

ADOPTED BY THE
MAYOR AND COUNCIL

ORDINANCE NO. 10417

RELATING TO BUILDINGS, ELECTRICITY, PLUMBING AND MECHANICAL CODE; AMENDING THE TUCSON CODE CHAPTER 6, BUILDINGS, ELECTRICITY, PLUMBING AND MECHANICAL CODE, ARTICLE 1 IN GENERAL, SECTION 6-1 ADMINISTRATIVE CODE ADOPTED BY REPEALING THE UNIFORM ADMINISTRATIVE CODE AND RESERVING SECTION 6-1; AMENDING ARTICLE III, BUILDINGS, DIVISION 1 BUILDING CODE, SECTION 6-34 BUILDING CODE ADOPTED BY ADOPTING THE INTERNATIONAL BUILDING CODE 2006 EDITION WITH LOCAL AMENDMENTS; SECTION 6-38 RESIDENTIAL CODE ADOPTED BY ADOPTING THE INTERNATIONAL RESIDENTIAL CODE 2006 EDITION WITH LOCAL AMENDMENTS; SECTION 6-40 ENERGY CONSERVATION CODE BY ADOPTING THE INTERNATIONAL ENERGY CONSERVATION CODE 2006 EDITION WITH LOCAL AMENDMENTS; AMENDING ARTICLE IV ELECTRICITY, DIVISION 1 ELECTRICAL CODE, SECTION 6-84 ELECTRICAL CODE ADOPTED BY ADOPTING THE 2005 NATIONAL ELECTRIC CODE WITH LOCAL AMENDMENTS; AMENDING ARTICLE VI MECHANICAL CODE SECTION 6-167 FUEL GAS CODE BY ADOPTING THE INTERNATIONAL FUEL GAS CODE 2006 EDITION; ESTABLISHING PENALTIES; AND DECLARING AN EMERGENCY.

BE IT ORDAINED BY THE MAYOR AND COUNCIL OF THE CITY OF TUCSON, ARIZONA, AS FOLLOWS:

SECTION 1. The Tucson Code, Chapter 6, Buildings, Electricity, Plumbing and Mechanical Code, Article I In General, is amended by repealing Section 6-1 *Administrative code adopted* and reserving Section 6-1.

SECTION 2. The Tucson Code, Chapter 6, Buildings, Electricity, Plumbing and Mechanical Code, Article III Buildings, Division I Building Code, Section 6-34 *Building code adopted* is hereby amended to read as follows:

Sec. 6-34. Building code adopted.

The document entitled "International Building Code, 2006 Edition" published by the International Code Council, with local amendments, a copy of which amendments are attached to Ordinance 10417 as Exhibit "A" are hereby adopted.

SECTION 3. The Tucson Code, Chapter 6, Buildings, Electricity, Plumbing and Mechanical Code, Article III Buildings, Division 1 Building Code, Section 6-38 Residential Code adopted, is hereby amended to read as follows:

Sec. 6-38. Residential code adopted.

The documents entitled "International Residential Code, 2006 Edition" published by the International Code Council, with local amendments, a copy of which amendments are attached to Ordinance No. 10417 as Exhibit "B" are hereby adopted.

SECTION 4. The Tucson Code, Chapter 6, Buildings, Electricity, Plumbing and Mechanical Code, Article III Buildings, Division 1 Building Code, Section 6-40 Energy Conservation Code adopted is hereby amended to read as follows:

Sec. 6-40. Energy conservation code adopted.

The document entitled the "International Energy Conservation Code, 2006 Edition" with local amendments, a copy of which amendments are attached as Exhibit "C" to Ordinance No. 10417 are hereby adopted.

SECTION 5. The Tucson Code, Chapter 6, Buildings, Electricity, Plumbing and Mechanical Code, Article 4 Electricity, Division 1 Electrical Code, Section 6-84 Electrical code adopted is hereby amended to read as follows:

Section 6-84 *Electrical code adopted*. The document entitled “2005 National Electrical Code” with local amendments, a copy of which amendments are attached as Exhibit “D” to Ordinance No. 10417 are hereby adopted.

SECTION 6. The Tucson Code, Chapter 6 Buildings Electricity Plumbing and Mechanical Code, Article VI Mechanical Code, Section 6-167 Fuel gas code is hereby amended to read as follows:

Section 6-167 *Fuel gas code*. The document entitled “International Fuel Gas Code, 2006 Edition” is hereby adopted.

SECTION 7. Any person violating any of the provisions of this ordinance shall be deemed responsible for a civil infraction and subject to punishment as set forth in this section. A.R.S. § 9-803 requires the penalties for a violation of any of code adopted by reference to be set forth in the adopting ordinance and those penalties shall be as set forth Tucson Code Section 8-6.1 for civil infractions which are restated here.

(1) A person found responsible for a civil infraction for the first time shall be fined not less than one hundred dollars (\$100.00) nor more than twenty-five hundred dollars (\$2,500.00) per civil infraction. A person found responsible for the same civil infraction for a second time shall be fined not less than two hundred dollars (\$200.00) nor more than twenty-five hundred dollars (\$2,500.00) per civil infraction. A person found responsible for the same civil infraction for a third or subsequent time shall be fined not less than three hundred dollars (\$300.00) nor more than twenty-five hundred dollars (\$2,500.00) per civil infraction. The imposition of a fine for civil infractions shall not be suspended.

(2) The magistrate, special magistrate or limited special magistrate shall, after a finding of responsibility, order abatement of the civil infraction. An abatement order shall be effective for one (1) year unless stayed on appeal. If stayed on appeal the order shall be effective for one (1) year from the end of the appeal if the finding of responsible and sentence is upheld.

(3) The magistrate, special magistrate or limited special magistrate shall warn a violator that additional fines will be imposed for failure to abate a violation and criminal charges may be brought by the city attorney for failure to obey an order to abate a violation.

(4) Failure of a defendant to comply with any order contained in a judgment for a civil infraction shall result in an additional fine of not less than one hundred dollars (\$100.00) nor more than twenty-five hundred dollars (\$2,500.00) for each day the defendant fails to comply. A defendant's second failure to comply with any order contained in a judgment for a civil infraction shall result in an additional fine of not less than two hundred dollars (\$200.00) nor more than twenty-five hundred dollars (\$2,500.00) for each day after the first determination of the defendant's failure to comply; a defendant's third and subsequent failures to comply with any order contained in a judgment for a civil infraction shall result in an additional fine of not less than three hundred dollars (\$300.00) nor more than twenty-five hundred dollars (\$2,500.00) for each day after the second or subsequent determination of the defendant's failure to comply; provided, however, that the total fines imposed by this subsection and subsection (a) shall not exceed twenty-five hundred dollars (\$2,500.00) per civil infraction.

SECTION 8. The various officers and employees are authorized and directed to perform all acts necessary or desirable to give effect to this ordinance.

SECTION 9. If any provision of this ordinance or the application thereof to any person or circumstance is invalid, the invalidity shall not affect other provisions or applications of this ordinance which can be given effect without the invalid provision or circumstance, and to this end the provisions of this ordinance are severable.

SECTION 10. WHEREAS it is necessary for the preservation of the peace, health and safety of the City of Tucson that this ordinance become immediately effective, an emergency is hereby declared to exist and this ordinance shall be effective immediately upon its passage and adoption.

PASSED, ADOPTED AND APPROVED BY THE MAYOR AND COUNCIL OF THE CITY OF TUCSON, ARIZONA, _____.

MAYOR

ATTEST:

CITY CLERK

APPROVED AS TO FORM:

REVIEWED BY:

A 

CITY ATTORNEY

CITY MANAGER

FWK
FWK:tec
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2006 International Building Code City of Tucson Amendments

Section 101.1 Title. INSERT: [name of jurisdiction] as “City of Tucson”.

Section 101.4.1 Electrical. REVISE section by DELETING “ICC Electrical Code” and REPLACING it with “2005 NFPA70: National Electrical Code as amended by the City of Tucson”.

Section 101.4.2 Gas. AMEND first sentence to read: “The provisions of the *International Fuel Gas Code*, as amended by the City of Tucson, shall apply to the installation of gas piping from the point of delivery, gas appliances and related accessories as covered in this code.”

Section 101.4.4 Plumbing. DELETE section in its entirety and REPLACE as follows:

Section 101.4.4 Plumbing. The provisions of the *International Plumbing Code* or *Uniform Plumbing Code*, as amended by the City of Tucson, shall apply to the installation, alteration, repair and replacement of plumbing systems, including equipment, appliances, fixtures, fittings and appurtenances, and where connected to a water or sewage system and all aspects of a medical gas system.

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 Sections 101.4.8, 101.4.9, and 101.4.10 as follows:

Section 101.4.8 Outdoor Lighting. The provisions of the City of Tucson/Pima County Outdoor Lighting Code shall apply to all new construction and major additions to land uses, development, buildings and structures.

Section 101.4.9 Existing Buildings. The provisions of the *2006 International Existing Building Code* shall apply when approved by the Building Official.

Section 101.4.10 Performance Engineering. The provisions of the International Code Council Performance Engineering Code shall apply when approved by the Building Official.

Section 104.10 Modifications. REVISE section by ADDING the following to the end of the paragraph:

“Request 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
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. AMEND section by ADDING the following sentence to the end of the paragraph to read:

Any owner or authorized agent who intends to construct, enlarge, alter, repair, move, demolish, or change the occupancy of a building or structure, or to erect, install, enlarge, alter, repair, remove, convert, or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be done, shall first make application to the Building Official and obtain the required permit. *See amendments to section 3303 for demolition permit requirements.*

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

The applicant for the registered plant annual permit shall be an architect or engineer registered and residing 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. All new applications shall be approved by the Building Official and 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 31st of each year and shall be renewed and approved for registered plant status to be maintained. The permit will be suspended if the registered plant no longer employs the approved applicant. If this occurs, the plant shall notify the Building Official and call for immediate inspection of any ongoing work until such time that a replacement registrant is approved by the Building Official. The Building Official may revoke an annual permit at any time for failure to comply with the annual permit requirements.

A summary report of all work done under the registered plant shall be prepared by the registrant 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 shall not 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 part of a building.
3. Any work that adds, alters, removes or penetrates rated fire or smoke control assemblies, exit courts, exit passageways or horizontal exits.
4. Any work that provides for the relocation of more than five sprinkler heads.
5. Any work that modifies load bearing structures.

Section 105.2 Work exempt from permit (Building). REVISE the building section by ADDING new items 14 to 17 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. Tents or membrane structures provided the area does not exceed 400 square feet or 900 square feet if a minimum two sides are open.
17. 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 as follows:

Other items:

1. Power for amusement devices and carnival rides in place on 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, contractor, control device, or overcurrent device of the required capacity in the same location.
5. Electrical wiring, devices, appliances, apparatus or equipment operating less than 25 volts and not capable of supplying more than 50 volt-amps.

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 105.3 Application for permit. REVISE section by ADDING new items 8 and 9 as follows:

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 state the exemption of A.R.S. 32-1121 claimed which exempts the requirement for a licensed contractor to do the proposed work.
9. Give the assessor's parcel number and such other data and information as may be required by the Building Official.

Section 105.3.2 Time Limit of Application. DELETE in its entirety and REPLACE as follows:

Section 105.3.2 Time Limit of Application. Applications for which no permit is issued within 180 days following the date of application shall expire by limitation, and plans and other data submitted for review may thereafter be returned to the applicant or destroyed by the Building Official. The Building Official may extend the time for action by the applicant for a period not exceeding 180 days on written request by the applicant showing that circumstances beyond the control of the applicant have prevented action from being taken. An application shall not be extended more than once. An application shall not be extended if this code or any other pertinent laws or ordinances have been amended subsequent to the date of application. In order to renew action on an application after expiration, the applicant shall resubmit plans and pay a new plan review fee.

Section 105.5 Expiration. DELETE section in its entirety and REPLACE as follows:

Section 105.5 Expiration. Every permit issued by the Building Official under the provisions of the technical codes shall expire by limitation and become null and void, if the building or work authorized by such permit is not commenced within 180 days from the date of such permit, or if the building or work authorized by such permit is suspended or abandoned at any time after the work is commenced for a period of 180 days. Before such work can be recommenced, a new permit shall be first obtained to do so, and the fee therefor shall be one half the amount required for a new permit for such work, provided no changes have been made or will be made in the original plans and specifications for such work; and provided further that such suspension or abandonment has not exceeded one year. In order to renew action on a permit after expiration, the permittee shall pay a new full permit fee.

A permittee holding an unexpired permit may apply for an extension of time within which work may commence under that permit when the permittee is unable to commence work within the time required by this section for good and satisfactory reasons. The Building Official may extend the time for action by the permittee for a period not exceeding 180 days upon written request by the permittee showing that circumstances beyond the control of the permittee have prevented action from being taken. Permits shall not be extended more than once.

Section 106.3.4.1 General. REVISE section by ADDING new text between the existing first and second paragraph as follows:

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 provisions 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 Model plans:

Section 108.3.1 Model plans. When two or more buildings of Group R-3 or U Occupancy, or swimming pools, are to be built from a single model plan, without substantial modification as defined by the Building Official.

