to continuous horizontal joint reinforcement continuously installed in the veneer bed joint not less than 16 inches (406 mm) on center vertically. When earth mortar systems are used the tie system shall prevent the accumulation of mortar at the base of the veneer. Conventional brick ties shall not be used to anchor earth units.

**Section 2114.15.2 Air space.** The veneer shall be separated from the sheathing by an air space of a minimum of 1 inch (25 mm) but not more than 2 inches (51 mm). A weather-resistant membrane or 15 lb. asphalt-saturated felt shall be provided except when veneer is applied over concrete masonry or concrete backing.

**Section 2114.15.3 Flashing.** Approved corrosion-resistive flashing shall be provided in the exterior wall envelop in such a manner as to prevent entry of water into the wall cavity or penetration of water into the building structural framing components. The flashing shall extend to the surface of the exterior wall finish and shall be installed to prevent water from reentering the exterior wall envelope. Flashing shall be located beneath the first course of veneer, and at other points of support, including structural floors, shelf angles and lintels. Approved corrosion-resisting flashing shall be installed at all of the following locations:

At top of all exterior window and door openings in such a manner as to be leak proof.

At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.

Under and at the ends of masonry, wood or metal copings and sills.

Where exterior porches, decks or stairs attach to a wall or floor assembly of wood – frame construction.

At wall and roof intersections.

**Section 2114.15.4 Weep holes.** Weep holes shall be provided in the outside wythe of masonry walls at a maximum spacing of 33 inches (838 mm) on center. Weep holes shall not be less than 3/16 inches (4.8 mm) in diameter. Weep holes shall be located immediately above the flashing.

**Section 2114.16 Buttresses.** Earthen walls used as buttresses shall not extend beyond an average length perpendicular to the wall to be braced a distance of 6 feet (1830 mm) without consideration to out-of-plane bending of the buttress.

**Section 2114.17 Gable End Walls.** Gable end walls shall be constructed using veneer construction as required by Section 2114.15 or shall be provided with lateral bracing to prevent overturn.

**Section 2114.18 Ledgers.** Ledgers shall not be used to support vertical live and dead loads in excess of 75 lbs. per lineal foot unless the tension in the wall due to bending from out-of-plane loads and the eccentric load from the ledger is zero.

**Section 2114.19 Material standards.** The materials used in earthen wall structures shall comply with the following material standards. For each of the tests prescribed in these standards, five full size sample units shall be selected at random from each lot of units of fraction thereof produced. Mass wall systems such as rammed earth shall provide a five tests for each required standard test series.

**Section 2114.19.1 Manufacturers of earthen materials.** Established manufacturers of earthen materials shall certify compliance with these standards. Copies of their periodic testing shall be supplied to the building official when requested. Literature, advertising and other information supplied by the manufacturer to designers and users of earthen materials shall include the actual dimensions of units, not nominal dimensions.

**Section 2114.19.2 Onsite earthen materials.** Earthen units, mortar, rammed earth wall materials mined, mixed, formulated, and or molded on site shall be tested for compliance with these standards. For individual structures, a set of tests shall be provided for the first 2500 square feet of wall and an additional test for each additional 2500 square feet or portion thereof in the structure. At least one set of tests shall be made for each structure and for each 2500 square feet of patio wall. The fabricator of the materials used in the project shall certify in writing to the building official compliance with these standards. The certification shall include the number of units site molded, size of the units, volume of material used as mortar, dates of fabrication, and results of testing of the material. If materials from established manufacturers and onsite materials are used in the project, copies of records including sources, quantities, and location of use within the structure shall be provided to the building official upon request.

**Section 2114.19.3 Categories of earthen materials.** Type I, II, III, and IV earthen materials are approved for use in construction of projects designed in accordance with Section 2114.

Exception: Type I adobe shall only be used for repairs and small additions in which new walls do not exceed 10% of the surface area of existing walls of Type I construction and for structures constructed of a similar material system and for projects requiring this class of materials to meet historic guidelines.

