

Source: City Manager

Agenda Item No: Supplemental  
Information

To: **City Council**

From: **City Manager and Staff**

Council Meeting Date: Sep 16, 2013

Re: EEC recommendations for residential building codes corrected letter- Supplemental information for Council

**EXECUTIVE SUMMARY:**

An incorrect letter from the Environment and Energy Commission was mistakenly introduced at the September 3, 2013 City Council meeting. The introduced letter was submitted as supplemental information for Agenda items B239-13 through B246-13. The corrected letter, dated April 17, 2013 is attached here as supplemental information.

**DISCUSSION:**

The Environment and Energy Commission (EEC) was requested by City Council to review changes to the building code in regards to energy efficiency. The commission originally submitted their recommendations to City staff in a letter dated January 17, 2013. Upon further review of their recommendations, the EEC re-submitted their letter to staff and City Council on April 17, 2013. The January 17, 2013 letter to staff was mistakenly submitted as supplemental information to Agenda items B239-13 through B246-13 at the September 3, 2013 City Council meeting.

The recommendations from the April 17, 2013 letter are the recommendations Council heard at their June 17 pre-Council meeting. Those recommendations are to adopt the 2012 energy code as written or accept the three compromises as recommended by the EEC. Those compromises are:

1. The amount of attic insulation
2. The amount of wall insulation
3. Perimeter foundation insulation

Staff apologizes for the confusion and have attached the correct letter, which has been seen by the City Council before, for clarification.

**FISCAL IMPACT:**

None

**VISION IMPACT:**

<http://www.gocolumbiamo.com/Council/Meetings/visionimpact.php>

By adopting the 2012 energy code, newer homes will be more energy efficient

**SUGGESTED COUNCIL ACTIONS:**

The Environment and Energy Commission requests that Council amend the proposed changes to building codes with the recommendations from the EEC.

| FISCAL and VISION NOTES:                   |        |                                                         |  |                                                  |            |
|--------------------------------------------|--------|---------------------------------------------------------|--|--------------------------------------------------|------------|
| City Fiscal Impact<br>Enter all that apply |        | Program Impact                                          |  | Mandates                                         |            |
| City's current net<br>FY cost              | \$0.00 | New Program/<br>Agency?                                 |  | Federal or State<br>mandated?                    |            |
| Amount of funds<br>already<br>appropriated | \$0.00 | Duplicates/Expands<br>an existing program?              |  | Vision Implementation impact                     |            |
| Amount of<br>budget<br>amendment<br>needed | \$0.00 | Fiscal Impact on any<br>local political<br>subdivision? |  | Enter all that apply:<br>Refer to Web site       |            |
| Estimated 2 year net costs:                |        | Resources Required                                      |  | Vision Impact?                                   | Choose One |
| One Time                                   | \$0.00 | Requires add'l FTE<br>Personnel?                        |  | Primary Vision, Strategy<br>and/or Goal Item #   |            |
| Operating/<br>Ongoing                      | \$0.00 | Requires add'l<br>facilities?                           |  | Secondary Vision, Strategy<br>and/or Goal Item # |            |
|                                            |        | Requires add'l<br>capital equipment?                    |  | Fiscal year implementation<br>Task #             |            |

# ENVIRONMENT & ENERGY COMMISSION

City of Columbia & County of Boone

City Hall, Conference Room 1A

April 17, 2013

Mayor McDavid and Council Members,

The Environment & Energy Commission has reviewed the 2012 Energy Code (Chapter 11 of the International Residential Code), and the recommendations of the Building Code Commission. The BCCC has done extensive research into the energy conservation sections of the residential code, and deserves recognition for this effort. The recommendations of the EEC are as follows:

***Insulation of hot water piping:*** The EEC agrees with the BCCC's proposal of eliminating hot water insulation requirements except in the case of hot water circulating pump piping.

***Wood frame wall insulation:*** The 2012 Energy Code requires R20 or R13+5 (R13 batt and R5 cladding). We agree with the BCCC that this new insulation requirement be kept in force. The BCCC has proposed an exception allowing high density batts to substitute for exterior continuous insulation cladding, however this does not meet the letter of *R402.1.3 U-Factor Alternative*. The EEC does not agree with the BCCC proposal allowing high density batts to substitute for continuous insulation cladding.

***Termite exemption for slab-on-grade and foundation insulation:*** The EEC recommends the retention of section *R402.2.9 Slab-on-grade-floor* insulation requirement in the 2012 International Energy Conservation Code. We suggest using standard termite barrier details which has been allowed as an option by City Authorities for some time. This is not in agreement with the BCCC recommendations for an exemption.

***Ceiling or Attic R-value:*** The 2012 Code recommends an increase in Attic insulation from R-38 to R-49, and in the case of an "Energy Band" truss, reduction to R-38 is allowed. The EEC Recommends that this requirement, which may result in reduced mechanical equipment size if properly implemented, will be cost effective. Contractors using proper "Manual J" Calculations will reduce equipment size, thus reduce overall building cost and energy use compared to the old Code. This reduced HVAC equipment size can directly reduce electric utility demand charges, reaping benefits to the City Utility as well as to the consumer. This is not in agreement with BCCC recommendations which propose to keep 2009 insulation requirements.

***Air leakage:*** The 2012 Code requires a blower door test on all new houses to determine air leakage. The EEC would agree with BCCC that a relaxed standard which requires a visual inspection of air leakage control measures during construction is feasible. The blower door test should be allowed as an option at the discretion of the Building Inspector in questionable or disputed cases.

**Duct leakage:** The 2012 Code requires a duct pressure test on all new houses to determine duct leakage. Mechanical contractors are more aware of leakage requirements, and testimony shows they are taking care to seal ductwork. The EEC would agree with the BCCC that a relaxed standard which requires a visual inspection of duct leakage control measures during construction be allowed. The duct pressure test should be allowed as an option at the discretion of the Building Inspector in questionable or disputed cases.

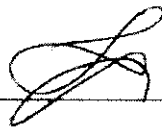
**Outdoor air duct:** The EEC agrees with the BCCC recommendation of a single outside air duct, with insect screen and damper, routed to the furnace return air intake to satisfy Section R303 and M1507 Mechanical Ventilation requirements. This duct should be 4" for houses less than 1500 square feet, 6" for houses less than 2400 square feet, and 8" for larger houses. If there are multiple furnaces, the requirements may be applied to the area served by the furnace, or to one of the multiple furnaces as long as the furnace is properly sized to handle the additional heating or cooling load imposed by the outside air. The duct should be placed as to discharge into the return air filter, to reduce allergens or dust from outdoors.

**Building cavities as return air** The EEC agrees with the BCCC that building cavities may be used as return air cavities without full duct lining, as long as leakage to outside air, attics, or unconditioned spaces is prevented by visually inspection.

**High efficacy lamps:** The EEC agrees with the BCCC recommending that the 2012 requirement that 75 percent of the *lamps* in light fixtures be high efficacy type, be changed to read 75 percent of the *fixtures shall* be high efficacy. This allows a few multiple bulb fixtures, such as candelabras, to be conventional bulbs, while retaining the requirement for high efficacy bulbs in most areas.

**Programmable thermostats:** The 2012 Code specifies that the initial heating setpoint shall be 70F and the cooling setpoint be 78F. The EEC agrees with the BCCC in recommending that this paragraph be changed from *shall* to *should*, which makes the requirement non-mandatory.

Respectfully Yours,

By:  \_\_\_\_\_  
Signature

Lawrence Lile,

Vice Chair and Acting Chair

Environment and Energy Commission

Introduced by \_\_\_\_\_

First Reading \_\_\_\_\_

Second Reading \_\_\_\_\_

Ordinance No. \_\_\_\_\_

Council Bill No. B 240-13

### **AN ORDINANCE**

repealing Article III of Chapter 6 of the City Code relating to the 2006 Edition of the International Code Council Electrical Administrative Provisions referencing the 2008 National Electrical Code and enacting in lieu thereof a new Article III adopting the 2006 Edition of the International Electrical Code referencing the 2011 National Electrical Code; and fixing the time when this ordinance shall become effective.

BE IT ORDAINED BY THE COUNCIL OF THE CITY OF COLUMBIA, MISSOURI, AS FOLLOWS:

SECTION 1. Article III of Chapter 6 of the Code of Ordinances, City of Columbia, Missouri, relating to the 2006 Edition of the International Code Council Electrical Administrative Provisions referencing the 2008 National Electrical Code, is hereby repealed and in lieu thereof a new Article III, relating to the 2006 Edition of the International Code Council Electrical Administrative Provisions referencing the 2011 National Electrical Code, is hereby enacted reading in words and figures as follows:

#### **CHAPTER 6. BUILDINGS AND BUILDING REGULATIONS**

...

#### **ARTICLE III. Electrical Code**

Sec. 6-31. Adopted.

The 2006 Edition of the International Code Council Electrical Administrative Provisions referencing the 2011 National Electrical Code, published by the International Code Council, Inc., one copy of each has been on file with the city clerk for a period of ninety (90) days prior to the adoption of this article, are hereby adopted by reference and made a part of the Code of Ordinances, City of Columbia, Missouri as fully as if set forth in their entirety. At least one (1) copy of the 2006 Edition of the International Code Council Electrical Administrative Provisions and one (1) copy of the 2011 National Electrical Code shall remain on file in the office of the city clerk and shall be kept available for public use, inspection and examination.

Sec. 6-32. – Amendments to 2006 International Code Council Electrical Code Administrative Provisions.

The 2006 International Code Council Electrical Code Administrative Provisions adopted by this article is hereby amended by substituting the following sections in lieu of those sections with corresponding numbers in the code, or, where there is no corresponding section in the code, the following sections shall be enacted as additions to the code:

101.1 Title: This ordinance shall be known as the Electrical Code of the City of Columbia, Missouri and will be referred to as “this code.”

101.4 Conductors: Conductors normally used to carry current shall be of copper unless otherwise provided in this code. Where the conductor material is not specified, the material and the sizes given in this code shall apply to copper conductors. Where other materials are used, the size shall be changed accordingly. Aluminum and copper-clad aluminum will be approved as outside feeders of 100 amperes or larger and must terminate nearest the point of entrance of the feeder; or as designed and recommended by a registered professional engineer or registered architect.

(FPN): For aluminum and copper-clad aluminum conductors, see Section 250.120 (B), 310-14.

SECTION 301 DEPARTMENT OF COMMUNITY DEVELOPMENT - DIVISION OF BUILDING AND SITE DEVELOPMENT

301.1 Administration and enforcement: The administration and enforcement of this code shall be the duty of the director of community development who shall be referred to as the code official in this code. The code official is authorized to take such action as may be reasonably necessary to enforce the provisions of this code. Such persons may be appointed and authorized as assistants or representatives of the director, as may be necessary, to carry out the provisions of this code.

301.2 Emergency power: In case of an emergency, the director is hereby empowered to cause the discontinuance of electrical service to any electrical wiring, devices, appliances and equipment found to be immediately dangerous to life or property until such wiring, devices, appliances and equipment have been made safe in accordance with the minimum requirements of this code.