A model plan approved by a jurisdiction having an Intergovernmental Agreement with the City of Tucson may be accepted by the Building Official and assessed an administrative fee of 25% 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 as follows:

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

ADD new Section 108.5.1 to read:

Section 108.5.1. Plan Review Fees. When submittal documents are required by Section 106.1, a plan review fee shall be paid at the time of submitting the submittal documents for plan review. Said plan review fee shall be in accordance with the fee schedule adopted by this jurisdiction.

The plan review fees are separate fees from the permit fees specified in Section 108.2 and are in addition to the permit fees.

When submittal documents are incomplete or changed so as to require additional plan review or when the project involves deferred submittal items as defined in Section 106.3.4.2, an additional plan review fee shall be charged in accordance with the fee schedule adopted by this jurisdiction.

Section 108.6 Refunds. DELETE section in its entirety and REPLACE as follows:

Section 108.6 Fee Refunds. The Building Official may authorize refunding of a fee paid hereunder, which was erroneously paid or collected.

1. The Building Official may authorize refunding of not more than 80 percent of the permit fee paid when no work has been done under a permit issued in accordance with this code.
2. The Building Official may authorize refunding of not more than 80 percent of the plan review fee paid when an applicant for a permit for which a plan review fee has been paid is withdrawn or cancelled before any examination time has been expended.
3. The Building Official shall not authorize the refunding of any fee paid except upon written application filed by the original permittee not later than 180 days after the date of fee payment.

ADD new Section 110.2.1. Posting as follows:

Section 110.2.1 Posting. The Certificate of Occupancy shall be posted in a conspicuous place and shall not be removed except by the Building Official.

Section 110.3 Temporary Occupancy. Add new paragraph as follows:

The Building Official shall determine by inspection that the structure appears safe for temporary occupancy. The temporary certificate of occupancy shall be for a period of 30 days, with the possibility of extensions if satisfactory progress is being made to complete the work. Written assurance of compliance with this code and the temporary occupancy time limit shall include a cash bond 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 surety 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 bonds 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 the period that the temporary certificate of occupancy 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 dwelling.

ADD new Sections 110.4.1, 110.4.2, 110.4.3, 110.4.4 as follows:

Section 110.4.1 Notice of Hearing. Except as provided by section 110.4.3, no Certificate of Occupancy shall be revoked prior to ten (10) days after delivery to both the owner and occupant of written notice of intent to revoke said Certificate of Occupancy.

During this 10-day period the owner and occupant may appeal the decision to the Advisory Appeals Board. The Building Official shall schedule the hearing within fifteen (15) days after receipt of the appeal and payment of the fee prescribed in the Development Services fee schedule. The Board may affirm, modify, or reverse the Building Official's action. A decision of the Advisory/Appeals Board, made at a duly scheduled and publicly noticed meeting, unless otherwise stated by the Advisory/Appeals Board in the body of said decision, shall be final. No further appeal is available to City boards or officials. Persons aggrieved by final decisions of the Advisory/Appeals Board must file their appeals in Superior Court.

Section 110.4.2 Posting. In addition to the delivery of the notice to revoke the Certificate of Occupancy, a copy thereof shall be posted in a conspicuous place on the outside of the premises concerned.

Section 110.4.3 Immediate Hazards. If, in the opinion of the Building Official, an immediate hazard to life or limb exists in any occupancy for any reason, the Certificate of Occupancy may be revoked immediately and such shall be accomplished when notice is given the person in charge of the premises. After such revocation, the owner or occupant may set the matter for hearing with the Advisory/Appeals Board in accordance with Section 112.

Section 110.4.4 Utilities. Upon revocation of the Certificate of Occupancy, utility connections for the premises involved shall be disconnected or discontinued by the utility company when ordered by the Building Official until the Certificate of Occupancy is restored.

ADD new Section 111.1.1 as follows:

Section 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:

- A. Existing buildings on the block are served with overhead conductors.
- B. The installation, when compared to the use of the 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.

Section 111.2 Temporary connections. Add a second paragraph as follows:

The Building Official shall determine by inspection that the structure appears safe for temporary connection of building service equipment to the source of energy, fuel or power for the period of time requested by the permittee. Written assurance of compliance with the Administrative Code, the applicable technical codes, and temporary connection time limit shall include a cash deposit or a good and sufficient 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 Sec. 304(a), second paragraph, whichever is greater

(not to exceed \$10,000.00), payable to the jurisdiction, executed by a surety company qualified to execute surety bonds in the State. Each such bond shall be joint and several and conditioned that the principal in the bond will faithfully conform to the Administrative Code and to the technical codes applicable to the building or structure or building service equipment 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 the 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. No bond shall be required under the provisions of this paragraph if for the building or structure concerned there is a Temporary Certificate of Occupancy issued and outstanding.

Exception: Owner-built, owner-occupied, single-family dwelling.

ADD new Section 111.2.1 as follows:

Section 111.2.1 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. A surety bond will not be required for construction power except in cases where the construction has been previously revoked. Each 120 volt circuit used for construction power shall be GFCI protected. Construction power may be revoked at any time for:

- A. Suspension or abandonment of the work per Section 105.5 or 105.6.
- B. Tampering with the electrical service panel in violation of the National Electric Code and the power company requirements.
- C. Use of construction power for temporary or permanent occupancy.
- D. Failure to protect each energized 120 volt circuit with a ground fault circuit interrupter.
- E. Failure to properly close-off all openings in the panel box and enclosure panel.
- F. Failure to make corrections to other work as required in the technical codes.
- G. Creating dangerous or unsafe conditions.

Section 112. Board of Appeals. DELETE section in its entirety and REPLACE as follows:

Section 112 Appeals

Section 112.1 Administrative Appeal. Whenever a violation of any of the technical codes of this code is determined, whether during construction or at the plan review stage, and the applicant wished to appeal the decision of the staff because of code interpretation, unreasonable hardship, or other acceptable reasons, an appeal may be made to the Building Official in the following manner:

1. The applicant shall file a written appeal on the forms provided by the Building Official and accompanied by a non-refundable fee (refer to the fee schedule adopted by this jurisdiction by separate ordinance).
2. The appeal will be reviewed by the Building Official within ten (10) days of receipt of the appeal.
3. The Building Official may use a hearing committee consisting of such staff members as deemed appropriate, or other technical persons, to advise the Building Official on a particular appeal.
4. Adequate information shall be provided by the applicant in order to fully describe the conditions in question.
5. The applicant may, but is not required to, personally meet with the Building Official.
6. If an appeal is denied by the Building Official, the appellant must comply with the decision of the Building Official or appeal to the Advisory/Appeals Board pursuant to Section XXX of this code.

Section 112.2 Advisory/Appeals Board. The Advisory/Appeals Board shall hear appeals of orders, decisions or determinations made by the Building Official concerning the application and interpretation of the technical codes and may determine the suitability of alternate materials and methods of construction and to recommend modifications to the applicable technical code review committee.

Section 112.3 Advisory/Appeals Board Appeal. Any person who desires a review by the Advisory/Appeals Board may do so as follows:

1. An application for review shall be filed on forms provided by the Building Official and accompanied by a non-refundable fee (refer to the fee schedule as adopted by this jurisdiction by separate ordinance), not less than three (3) weeks prior to the regularly scheduled Advisory/Appeals Board Committee meeting. The three (3) weeks advance filing requirement may be reduced at the discretion of the Advisory/Appeals Board.
2. Adequate information shall be provided by the applicant in order to fully describe the conditions in question.
3. At the hearing the applicant may introduce evidence in support of his/her position.
4. Decisions and findings of the Advisory/Appeals Board shall be final and made in writing to the Building Official and the applicant. Decisions of the board shall be made by a majority vote of the members present, provided that a

quorum shall consist of a majority of the board members appointed at the time of that meeting.

References to any “Board of Appeals” in the technical codes shall be construed to mean “Advisory/Appeals Board”.

Section 112.4 Court Review of Board Decision. A decision of the Advisory/Appeals Board, made at a duly scheduled and publicly noticed meeting, unless otherwise stated by the Advisory/Appeals Board in the body of said decision, shall be final. No further appeal is available to City or County boards or officials. Persons aggrieved by final decisions of the Advisory/Appeals Board must file their appeals in the Superior Court.

Section 113.1 Unlawful Acts. DELETE in its entirety and REPLACE as follows:

Section 113.1 Unlawful Acts. It shall be a civil infraction for any person, firm or corporation to erect, construct, alter, extend, repair, move, remove, demolish or occupy any building, structure or equipment regulated by this code, or cause same to be done, in conflict with or in violation of any of the provisions of this code and each day such violation continues shall constitute a separate offense.

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

Section 310.1 Residential Group R. REVISE section R-4 as follows:

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 the 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 in its entirety and REPLACING as follows:

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 assemble 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 (Item 2) Group F-1. REVISE section by REPLACING the word “three” with the word “two”.

Section 903.2.6 (Item 2) Group M. REVISE section by REPLACING the word “three” with the word “two”.

Section 903.2.8 (Item 2) Group S-1. REVISE section by REPLACING the word “three” with the word “two”.

Section 903.1.10.1 Stories and basements without openings. REVISE section by REPLACING the first paragraph 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 two stories. REVISE the section by DELETING it in its entirety and REPLACING it as follows:

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 as follows:

Section 903.2.10.4 Special amusements buildings (also see Section 411). 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 number four in its entirety.

Section 903.1.2.1 Balconies. REVISE section by DELETING all text after the first sentence.

Section 904.11.2 System interconnection. REVISE section by ADDING the following to the end of the first sentence:

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

Section 1011.2 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 illuminated, 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 as follows:

Section 1610.1.1 Presumptive active pressure. For typical unsaturated soils in Pima County, a presumptive active lateral pressure of 35pcf 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 ration 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 fence/retaining wall consists of more than one wall thickness, the smallest thickness shall be used in determining the height-to-thickness ratio.

ADD new Section 1804.2.1 as follows:

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

ADD new Section 1804.3.2 as follows:

Section 1804.3.2 Presumptive coefficient of friction. For typical unsaturated soils in Pima County, a presumptive coefficient of friction for lateral sliding of 0.30 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 a 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, sub-sections, and Tables 1805.5 (1) through 1805.5 (5).

ADD new Section 1901.2.1 as follows:

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 provided 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 as follows:

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.

Table 2114.6.A

ALLOWABLE STRESSES FOR EMPIRICAL DESIGN OF EARTHEN WALL STRUCTURES

STRENGTH OF UNIT, GROSS AREA		ALLOWABLE STRESSES GROSS CROSS-SECTIONAL AREA	NOTE 1
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 air 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 Table 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 Table 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 1/2 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 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 (406 mm) shall not be supported on non-combustible 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 non-combustible 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. Earthen 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 of 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 envelope 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:

1. At top of all exterior window and door openings in such a manner as to be leak proof.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projections lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
5. At wall and roof intersections.

Section 2114.15.4 Weep holes. Weep holes shall be provided in the outside with 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 fur 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 unites shall be selected at random from each lot of units of fraction thereof produced. Mass wall systems such as Rammed Earth shall provide 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 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.

Section 2114.19.3.1 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 (102 mm) 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.

Section 2114.19.3.2 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

Material Type	Dry Compression 2114.16.3.1.1	Wet Compression 2114.16.3.1.2	Modulus of Rupture 2114.16.3.1.3	Absorption <2.5% 2114.16.3.1.4	Absorption <5.0% 2114.16.3.1.5	Moisture Content 2114.16.3.1.6
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° C.) 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 2114.19.3.3.4 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 (1.27 mm) 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 suitable 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. Bed on and cap with a felt pad not less than 1/8 inch (3.2 mm) or more than 1/4 inch (6.4 mm) in thickness.

Section 2114.19.4.4 Testing the 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 inches (1.27 mm) 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 or 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 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:

Equation 2116.3.1.3.4-1

$$Fr = 3WLs/2bt^2$$

Where, for 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 = Th 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 ° F. to 239° 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° F. to 239° 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 (76 mm) in length or 1/8 inch (3.2 mm) 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 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 shall 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 provided 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 D2216, 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 S 698). Samples taken from the wall shall exceed 300 psi compression (ASTM D1633) 14 days after placement.

Section 2308.10.1 Wind uplift. REVISE section by DELETING the paragraph and REPLACING it with the following:

Uplift resistance shall be determined by either **Method 1** or **2**.

Method 1 Design-based wind uplift criteria. Win 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 rater or truss tied to the foundation.

Method 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).

Method 2.1 Conventionally-framed wood or cold-formed steel structures. All bearing wall vertical connections provide a continuous load path from the joist or truss through the ledger or top plate to the bottom plate with approved structural sheathing or approved clips. There clips are used, they shall be minimum Simpson H2.5 (A34 at ledger), or equivalent load capacity, or 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.

Method 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.

Method 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".

Method 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”.

Method 2.3 Structural steel structures. Structural steel buildings shall have roof members attached by either welds, bolts 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 rooms containing hot tubs, whirlpools, saunas, steam rooms, bathtubs, or showers where the bottom exposed edge of the glazing is less than 60 inches above a standing surface.
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 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 18inches above the walking surface (ARS 36-1631).