Required plaster veneer. Adobe of Type I and II shall be protected on the exterior with exterior plaster meeting the requirements of IBC Section 2512 applied over wire lath. Type I and II adobe shall not be used within 4 inches (102mm) of the floor or at the top of parapet walls or near potential sources of water which may effect the stability of the earth wall system. Other Types of adobe may be left unplastered and may be used without separation from the floor.

Adobe units and mortar. Moisture resistant stabilized adobe units and mortar shall meet the following testing standards as indicated in Table. Type S portland cement mortar may be used for Type II, III, and IV adobe in lieu of earth mortar.

**Table 2114.16.3.1**

<b>Material Type</b>	<b>Dry Compression 2114.16.3.1.1</b>	<b>Wet Compression 2114.16.3.1.2</b>	<b>Modulus of Rupture 2114.16.3.1.3</b>	<b>Absorption &lt;2.5% 2114.16.3.1.4</b>	<b>Absorption &lt;5.0% 2114.16.3.1.5</b>	<b>Moisture Content 2114.16.3.1.6</b>
I	X		X			X
II	X		X		X	X
III	X		X	X		X
IV		X	X			X

**X** Indicates that material must pass the test standards prescribed in this Section.

**Section 2114.19.3.3 Dry compression strength.** Determine the compressive strength of the required number of samples as required by Section 2114.19. in accordance with the following procedures.

**Section 2114.19.3.3.1 Dry the specimen.** Dry the specimen at a temperature of 85° F.+15° F. (29° C. +- 9°) in an atmosphere having relative humidity of not more than 50 percent. Weigh the specimen at one-day intervals until constant weight is attained.

**Section 2114.19.3.3.2 Cap the specimen.** The specimen may be suitably capped with calcined gypsum mortar or the bearing surfaces may be rubbed smooth and true. Then calcined gypsum is used for capping, conduct the test after the capping has set and the specimen has been dried to constant weight in accordance with Item 1 of this section.

**Section 2114.19.3.3.3 Test the Specimen.** Test the specimens in the position in which the earthen unit is designed to be used. And bed on and cap with a felt pad not less than 1/8 inch (3.2mm) or more than ¼ inch (6.4mm) in thickness.

**Section 2114.19.3.3.4 Testing equipment.** The loading head shall completely cover the bearing area of the specimen and the applied load shall be transmitted through a spherical bearing block of proper design. The speed of the moving head of the testing machine shall not be more than 0.05 inch (1.27mm) per minute.

**Section 2114.19.3.3.5 Reporting results.** Calculate the average compressive strength of the specimens tested and report this as the compressive strength of the block. Units shall have an average dry compressive strength of 300 psi (2068 kPa) and no individual unit may have a strength of less than 250 psi. (1724 kPa).

**Section 2114.19.4 Wet compression strength.** Determine the compressive strength of the required number of specimen as required by Section 2114.19. in accordance with the following procedures.

**Section 2114.19.4.1 Cap the specimen.** The specimens may be suitably capped with a capping material compatible with water saturation or the bearing surfaces may be rubbed smooth and true.

**Section 2114.19.4.2 Wetting the specimen.** Submerge the specimen under water for not less than 8 hours or longer as required until fully saturated.

**Section 2114.19.4.3 Test the specimen.** Immediately test the specimen in the position in which the earthen unit is designed to be used. And bed on and cap with a felt pad not less than 1/8 inch (3.2mm) or more than ¼ inch (6.4mm) in thickness.

**Section 2114.19.4.4 Testing equipment.** The loading head shall completely cover the bearing area of the specimen and the applied load shall be transmitted through a spherical bearing block of proper design. The speed of the moving head of the testing machine shall not be more than 0.05 inch (1.27mm) per minute.

**Section 2114.19.4.5 Reporting results.** Calculate the average compressive strength of the specimens tested and report this as the compressive strength of the block. Adobe units shall have an average wet compressive strength of 300 psi (2068 kPa). Five samples shall be tested and no individual unit may have a wet compressive strength of less than 250 psi. (1724 kPa).

**Section 2114.19.5 Modulus of rupture.** Adobe units shall have an average modulus of rupture of 50 psi (345 kPa) when tested in accordance with the following procedure. Five samples shall be tested and no individual unit shall have a modulus of rupture of less than 35 psi (241 kPa).