301.3 Restriction of employees: An employee connected with the Department of Community Development - Division of Building and Site Development shall not be engaged in or directly or indirectly connected with the furnishing of labor, materials or appliances for the construction, alteration or maintenance of a building, or the preparation of plans or of specifications therefore, unless such employee is the owner of the building; nor shall such

employee engage in any work which conflicts with such employee's official duties or with the interest of the department.

302.9 Liability: Any officer or employee charged with the enforcement of this code, while acting on behalf of the city, shall not thereby render such individual liable personally, and is hereby relieved from all personal liability for any damage accruing to persons or property as a result of any act performed in the discharge of official duties. Any suit instituted against any officer or employee because of an act performed by that officer or employee in the lawful discharge of duties and under the provisions of this code shall be defended by the legal representative of the jurisdiction until the final termination of the proceedings. The officer or employee shall not be liable for costs in any action, suit or proceeding that is instituted pursuant to the provisions of this code; and any officer or employee acting within the scope of employment and in good faith and without malice, shall be free from liability for acts performed under any of its provisions or by reason of any act or omission in the performance of official duties in connection therewith. Nothing contained herein shall be deemed a waiver of the immunities and protection afforded to the city or officers and employees pursuant to state and federal law.

## SECTION 304 BOARD OF ELECTRICAL EXAMINERS

304.1 Board of electrical examiners: A board of electrical examiners consisting of six (6) persons is hereby created. One (1) member shall be the director of community development or the director's designee, who shall be a non-voting ex-officio secretary to the board; the remaining five (5) members shall be appointed by the city council. One (1) member shall be a registered professional engineer, one (1) member shall be a licensed electrical contractor, one (1) member shall be a licensed electrician, and two (2) members shall be laymen. The first two (2) persons appointed to the board shall serve for three (3) years, the second two (2) persons shall serve for two (2) years, and the last person shall serve for one year. Thereafter, each member of the board shall serve for three (3) years and until a replacement is appointed and qualified. The first meeting of the calendar year, the board shall select one of its members to serve as chair and the code official shall designate a clerk from the department to serve as secretary to the board, who shall keep a detailed record of all proceedings on file in the building and site development division. The board of electrical examiners shall be empowered to select examinations, and authorize testing for electricians' licenses and certificates, to approve or disapprove applications for electricians' licenses and certificates, and to issue or revoke electricians' licenses or certificates. The board shall meet upon the call of the chair, or upon the call of a majority of its membership, however, it shall meet within at least thirty (30) days after filing of an application for examination as an electrician for the purpose of examining such applicant or applicants. The chair of the board is authorized to excuse any member from attendance at a board meeting; provided, that the member requested to be excused before the meeting. Any member who is absent, without being excused, from twenty-five (25) percent of the regular board meetings held in a calendar year shall automatically forfeit the office. It shall be the duty of the chair to promptly notify the council of the vacancy. Applicants scheduled for examination shall be notified of the date, time and place of examination at least three (3)

days prior to the date of examination. A fee of fifty dollars (\$50.00) must be submitted with the application. The fee shall be refunded to the applicant if the applicant appears at the board meeting at which the examination is scheduled.

304.2 Certificate of competency: It shall be unlawful for any person to engage in the installation, alteration or repair of electrical wiring, equipment, apparatus or fixtures for light, heat or power purposes; installation or additions to sound, audio visual or communication equipment in or on any building, structure, or premises within the corporate limits of the City of Columbia, Missouri, unless issued a certificate of competency by the board of electrical examiners, except as provided by Section 401.4 Exception 2. This shall not be construed to cover cases where the connected electrical load is not increased or where no new electrical wiring is required.

304.3 Types of certificates: The board of electrical examiners is herein empowered to provide for the following types of certificates:

1. Electrical Contractor or Master Certificate (Type A)
2. Electrical Sign Contractor Certificate (Type B)
3. Journeyman Certificate, 8,000-Hrs (Type C-8 General)
4. Journeyman Certificate, 6,000-Hrs (Type C-6 General)
5. Sign Wireman Certificate (Type D)
6. Security-Fire Alarm Certificate (Type F)
7. Communication and Sound Certificate (Type G)
8. Maintenance Electrician Certificate (Type H)
9. Apprentice Electrician Certificate (Type E)

304.3.1 Requirements: Certificates will be issued to applicants who meet the following requirements:

*Apprentice (Type E)* Submit application stating name, address and telephone number and employer's signature. No fee required.

*Journeyman (Type C-8)*

1. Submit application to director of community development stating name, address, telephone number and type of certificate requested.
2. Prove 8,000 hours active employment as an apprentice electrician. Time in an appropriate electrical apprenticeship program or trade schools may be considered for credit toward 8,000 hours requirement.
3. List names, address and telephone number of all previous employers under which applicant worked as an apprentice electrician.
4. Successfully complete examination required by the board of electrical examiners.

*Journeyman (Type C-6)*

1. Submit application to director of community development stating name, address, telephone number and type of certificate requested.
2. Prove 6,000 hours active employment as an apprentice electrician. Time in an appropriate electrical apprenticeship program or trade schools may be considered for credit toward 6,000 hours requirement.
3. List names, address and telephone number of all previous employers under which applicant worked as an apprentice electrician.
4. Successfully complete examination required by the board of electrical examiners.

*Contractor or Master (Type A)*

1. Submit application to director of community development stating name, address, telephone number and type of certificate requested.
2. Prove 4,000 hours active employment as journeyman electrician C-8, 6,000 hours as journeyman electrician C-6 or be registered with the State of Missouri as a professional engineer or architect and be actively engaged in the business of electrical contracting.
3. List names, address and telephone number of all previous employers under which applicant worked as an apprentice or journeyman electrician.
4. Successfully complete examination required by the board of electrical examiners.

*General Security-Fire Alarm (Type F)* Submit application to director of community development stating name, address, telephone number and type of certificate requested, along with a certificate or statement to install manufacture system.

*Communication and Sound (Type G)* Submit application to director of community development stating name, address, telephone number and type of certificate requested, along with a certificate or statement to install manufacture system.

*(Type B, D, and H)*

1. Submit application to director of community development stating name, address, telephone number and type of certificate requested.
2. List name, address and telephone number of all previous employers under which applicant worked in a capacity similar to that covered by the requested certificate.
3. Successfully complete examination required by the board of electrical examiners.

304.4. Application for certificate: The board of electrical examiners shall approve or disapprove the issuance of a certificate upon (1) the filing of the proper application, (2) completion of examination when required, (3) payment of the required fee. This section shall not apply to apprentice electricians.

304.5 Type of examination required: The type of examination required will be determined by the board of electrical examiners and will be selected from the standard examination list as prepared and published by Thomson Prometric, 1260 Energy Lane, St. Paul, MN 55108, or the ICC National Standardized Examinations Program, [www.iccsafe.org/contractor](http://www.iccsafe.org/contractor) (1-877-STD-Exam), or any state issued and approved exam.

304.6 Reciprocity: The board of electrical examiners will honor licenses issued from other jurisdictional areas provided the applicant meets the minimum experience requirements of the City of Columbia, Missouri, and provides certification of having satisfactorily completed the Thomson Prometric or ICC examination applicable for the type of license requested.

304.7 Work authorized by type of certificate: The scope of work authorized by each type of certificate shall be as follows:

1. The Electrical Contractor or Masters Certificate (Type A) shall authorize the grantee to engage in the business of contracting for the installation, repair, altering, and making additions to electrical wiring, heating devices, lights, motors, fixtures, conduits, generators, appliances and appurtenances and to supervise construction or installation of same.
2. An Electrical Sign Contractor Certificate (Type B) shall authorize the grantee to engage in the business of contracting for the fabrication, installation, repair, alteration or making additions to electrical signs, and to make the electrical connections thereto within five (5) feet of the work authorized to be installed. Any electrical sign contractor personally performing electrical sign work shall be a certificated sign wireman.
3. An Electrical Journeyman, Type C-8 shall authorize the grantee to perform electrical work under persons or firms holding contractor license (Type A).
4. An Electrical Journeyman, Type C-6 shall authorize the grantee to perform electrical work under persons or firms holding contractor license (Type A).
5. A Sign Wireman Certificate (Type D) shall authorize the grantee to perform electrical work on any electrical sign and to make connections to or disconnections from the power source within five (5) feet of an electrical sign.
6. Security-Fire Alarm Certificate (Type F) shall authorize the grantee to engage in the business of contracting and to install, repair and make alterations on burglar and fire

alarm equipment and to make electrical connections thereto within five (5) feet of the equipment authorized to be installed.

7. Communication and Sound Certificate (Type G) shall authorize the grantee to engage in the business of contracting and to install, repair and make alterations on communication and sound equipment and to make electrical connections thereto within five (5) feet of the equipment authorized to be installed.
8. A Maintenance Certificate (Type H) shall authorize the grantee to perform electrical routine maintenance only, on equipment applicable to his trade and for a specified employer. In addition, with 6,000 hours the grantee shall be authorized to take the journeyman electric exam.
9. An Apprentice Electrical Certificate (Type E) shall authorize the grantee to perform electrical work only when under the immediate supervision of an electrician holding a Type C, D, G or H Certificate. The ratio shall not exceed three apprentices to one master or journeyman electrician.

304.9 Insurance requirements: It shall be unlawful for any person holding a Type A, B, F or G Certificate to engage in work authorized by such certificate in the corporate limits of the city without first having filed with the city business license administrator a certificate of comprehensive liability insurance with a minimum of \$100,000 per claim bodily injury, \$100,000 per claim property damage with \$300,000 aggregate per occurrence. Such insurance shall insure the proper construction, erection, and maintenance of the electrical work in accordance with the provisions of this code and shall insure the city from any and all claims or demands for damages by reason of any negligence of the electrical contractor or his agents, or by reason of defects in the construction, or damages resulting from any part thereof. The city requires a thirty (30) day cancellation notice from the insurance company.

304.10 Work allowed under license: No person who has obtained an Electrical Contractor's Certificate (Type A) shall allow his name to be used by another person for the purpose of obtaining permits, or for doing business or work under his license. Every person licensed shall notify the board of the address of his place of business, if any, and the name under which such business is carried on, and shall give immediate notice to the board of any change in either.

304.11 Re-examination: Any person, who fails to pass the examination, as prescribed by the board, may apply for re-examination.

304.12 License Fees: Electrical contractors with Type A, B, F or G Certificate shall pay annual business license fees to the city in an amount to be determined under the provisions of chapter 13 of the Code of Ordinances.

304.13 Certificate Issuance: All applicants approved by the board for Journeyman certificate shall pay a thirty dollar (\$30.00) fee prior to the issuance of the certificate. Master certificates shall require a payment of ninety dollars (\$90.00) prior to the issuance of the certificate. Certificates issued in September, October, and November of the renewal year are not required to pay a renewal fee in December.