Table 2902.1 number 2 and 6. REVISE as follows:

Service sinks shall not be required for business and mercantile occupancies equal to or less than 1500 square feet.

Section 3303.1. Construction Documents. MOVE this section to 3303.1.1. REPLACE the text in section 3303.1 to read as follows:

Section 3303.1 Purpose. The purpose of the section is two-fold. First, it is intended to insure that the safety and health of the public is protected during and after demolition of existing structures. Second, it is intended to insure within the historic central core of the City that there will be a preliminary review of proposed demolitions to determine whether any affect historical structures. Where there is a potential impact, this section will allow the City sufficient time to document the historical status and characteristics so that they are not irretrievable lost and, where appropriate, seek to preserve the most significant structures.

ADD new Section 3303.1.1 to read:

Section 3303.1.1. Construction Documents. Construction documents and a schedule for demolition must be submitted when required by the building official. Where such information is required, no work shall be done until such construction documents or schedule, or both, are approved.

ADD new Section 3303.1.2 to read:

Section 3303.1.3 Application. An application for a demolition permit shall contain the following:

1. The address of the property and the name of the owner of the property.
2. The date of initial construction and the date(s) of any substantial additions or alterations to the structure.
3. The person or company responsible for the demolition.
4. The square footage of the structure to be demolished.
5. A revised site plan showing the property after demolition of the structure.
6. A description of the principal use of the structure or the last use permitted by a certificate of occupancy for the structure.
7. Documentation that the disconnection and capping of all utilities has been provided for following demolition.
8. Description of the safeguards to be provided to protect the public during and following demolition, including documentation of the treatment of asbestos by submitting a copy of the form provided to Pima County Department of Environmental control titled Demolition/renovation asbestos NESHAP exemption. The work of demolishing any building shall not be commenced until pedestrian protection is in place as required by this chapter.
9. Description of the provisions to ensure that all building debris, trash, junk, dead organic materials, rodent harborage, combustible material, and any other material that may constitute a threat to public health and safety will be removed from the site no later than thirty (30) days after demolition.
10. A description of how the property will be stabilized following demolition in a manner that will provide protection from safety and environmental hazards, including stabilization of the soil to prevent erosion or dust.
11. A statement of the reason for the demolition.
12. The date for completion of the demolition.

Section 3303.2 Pedestrian Protection. DELETE text from section and REPLACE as follows:

Section 3303.2 Notice. At least fifteen (15) days prior to the start of demolition, the applicant shall provide notice to the adjacent property owners of the proposed demolition. Confirmation of the notice may be submitted with the application.

Section 3303.4 Vacant Lot. DELETE text from section and REPLACE as follows:

Section 3303.4 Finished Site Requirements. No later than thirty (30) days following demolition, all building debris, trash, junk, dead organic materials, rodent harborage, combustible material, and any other material that may constitute a threat to public health and safety will be removed from the site and the site shall be stabilized to provide protection from safety and environmental hazards, including stabilization of the soil to prevent erosion or dust.

Section 3303.6 Utility Connections. DELETE text from section and REPLACE as follows:

Section 3303.6 Utility disconnections. Prior to the demolition, the applicant shall demonstrate to the satisfaction of the Building Official, that all necessary utility disconnections have been arranged and that necessary provisions have been made to ensure the safety of the property.

ADD new Section 3303.7 to read:

Section 3303.7 Demolition in the Historic Central Core. Any demolition of a building, structure or building service that is wholly or partially more than forty-five (45) years old within the area that compromised the city limits for the City of Tucson as of October 6, 1953, the "Historic Central Core", shall be reviewed to determine whether the building, structure or building service provides historic or architectural resources in its original setting, placement and appearance that is important to the preservation of the history of the City's development and character as provided in this section.

1. Statement of historic and architectural features and context. A survey shall be prepared of the properties within 300 feet of the proposed demolition to establish the historical and architectural features and context for the area. The survey shall included the date of construction for the structure to be demolished and structures in the survey area, any common architectural features, designs or attributes, any historical events which occurred in the survey area, or whether there are any homes of historic figures in the survey area. The survey may be prepared by the applicant and submitted with the application. They City may accept the survey, request additional information or conduct its own survey prior to acceptance of the application.
2. Applications shall be reviewed by the Plans Review Subcommittee of the Tucson/Pima County Historical Commission, which shall provide a recommendation on whether the proposed demolition has any impact on the history and architecture of the Historic Central Core. The Plans Review Subcommittee of the Tucson/Pima County Historical Commission shall make its recommendation no later than thirty (30) days after the application is accepted by the City unless the applicant agrees to additional time for its consideration.

3. Within thirty (30) days of the recommendation from the Plans Review Subcommittee of the Tucson Pima County Historical Commission, the Building Official shall decide whether to approve the demolition permit subject to the following:
 - A. The Building Official may delay the demolition for no more than 90 days in order to document important historical features.
 - B. The Building Official may delay the demolition for no more than 180 days for significant historical structures to provide the City with time to preserve the structure either by purchasing or arranging the purchase of the property or structure.
4. Compliance with the provisions of Sec. 2.8.8.7 or Sec. 2.8.10.7 of the Land Use Code will satisfy the requirements of this section.

ADD new Section 3303.8 to read:

Section 3303.8 Bond. The Building Official may require a bond to be posted in an amount sufficient to insure that the site will be stabilized following the demolition.

ADD new Section 3303.9 to read:

Section 3303.9 Emergency Demolition. If the structured has been determined by the Building Official to be an imminent hazard to public safety and repairs would be impractical, emergency demolition procedures to be followed will be in accordance with the requirements for such sites and structured of Chapter 6 of the Tucson Code. Refer to Development Standard 4-01.0 for information on these procedures.

Section 3109 Swimming pool enclosures and Safety devices. REVISE as follows:

Section 3109.2 Swimming Pools. REVISE section by DELETING text and REPLACING as follows:

A body of water intended for swimming, eighteen or more inches in depth at any point and eight feet or more in length or width.

Section 3109.3 Public swimming pool. REVISE section by DELETING the fence height of “4 feet” and REPLACING it with “5 feet”.

Section 3109.4 Residential swimming pools. REVISE section by DELETING this section and subsections 3109.4.1 through 3109.4.1.9 and REPLACE with the following:

Section 3109.4 Residential swimming pool enclosures; requirements; exceptions.

1. A swimming pool, as defined in amended Section 3109.2, whether above ground or below ground, shall be protected by an enclosure surrounding the pool area as provided in this section and shall meet the following requirements:
 - A. Be entirely enclosed by at least a five-foot wall, fence or other barrier as measured on the exterior side of the wall, fence or barrier.
 - B. Have no openings in the wall, fence or barrier through which a spherical object four inches in diameter can pass. The horizontal components of any wall, fence or barrier shall be spaced not less than forty-five inches apart measured vertically or shall be placed on the pool side of a wall, fence or barrier which shall not have any opening in the vertical components (vertical rails) greater than one and three-quarter inches measured horizontally. Wire mesh or chain link fences shall have a maximum mesh size of one and three-quarter inches measured horizontally.
 - C. Gates for the enclosure shall be self-closing and self-latching with a latch located at least 54 inches above the underlying ground or on the pool side of the gate with a release mechanism at least five inches below the top of the gate and no openings greater than one-half inch within 24 inches of the release. The gate shall open outward from the pool.
 - D. The wall, fence or barrier shall not contain openings, handholds or footholds accessible from the exterior side of the enclosure that can be used to climb the wall, fence or barrier.
 - E. The wall, fence or barrier shall be at least 20 inches from the water's edge.
2. The residence or living area cannot constitute part of the enclosure required by section 3109.4 for a swimming pool or other contained body of water except in the case of Indoor Pools, or if there are no operable openings exceeding four inches in the wall of the building that is being used as an enclosure. If there are openings greater than 4 inches from the residence to the pool area, one of the following is required:
 - A. Between the swimming pool or other contained body of water and the residence or living area, a minimum four foot wall, fence or barrier to the pool area which meets all of the requirements of Subsection 2, paragraphs A through E **OR**
 - B. The swimming pool shall be an above ground swimming pool, which has non-climbable exterior sides, which are a minimum height of four feet. Any access ladder or steps shall be removable without tools and secured in an inaccessible position with a latching device not less than 54 inches above the ground when the pool is not in use.

Section 3109.4.2 Indoor swimming pools. REVISE section by DELETING text and REPLACING with the following:

All doors with direct access to the swimming pool or other contained body of water shall be equipped with a self-latching device which meets the requirements of subsection 1, paragraph C. All other openable dwelling unit or guest room windows with similar access shall be equipped with a screwed in-place wire mesh screen or a keyed lock that prevents opening the window more than 4 inches, or a latching device located not less than 54 inches above the floor. Emergency escape or rescue windows that adjoin the pool area are not permitted.

ADOPT **Appendix E** (Supplemental Accessibility Requirements), **G** (Flood-Resistant Construction), **I** (patio Covers), and **J**.

Appendix J Grading. REVISE this section by ADDING a second paragraph to **J109.1 General** as follows:

Unless otherwise recommended by a registered design professional, drainage facilities and terracing shall be provided in accordance with the requirements of this section.

The City of Tucson Development Standard 11-01.0 is hereby adopted into Appendix J.

2006 International Residential Code City of Tucson Amendments

Table R301.2(1) Climatic and geographic design criteria. INSERT following data:

Ground Snow Load	Less than 4000 ft 0 psf 4 to 5000 ft 20 psf 5 to 7000 ft 40 psf 7 to 8000 ft 60 psf Over 8000 ft 80 psf
Wind Speed	90 mph
Seismic Design	Cat. B
Weathering	Up to 4000 ft-Negligible Above 4000 ft-Moderate
Frost Line Depth	Up to 4000 ft-0 in Above 4000 ft-24 in
Termite	Moderate to Heavy
Decay	None to Slight
Winter Design Temperature	32 deg less than 4000 ft 4 deg over 4000 ft
Flood Hazards	NFIP: February 15, 1983 FIRM: February 8, 1999

Section R105.1 Required. AMEND section by ADDING the following sentence to the end of the paragraph to read:

“Any owner or authorized agent who intends to construct, enlarge, alter, repair, move, demolish, or change the occupancy of a building structure, or to erect, install, enlarge, alter, repair, remove, convert, or replace any electrical gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause such work to be done, shall first make application to the building official and obtain the required permit. *See amendments to section 3303 of the International Building Code and its amendments for demolition permit requirements.*”

ADD new section 105.1.1 to read:

Section 105.1.1 Demolition Permits. No building or structure regulated by this code shall be demolished unless a permit is obtained in conformance with this section and section 3303 of the International Building Code, including local amendments.

Section R301.2.2.2 Irregular buildings. REVISE section by ADDING “B” in front of “C” in the first paragraph.

Section 302 Exterior Wall Location. DELETE section in its entirety, including table 302.1, and REPLACE as follows:

R302.1 Exterior walls. Exterior walls with a fire separation distance less than 3 feet (914mm) shall have not less than a one-hour fire-resistive rating with exposure from both sides. Projections shall not extend to a point closer than 2 feet (610 mm) from the line used to determine the fire separation distance.

Exception: Detached garages accessory to a dwelling located within 2 feet of a lot line may have roof eave projections not exceeding 4 inches.

Projections extending into the fire separation distance shall have not less than one-hour fire-resistive construction on the underside. The above provisions shall not apply to walls which are perpendicular to the line used to determine the fire separation distance.

Exception: Tool and storage sheds, playhouses and similar structures exempted from permits by R105.2 are not required to provide wall protection based on location on the lot. Projections beyond the exterior wall shall not extend over the lot line.

R302.2 Openings. Openings shall not be permitted in the exterior wall of a dwelling or accessory building with a fire separation distance less than 3 feet (914 mm). This distance shall be measured perpendicular to the line used to determine the fire separation distance.

Exceptions:

1. Openings shall be permitted in walls that are perpendicular to the line used to determine the fire separation distance.
2. Foundation vents installed in compliance with this code are permitted.

R302.3 Penetrations. Penetrations located in the exterior wall of a dwelling with a fire separation distance less than 3 feet (914 mm) shall be protected in accordance with Section R317.3.

Exception: Penetrations shall be permitted in walls that are perpendicular to the line used to determine the fire separation distance.

Section R308.4 Number 5. DELETE in its entirety and REPLACE as follows:

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.

Section R308.4 Number 6. DELETE in its entirety and **REPLACE** as follows:

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).

Section R309.1 Opening protection. REVISE section by **INSERTING** the following at the end of the first paragraph:

Doors providing opening protection shall be self-closing and self-latching.

Section R403.1 General. REVISE section by **INSERTING** the following at the end of the paragraph:

Footings and monolithic foundation slab turndowns shall have minimum reinforcement consisting of one No. 4 bar located a minimum of 3 inches (76 mm) clear from the bottom of the footing. Masonry and concrete stemwalls shall have minimum reinforcement in accordance with Section R606.1.1 and with vertical reinforcement installed in the footing with a standard hook.