**Section 2114.19.5.1 Support conditions.** A cured unit shall be simply supported by 2-inch-diameter (51 mm) cylindrical supports located 2 inches (51 mm) in from each end and extending the full width of the unit.

**Section 2114.19.5.2 Loading conditions.** A 2-inch-diameter (51 mm) cylinder shall be placed at midspan parallel to the supports.

**Section 2114.19.5.3 Testing procedure.** A vertical load shall be applied to the cylinder at the rate of 500 pounds per minute (37 N/s) until failure occurs.

**Section 2114.19.5.4 Modulus of rupture determination.** The modulus of rupture shall be determined by the formula:

$$Fr = 3WL_s/2bt^2 \quad \text{(Equation 2116.3.1.3.4-1)}$$

Where, for the purposes of this section only:

b = Width of the test specimen measured parallel to the loading cylinder, inches (mm).

fr = Modulus of rupture, psi (Mpa).

Ls = Distance between supports, inches (mm).

t = Thickness of the text specimen measured parallel to the direction of load, inches (mm).

W = The applied load at failure, pounds (N).

**Section 2114.19.6 Absorption less than 2.5%.** A 4-inch (102 mm) cube, cut from an adobe unit fired to a constant weight in a ventilated oven at 212 degrees F to 239 degrees F, shall not absorb more than 2 ½ percent moisture by weight when placed upon a constantly water-saturated, porous surface for 7 days. A minimum of five specimens shall be tested and each specimen shall be cut from a separate unit.

**Section 2114.19.7 Absorption less than 5.0%.** A 4-inch (102 mm) cube, cut from an adobe unit fired to a constant weight in a ventilated oven at 212 degrees F to 239 degrees F , shall not absorb more than 2 ½ percent moisture by weight when placed upon a constantly water-saturated, porous surface for 7 days. A minimum of five specimens shall be tested and each specimen shall be cut from a separate unit.

**Section 2114.19.8 Additional requirements.** All earthen units shall meet the following requirements.

**Section 2114.19.8.1 Moisture content requirements.** Earthen units shall have a moisture content not exceeding 4 percent by weight at the time of use.

**Section 2114.19.8.2 Shrinkage cracks.** All earthen units shall not contain more than three shrinkage cracks and any single shrinkage crack shall not exceed 3 inches (76mm) in length or 1/8 inch (3.2mm) in width.

**Section 2114.19.8.3 Soil requirements.** Soil used for moisture resisting adobe units and mortar shall be chemically compatible with the stabilizing material. The soil shall contain sufficient clay to bind the particles together without the aid of stabilizers. The soil shall contain not more than 0.2 percent of water-soluble salts.

**Section 2114.19.9 Cement stabilized rammed earth.** Cement stabilized Rammed Earth shall meet the following standards. The installer of the wall system shall comply with the requirements of Section 2114.19.2 for frequency of testing.

**Section 2114.19.9.1 Testing before construction.** The installer of cement stabilized Rammed Earth shall provide the following testing before issuance of a building permit.

**Section 2114.19.9.2 Materials from a licensed sand and gravel producer.** A copy of Proctor ASTM D 698 shall be provided for each soil type and source or combination of sources. Periodic testing as provided by the supplier may be supplied to meet this requirement. The soil contain not more than 0.2 percent of water-soluble salts.

**Section 2114.19.9.3 Material mined and mixed on site.** A copy of ASTM D 698, ASTM C 117, ASTM C 136, and ASTM D 4318 shall be provide for each soil type and source or combination of sources. Such tests shall be repeated as required to assure that all materials to be used have been tested and are represented by the tests. The soil shall contain not more than 0.2 percent of water-soluble salts.

**Section 2114.19.9.4 Testing required during construction.** The installer of cement stabilized Rammed Earth shall provide the following tests made during the construction process. A certified testing laboratory shall provide field density tests for comparison to the pre-construction Proctor ASTM D 698, percent moisture ASTM D 2216, dry density ASTM D 698, and percent moisture ASTM D 1556.