304.14 Certificate Renewal: All certificated electricians holding Type A, B, C, D, F, G and H certificates shall renew their certificate every three (3) years and pay a renewal fee of thirty dollars (\$30.00) for a Journeyman certificate, and ninety dollars (\$90.00) for a Master certificate. The first renewal date is January 1. Failure to renew by the January 1 date of the renewal year will result in the certificate expiring. Individuals holding expired certificates will be required to make application for a new certificate, and pay a renewal fee.

401.4 Exceptions to work authorized: No permit to install or perform any work authorized by Type A, B, F, or G license shall be granted to any person other than a contractor, except as follows: All electrical permits may be issued to the general contractor on behalf of the master electrical contractor for new one and two family dwellings and building alteration or building additions for one and two family dwellings. All electrical work must be performed by an electrician licensed by the City of Columbia, or as allowed by ordinance.

Exception No. 1. Electricians holding a Type C-6 or C-8 certificate who are regular employees of the firm or corporation for which the work is to be performed, may obtain a permit to do electrical work on the premises of the firm or corporation provided the work is not associated with work requiring a building permit.

Exception No. 2. A permit may be issued to any person to do work in a single family dwelling used exclusively for living purposes, including the usual accessory buildings and quarters in connection with such building, provided that the person is a bona fide owner of the dwelling, will occupy the dwelling for a period of not less than one year, will personally purchase all materials and perform all labor authorized by the permit, and that the applicant shall file an affidavit certifying that these conditions will be met before the issuance of the permit. Any person obtaining a permit under this section shall not be issued another permit within two (2) years.

Work performed under any permit shall be subject to all applicable regulatory provisions of this code.

404.2 The director of community development shall issue a permit for proposed work set forth in the application if in compliance with this and all other ordinances and regulations of the City of Columbia, Missouri, and upon payment of fees set forth hereinafter. In no case shall the fees for permits be less than the following:

For alterations of or extensions to existing wiring,  
or any other electrical permit.....\$20.00

|                                                                                            |             |
|--------------------------------------------------------------------------------------------|-------------|
| For each service entrance panel 225 amperes or less .....                                  | \$20.00     |
| For each service entrance panel over 225 amperes.....                                      | \$0.10/Amp  |
| For each circuit (whether 2-wire, 3-wire or 3-phase)                                       |             |
| For first fifteen .....                                                                    | \$1.35 each |
| For all over fifteen .....                                                                 | \$1.20 each |
| For each connection of hot air or hot water heating plant.....                             | \$4.00 each |
| For installation of or addition to sound, audio-visual or<br>communication equipment ..... | \$20.00     |
| Swimming pool .....                                                                        | \$50.00     |

Re-inspection fees will be charged in accordance with the Building Code of Columbia, Missouri.

|                                                       |         |
|-------------------------------------------------------|---------|
| First failed inspection .....                         | \$35.00 |
| Failed re-inspection of prior correction notice ..... | \$70.00 |

In addition to persons authorized hereunder, an application for permit may be submitted by a general contractor or the owner of a new one- or two-family dwelling. Fees may be paid at the date of application or through billing by the finance department. Failure to pay any billed fee within thirty (30) days of billing shall nullify any permit for which billing was made and work shall cease until fees are actually received by the city. Permit revocation and work stoppage are remedial steps which may be taken in addition to any other remedy for collection authorized by law.

1003.1 Penalties: Any person who shall violate a provision of this code or shall fail to comply with any of the requirements thereof, shall be guilty of a misdemeanor and upon conviction thereof, shall be punished by a fine of not more than one thousand dollars (\$1,000.00) or by imprisonment not exceeding one (1) year, or by both such fine and imprisonment. Each day that a violation continues shall be deemed a separate offense.

## Section 1101 Building Construction Codes Commission

1101.1 Board of appeals established. Delete in its entirety

1101.3 Application for Appeal: The applicant for an electrical permit, the holder of an electrical permit, or the owner or agent of a building or structure wherein electrical work is to be installed may appeal a decision of the code official refusing to grant modification of

the provisions of the Electrical Code covering the manner of installation, or materials to be used in the installation, to the building construction codes commission. Application for appeal shall be filed in accordance with the procedures set out in Section 113 of the Building Code of Columbia, Missouri.

1102 Membership: Delete in its entirety

1103 Procedures: Delete in its entirety

1201.1.1 Adoption: Electrical systems and equipment shall be designed and constructed in accordance with the 2012 International Residential Code or NFPA 70 National Electrical Code 2011 edition as applicable, except as otherwise provided in this code.

1201.1.2 Amendments to NFPA 70, NEC 2011 as follows:

210.8 Ground-Fault Circuit-Interrupter Protection for Personnel: (A) Dwelling Units. (3); Add the following to Exception to (3): Receptacles in an exterior soffit that are used for seasonal decorative lighting are not required to be readily accessible.

210.8 Ground-Fault Circuit-Interrupter Protection for Personnel: (A) Dwelling Units. (5);

Exception No. 1 to (5): Receptacles that are not readily accessible.

Exception No. 2 to (5): A single receptacle or a duplex receptacle for two appliances located within dedicated space for each appliance that, in normal use, is not easily moved from one place to another and that is cord-and-plug connected in accordance with 400.7(A)(6), (A7), or (A8).

Exception No. 3 to (5): A receptacle supplying only a permanently installed fire alarm or burglar alarm system shall not be required to have ground-fault circuit-interrupter protection.

210.8 Ground-Fault Circuit-Interrupter Protection for Personnel: (A) Dwelling Units. (7); Laundry, utility, and wet bar sinks – where the receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink. Dedicated circuits receptacles installed for specific appliances such as clothes washers, refrigerators, and microwave ovens shall not be required to be GFCI protected where located within 6 feet of laundry, utility or wet bar sinks in a dwelling. A duplex receptacle may be used for a single appliance provided the duplex receptacle is located behind the appliance which, in normal use, is not easily moved and the receptacle is not readily accessible for the use of power tools. This receptacle must be marked, not GFCI protected. Receptacles installed under the exceptions to 210.8 (A)(7) shall not be considered as meeting the requirements of 210.52 (G).

210.12(A) Dwelling Units. All 120-volt, single phase, 15 – and 20 - ampere branch circuits supplying outlets installed in dwelling unit bedrooms and for smoke detectors shall be

protected by a listed arc-fault circuit interrupter, combination-type, installed to provide protection of the branch circuit. The rest of 210.12(A) remains as stated.

Add the following Exception No. 4: Arc-Fault Circuit Interrupter Protection is not required in one- and two-family dwellings which are regulated by the International Residential Code.

210.52 Dwelling unit receptacle outlets (C) Countertops (5) Receptacle outlet location. *Exception to (5):* Delete the second sentence to the first paragraph that reads; "Receptacles mounted below a countertop in accordance with this exception shall not be located where the countertop extends more than 150mm (6 inches) beyond its support base." The rest of the section remains as stated. This deletion is to allow the placement of the receptacle no more than 12 inches below the countertop, and anywhere the countertop extends beyond its support base.

Add the following Exception to (E).(3): A receptacle is not required at an existing structure.

210.63 Heating, Air-Conditioning, and Refrigeration Equipment Outlet: Existing exception to be shown as Exception No. 1: and add: Exception No. 2: Rooftop and exterior equipment on one- and two-family dwellings.

220.14.(J) Dwelling Occupancies: Delete "one-family, two-family" and add the following requirements for one- and two-family dwellings:

- (1) In one- and two-family dwellings, a 15-amp rated general purpose circuit shall be limited to a maximum of eight receptacle outlets or openings, or eight lighting outlets or openings, or any combination of receptacle outlets and lighting outlets totaling not more than eight.
- (2) In one- and two-family dwellings, a 20-amp rated general purpose circuit shall be limited to a maximum of ten receptacle outlets or openings, or ten lighting outlets or openings, or any combination of receptacle outlets and lighting outlets totaling not more than ten.
- (3) In one- and two-family dwellings, the small appliance circuits serving the kitchen countertop and similar areas, shall be limited to not more than two receptacle outlets or openings for the first two such circuits; the third and succeeding small appliance circuits shall be limited to not more than three receptacle outlets or openings per circuit.
- (4) In one- and two-family dwellings, the microwave receptacle outlet shall be a dedicated 20-amp rated circuit, and shall share with no other outlets.

230.50 Protection Against Physical Damage. (B) (1) (3) Scheduled 40 rigid nonmetallic conduit or equivalent.

250.53.(A).(2) Supplemental Electrode Required: Delete.

250.94 Delete in its entirety

300.5 Underground Installations: (D) Protection from Damage: (3) Service Conductors: Warning tape shall be installed a minimum of six (6) inches below grade and not less than six (6) inches above the electrical cables or conduit in all underground installations of 50 volts or more.

300.5 Underground Installations: (D) Protection from Damage: (4) Enclosure and Raceway Damage: Where the enclosure or raceway is subject to physical damage, the conductors shall be installed in rigid metal conduit, intermediate metal conduit, Schedule 40 rigid nonmetallic conduit, or equivalent.

300.9 Raceways in Wet Locations Above Grade: Delete in its entirety.

300.11.(A).(2) Non-Fire Rated Assemblies: Add exception: One 3/4 inch raceway or smaller, with maximum conductor fill (for example, twelve #12 AWG), shall be permitted to be supported by the ceiling support wires.

314.23(B)(1) Nails and Screws: Add last sentence to paragraph: Screws may be installed through the interior sides of a nonmetallic box to mount or fasten the box in place regardless of its listing and labeling provided the heads of the screws are covered or coated with a nonmetallic material.

334.12 Uses not permitted. (A) Types NM, NMC, and NMS. Types NM, NMC, and NMS cables shall not be permitted as follows: Delete the following in its entirety: (2). "Exposed in dropped or suspended ceilings in other than one- and two-family and multi-family dwellings."

334.12(B) Types NM and NMS. Types NM and NMS cables shall not be used under the following conditions or in the following locations. Exception: Type NMS cable shall be permitted in wet or damp locations.

334.15(B) Protection from Physical Damage: Where schedule 80 PVC is stated in paragraph, replace with scheduled 40 PVC or better. Cable shall be protected from physical damage where necessary by rigid metal conduit, intermediate metal conduit, electrical metallic tubing. Schedule 40 PVC conduit, or other approved means. Where passing through a floor, the cable shall be enclosed in rigid metal conduit, intermediate metal conduit, electrical metallic tubing, Schedule 40 PVC conduit, or other approved means extending at least 150 mm (6 in.) above the floor.

334.80 Ampacity. The ampacity of Types NM, NMC and NMS cable shall be determined in accordance with 310.15. The ampacity shall be in accordance with the 60 degrees C (140 degrees F) conductor temperature rating. The 90 degree C (194 degree F) rating shall be permitted to be used for ampacity derating purposes, provided the final derated ampacity does not exceed that for a 60 degree C (140 degree F) rated conductor. The ampacity of Types NM, NMC, and NMS cable installed in cable tray shall be determined in accordance with 392.11.

Where more than two NM cables containing two or more current-carrying conductors are installed, without maintaining spacing between the cables, through the same opening in wood framing that is to be fire- or draft-stopped using thermal insulation, caulk, or sealing foam, the allowable ampacity of each conductor shall be adjusted in accordance with Table 310.15(B)(2)(a). The rest of 334.80 is deleted in its entirety.