Figure R403.1.7.1 Foundation Clearances from Slopes. DELETE figure and **REPLACE** with 2006 International Building Code **Figure 1805.3.1 Foundation Clearances from Slopes.**

ADD new section R606.1.2 as follows:

Section R606.1.2 Reinforcement required. All masonry construction, except that conforming to requirements of Section R614, shall be reinforced in accordance with the following:

1. Horizontal reinforcement. Horizontal joint reinforcement shall consist of at least two longitudinal W1.7 wires spaced not more than 16 inches (406 mm) for walls not exceeding 4 inches (102 mm) in width; or at least one No. 4 bar spaced not more than 48 inches (1219 mm). Where two longitudinal wires of joint reinforcement are used, the space between these wires shall be the widest that the mortar joint will accommodate. Horizontal reinforcement shall be provided within 16 inches of the top and bottom of these masonry elements. Openings in walls and columns shall comply with the details provided in Figure R606.11(3).
2. Vertical Reinforcement. Vertical reinforcement shall consist of at least one No. 4 bar spaced not more than 48 inches (1219 mm). Vertical reinforcement shall be located within 16 inches (406 mm) of the ends of the masonry walls and shall comply with the details provided in figure R606.11(3).

ADD NEW Section R614 - Earthen Wall Structures.

Section R614 - Earthen Wall Structures

R614.1 General. Earthen wall structures in Seismic Design Category A, B or C with basic wind speed of 90 mph or less with wind exposure category of A, B, or C may be designed and constructed in accordance with the provisions of this Section R614.

This Section shall supersede the limitations of Section R301.2.2 and structures complying with the provisions of Section R614 shall have complied with the seismic requirements of this code.

Exception: Structures with any site conditions may be designed with accepted engineering practice for earthen wall structures and the provisions of the IBC Section 2114 as amended.

R614.1.1 Earthen materials. This section shall establish minimum standards for safety for construction of earthen materials structures, collectively known as adobe, rammed earth, and hydraulic pressed unit construction.

R614.1.2 Professional registration not required. When the empirical design provisions of this section are used to design wall systems, project drawings, typical details and specifications are not required to bear the seal of an architect or engineer, unless otherwise required by the state law of the jurisdiction having authority or as required by Section R614.1.3.

R614.1.3 Professional registration required. When the earthen structure is over 12 feet (3638 mm) in height, as measured by Table R602.3.1, or is over 1 story, the plans and specifications shall be prepared by a registered professional architect or engineer licensed in the state for which the project is to be constructed. All such projects shall be designed in accordance with accepted engineering practice for earthen wall structures and in accordance the International Building Code Section 2114 as amended.

R614.2 Dimensions of earth walls. The actual measured thickness of earthen walls shall conform to the requirements of Section R614.

R614.2.1 Thickness and Height. The minimum thickness and maximum height of earthen walls and parapets shall be in accordance with Tables R614.2.1 (1 to 6) based upon the S_{ds} value for the site of the project. Wall thickness shall be measured from face to face of walls with concave joints. Walls with rake joints shall be measured surface of joint to surface of joint. The thickness of wall sections shall not be combined without full cross bonding of the masonry units throughout the wall.

Exception: Walls supported only at ground level and only supported at the base of the wall shall be limited to a height of ½ that allowed by Tables R614.2.1 (1 to 6).

Table R614.2.1 (1)

Seismic Sites with Sds

0.00 TO 0.25

Assuming zero tension out-of-plane

	10	11	12	Actual Wall Thickness (in) 13	14	15	16	18	20	22	24
	Maximum Wall Heights (inches)										
EXTERIOR	NP	83	99	116	135	144	144	144	144	144	144
INTERIOR	127	140	144	144	144	144	144	144	144	144	144
PARAPET	NP	22	24	26	28	30	32	36	40	44	48
	Bond Beam Size and Steel Requirements All Bond Beams 8" Minimum Height										
EXTERIOR WALL NO PARAPET											
TYPE "A"	2- #4	2- #4	2- #5	2- #5	2- #5	2- #5	2- #4	2- #4	2- #4	2- #4	2- #4
TYPE "B"	2- #5	2- #5	2- #5	4- #4	4- #4	4- #4	2- #5	2- #4	2- #4	2- #4	2- #4
TYPE "C"	NP	NP	NP	NP	NP	4- #5	4- #4	2- #4	2- #4	2- #4	2- #4
EXTERIOR WALL with FULL PARAPET											
TYPE "A"	2- #4	2- #4	2- #5	2- #5	2- #5	2- #5	2- #4	2- #4	2- #4	2- #4	2- #4
TYPE "B"	2- #5	2- #5	2- #5	4- #4	4- #4	4- #4	2- #5	2- #4	2- #4	2- #4	2- #4
TYPE "C"	NP	NP	NP	NP	NP	4- #5	4- #4	2- #4	2- #4	2- #4	2- #4
INTERIOR WALL w/ infill between beams											
TYPE "A"	2- #4	2- #4	2- #5	2- #5	2- #5	2- #5	2- #4	2- #4	2- #4	2- #4	2- #4
TYPE "B"	2- #5	2- #5	2- #5	4- #4	4- #4	4- #4	2- #5	2- #4	2- #4	2- #4	2- #4
TYPE "C"	NP	NP	NP	NP	NP	4- #5	4- #4	2- #4	2- #4	2- #4	2- #4

NP = This wall not permitted.

Table R614.2.1 (2)

Seismic Sites with Sds

0.25 TO 0.30

Assuming zero tension out-of-plane

	10	11	12	Actual Wall Thickness (in)	14	15	16	18	20	22	24
				13							
				Maximum Wall Heights (inches)							
EXTERIOR	NP	83	99	116	135	144	144	144	144	144	144
INTERIOR	106	116	127	137	144	144	144	144	144	144	144
PARAPET	NP	22	24	26	28	30	32	36	40	44	48
				Bond Beam Size and Steel Requirements							
				All Bond Beams 8" Minimum Height							
EXTERIOR WALL NO PARAPET											
TYPE "A"	2- #4	2- #5	2- #5	2- #5	4- #4	4- #4	2- #5	2- #4	2- #4	2- #4	2- #4
TYPE "B"	2- #5	4- #4	4- #4	4- #5	4- #5	4- #5	4- #4	2- #5	2- #4	2- #4	2- #4
TYPE "C"	NP	NP	NP	NP	NP	4- #5	4- #5	2- #5	2- #4	2- #4	2- #4
EXTERIOR WALL with FULL PARAPET											
TYPE "A"	2- #4	2- #5	2- #5	2- #5	4- #4	4- #4	2- #5	2- #4	2- #4	2- #4	2- #4
TYPE "B"	2- #5	4- #4	4- #4	4- #5	4- #5	4- #5	4- #4	2- #5	2- #4	2- #4	2- #4
TYPE "C"	NP	NP	NP	NP	NP	4- #5	4- #5	2- #5	2- #4	2- #4	2- #4
INTERIOR WALL w/ infill between beams											
TYPE "A"	2- #4	2- #5	2- #5	2- #5	4- #4	4- #4	2- #4	2- #4	2- #4	2- #4	2- #4
TYPE "B"	2- #5	4- #4	4- #4	4- #5	4- #5	4- #5	4- #4	2- #5	2- #4	2- #4	2- #4
TYPE "C"	NP	NP	NP	NP	NP	4- #5	4- #5	2- #5	2- #4	2- #4	2- #4

NP = This wall not permitted.

BOND BEAM LOAD	46	61	79	100	125	125	108	80	42	0	0
BOND BEAM LOAD	81	103	130	160	194	204	198	194	183	171	203
BOND BEAM LOAD	84	100	118	137	150	151	152	155	158	161	164

Table R614.2.1 (3)

Assuming zero tension out-of-plane

	10	11	12	Actual Wall Thickness (in) 13	14	15	16	18	20	22	24
				Maximum Wall Heights (inches)							
EXTERIOR	NP	83	99	116	127	136	144	144	144	144	144
INTERIOR	91	100	109	118	127	136	144	144	144	144	144
PARAPET	NP	22	24	26	28	30	32	36	40	44	48
				Bond Beam Size and Steel Requirements All Bond Beams 8" Minimum Height							
EXTERIOR WALL NO PARAPET											
TYPE "A"	2- #5	2- #5	2- #5	4- #4	4- #4	4- #5	4- #5	4- #4	2- #5	2- #4	2- #4
TYPE "B"	4- #4	4- #4	4- #5	4- #5	4- #5	4- #5	4- #5	4- #4	2- #5	2- #4	2- #4
TYPE "C"	NP	NP	NP	NP	NP	4- #6	4- #6	4- #5	4- #4	2- #5	2- #4
EXTERIOR WALL with FULL PARAPET											
TYPE "A"	2- #5	2- #5	2- #5	4- #4	4- #4	4- #4	2- #5	4- #4	2- #5	2- #4	2- #4
TYPE "B"	4- #4	4- #4	4- #5	4- #5	4- #5	4- #5	4- #5	4- #4	2- #5	2- #4	2- #4
TYPE "C"	NP	NP	NP	NP	NP	4- #6	4- #6	4- #5	4- #4	2- #5	2- #4
INTERIOR WALL w/ infill between beams											
TYPE "A"	2- #5	2- #5	2- #5	4- #4	4- #4	4- #5	4- #5	4- #4	2- #5	2- #4	2- #4
TYPE "B"	4- #4	4- #4	4- #5	4- #5	4- #5	4- #5	4- #5	4- #4	2- #5	2- #4	2- #4
TYPE "C"	NP	NP	NP	NP	NP	4- #6	4- #6	4- #5	4- #4	2- #5	2- #4

NP = This wall not permitted.

BOND BEAM LOAD	53	71	92	117	137	157	176	156	127	88	40
BOND BEAM LOAD	94	121	151	186	218	250	281	289	291	287	277
BOND BEAM LOAD	86	103	120	140	160	182	203	206	210	213	216

Table R614.2.1 (4)

Seismic Sites with Sds

0.35 TO 0.40

Assuming zero tension out-of-plane

	10	11	12	Actual Wall Thickness (in) 13	14	15	16	18	20	22	24
				Maximum Wall Heights (inches)							
EXTERIOR	NP	83	95	103	111	119	127	143	144	144	144
INTERIOR	79	87	95	103	111	119	127	143	144	144	144
PARAPET	NP	22	24	26	28	30	32	36	40	44	48
				Bond Beam Size and Steel Requirements All Bond Beams 8" Minimum Height							
EXTERIOR WALL NO PARAPET											
TYPE "A"	2- #5	2- #5	4- #4	4- #4	4- #4	4- #5	4- #5	4- #5	4- #4	2- #5	2- #5
TYPE "B"	4- #4	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #4	2- #5
TYPE "C"	NP	NP	NP	NP	NP	4- #6	4- #6	4- #6	4- #5	4- #5	2- #5
EXTERIOR WALL with FULL PARAPET											
TYPE "A"	2- #5	2- #5	4- #4	4- #4	4- #4	4- #5	4- #5	4- #5	4- #4	2- #5	2- #5
TYPE "B"	4- #4	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #4	2- #5
TYPE "C"	NP	NP	NP	NP	NP	4- #6	4- #6	4- #6	4- #5	4- #5	2- #5
INTERIOR WALL w/ infill between beams											
TYPE "A"	2- #5	2- #5	4- #4	4- #4	4- #4	4- #5	4- #5	4- #5	4- #4	2- #5	2- #5
TYPE "B"	4- #4	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #4	2- #5
TYPE "C"	NP	NP	NP	NP	NP	4- #6	4- #6	4- #6	4- #5	4- #5	2- #5

NP = This wall not permitted.

BOND BEAM LOAD	61	81	101	118	137	157	179	227	211	181	142
BOND BEAM LOAD	108	138	168	198	229	263	299	379	399	409	412
BOND BEAM LOAD	89	105	123	143	163	186	209	260	268	272	276

Table R614.2.1 (5)

0.40 TO 0.45

Seismic Sites with Sds

Assuming zero tension out-of-plane

	10	11	12	13	14	15	16	18	20	22	24
	Actual Wall Thickness (in)										
	Maximum Wall Heights (inches)										
EXTERIOR	NP	78	85	92	99	106	113	127	141	144	144
INTERIOR	70	78	85	92	99	106	113	127	141	144	144
PARAPET	NP	22	24	26	28	30	32	36	40	44	48
	Bond Beam Size and Steel Requirements										
	All Bond Beams 8" Minimum Height										
EXTERIOR WALL NO PARAPET											
TYPE "A"	2- #5	2- #5	4- #4	4- #4	4- #4	4- #5	4- #5	4- #5	4- #5	4- #5	4- #4
TYPE "B"	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #6	4- #5	4- #5
TYPE "C"	NP	NP	NP	NP	NP	4- #6	4- #6	4- #6	4- #6	4- #6	4- #5
EXTERIOR WALL with FULL PARAPET											
TYPE "A"	2- #5	2- #5	4- #4	4- #4	4- #4	4- #5	4- #5	4- #5	4- #5	4- #5	4- #4
TYPE "B"	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #6	4- #5	4- #5
TYPE "C"	NP	NP	NP	NP	NP	4- #6	4- #6	4- #6	4- #6	4- #6	4- #5
INTERIOR WALL w/ infill between beams											
TYPE "A"	2- #5	2- #5	4- #4	4- #4	4- #4	4- #5	4- #5	4- #5	4- #5	4- #5	4- #4
TYPE "B"	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #6	4- #5	4- #5
TYPE "C"	NP	NP	NP	NP	NP	4- #6	4- #6	4- #6	4- #6	4- #6	4- #5

NP = This wall not permitted.