Cement Stabilized Rammed Earth walls shall meet or exceed 95% maximum dry density (ASTM D 698). Samples taken from the wall shall exceed 300 psi compression (ASTM D 1633) 14 days after placement.

**Section 2308.10.1 Wind uplift.** REVISE section by DELETING both paragraphs and ADDING the following:

Uplift resistance shall be determined by either method 1 or 2 below:

### **1. Design-based wind uplift criteria**

Wind uplift requirements shall be determined by using the design wind value of 110 mph within Table 2308.10.1 for the continuous load path transmitting the uplift forces from the rafter or truss ties to the foundation.

## **2. Prescriptive-based wind uplift criteria**

(Please note that the requirements of this section are in addition to those required for the structural connection of wood members).

### **2.1. Conventionally-framed wood or cold-formed steel structures**

All bearing wall vertical connections shall be clipped with either approved structural sheathing or approved clips to provide a continuous load path from the joist or truss through the ledger or top plate to the bottom wall plate. Where clips are used, they shall be minimum Simpson H2.5 (A34 at ledger), or equivalent load capacity, of configuration to match connection and spaced at intervals not to exceed 24". At openings, lower cripple studs do not require clipping but king/trimmer studs require double clips at bottom and upper cripples require both full clipping to header as well as header to king stud. All platform framing requires either strapping listed for the purpose or continuous sheathing over rim joist from stud to stud vertically at each floor level.

All non-bearing exterior walls shall be clipped as above except that the spacing may be extended not to exceed every other stud.

### **2.2. Masonry or concrete structures**

If lateral design requires larger anchors or more conservative spacing, these may be used in lieu of those called out in this section.

#### **2.2.1. Roof bearing on wall top plate**

Top plates shall be secured to masonry or concrete walls with minimum 0.5" embedded anchor bolts spaced at intervals not to exceed 48". Each joist or truss shall be clipped to plate at bearing with minimum Simpson H2.5 or equivalent load capacity and of configuration to match connection. Gable end joists or trusses shall also be clipped at intervals not to exceed 48".

#### **2.2.2. Roof bearing on wall ledger**

Joists or trusses both parallel or perpendicular to a wall ledger shall be secured to masonry or concrete walls with minimum Simpson PAI23 purlin anchors or equal with equivalent load capacity listed for the application and embedded into wall per listing at intervals not to exceed 48".

### **2.3. Structural steel structures**

Structural steel buildings shall have roof members attached by either welds, bolt or other similarly approved connections at intervals not to exceed 48". Ledger designs shall connect to roof trusses with strapping listed for the purpose at intervals not to exceed 48" on all diaphragm sides. If lateral design requires larger anchors or more conservative spacing, these may be used in lieu of those called out in this section.

**Section 2406.3 Hazardous locations.** REVISE section by DELETING items 5 and 6 and REPLACING them with the following:

5. Glazing in any room containing a hot tub, whirlpool, sauna, steam room, bathtub, and shower where the bottom exposed edge of the glazing is less than 60 inches above a standing surface (ARS §36-1631).

6. Glazing, in an individual fixed or operable panel adjacent to a door where the nearest exposed edge of the glazing is within a 24 inch arc of either vertical edge of the door in the closed position, and where the bottom edge of the glazing is less than 60 inches above the walking surface; or where the nearest exposed edge of the glazing is within a 36 inch arc of either vertical edge of the door in the closed position and where the bottom edge of the glazing is less than 18 inches above the walking surface (ARS §36-1631).

**Table 2902.1 Minimum number of required plumbing fixtures.** REVISE items number 2 and 6 by ADDING the following: Service sinks shall not be required for business and mercantile classifications equal to or less than 1500 square feet.

**Section 3109 Swimming pool enclosures and safety devices.** DELETE section and subsections and REPLACE with: Arizona Administrative Code, Title 18, Chapter 5, Article 2. Public and Semipublic Swimming Pools and Spas is hereby adopted by reference and subject to the requirements of this code.

**Adopt Appendix E, G, I, and K12.**