338.10.(4).(A) Interior Installations. In addition the provisions of this article, Type SE service-entrance cable used for interior wiring shall comply with the installation requirements of Part II of Article 334, excluding 334.80.

404.2.(C): Switches Controlling Lighting Loads: Delete.

404.9.(B) Grounding: Add exception 4: In one and two-family dwellings, switches mounted to non-metallic boxes with non-metallic face plates shall not be required to be effectively grounded.

#### 406.8 Receptacles in Damp or Wet Locations

- (A) *Damp Locations.* A receptacle installed outdoors in a location protected from the weather or in other damp locations shall have an enclosure for the receptacle that is weatherproof when the receptacle is covered (attachment plug cap not inserted and receptacle covers closed).

An installation suitable for wet locations shall also be considered suitable for damp locations.

A receptacle shall be considered to be in a location protected from weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff. The rest of 406.8(A) is deleted in its entirety.

- (B) *Wet Location*

- 1) 15- and 20- Ampere receptacles in wet locations. 15- and 20- ampere, 125- and 250- volt receptacles installed in a wet location shall have an enclosure that is weather-proof whether or not the attachment plug cap is inserted. Weatherproof "in-use or bubble" covers not required.

The rest of 406.8(B) is deleted in its entirety.

406.12 Tamper-Resistant Receptacles in Dwelling Units. Delete in its entirety

410.24(B) Access to Boxes. Delete in its entirety

422.16(B) Specific Appliances (5) Storage-Type Water heaters: Storage-type water heaters shall be permitted to be cord-and –plug connected with a flexible cord rated at 30 amperes. Cord will not be required to be listed for this use.

440.14 Location: Add: Exception No 3: Cord-and-plug connected appliances.

550.15.(H).(2): Change Schedule 80 PVC to Schedule 40 PVC.

680.43 Indoor Installations: Delete Exception No. 2.

680.74 Bonding: Delete the last sentence.

SECTION 2. The repeal of Article III of Chapter 6 of the Code of Ordinances, City of Columbia, Missouri, relating to the 2006 Edition of the International Code Council Electrical Administrative Provisions referencing the 2008 National Electrical Code shall not affect any offense or act committed or done or any penalty or forfeiture incurred before the effective date of this ordinance.

SECTION 3. This ordinance shall be in full force and effect from and after October 1, 2013.

PASSED this \_\_\_\_\_ day of \_\_\_\_\_, 2013.

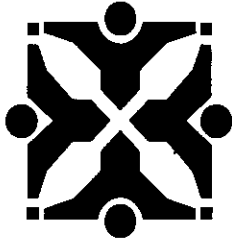
ATTEST:

\_\_\_\_\_  
City Clerk

\_\_\_\_\_  
Mayor and Presiding Officer

APPROVED AS TO FORM:

\_\_\_\_\_  
City Counselor



Source: Community Development - BSD 

Agenda Item No:

To: City Council

From: City Manager and Staff 

Council Meeting Date: Sep 3, 2013

Re: Update of Building Codes

### **EXECUTIVE SUMMARY:**

The Building Construction Codes Commission has completed their review of the 2012 International Code Council Codes and 2011 National Electrical Code for adoption by the city. There are numerous minor changes and several major changes. The new codes provide clarity and enhance the life safety, protection of property, and energy efficiency of buildings. Among the major changes, the cost implications of the energy efficiency chapter of the residential code is the largest concern.

### **DISCUSSION:**

Numerous meetings were held evaluating the effect of the new codes and determining what local addendums would be needed. These meetings were staffed by representatives of the Building and Site Development Division of the Community Development Department and the Fire Department.

Some of the most significant changes deal with the energy conservation requirements of the code. Staff has attached memorandums from both the BCCC and the Environment and Energy Commission (EEC). Members of the BCCC and EEC met to discuss the changes in the code. The BCCC brought forth their suggestions and the EEC agreed with all but three items. Staff supports the BCCC's recommendations on the basis that the codes are specifically designed to be minimum requirements. The EEC has made recommendations for higher standards on the broader basis of long term energy conservation.

The three differences between the BCCC and EEC recommendations are:

1. The amount of attic insulation.
2. The amount of wall insulation (changing from 2x4 framing to 2x6 framing).
3. Perimeter foundation insulation.

If the codes are to continue to be minimum standards, the recommendation of the BCCC should be adopted. Adopting the higher standards of insulation recommended by the EEC, on the other hand, would be in keeping with the City's commitment to conservation of energy resources. It is important that the new codes be adopted even if there is to be further consideration of the energy code requirements.

Below are some of the other significant changes and the BCCC's recommendations. Where no recommendations are listed, the BCCC is in favor of adopting the code as written:

#### **International Residential Code:**

1. Manufactured wood I-joists used in floor assemblies will be required to have ½" of gypsum board applied to the underside of the floor framing member. The new code requires a closer on the door between the residence and garage. The BCCC chose not to adopt this provision due to the inconvenience to the home owner.

2. Whole house mechanical ventilation is required (an exhaust fan running intermittently or continuously).  
The BCCC made provisions to add an exterior opening ducted to the return ductwork to provide additional natural ventilation in lieu of mechanical ventilation.
3. The BCCC has now defined that grass and landscaped areas are not walking surfaces therefore adjacent walls do not require guards.
4. A simplified wall bracing section has been added which is applicable to how homes are constructed in Columbia and will simplify construction and inspection of braced walls.
5. The 2012 code requires additional hold downs are required for long span rafters and trusses.
6. Continuous sidewall flashing is now acceptable in lieu of step flashing only.
7. The 2012 code requires a drip edge is now required at roofs.
8. The BCCC has amended the code so that the use of purple primer on waste and vent piping obviates the need for testing.
9. The BCCC decided to delete the requirement for Arc Fault Circuit Interrupters in one and two family dwellings.
10. The BCCC amended the requirement for sanitary sewer backwater valves that the waste piping does not need to be separated based on the flood rim of the fixture.
11. The BCCC has established a maximum number of receptacles based on the circuit breaker amperage. This simplifies the code requirements.
12. The supplemental electrode (additional grounding rod) requirement was deleted by the BCCC.

#### International Building Code:

1. The 2012 code more clearly defines different types of care facilities.
2. Children's structures (playgrounds) are more broadly regulated.
3. The area of furniture manufacturing and sales where a sprinkler system is required is now defined. The BCCC has accepted the code change and removed our current amendment.
4. Basements with walls or partitions must be sprinklered.
5. Educational occupancies are required to have an Emergency Voice/Alarm Communication System (EV/ACS). The BCCC recommended this requirement only apply to occupancies over 75 people.
6. Reduced exit widths are allowable for buildings equipped with EV/ACS.
7. Carbon monoxide alarms are now required in buildings with residential or institutional occupancies that have fuel burning appliances.
8. Exits may now be arranged to serve a portion of a story instead of the entire story.
9. Retained the reference to the 2009 International Energy Conservation code due to the complexity of the 2012 IECC and the fact that there is no software that meets the 2012 IECC requirements.
10. Firestop system third party inspections are now mandatory in risk category III or IV buildings.
11. No thermal barrier is required on the floor side of a structural insulated panel system floor.
12. Foam plastic meeting certain requirements may be used in plenums.
13. Toilet facilities are no longer required in parking garages.
14. Chapter 34 provisions take precedence over other codes. The BCCC has included an amendment which further clarifies which other codes are applicable.
15. The previous amendment regarding retaining walls has been removed as it is adequately addressed by the code book.

Other changes include the number of members for a quorum and the ability of alternates to sit on the commission for any absent member.

#### **FISCAL IMPACT:**

None.

**VISION IMPACT:**

<http://www.gocolumbiamo.com/Council/Meetings/visionimpact.php>

By adopting the 2012 ICC Codes, new homes will be more energy efficient.

**SUGGESTED COUNCIL ACTIONS:**

**Passage of the ordinances.**

| <b>FISCAL and VISION NOTES:</b>                   |        |                                                   |    |                                               |       |
|---------------------------------------------------|--------|---------------------------------------------------|----|-----------------------------------------------|-------|
| <b>City Fiscal Impact</b><br>Enter all that apply |        | <b>Program Impact</b>                             |    | <b>Mandates</b>                               |       |
| City's current net FY cost                        | \$0.00 | New Program/Agency?                               | No | Federal or State mandated?                    | No    |
| Amount of funds already appropriated              | \$0.00 | Duplicates/Expands an existing program?           | No | <b>Vision Implementation impact</b>           |       |
| Amount of budget amendment needed                 | \$0.00 | Fiscal Impact on any local political subdivision? | No | Enter all that apply:<br>Refer to Web site    |       |
| Estimated 2 year net costs:                       |        | <b>Resources Required</b>                         |    | Vision Impact?                                | Yes   |
| One Time                                          | \$0.00 | Requires add'l FTE Personnel?                     | No | Primary Vision, Strategy and/or Goal Item #   | 9.3.3 |
| Operating/Ongoing                                 | \$0.00 | Requires add'l facilities?                        | No | Secondary Vision, Strategy and/or Goal Item # |       |
|                                                   |        | Requires add'l capital equipment?                 | No | Fiscal year implementation Task #             |       |

Significant changes from the 2009 to 2012 IRC energy code:

Background:

The BCCC spent eight weeks reviewing the energy code portion of the IRC, far longer than they spent on any other portion of the code. During this period they sought the advice of several experts including:

Terry Freeman, Energy Services Supervisor, Water & Light  
Fred Malicoat, P.E., Malicoat-Winslow Engineers (chairman of the BCCC)  
Guy Ford, Missouri Insulation Supply  
Dan Riepe, Home Performance Experts

The committee also reviewed the following documents:

- North Carolina 2012 Energy Code
- BCAP - Kansas City Residents Buying 2012 IECC Homes Will Save Thousands
- USDoE – Missouri Energy and Cost Savings
- BCAP - Illinois – Your Home, More Affordable with the 2012 IECC
- Alliance for Environmental Sustainability – Comparing IECC in Illinois to Above-Code Programs
- BCAP - Local Energy Code Action Kit for Municipalities in Missouri
- Texas A&M University Energy Systems Laboratory – A Comparison of Building Energy Code Stringency: 2009 IRC Versus 2012 IRC for Single-Family Residences in Texas
- Midwest Energy Efficiency Alliance – 2012 International Energy Conservation Code (Residential)
- Instructions for the Residential Building Data Collection Checklist 2012 IECC – Residential Provisions
- Carroll County Maryland – 2012 IECC Residential Energy Efficiency Code Requirement Flow Chart
- USDoE – Residential Code Change Proposals for the 2015 IECC
- Energy Efficient Codes Coalition – Estimate of Energy and Cost Savings from Proposed IECC Code Changes for 2012
- USDoE – Guide to the Changes between the 2009 and 2012 International Energy Conservation Code
- Testimony Regarding Montgomery County (MD) Department of Permitting Services Proposal to Adopt the 2012 International Residential and Energy Conservation Codes
- USDoE – Air Leakage Guide
- Association of Professional Energy Consultants – Measuring the Baseline Compliance Rate for Residential and Non-Residential Buildings in Illinois Against the 2009 International Energy Conservation Code
- BCAP – True Cost of the 2009 International Energy Conservation Code

The committee members who attended included:

John Page, Owner, J-Bar Construction  
Fred Malicoat, P.E., Owner, Malicoat-Winslow Engineers  
Kas Carlson, Owner, C&C Construction  
Jay Creasy, Benchmark Testing and Inspections  
Doug Muzzy, Owner, Muzzy Builders  
David Weber, P.E., Allstate Consultants  
Phil Clithero, Kliethermes Custom Homes  
Dan McCray, McCray Builders

Others in regular attendance included:

David Forward, Chief Building Inspector, Boone County  
Phil Teeple, P.E., Building Regulations Supervisor, City of Columbia  
Stephen Adair, Building Inspector, City of Columbia  
Shane Creech, P.E., Building and Site Development Manager, City of Columbia

General issues:

The 2012 code allows for a prescriptive based approach and a simulated performance alternative. In the discussions and based on the APEC report, the way to higher compliance is thru having an easy to understand prescriptive compliance option. The BCCC has drafted a one page section of a house that shows what insulation goes where and other important energy considerations. This is based on work done by North Carolina. When dealing with a large number of builders of various size and complexity, the KISS (keep it simple stupid) method should be adopted to achieve a high rate of compliance.