BOND BEAM LOAD	68	85	101	118	137	157	179	227	280	274	243
BOND BEAM LOAD	121	149	177	208	241	276	314	398	491	530	548
BOND BEAM LOAD	91	108	126	146	167	189	213	265	322	339	343

Table R614.2.1 (6)

Seismic Sites with Sds

0.45 TO 0.50

Assuming zero tension out-of-plane

	10	11	12	Actual Wall Thickness (in) 13	14	15	16	18	20	22	24
				Maximum Wall Heights (inches)							
EXTERIOR	NP	70	76	82	89	95	101	114	127	140	144
INTERIOR	63	70	76	82	89	95	101	114	127	140	144
PARAPET	NP	22	24	26	28	30	127	36	40	44	48
				Bond Beam Size and Steel Requirements All Bond Beams 8" Minimum Height							
EXTERIOR WALL NO PARAPET											
TYPE "A"	2- #5	2- #5	4- #4	4- #4	4- #4	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5
TYPE "B"	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #6	4- #6	4- #5
TYPE "C"	NP	NP	NP	NP	NP	4- #6	4- #6	4- #6	4- #6	4- #6	4- #6
EXTERIOR WALL with FULL PARAPET											
TYPE "A"	2- #5	2- #5	4- #4	4- #4	4- #4	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5
TYPE "B"	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #6	4- #6	4- #5
TYPE "C"	NP	NP	NP	NP	NP	4- #6	4- #6	4- #6	4- #6	4- #6	4- #6
INTERIOR WALL w/ infill between beams											
TYPE "A"	2- #5	2- #5	4- #4	4- #4	4- #4	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5
TYPE "B"	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #5	4- #6	4- #6	4- #5
TYPE "C"	NP	NP	NP	NP	NP	4- #6	4- #6	4- #6	4- #6	4- #6	4- #6

NP = This wall not permitted.

BOND BEAM LOAD	70	85	101	118	137	157	179	227	280	338	345
BOND BEAM LOAD	129	156	185	218	252	290	330	417	515	623	683
BOND BEAM LOAD	93	110	129	149	170	193	217	269	327	390	417

R614.2.2 Maximum length. The maximum length of any earthen wall laterally braced by Bond Beams per Section R614.5.2 shall be 20 feet (6,096 mm) between perpendicular bracing walls. Any wall in excess of 20 feet (6,096 mm) shall be designed in accordance with the amended IBC as noted in Section R614.1 above, (See Section R614.7 for required lengths of solid shear panels in walls.), or braced by a roof diaphragm roof system as required by Section R614.5.2.3.

R614.3 Support conditions. Earthen walls shall be supported on a solid concrete, solid masonry foundation system the width of which shall be not be less than 1/2 inch narrower than the earthen wall which it supports. Earthen structures shall not be less than 6 inches above adjacent grade.

R614.3.1 Moisture barrier. A moisture barrier equal to 30 lbs. asphalt impregnated building paper, or equivalent moisture resistant barrier, shall be installed between the supporting foundation and the earthen wall material.

R614.4 Allowable stresses. Allowable compressive, tensile and shear stresses in earthen walls shall not exceed the values prescribed in Table R614.4. In determining the stresses in masonry, 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 taken into account. Bolts in shear shall be limited to those values in IBC Table 2109.8.3.1.

R614.4.1 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 (76.2 mm).

When dissimilar materials, (e.g. concrete masonry or steel) are 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.

Table R614.4

ALLOWABLE STRESSES FOR EMPIRICAL DESIGN OF EARTHEN WALL STRUCTURES

STRENGTH OF UNIT, GROSS AREA		ALLOWABLE STRESSES	
		GROSS CROSS-SECTIONAL AREA	NOTE 1
Compression	300 psi	Normal Loading	30 psi
		Concentrated Loading	30 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.

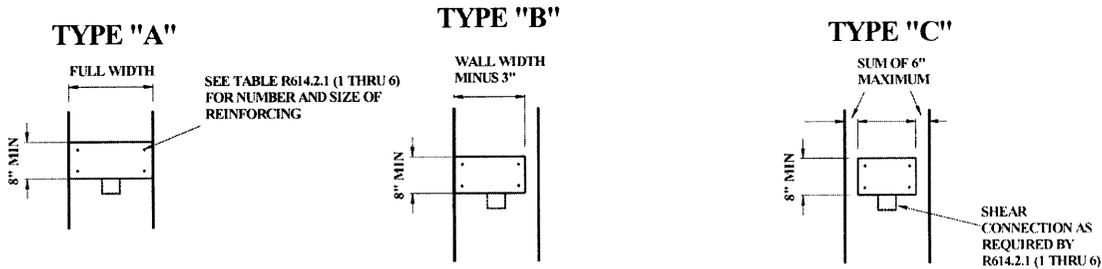
Notes:

1. Gross cross-sectional area shall be calculated on the actual rather than the nominal dimensions.

R614.5 Lateral support. Earthen walls constructed of earthen units shall be bonded and tied to intersecting earthen walls and laterally supported in the vertical direction in accordance with one of the methods in Section R614.5.2 or Section R614.5.3.

R614.5.2 Bond Beams. A continuous concrete 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 shall be not less than the width of the wall minus 6 inches (152.4 mm) and a height of not less than 8 inches. Bond beams shall be reinforced as required by Tables R614.2.1 (1 to 6). Bars shall be placed not more than 1 ½” from the inside face of the form or veneer block as indicated in Figure R614.5.2.1.

Figure R614.5.2.1



R614.5.2.2.1 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 200 lbs. per lineal foot plus an additional 25 lbs. per lineal foot for every inch of thickness in excess of 16” thick.

R614.5.3 Roof diaphragm. A roof diaphragm complying with other provisions of this code adequate to provide not less than 200 lbs. per lineal foot of lateral support may be used to brace earthen walls. Earthen walls shall be anchored to roof diaphragms with connections to resist loads of not less than 200 lbs. per lineal foot plus an additional 25 lbs. per lineal foot for every inch of thickness in excess of 16” thick. This anchorage shall be tie beams as specified in Section R614.5.3.2 or other anchorage methods of equal strength.

R614.5.3.1 Tie beams. A tie beam is a concrete or masonry 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. Tie beams shall be anchored to the roof diaphragm system as required by other provisions in this code at intervals not exceeding 4 feet (1219 mm).

Tie beams shall be not less than ½ the width of the earthen wall, a minimum of 8 inches (203.2 mm) high and reinforced with 2 - #4 reinforcing bars.

R614.5.3.2 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 200 lbs. per lineal foot plus an additional 25 lbs. per lineal foot for every inch of thickness in excess of 16" thick.

R614.6 Lintels. Earthen walls over openings shall be supported by steel lintels, reinforced concrete or masonry lintels or earthen 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.

R614.7 Shear walls. Earthen walls subject to in-plane loads shall be designed with at least one earthen wall shear panel, at least 4 feet long, free of openings, with a length as computed by formula R614.7-1.

$$\text{Equation R614.7-1- } L = (\text{Sqrt PL} \times \text{Sds} \times 4)$$

Where:

L = Length of shear panel

PL = Sum of overall length of walls perpendicular to the panel.

Sds = Sds factor as determined by Section 1615 of the International Building Code.

R614.8 Jambs at openings. Portions of walls between openings or corner shall be constructed with lengths of not less than 1 ½ times the thickness of the wall in which they occur.

R614.9 Piers. The thickness of isolated earthen piers shall be not less than 1 ½ times those wall thickness values indicated in Table R614.2.1(1 to 6). 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 as required by Section R614.11.

R614.9.1 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.

R614.10 Chases. Chases and recesses in earthen walls shall not be deeper than one-half 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 (203.2 mm) of masonry in back of the chases and recesses and between adjacent chases or recesses 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. Masonry directly above chases or recesses wider than 12 inches (304.8 mm) shall be supported on noncombustible lintels.

R614.11 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.

R614.12 Metal reinforcement. In addition to bonding earthen walls shall be anchored at their intersections, all walls shall be reinforced with joint reinforcement at vertical intervals of not more than 16 inches (406.4 mm). Horizontal reinforcement shall be continuous at the intersections. Reinforcement shall be not more than 4 inches narrower than the wall thickness.

R614.13 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 shall be limited to the first story above grade and be not less than 4 inches (101.6 mm) or greater than 8 inches (203.2 mm) in thickness. Veneers shall not exceed a height of over 20 times their thickness without structural vertical support.

R614.13.1 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 (406.4 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.

R614.13.2 Air space. The veneer shall be separated from the sheathing by an air space of a minimum of 1 inch (25.4 mm) but not more than 2 inches (50.8 mm). A moisture-resistant barrier or 15 lb. asphalt-saturated felt as required by Section R703.2 shall be provided except when veneer is applied over concrete masonry or concrete backing.

R614.13.3 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:

1. At top of all exterior window and door openings in such a manner as to be leak proof.
2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
5. At wall and roof intersections.

R614.13.4 Weep holes. Weep holes shall be provided in the outside withe of masonry walls at a maximum spacing of 33 inches (838.2 mm) on center. Weep holes shall not be less than 3/16 inches (4.76 mm) in diameter. Weep holes shall be located immediately above the flashing.

R614.13.5 Plaster veneer. Both interior and exterior faces of earthen walls which are to be plastered with cement plaster shall be lathed and plastered in accordance the Section R703.6.1.

R614.14 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 (1829 mm) without consideration to out-of-plane bending of the buttress.

R614.15 Gable end walls. Gable end walls shall be constructed using veneer construction as required by Section R703.7 or shall be provided with lateral bracing to prevent overturn designed in accordance with the IBC as modified.

R614.16 Ledgers. Ledgers shall not be used to support vertical live and dead loads in excess of 75 lbs. per lineal foot.

R614.17 Construction documents. In addition to the provisions of Section R106 all plans for earthen structures shall include the following:

1. The Sds number of the site.
2. The wind speed and site exposure coefficient of the site.
3. The material standard to which the earthen materials will comply.
4. The foundation supporting system and moisture barrier material.
5. The length, height and thickness in the actual dimensions of all earthen walls and parapets.
6. The bond beam or tie beam construction and attachment method to the earthen wall.
7. Lintel design, construction and end bearing area.
8. Veneer dimensions, attachment methods, moisture barrier and supporting structure.
9. Flashing materials and installation.
10. Metal reinforcement type and location.

R614.18 Corbeled wall elements. The maximum corbeled projection beyond the face of the wall shall not be more than one fourth of the wall thickness.

R614.19 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 five tests for each required standard test series.

R614.19.1 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.

R614.19.2 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.

R614.19.3 Categories of earthen materials. Type I, II, III, and IV earthen materials are approved for use in construction of projects designed in accordance with the IBC and Table R614.19.3.2.

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.

R614.19.3.1 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 (101.6 mm) of the floor or at the top of parapet walls or near potential sources of water which may affect the stability of the earth wall system. Other Types of adobe may be left unplastered and may be used without separation from the floor.

R614.19.3.2 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 R614.19.3.2

<i>Material Type</i>	Dry Compression R614.19.3.2.1	Wet Compression R614.19.3.2.2	Modulus of Rupture R614.19.3.1.3	Absorption <2.5% R614.19.3.2.4	Absorption <5.0% R614.19.3.2.5	Moisture Content R614.19.3.2.6
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.

R614.19.3.2.1 Dry compression strength. Determine the compressive strength of the required number of samples as required by Section R614.19. in accordance with the following procedures.

R614.19.3.2.1.1 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.

R614.19.3.2.1.2 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.

R614.19.3.2.1.3 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 (6.4 mm) in thickness.

R614.19.3.2.1.4 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 (1.27 mm) per minute.

R614.19.3.1.5 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).

R614.19.3.2.2 Wet compression strength. Determine the compressive strength of the required number of specimen as required by Section R614.19. in accordance with the following procedures.

R614.19.3.2.2.1 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.

R614.19.3.2.2.2 Wetting the Specimen. Submerge the specimen under water for not less than 8 hours or longer as required until fully saturated.

R614.19.3.2.2.3 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 (3.2 mm) or more than ¼ inch (6.4 mm) in thickness.

R614.19.3.2.2.4 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 (1.27 mm) per minute.

R614.19.3.2.2.5. 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).

R614.19.3.2.3 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).

R614.19.3.2.3.1 Support conditions. A cured unit shall be simply supported by 2-inch-diameter (50.8 mm) cylindrical supports located 2 inches (50.8 mm) in from each end and extending the full width of the unit.

R614.19.3.2.3.2 Loading conditions. A 2-inch-diameter (50.8 mm) cylinder shall be placed at mid-span parallel to the supports.

R614.19.3.2.3.3 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.

R614.19.3.2.3.4 Modulus of rupture determination. The modulus of rupture shall be determined by the formula:

$$\text{Equation 2116.3.2.3.4-1 } Fr = 3WLs/2bt^2$$

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).

R614.19.3.2.4 Absorption less than 2.5%. A 4-inch (101.6 mm) cube, cut from an adobe unit fried 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.

R614.19.3.2.5 Absorption less than 5.0%. A 4-inch (101.6 mm) cube, cut from an adobe unit fried 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.

R614.19.3.2.6 Additional Requirements. All earthen units shall meet the following requirements.

R614.19.3.2.6.1 Moisture content requirements. Earthen units shall have a moisture content not exceeding 4 percent by weight at the time of use.

R614.19.3.2.6.2 Shrinkage cracks. All earthen units shall not contain more than three shrinkage cracks and any single shrinkage crack shall not exceed 3 inches (76.2 mm) in length or 1/8 inch (3.2 mm) in width.

R614.19.3.2.6.3 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.

R614.19.3.3 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 2114.14.2 for frequency of testing.

R614.19.3.3.1 Testing before Construction. The installer of cement stabilized Rammed Earth shall provide the following testing before issuance of a building permit.

R614.19.3.3.2 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 shall contain not more than 0.2 percent of water-soluble salts.

R614.19.3.3.3 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.

R614.19.3.3.4 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 R802.11.1 Uplift Resistance. AMEND by DELETING first two paragraphs and REPLACING as follows:

Roof assemblies which are subject to wind uplift pressures shall have roof rafters or trusses attached to their supporting wall assemblies by connections capable of providing the resistance required in Table R802.11 but not less than 365 pounds. A continuous load path shall be provided to transmit the uplift forces from the rafter or truss ties to the foundation.

ADD new Section M1307:

M1307.6 Liquefied Petroleum Appliances. LPG appliances shall not be installed in an attic, pit or other location that would cause a ponding or retention of gas.

Section G2415.9 Minimum burial depth. DELETE G2415.9 & G2415.9.1 and REPLACE as follows:

Underground piping systems shall be installed a minimum depth of 12 inches (304.8 mm) below grade for metal piping and 18 inches (457 mm) for plastic piping with caution tape 6 inches (152.5 mm) above plastic pipes.

ADD new section P2602.1.1:

Section 2602.1.1 Individual metering in new multi-family residential units. The water supply to all new multi-family residential buildings shall be individually metered for each dwelling unit. The metering may be private or utility installed.

Section P2603.6.2 Sewer Depth. INSERT [number] as “12” in both locations.

Section P3003.2 Prohibited joints. REVISE section by DELETING the period at the end of item 5 and ADDING, “unless the solvent-cement is listed for the purpose.”

Section P3008.1 General. REVISE section by DELETING paragraph and ADDING new text to read:

Where the finish floor elevation is less than 12 inches above the elevation of the next upstream manhole in the public sewer or private sewer collection system, a backwater valve shall be installed in the building drain or branch of the building drain serving that floor. Floors discharging from above that reference point shall not discharge through the backwater valve. Backwater valves shall be provided with access.

Section E3306.3: Minimum size of conductors. REPLACE the words “No 12 AWG aluminum” with “No. 10 AWG aluminum”.

Section 3603.1: Branch circuits for heating. REVISE by ADDING the following sentence to the end of the paragraph:

Evaporative cooler fan and pump motors shall be permitted to be connected to the same branch circuit as central heating.

ADD NEW subsection E3603.7:

Section E3603.7 Dishwasher and Garbage Disposer Branch Circuits – Dwelling Units. In residential occupancies, dishwasher and garbage disposer may be on the same 20-ampere branch circuit.

ADD NEW subsection E3702.7:

Section E3702.7 Earthen material wiring method. Type UF Cable shall be permitted to be used in mortar joints of adobe construction in occupancies where the use of Nonmetallic Sheathed Cable is permitted by this code.

Table E3701.4 Allowable Applications for Wiring Methods. Revise as Follows:

Allowable Applications (application allowed where marked with an "A")	AC	EMT	ENT	FMC	IMC		LFC ^a	MC	NM	SR	SE	UF	USE
					RNC	RMC							
Services		A	A ^h	A ⁱ		A	A ⁱ	A			A		A
Feeders	A	A	A	A		A	A	A	A		A ^b	A	A ^b
Branch Circuits	A	A	A	A		A	A	A	A	A	A ^c	A	
Inside a building	A	A	A	A		A	A	A	A	A	A	A	
Wet locations exposed to sunlight		A	A ^h	A ^d		A	A	A			A	A ^c	A ^c
Damp locations		A	A	A ^d		A	A	A			A	A	A
Embedded in noncinder concrete in dry location		A	A			A							
In noncinder concrete in contact with grade		A	A ^f			A ^f							
Embedded in plaster not exposed to dampness	A	A	A	A		A	A	A			A	A	
Embedded in masonry		A	A			A ^f	A	A				A ^j	
In masonry voids and cells exposed to dampness or below grade lime		A ^f	A	A ^d		A ^f	A	A			A	A	
Fished in masonry voids	A			A		A	A	A	A		A	A	
In masonry voids and cells not exposed to dampness	A	A	A	A		A	A	A	A		A	A	
Run exposed	A	A	A	A		A	A	A	A	A	A	A	A
Run exposed and subject to physical damage						A							
For direct burial		A				A ^g	A	A				A	A
Embedded in earthen material wall systems with full head and bed joints		A ^f	A	A		A ^f	A	A ^f				A	
Embedded in Straw Bale walls		A ^f	A	A		A ^f	A	A ^f	A			A	

For SI: 1 foot = 304.8 mm

- Liquid-tight flexible nonmetallic conduit without integral reinforcement within the conduit wall shall not exceed 6 feet in length.
- The grounded conductor shall be insulated except where used to supply other buildings on the same premises. Type USE cable shall not be used inside buildings.
- The grounded conductor shall be insulated.
- Conductors shall be a type approved for wet locations and the installation shall prevent water from entering other raceways.
- Shall be listed as "Sunlight Resistant".
- Metal raceways shall be protected from corrosion and approved for the application.
- RNC shall be Schedule 80 when exposed outside or when exposed to physical damage inside.
- Shall be listed as "Sunlight Resistant" where exposed to the direct rays of the sun.
- Conduit shall not exceed 6 feet in length.
- Type UF cable shall be permitted to be used in mortar joints of adobe construction in occupancies where the use of nonmetallic cable is permitted by this code.

Section E3808.8.1 Flexible metal conduit. DELETE and REPLACE section and exceptions with:

Section E3808.8.1 Flexible metal conduit. Flexible metal conduit shall not be permitted as a grounding means. An equipment grounding conductor, sized in accordance with Table E3808.12, shall be installed in all flexible metal conduits. Where an equipment-bonding jumper is required around flexible metal conduit, it shall be installed in accordance with Section E3808.20.

Exception: Listed and labeled factory assembled (pre-wired) fixtures and equipment with flexible metal conduit will not require the addition of the grounding conductor in the pre-wired raceway.

Section E3808.8.2 Liquid-tight flexible metal conduit. DELETE and REPLACE section with:

Section E3808.8.2 Liquid-tight flexible metal conduit. Liquid-tight flexible metal conduit shall not be permitted as a grounding means. An equipment grounding conductor, sized in accordance with Table E3808.12, shall be installed in all liquid-tight flexible metal conduits. Where an equipment-bonding jumper is required around liquid-tight flexible metal conduit, it shall be installed in accordance with Section E3808.20.

Exception: Listed and labeled factory assembled (pre-wired) fixtures and equipment with liquid-tight flexible metal conduit will not require the addition of the grounding conductor in the pre-wired raceway.

ADD new subsection E4202.3:

Section E4202.3 Location of power supplies and transformers.

Section E4202.3.1 Accessibility. Class 1, Class 2, and Class 3 power supplies and transformers shall be accessible.

Section E4202.3.2 Prohibited locations.

1. In any closet or space where clearances are not respected as per incandescent exposed luminaires in Section E3903.11.
2. In attics or other space subject to high ambient temperatures.

All Appendix Requirements are adopted with the following exceptions:

APPENDIX E MANUFACTURED HOUSING USED AS DWELLINGS

DELETE this portion in its entirety and REPLACE as follows:

See State office of Manufactured Housing Regulations.

APPENDIX F RADON CONTROL METHODS

DELETE this portion in its entirety.

APPENDIX G POOLS

Section AG102 Definitions

Swimming Pool. DELETE and REPLACE as follows:

A body of water intended for swimming, eighteen or more inches in depth at any point and eight feet or more in length or width.

Section AG105.2 Outdoor swimming pool. DELETE and REPLACE as follows:

Section AG105.2 Pool enclosures; requirements; exceptions.

1. A swimming pool, as defined in section AG102, whether above ground or below ground, shall be protected by an enclosure surrounding the pool area as provided in this section and shall meet the following requirements:
 - A. Be entirely enclosed by at least a five-foot wall, fence or other barrier as measured on the exterior side of the wall, fence or barrier.
 - B. Have no openings in the wall, fence or barrier through which a spherical object four inches in diameter can pass. The horizontal components of any wall, fence or barrier shall be spaced not less than forty-five inches apart measured vertically or shall be placed on the pool side of a wall, fence or barrier which shall not have any opening in the vertical components (vertical rails) greater than one and three-quarter inches measured horizontally.
 - C. Gates for the enclosure shall be self-closing and self-latching with a latch located at least 54 inches above the underlying ground or on the pool side of the gate with a release mechanism at least five inches below the top of the gate and no openings greater than one-half inch within 24 inches of the release. The gate shall open outward from the pool.
 - D. The wall, fence or barrier shall not contain openings, handholds, or footholds accessible from the exterior side of the enclosure that can be used to climb the wall, fence or barrier.
 - E. The wall, fence or barrier shall be at least twenty inches from the water's edge.
2. The residence or living area cannot be used as part of the enclosure required by subsection 1 for a swimming pool or other contained body of water except:
 - (a) in the case of Indoor Pools,
 - (b) if there are no operable openings exceeding 4 inches in the wall of the building in the portion used as an enclosure.

If there are openings greater than 4 inches from the residence or living space which would permit access to the swimming pool or other contained body of water, one of the following is required:

- (a) Between the swimming pool or other contained body of water and the residence or living area, a minimum four foot wall, fence or barrier to the pool area which meets all of the requirements of subsection 1, paragraphs A through E, or
- (b) The swimming pool shall be an above ground swimming pool, having non-climbable exterior sides, which are a minimum height of four feet. Any access ladder or steps shall be removable without tools and secured in an inaccessible position with a latching device not less than fifty-four inches above the ground when the pool is secure.

3. This section does not apply to:

- A. A system of sumps, irrigation canals, irrigation, flood control or drainage works constructed or operated for the purpose of storing, delivering, distributing or conveying water.
- B. Stock ponds, storage tanks, livestock operations, livestock watering troughs or other Structures used in normal agricultural practices.
- C. A swimming pool or contained body of water constructed prior to June 2, 1991.

Section AG105.3 Indoor pools. DELETE and REPLACE with the following:

All doors with direct access to the swimming pool or other contained body of water shall be equipped with a self-latching device which meets the requirements of subsection 1 paragraph C. All other openable dwelling unit or guest room windows with similar access shall be equipped with a screwed in-place wire mesh screen or a keyed lock that prevents opening the window more than four inches, or a latching device located not less than fifty-four inches above the floor. Emergency escape or rescue windows that adjoin the pool area are not permitted.

APPENDIX I: PRIVATE SEWAGE DISPOSAL

Section AI101.1 Scope: DELETE in its entirety and REPLACE as follows:

See State Department of Environmental Quality Regulations.

APPENDIX L: PERMIT FEES DELETE in its entirety and REPLACE as follows:

Appendix L: IRC Residential Structures:

An automatic fire sprinkler system shall be installed throughout every IRC residential structure constructed on property when:

- 1. Fire-flow for buildings as required in the Fire Code cannot be met, or
- 2. Fire hydrant location and spacing requirements of the Fire Code cannot be met, or
- 3. Fire Department access roads with grades less than 15% are not provided, or
- 4. The distance between any portion of an exterior wall of the first story and an approved hydrant is greater than 500 feet.

Residential or quick response sprinklers shall be used. The sprinkler system may be connected to the domestic water supply provided the required design density can be met. Residential fire sprinkler systems shall be installed in accordance with the Fire Code.

APPENDIX M: HOME DAY CARE- R-3 OCCUPANCY- DELETE in its entirety REPLACE as follows:

Appendix M - Straw-Bale Structures

Section AM101 Purpose. The purpose of this appendix chapter is to establish minimum prescriptive standards of safety for the construction of structures which use baled straw as a load bearing or non-load bearing material.

Section AM102 Scope. The provisions of this chapter shall apply to all structures utilizing straw-bales in the construction of wall systems. Load bearing structures shall be limited to Occupancy Groups R, Division 3 and U.

Section AM103 Definitions. For the purpose of this chapter, certain terms are defined as follows:

STRAW is the dry stems of cereal grains left after the seed heads have been removed.