The simulated performance option will still be available however the APEC study showed that both the modelers and code officials did not properly perform or understand the modeling and there were substantial compliance problems.

The Department of Energy plans to achieve 50% better energy performance over the 2006 code by changing the energy code. They are limited to heating, cooling, water heating, and lighting. However they do not get to take credit for increased efficiency of the furnace or air conditioner as it is considered an appliance which falls under the NAECA. The DoE is mandating that furnaces be 90% efficient starting in March of 2013. They are currently required to be 78% efficient. This presents its own unique challenges to the building community. All of the studies reviewed by the committee were based on 78% efficient furnaces. The result of this is the magnitude of savings shown by some studies will be reduced by the required appliance changes.

## Individual Changes

### *Wall Insulation requirements*

The code requires R-20 or R-13+5 for exterior walls. Essentially for most builders this would mean 2x6 framing for exterior walls. BCAP estimates the increased framing cost for their model 2,400 ft<sup>2</sup> house at \$1,404. This does not include additional costs for jamb extensions for windows and doors. The usable area of the home is also reduced. The Texas A&M study found that the increased wall insulation accounted for 3.3% energy savings above the 2009 code. The structural requirements should govern and it is the BCCC's opinion that at a minimum the wall cavity should be filled with insulation. High density batts are also available for 2x4 walls though they are more expensive (approximately 2.5x more expensive than R-13 batts).

**BCCC recommendation:** Walls must meet an R-20, R-13+5, or be completely filled with insulation. On a 2x4 wall, the minimum R-value shall be R-15.

### *Slab-on-grade floors*

The 2012 code requires that for slab on grade floors a minimum of 2' of R-10 insulation be provided either interior or exterior, vertically or horizontally. The code says this insulation is not required in jurisdictions designated by the building official as having a very heavy termite infestation. The committee views adding this insulation as a route and place for termites to enter buildings and live. According to the IRC we are in the "moderate to heavy" termite infestation probability portion of the country.

**BCCC recommendation:** Exempt the requirement for slab-on-grade floor insulation unless it is a heated floor.

### *Air leakage*

The 2012 code requires a blower door test on all new houses to determine the rate of air leakage. Based on testimony by Terry Freeman of the Columbia Water & Light Department and Dan Riepe of Home Performance Experts, the houses currently being constructed and blower door tested meet the code requirements of less than 3 air changes per hour. Texas A&M research found that meeting the air leakage requirements would provide the most substantial cost saving of any of the changes in the 2012 code. Mr. Freeman also stated that walls of current houses are often too tight to meet fresh air requirements. The other issue with blower door tests is that they are performed when construction is near completion and addressing flaws in the building envelope would be difficult and expensive. The test alone costs approximately \$250.

**BCCC recommendation:** Ensure the building envelope is properly sealed at the insulation inspection. Allow the blower door test if a contractor does not agree with the building inspector as an option.

### *Mechanical ventilation*

The proposed code requires mechanical ventilation but this is not mentioned in the Energy Efficiency chapter. It is specified in Section R303 – Light, Ventilation and Heating and is further specified in Section M1507 – Mechanical Ventilation. The code requires for a 1,500 square foot, 3 bedroom home, continuous exhaust of 45 CFM. This is 64,800 ft<sup>3</sup> per day, or for a house with 8' ceilings, 5.4 air changes per day. The report by the Montgomery County Energy and Air Quality Advisory Committee found that the code requirements for air leakage and mechanical ventilation are at odds with each other. Montgomery County, MD is a county of approximately 1 million residents. Two Illinois jurisdictions had concerns about this as well as stated in the APEC report. The tight envelope requires forced mechanical ventilation which increases energy use compared with the natural ventilation thru the walls. Terry Freeman made similar comments. The Montgomery County Energy and Air Quality Advisory Committee proposed to keep houses naturally ventilating. The BCCC has provided a middle of the road solution because they often see combustion air intakes filled with insulation and are also concerned that if there is a fan that runs continuously or intermittently, people could shut it off.

**BCCC recommendation:** Provide a duct from the return air to the outside. A 4" duct for houses < 1,500 ft<sup>2</sup>, a 6" duct for houses < 2,400 ft<sup>2</sup>, and an 8" duct for larger houses. The duct would be insulated to prevent condensation, contain a manual damper to adjust to the required amount of fresh air, and have a screen on the exterior to stop insects and animals.

### *Duct tightness*

The adopted code requires testing if the duct is outside of the building's thermal envelope. Nemow Insulation has done a significant amount of duct testing in Columbia. When Phil Teeple contacted Nemow, they stated they had one failure in over 90 tests. Similar sentiments were echoed by Mr. Freeman and Mr. Riepe. Boone County requires the ducts to be sealed but not tested. Ducts which have been subsequently tested in Boone County have passed. The test costs \$400.

**BCCC recommendation:** Allow a duct test if a contractor does not agree with the visual inspection performed by the building inspector.

### *Building cavities as ducts/plenums*

The energy code does not allow building framing cavities to be used as ducts or plenums. The mechanical code still allows this. This would require all returns to be ducted. BCAP mentions this change but only caught the ducts in floor joists, and not the returns that go up the walls to the grills and estimated this would cost \$172. Ducting the returns in the wall would add substantial costs above and beyond those BCAP figured.

**BCCC recommendation:** Amend the energy code to conform to the mechanical code.

*Hot water pipe insulation*

The code has a list of 9 different instances combined with a table with pipe diameter and run length to determine if hot water pipes should be insulated. Water use in homes is on an intermittent basis. The committee based on their experience with standard and recirculating water systems did not see value in insulating the hot water pipes due to the substantial increase in costs and minimal energy savings.

**BCCC recommendation:** Amend the energy code to remove the hot water pipe insulation requirement.

# ENVIRONMENT & ENERGY COMMISSION

City of Columbia & County of Boone

City Hall, Conference Room 1A

January 17, 2013

Mayor McDavid and Council Members,

The Environment & Energy Commission has reviewed the 2012 Energy Code (Chapter 11 of the International Residential Code), and the recommendations of the Building Code Commission. The BCCC has done extensive research into the energy conservation sections of the residential code, and deserves recognition for this effort. The recommendations of the EEC are as follows:

***Insulation of hot water piping:*** Along with BCCC, the EEC recommends eliminating hot water insulation requirements except in the case of hot water circulating pump piping.

***Wood Frame Wall Insulation:*** The 2012 Energy Code requires R20 or R13+5 (R13 batt and R5 cladding). We agree with the BCCC that this new insulation requirement be kept in force. The Code also allows an overall U-Factor of 0.057, roughly equivalent to an average R-value of R17.5. As this can be achieved with a high-density R-15 batt in a standard 2X4 wall, we recommend that this be an allowable method as it meets the letter of the new code.

***Termite Exemption for slab-on-grade and foundation insulation:*** We recommend that the Columbia jurisdiction continue to exempt houses from slab and foundation insulation requirements as this is a heavy termite infestation area, and these kinds of insulation can allow termites access to walls. This practice has a long history and is consistent with BCCC recommendations.

***Cieling or Attic R-Value:*** The 2012 Code recommends an increase in Attic insulation from R-38 to R-49, and in the case of an "Energy Band" truss, R-38 is allowed. The EEC Recommends that this requirement, which may result in reduced mechanical equipment size if properly implemented, will be cost effective. Contractors using proper "Manual J" Calculations will reduce equipment size, thus reduce overall building cost and energy use compared to the old Code. This reduced HVAC

equipment size can directly reduce electric utility demand charges, reaping benefits to the City Utility as well as to the consumer. This is not in agreement with BCCC recommendations.

***Air Leakage:*** The 2012 Code requires a blower door test on all new houses to determine air leakage. The EEC would agree with BCCC that a relaxed standard which requires a visual inspection of air leakage control measures during construction is feasible. The blower door test should be allowed as an option at the discretion of the Building Inspector in questionable or disputed cases.

***Duct Leakage:*** The 2012 Code requires a duct pressure test on all new houses to determine duct leakage. Mechanical contractors are more aware of leakage requirements, and testimony shows they are taking care to seal ductwork. The EEC would agree with the BCCC that a relaxed standard which requires a visual inspection of duct leakage control measures during construction be allowed. The duct pressure test should be allowed as an option at the discretion of the Building Inspector in questionable or disputed cases.

***Outdoor Air Duct:*** The EEC agrees with the BCCC recommendation of a single outside air duct, with insect screen and damper, routed to the furnace return air intake to satisfy Section R303 and M1507 Mechanical Ventilation requirements. This duct should be 4" for houses less than 1500 square feet, 6" for houses less than 2400 square feet, and 8" for larger houses. If there are multiple furnaces, the requirements may be applied to the area served by the furnace, or to one of the multiple furnaces as long as the furnace is properly sized to handle the additional heating or cooling load imposed by the outside air. The duct should be placed as to discharge into the return air filter, to reduce allergens or dust from outdoors.

***Building Cavities as Return Air*** The EEC agrees with the BCCC that building cavities may be used as return air cavities without full duct lining, as long as leakage to outside air, attics, or unconditioned spaces is prevented by visually inspection.

***High Efficacy Lamps:*** The EEC recommends that the 2012 requirement that 75 percent of the *lamps* in light fixtures be high efficacy type, be changed to read 75 percent of the *fixtures* be high efficacy. This allows a few multiple bulb fixtures, such as candelabras, to be conventional bulbs, while retaining the requirement for high efficacy bulbs in most areas. Previously the 2009 amendment changed *shall* to *should* in this paragraph.

***Programmable Thermostats:*** The 2012 Code specifies that the initial heating setpoint shall be 70F and the cooling setpoint be 78F. The EEC recommends that this paragraph be changed from *shall* to *should*, which makes the requirement non-mandatory.