BALES are rectangular compressed blocks of straw, bound by strings or wire.

FLAKES are slabs of straw removed from an untied bale. Flakes are used to fill small gaps between the ends of stacked bales.

LAID FLAT refers to stacking bales so that the sides with the largest cross-sectional area are horizontal and the longest dimension of this area is parallel with the wall plane.

LAID ON-EDGE refers to stacking bales so that the sides with the largest cross-sectional area are vertical and the longest dimension of this area is horizontal and parallel with the wall plane.

Section AM104 MATERIALS

AM104.1 Specifications for Bales.

AM104.1.1 Type of Straw. Bales of various types of straw, including, but not limited to, wheat, rice, rye, barley, oats and similar plants, shall be acceptable if they meet the minimum requirements for density, shape, moisture content, and ties.

AM104.1.2 Shape. Bales shall be rectangular in shape.

AM104.1.3 Dimensions. Bales used within a continuous wall shall be of consistent height and width to ensure even distribution of loads within wall systems.

AM104.1.4 Ties. Bales shall be bound with ties of either polypropylene string or baling wire. Bales with broken or loose ties shall not be used unless the broken or loose ties are replaced with ties which restore the original degree of compaction of the bale.

AM104.1.5 Moisture Content. Moisture content of bales, at time of installation, shall not exceed 20% of the total weight of the bale. Moisture content of bales shall be determined by one of the following:

AM104.1.5.1 Field Method. A suitable moisture meter, designed for use with baled straw or hay, and equipped with a probe of sufficient length to reach the center of the bale, shall be used to determine the average moisture content of 5 bales randomly selected from the bales to be used.

AM104.1.5.2 Laboratory Method. A total of 5 samples, taken from the center of each of 5 bales randomly selected from the bales to be used, shall be tested for moisture content by a recognized testing lab.

AM104.1.6 Density. Bales in load-bearing structures shall have a minimum calculated dry density of 7.0 pounds per cubic foot. The calculated dry density shall be determined after reducing the actual bale weight by the weight of the moisture content, as determined in Section 7204.1.5. The calculated dry density shall be determined by dividing the calculated dry weight of the bale by the volume of the bale.

AM104.1.7 Custom Size Bales. Where custom-made partial bales are used, they shall be of the same density, same string or wire tension, and, where possible, use the same number of ties as the standard size bales.

Section AM105 - Construction and General Requirements

AM105.1 General. Bale walls, when covered with plaster, drywall or stucco shall be deemed to have the equivalent fire resistive rating as wood frame construction with the same wall-finishing system.

AM105.2 Wall Thickness. Nominal minimum bale wall thickness shall be 14 inches.

AM105.3 Wall Height. Bale walls shall not exceed one story in height and the bale portion shall not exceed a height to width ratio of 5.6 : 1 (for example, the maximum height for the bale portion of a 23 inch thick wall would be 10 feet - 8 inches), unless the structure is designed by an engineer or architect licensed by the State to practice as such, and approved by the Building Official.

Exception: In the non-load bearing exterior end walls of structures with gable or shed roofs, an approved continuous assembly shall be required at the roof bearing assembly level.

AM105.4 Unsupported Wall Length. The ratio of unsupported wall length to thickness, for bale walls, shall not exceed 13:1 (for a 23-inch thick wall, the maximum unsupported length allowed is 25 feet), unless the structure is designed by an engineer or architect licensed by the State to practice as such, and approved by the Building Official.

AM105.5 Allowable Loads. The allowable vertical load (live and dead load) on the top of bale walls shall not exceed 360 pounds per square foot (psf) and the resultant load shall act at the center of the wall. Bale structures shall be designed to withstand all vertical and horizontal loads as specified in Chapter 16.

AM105.6 Foundations. Foundations shall be sized to accommodate the thickness of the bale wall and the load created by the wall and roof live and dead loads. Foundation (stem) walls which support bale walls shall extend to an elevation of not less than 6 inches above adjacent ground at all points. The minimum width of the footing shall be the width of the bale it supports, except that the bales may overhang the exterior edge of the foundation by not more than 3 inches to accommodate rigid perimeter insulation. Footings shall extend a minimum of 12 inches below natural, undisturbed soil, or to frost line, whichever is lower.

Section AM105.7 Wall and Roof Bearing Assembly Anchorage

AM105.7.1 General. Vertical reinforcing bars with a minimum diameter of 1/2", shall be embedded in the foundation a minimum depth of 6 inches, and shall extend above foundation a minimum of 12 inches. These vertical bars shall be located along the centerline of the bale wall, spaced not more than 2 feet apart. A vertical bar shall also be located within 1 foot of any opening or corner, except at locations occupied by anchor bolts.

AM105.7.2 Intersecting Walls. Walls of other materials intersecting bale walls shall be attached to the bale wall by means of one or more of the following methods or an acceptable equivalent:

1. Wooden dowels at least 5/8" in diameter of sufficient length to provide 12 inches of penetration into the bale, driven through holes bored in the abutting stud, and spaced to provide one dowel connection per bale.
2. Pointed wooden stakes, at least 12 inches in length and 1-1/2" by 3-1/2" at the exposed end, fully driven into each course of bales, as anchorage points.
3. Bolted or threaded rod connection of the abutting wall, through the bale wall, to a steel nut and steel or plywood plate washer, a minimum of 6 inches square and a minimum thickness of 3/16" for steel and 1/2" for plywood, in at least three locations.

AM105.7.3 Anchor Bolts. Load bearing bale walls shall be anchored to the foundation by 1/2" diameter steel anchor bolts embedded at least 7 inches in the foundation at intervals of 6 feet or less. A minimum of two anchor bolts per wall shall be provided with one bolt located within 36 inches of each end of each wall. Sections of 1/2" diameter threaded rod shall be connected to the anchor bolts, and to each other, by means of threaded coupling nuts and shall extend through the roof bearing assembly and be fastened with a steel washer and nut. Bale walls and roof bearing assemblies may be anchored to the foundation by means of other methods which are adequate to resist uplift forces resulting from the design wind load. There shall be a minimum of two points of anchorage per wall, spaced not more than 6 feet apart, with one located within 36 inches of each end of each wall.

The dead load of the roof and ceiling systems will produce vertical compression of the bales. Regardless of the anchoring system used to attach the roof bearing assembly to the foundation, prior

to installation of wall finish materials, bolts or straps shall be re-tightened to compensate for this compression.

AM105.7.4 Moisture Barrier. A moisture barrier shall be used between the top of the foundation and the bottom of the bale wall to prevent moisture from migrating through the foundation into the bottom course of bales. This barrier shall consist of one of the following:

1. cementitious waterproof coating;
2. type 30 asphalt felt over an asphalt emulsion;
3. sheet metal flashing, sealed at joints;
4. other approved building moisture barrier. All penetrations through the moisture barrier, as well as all joints in the barrier, must be sealed with asphalt, caulking or an approved sealant.

AM105.7.5 Stacking and Pinning. Bales in load-bearing walls shall be laid flat and stacked in running bond where possible, with each bale overlapping the two bales beneath it. Bales in non load-bearing walls may be laid either flat or on-edge and stacked in running bond where possible. For non-load bearing walls, bales may be laid either flat or on-edge. Bales in load bearing walls shall be laid flat and stacked in a running bond, where possible, with each bale overlapping the two bales beneath it. Overlaps shall be a minimum of 12 inches. Gaps between the ends of bales which are less than 6 inches in width can be filled by an untied flake inserted snugly into the gap.

The first course of bales shall be laid by impaling the bales on the vertical bars or threaded rods, if any, extending from the foundation. When the fourth course has been laid, #4 rebar pins, or an acceptable equivalent long enough to extend through all four courses, shall be driven down through the bales, two in each bale, located so that they do not pass within six inches of, or through the space between the ends of any two bales. The layout of these pins shall approximate the layout of the vertical bars extending from the foundation. As each subsequent course is laid, two such pins, long enough to extend through the course being laid and the three courses immediately below it, shall be driven down through each bale. This pinning method shall be continued to the top of the wall. In walls seven or eight courses high, pinning at the fifth course may be eliminated.

Only full-length bales shall be used at corners of load bearing walls, unless exceptions are designed by an engineer or architect licensed by the State to practice as such, and approved by the Building Official.

Vertical #4 rebar pins, or an acceptable alternative, shall be located within 1 foot of all corners or door openings.

Staples, made of #3 or larger rebar formed into a "U" shape, at least 18 inches long with two 6 inch legs, shall be used at all corners of every course, driven with one leg into the top of each abutting corner bale. In lieu of staples, corner bales may be tied together, by a method approved by the building official.

AM105.7.5.1 Alternative Pinning Method. When the third course has been laid, vertical #4 rebar pins, or an acceptable equivalent, long enough to extend through all three courses, shall be driven down through the bales, two in each bale, located so that they do not pass within 6 inches

of, or through the space between the ends of any two bales. The layout of these rebar pins shall approximate the layout of the rebar pins extending from the foundation. As each subsequent course is laid, two such pins, long enough to extend through that course and the two courses immediately below it, shall be driven down through each bale. This pinning method shall be continued to the top of the wall.

AM105.7.6 Roof Bearing Assembly. Load bearing bale walls shall have a roof bearing assembly at the top of the wall to bear the roof load and to provide a means of connecting the roof structure to the foundation. The roof bearing assembly shall be continuous along the tops of structural walls.

An acceptable roof bearing assembly option consists of two double 2" X 6", or larger, horizontal top plates, one located at the inner edge of the wall and the other at the outer edge. Connecting the two doubled top plates and located horizontally and perpendicular to the length of the wall shall be 2" X 6" cross members spaced no more than 72 inches center to center, and as required to align with the threaded rods extending from the anchor bolts in the foundation. The double 2" X 6" top plates shall be face nailed with 16d nails staggered at 16 inches on center, with laps and intersections face nailed with four 16d nails. The cross members shall be face nailed to the top plates with four 16d nails at each end. Corner connections shall include overlaps nailed as above or an acceptable equivalent such as plywood gussets or metal plates. Alternatives to this roof bearing assembly option must provide equal or greater vertical rigidity and provide horizontal rigidity equivalent to a continuous double 2 by 4 top plate.

The connection of roof framing members to the roof bearing assembly shall comply with the appropriate sections of the UBC.

AM105.7.7 Openings and Lintels. All openings in load bearing bale walls shall be a minimum of one full bale length from any outside corner, unless exceptions are designed by an engineer or architect licensed by the State to practice as such, and approved by the Building Official.

AM105.7.7.1 Openings. Openings in exterior bale walls shall not exceed 50 percent of the total wall area, based on interior dimensions, where the wall is providing resistance to lateral loads, unless the structure is designed by an engineer or architect licensed by the State to practice as such, and approved by the Building Official.

AM105.7.7.2 Lintels. Wall and/or roof load present above any opening shall be carried, or transferred to the bales below by one of the following:

1. A structural frame,
2. A lintel (such as an angle-iron cradle, wooden beam, wooden box beam). Lintels shall be at least twice as long as the opening is wide and extend at least 24" beyond either side of the opening. Lintels shall be centered over openings, and shall not exceed the load limitations of Section 7205.5 by more than 25 percent.

AM105.7.8 Moisture Protection. All weather-exposed bale walls shall be protected from water damage. An approved building moisture barrier shall be used to protect at least the bottom course of bales, but not more than the lower one-third of the vertical exterior wall surface, in order to allow

natural transpiration of moisture from the bales. The moisture barrier shall have its upper edge inserted at least 6 inches into the horizontal joint between two courses of bales, and shall extend at least 3 inches below the top of the foundation. Bale walls shall have special moisture protection provided at all window sills. Unless protected by a roof, the tops of walls shall also be protected. This moisture protection shall consist of a waterproof membrane, such as asphalt-impregnated felt paper, polyethylene sheeting, or other acceptable moisture barrier, installed in such manner as to prevent water from entering the wall system at window sills or at the tops of walls.

AM105.7.9 Wall Finishes. Interior and exterior surfaces of bale walls shall be protected from mechanical damage, flame, animals, and prolonged exposure to water. Bale walls adjacent to bath and shower enclosures shall be protected by a moisture barrier.

Cement stucco shall be reinforced with galvanized woven wire stucco netting or an acceptable equivalent. Such reinforcement shall be secured by attachment through the wall at a maximum spacing of 24 inches horizontally and 16 inches vertically, using a method approved by the Building Official.

Where bales abut other materials, the plaster/stucco shall be reinforced with galvanized expanded metal lath, or an acceptable equivalent, extending a minimum of 6 inches onto the bales.

Earthen and lime-based plasters may be applied directly onto the exterior and interior surface of bale walls without reinforcement, except where applied over materials other than straw. Weather-exposed earthen plasters shall be stabilized using a method approved by the building official.

Lime based plasters may be applied directly onto the exterior surface of bale walls without reinforcement, except where applied over materials other than straw.

AM105.7.10 Electrical. All wiring within or on bale walls shall meet all provisions of the National Electrical Code adopted by this jurisdiction. Type NM or UF cable may be used, or wiring may be run in metallic or nonmetallic conduit systems.

Electrical boxes shall be securely attached to wooden stakes driven a minimum of 12 inches into the bales, or an acceptable equivalent.

AM105.7.11 Plumbing. Water or gas pipes within bale walls shall be encased in a continuous pipe sleeve to prevent leakage within the wall. Where pipes are mounted on bale walls, they shall be isolated from the bales by a moisture barrier.

Section AM106 Privacy/Landscape Walls

AM106.1 General. This section covers freestanding or attached bale privacy or landscape walls, not exceeding 6 feet in height, from final grade to top of wall. Bales may be stacked either flat or on-edge. Alternate methods, other than those listed in this section, may be approved by the building official.

AM106.2 Foundations. The minimum foundation shall consist of an 8 inch thick reinforced concrete stem wall, over an approved footing. Minimum width of the stem wall shall be equal to the width of the

bottom bale. Stem walls shall have continuous horizontal reinforcement consisting of two #4 bars with 24 inches minimum lap at splices.

AM106.2.1 Reinforcement. Vertical reinforcing bars, a minimum 3/8" in diameter, shall be placed in the center of the stem wall, two per bale, and extend up a minimum of 24 inches, and be embedded a minimum of 4 inches into the concrete stem wall. Bales shall be pinned, using two 3/8" diameter bars per bale, and use pins long enough to provide at least one vertical bar from stem wall to top of wall, with a minimum of one full bale overlap where not continuous.

For the purpose of attaching stucco mesh to the wall, 12d or larger galvanized common double-headed nails shall be embedded in the concrete a minimum of 1 inch below the top of the stem wall, with the heads embedded a minimum of 2 inches into the concrete, and the points extending a minimum of 3/4" from the face of the stem wall, and spaced a minimum of 6" on center on both sides of the wall.

AM106.2.2 Moisture Barrier. A moisture barrier shall be used between the top of the stem wall and the first course of bales. A moisture barrier shall also be used to protect the tops of bales at the top of walls, and shall extend 6 inches down on either side of the wall.

AM106.2.3 Stucco Mesh. Stucco mesh, 20 gauge or heavier, shall be attached by means of clinching the embedded nails on one side of the wall, stretching a continuous piece of netting tightly over the top of the wall, and fastening the netting in the same manner on the opposite side of the wall.

AM106.2.4 Wall Finish. Walls shall be finished with cement stucco, or stabilized mud plaster, with a minimum thickness of 7/8".

Appendices O, P, Q are hereby DELETED in their entirety.

Amendments to the:
2006 International Energy Conservation Code

Section 101.1 Title. Insert:[name of jurisdiction] as “City of Tucson”.

ADD new section 101.5 to read:

Section 101.5 Sustainable energy standard. Compliance with the Sustainable Energy Standard shall be deemed to comply with this code.

Section 202. Definitions. AMEND section by ADDING a definition for Indirectly Conditioned Space as follows:

Indirectly Conditioned Space. An indirectly conditioned space has no heating or cooling system, but is directly heated or cooled due to its proximity to spaces that are heated or cooled. Two criteria can be applied to determine if a space is indirectly conditioned:

- (a) If the heat transfer rate to conditioned space is larger than the heat transfer rate to the exterior (ambient conditions), then the space is considered indirectly conditioned.
- (b) If there is an air transfer rate between the space and conditioned space that exceeds three air changes per hour (ACH), then the space is considered indirectly conditioned. Air transfer can be provided by natural or mechanical means.

ADD new section 302.2 to read:

Section 302.2 Exterior design conditions.

**Table 302.1
 Exterior Design Conditions**

Pima County Arizona			
CONDITION		Under 4,000 feet elevation ¹	4,000 feet elevation & above ²
Winter	Design Dry Bulb Temp	32°F	4°F
Summer	Design Dry Bulb Temp	104°F	90°F
	Design Wet Bulb Temp	66°F	61°F
Degree days heating		2100	7000
Degree days cooling		2814	140
Climate zone		2B	5B

Section 501.2 Application. REVISE this section by DELETING the last sentence of the paragraph.

Section 503.2.7 Duct and plenum insulation and sealing. AMEND this section by DELETING *only* the first paragraph and replacing it with the following:

“All supply and return air ducts and plenums shall be insulated with a minimum of R-4.2 insulation when located in indirectly conditioned spaces or unconditioned spaces (neither heated nor cooled) within a building thermal envelope, and with a minimum of F-8 insulation when located outside the building. Then located within a ventilated attic or space within a building envelope that freely communicated with the outside, ducts shall have R-8 insulation. When located within a building thermal envelope, duct insulation is not required.

City of Tucson
 Amendments to the:
2005 National Electrical Code

Section 210.5 Identification for branch circuits. REVISE section by DELETING paragraph (C) and REPLACING it with the following:

(C) Ungrounded conductors. Branch circuits shall conform to the following color code.

<u>Volts</u>	<u>Phase</u>	<u>System</u>	<u>Phase A</u>	<u>Phase B</u>	<u>Phase C</u>	<u>Grounded Conductor</u>
120/208	3	WYE	Black	Red	Blue	White
277/480	3	WYE	Brown	Orange	Yellow	Grey
120/240	3	DELTA	Black	Orange	Red	white

Exception No. 1: The above color coding is not required in residential occupancies.

Exception No. 2: Industrial occupancies holding a Registered Plant Permit may use their own coding system.

Exception No. 3: Additions to an existing electrical system, where an acceptable color coding system exists, the existing color coding system shall be continued.

Section 210.11(C) Dwelling units. REVISE section by ADDING Item (4) to read:

(4) Dishwasher and garbage disposer branch circuits-dwelling units. In residential occupancies, dishwasher and garbage disposer may be on the same 20-ampere branch circuit.

ADD new Section 220.89 to read:

220.89 Optional calculation for non-dwelling unit occupancies. The calculation of feeder or service load in non-dwelling unit occupancies shall be permitted to be calculated in accordance with Table 220.89 in lieu of Part II of this article. This section shall not apply to calculations performed under Sections 220.86, 220.87, or 220.88. Calculations for this section shall be prepared by a registered electrical engineer.

Table 220.89
Optional Method-Demand Factors for
Non-Dwelling Unit Occupancies

Connected Loads from Part II, Article 220	Demand Factors¹ (Percent)
Connected load up to and including 800 amperes	100
Connected load over 800 amperes	90

Footnote:

¹Other demand factors may be permitted at the discretion of the Building Official.

Section 225.32 Location. REVISE section by ADDING the following:

Exception No. 5: For freestanding canopies, carports, towers, and similar structures, a branch circuit disconnecting means shall be permitted to be located elsewhere on the premises. A bonding conductor sized per Section 250.122 shall be run with the circuit conductors.

Section 230.40 Number of service-entrance conductor sets. REVISE section by DELETING exception no. 1 and REPLACING it with the following:

Exception No. 1: For multiple-occupancy buildings, not more than two groups of one to six disconnects shall be permitted to be tapped from a single service drop or set of service lateral conductors. When mounted in individual enclosures, the groups of one to six disconnects shall be separated by not less than two feet. When part of a manufactured gangable meter center (cable terminal box and meter/disconnect section bussed together), a readily identifiable separation shall exist between the two groups of one to six disconnects.

In addition, DELETE exception No. 4 in its entirety and renumber exception No. 5 to exception No. 4.

Section 230.70(B) Marking. REVISE this section by ADDING the following to the end of the sentence:

The markings shall be of sufficient durability to withstand the environment involved. Identifying labels required for disconnecting means shall have engraved or raised letters and be secured by screws or rivets (plastic tape shall not be considered durable material).

Section 230.90 (A) General. Add Exception No. 6 to read:

Exception No. 6: For services conforming to Section 230.40, Exception No.1 only, not more than two groups of one to six circuit breakers or sets of fuses shall be permitted as the overcurrent devices to provide the overload protection. The sum of the ratings of the circuit breakers or fuses shall be permitted to exceed the ampacity of the service conductors, provided the calculated load in accordance with Article 220 does not exceed the ampacity of the service conductors.

Section 240.24(B) Occupancy. REVISE section by DELETING both exceptions and REPLACING them with the following:

Exception No. 1: In a multiple-occupancy building where electric service supplies more than one occupancy and electrical maintenance is provided by the building management and where these are under continuous supervision by the building management or agent, the service overcurrent devices, feeder overcurrent devices and branch circuit overcurrent devices shall be permitted to be accessible to authorized personnel only.

Section 250.118 Types of equipment grounding conductors. REVISE section by DELETING items (5), (6), (7), and (8).

Table 310.5 Minimum size of conductors. REVISE Table to read:

Table 310.5

Voltage Rating of Conductor - Volts	Minimum Conductor Size - AWG
0 through 2000	14 Copper 12 Copper-Clad Aluminum 8 Aluminum
2001 through 8000	8
8001 through 15000	2
15001 through 28000	1
28001 through 35000	1/0

Section 340.10 Uses permitted. REVISE section by ADDING new item (8) to read:

(8) Type UF Cable shall be permitted to be used in mortar joints of adobe construction in occupancies where the use of Nonmetallic Sheathed Cable is permitted by this code.

Section 348.60 Grounding and bonding. REVISE section by DELETING and REPLACING with the following:

Flexible metal conduit shall not be permitted as a grounding means. An equipment grounding conductor, sized in accordance with Table 250.122, shall be installed in all flexible metal conduits. Where an equipment bonding jumper is required around flexible metal conduit, it shall be installed in accordance with Section 250.102.

Exception: Listed and labeled factory assembled (pre-wired) fixtures and equipment with flexible metal conduit will not require the addition of the grounding conductor in the pre-wired raceway.

Section 350.10 Uses permitted. REVISE section by ADDING new item (4) to read:

(4) For feeders.

Section 350.60 Grounding and bonding. REVISE section by DELETING and REPLACING with the following:

Liquidtight flexible metal conduit shall not be permitted as a grounding conductor. A conductor (as determined by Table 250.122) shall be installed in all liquidtight flexible metal conduits. Where an equipment bonding jumper is required around liquidtight flexible metal conduit, it shall be installed in accordance with Section 250.102.

Exception: Listed and labeled factory assembled (pre-wired) fixtures and equipment with liquidtight flexible metal conduit will not require the addition of the grounding conductor in the pre-wired raceway.

Section 352.12 Uses not permitted. REVISE section by ADDING new paragraph (G) to read:

(G) Where exposed in exterior locations.

Exception: Schedule 80 PVC may be used exposed out of doors.

Section 410.16 (C) Suspended ceilings. REVISE section by ADDING the following to the end of the paragraph:

1. Mount luminaires (fixtures) installed in acoustical tile or lay-in panel ceilings in a manner that will not compromise ceiling performance.
2. Pendant luminaire (fixture) hangers attached to main or cross runners shall have approved support direct from structure.
3. Luminaires (fixtures) weighing less than 25.5kg (56 pounds) shall have two No. 12 gage hangers connected from the luminaire (fixture) housing to the structure above. These wires may be slack.
4. Luminaires (fixtures) weighing over 25.5kg (56 pounds) shall be supported directly from structure with approved hangers.

Section 422.12 Central heating equipment. REVISE section by ADDING sentence to the end of the paragraph to read:

Evaporative cooler fan and pump motors shall be permitted to be connected to the same branch circuit as central heating equipment when the controls do not permit the evaporative cooler and the central heating to operate at the same time or the air distribution system is designed to not have the evaporative cooler and the central heating equipment operating at the same time.

Section 440.65 Leakage current detection and interruption and arc-fault circuit interrupter. DELETE section in its entirety.

Section 501.30(B) Types of equipment grounding conductors. REVISE section by DELETING the exception.

Section 502.5 General. REVISE section by NUMBERING FPN to FPN No. 1, and ADDING FPN No. 2 to read:

(FPN No. 2): The following is a guideline for a Small Woodworking Facility.

1. Complete U.L. listed Dust Collection System, interlocked with dust producing equipment.
2. Light fixtures below 12' shall be of the enclosed type.
3. Boxes shall be "Bell" or "FS" type with threaded hubs and gasketed covers.
4. Wiring methods shall be IMC, RMC, LFMC or EMT with compression or threaded fittings.
5. Requirements extend in a 10' radius from each dust producing piece of equipment.
6. Seal any openings in boxes or electrical equipment to prevent the intrusion of dust (NOTE: DO NOT VOID U.L. LISTING BY SEALING DESIGNED HEAT VENTS).
7. See Section 500.5 (C) (2) FPN #1.

Section 502.30(B) Types of equipment grounding conductors. REVISE section by DELETING this exception.

Section 503.30 (B) Types of equipment grounding conductors. REVISE section by DELETING this exception.

Section 700.27 Coordination. DELETE this section in its entirety.

Section 701.18 Coordination. DELETE this section in its entirety.

ADD new Section 725.12 to read:

Section 725.12 Location of Power Supplies and Transformers.

(A) Accessibility. Class 1, Class 2 and Class 3 power supplies and transformers shall be accessible.

(B) Prohibited locations.

- 1) In any closet or space not complying with the clearances specified in section 410.8 (D)(1).
- 2) In attics or other space subject to high ambient temperatures.