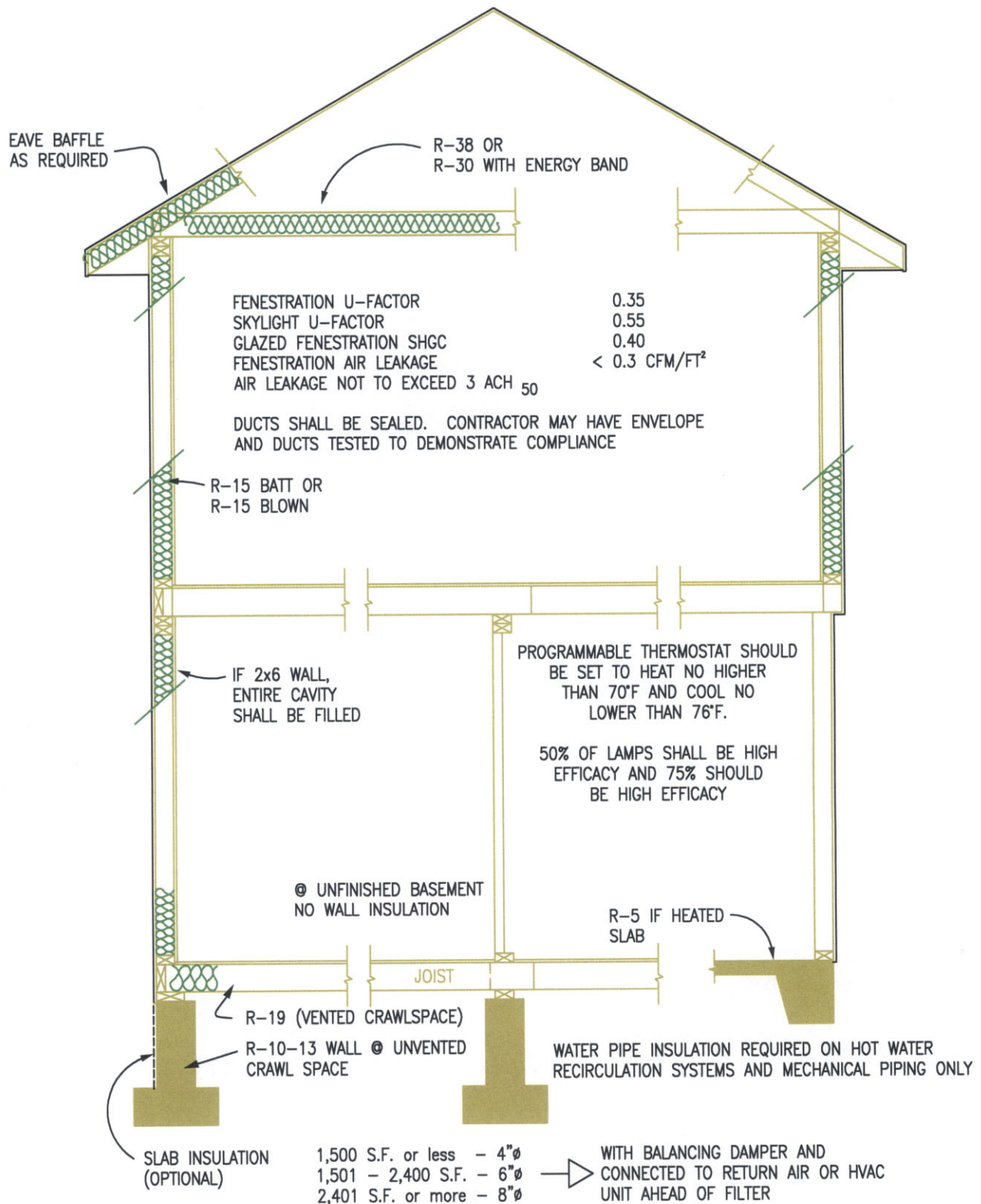
Respectfully Yours,

Karl Skala,

Chair

Environment and Energy Commission

# RESIDENTIAL ENERGY CODE REQUIREMENTS DIAGRAM



THIS SHEET IS NOT AN EXHAUSTIVE LIST. SEE IRC CHAPTER 11 FOR FULL REQUIREMENTS

# ALTERNATIVE 1.1

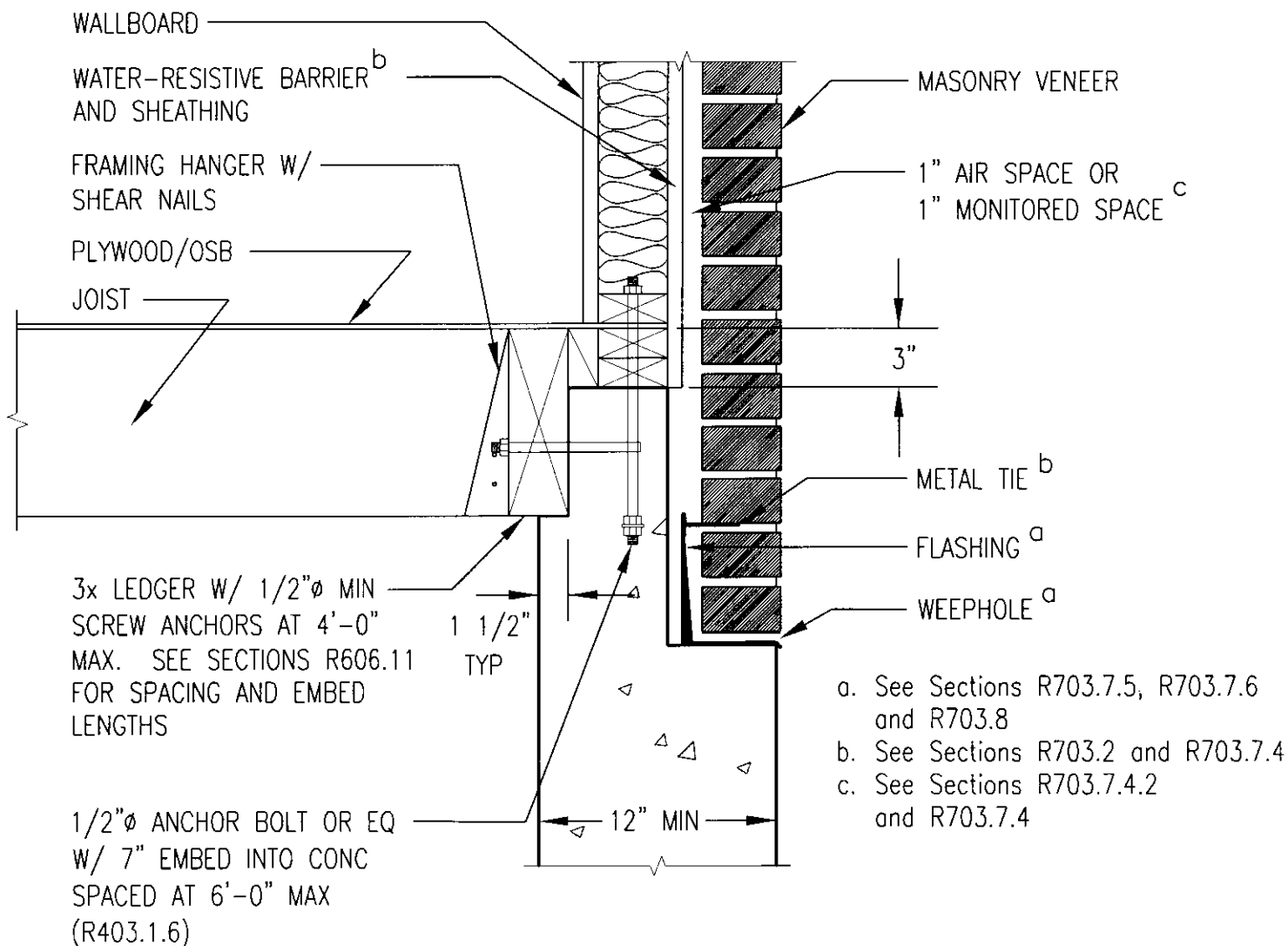
## Joist Perpendicular to Wall W/ Brick

2012 IRC

Section R404 Foundations and Retaining Walls

Section R404.1 Concrete and Masonry Foundation Walls

\*This figure is provided as an example. This is not an all inclusive list of code requirements.



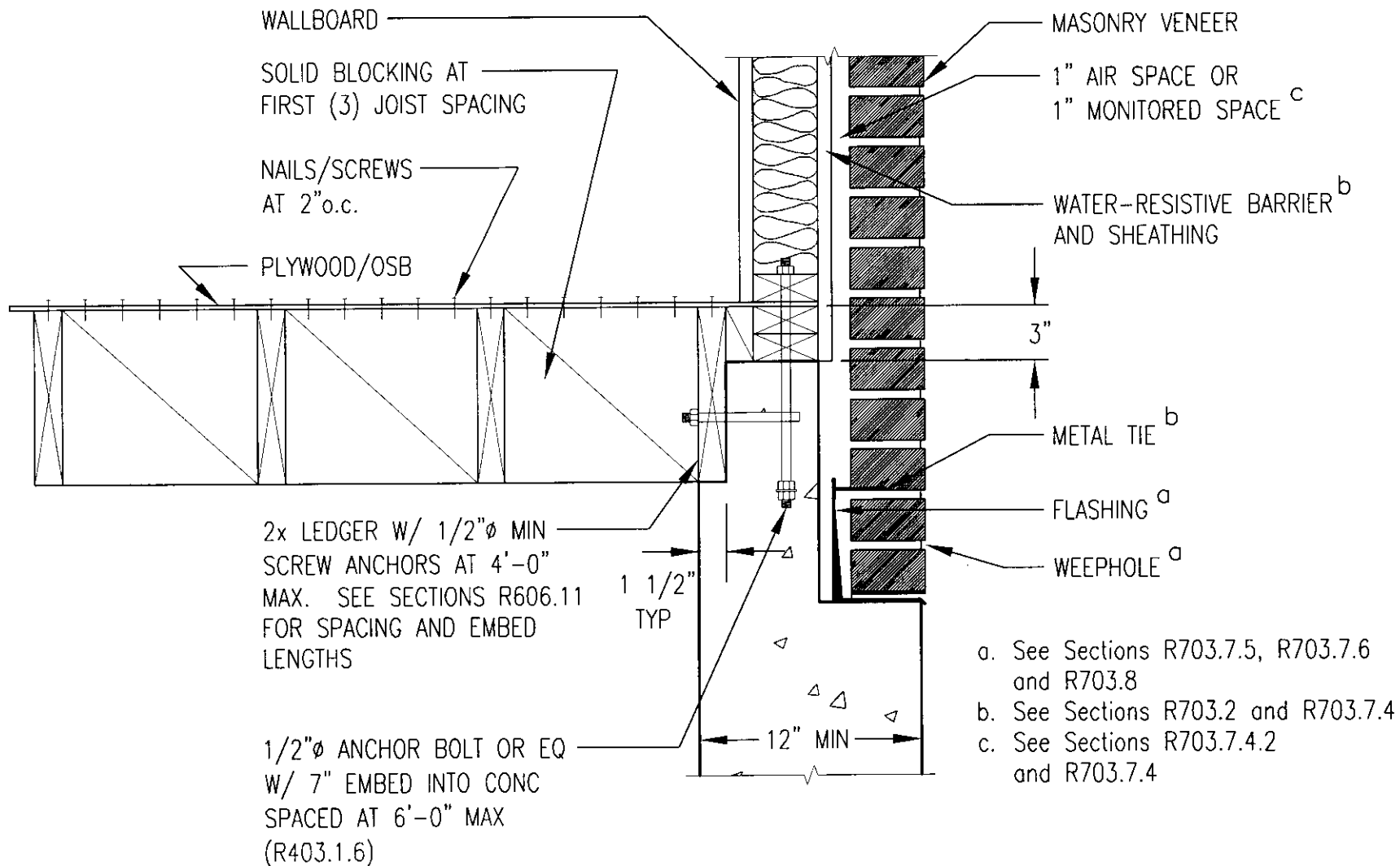
# ALTERNATIVE 1.2

## Joist Parallel to Wall W/ Brick

2012 IRC

Section R404 Foundations and Retaining Walls  
Section R404.1 Concrete and Masonry Foundation Walls

\*This figure is provided as an example. This is not an all inclusive list of code requirements.



## ALTERNATIVE 1.3

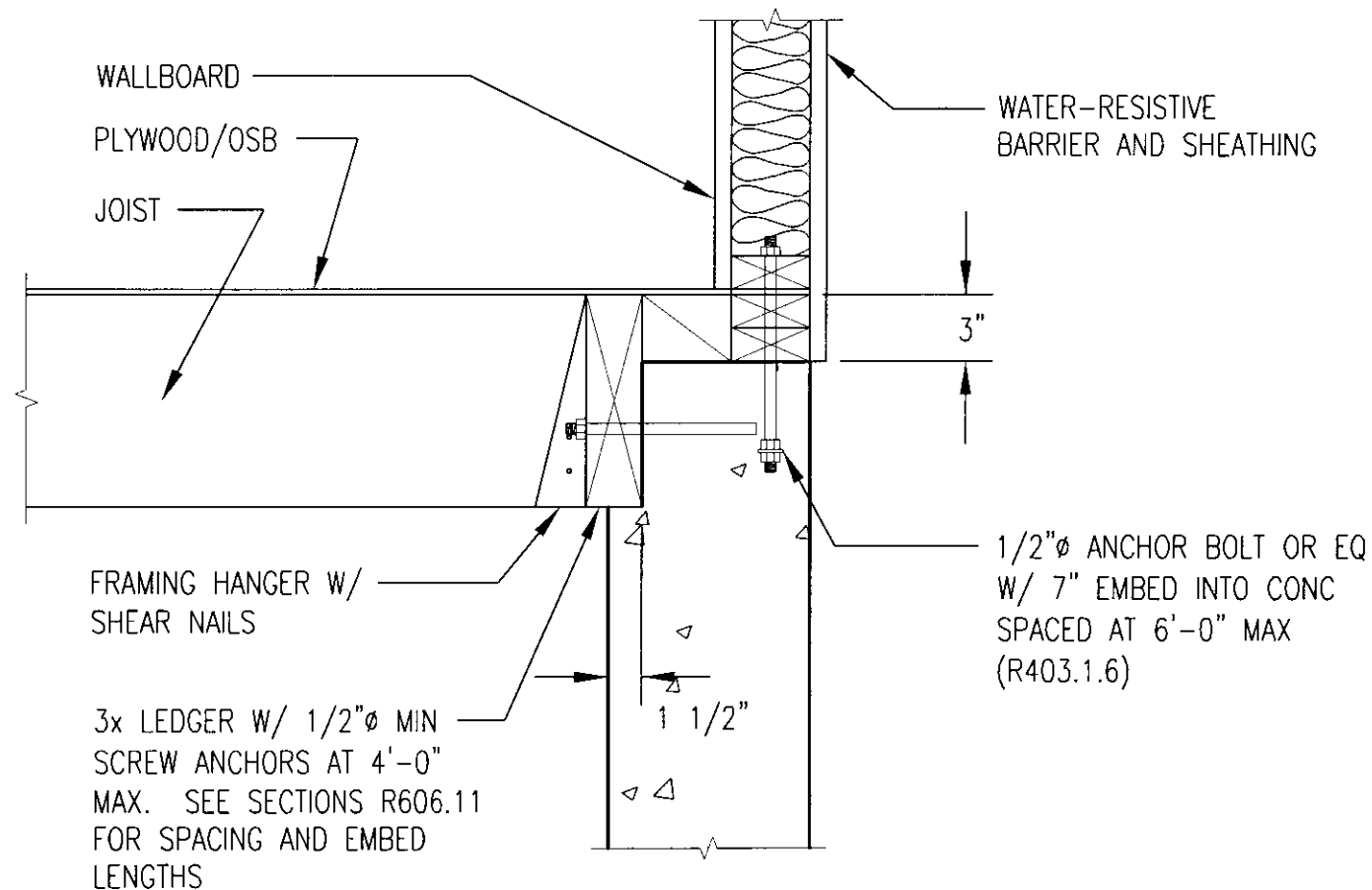
### Joist Perpendicular to Wall W/O Brick

2012 IRC

Section R404 Foundations and Retaining Walls

Section R404.1 Concrete and Masonry Foundation Walls

\* This figure is provided as an example. This is not an all inclusive list of code requirements.



# ALTERNATIVE 1.4

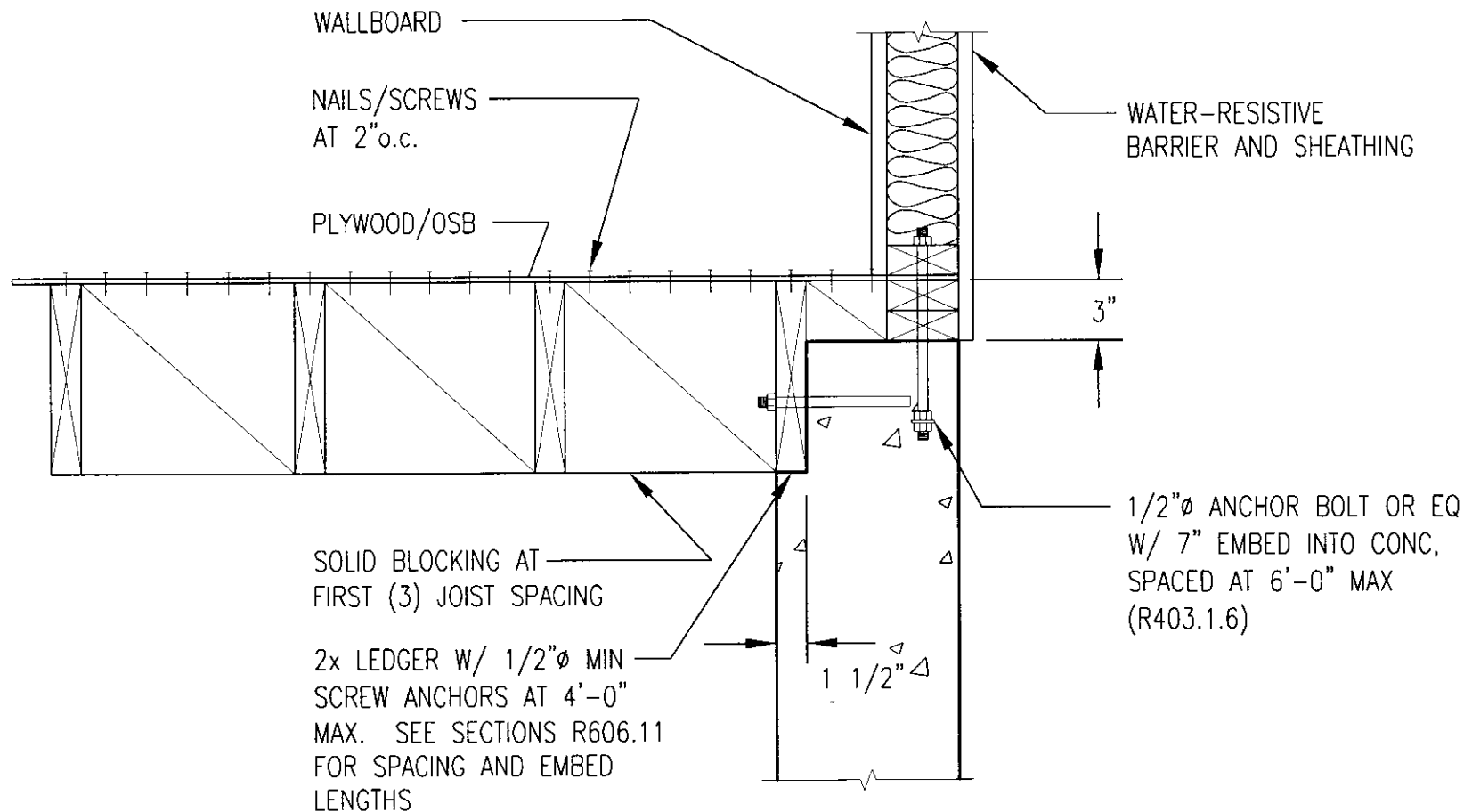
## Joist Parallel to Wall W/O Brick

2012 IRC

Section R404 Foundations and Retaining Walls

Section R404.1 Concrete and Masonry Foundation Walls

\* This figure is provided as an example. This is not an all inclusive list of code requirements.



# ALTERNATIVE 2.1

## Joist Perpendicular to Wall

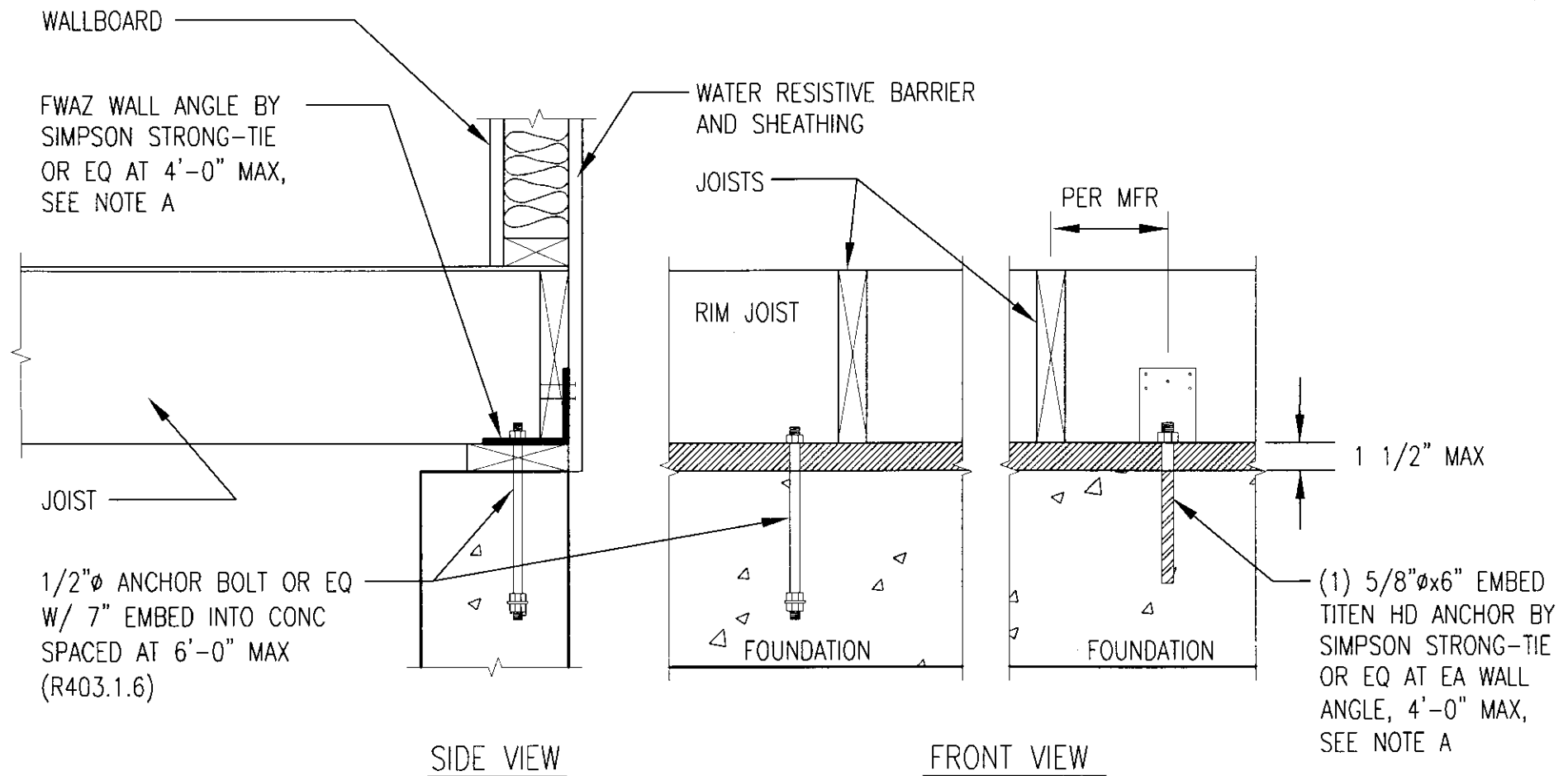
2012 IRC

Section R404 Foundations and Retaining Walls

Section R404.1 Concrete and Masonry Foundation Walls

\* This figure is provided as an example. This is not an all inclusive list of code requirements.

NOTE A: Refer to the manufacturers tables for required spacing and placement of FWAZ wall angles



# ALTERNATIVE 2.2

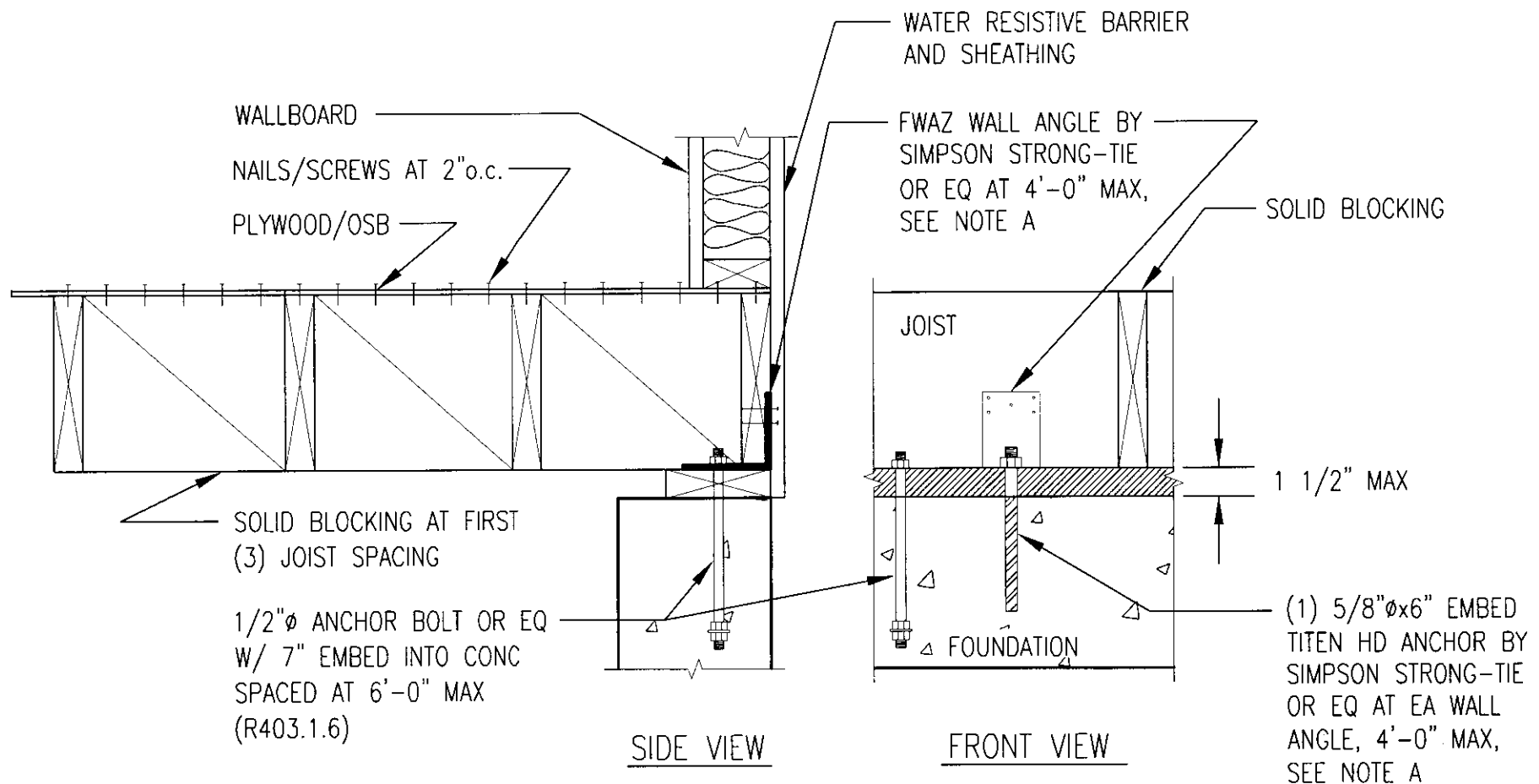
## Joist Parallel to Wall

2012 IRC

Section R404 Foundations and Retaining Walls  
Section R404.1 Concrete and Masonry Foundation Walls

\* This figure is provided as an example. This is not an all inclusive list of code requirements.

NOTE A: Refer to the manufacturers tables for required spacing and placement of FWAZ wall angles



## ALTERNATIVE 3.1

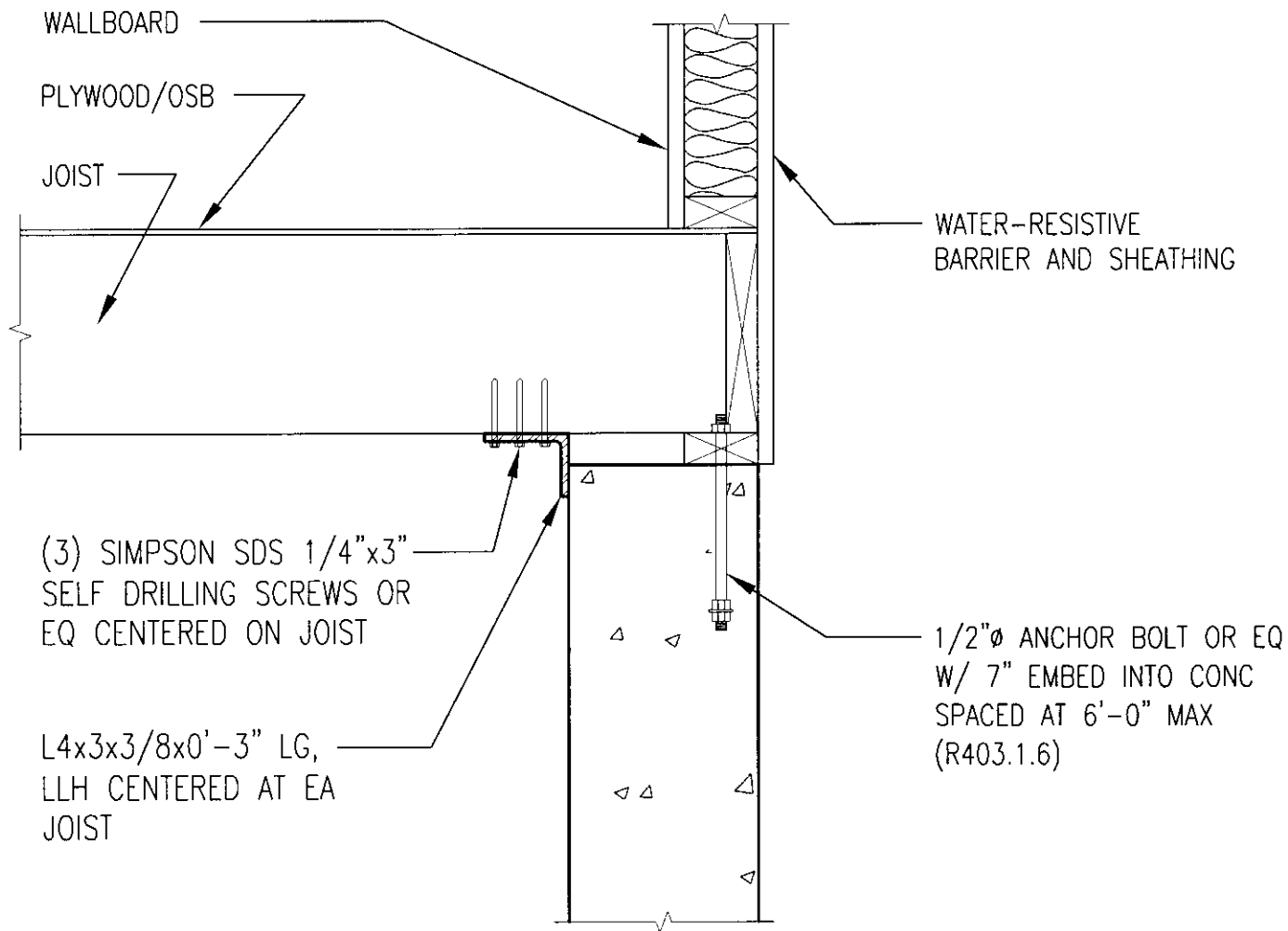
### Joist Perpendicular to Wall W/O Brick

2012 IRC

Section R404 Foundations and Retaining Walls

Section R404.1 Concrete and Masonry Foundation Walls

\* This figure is provided as an example. This is not an all inclusive list of code requirements.



# ALTERNATIVE 3.2

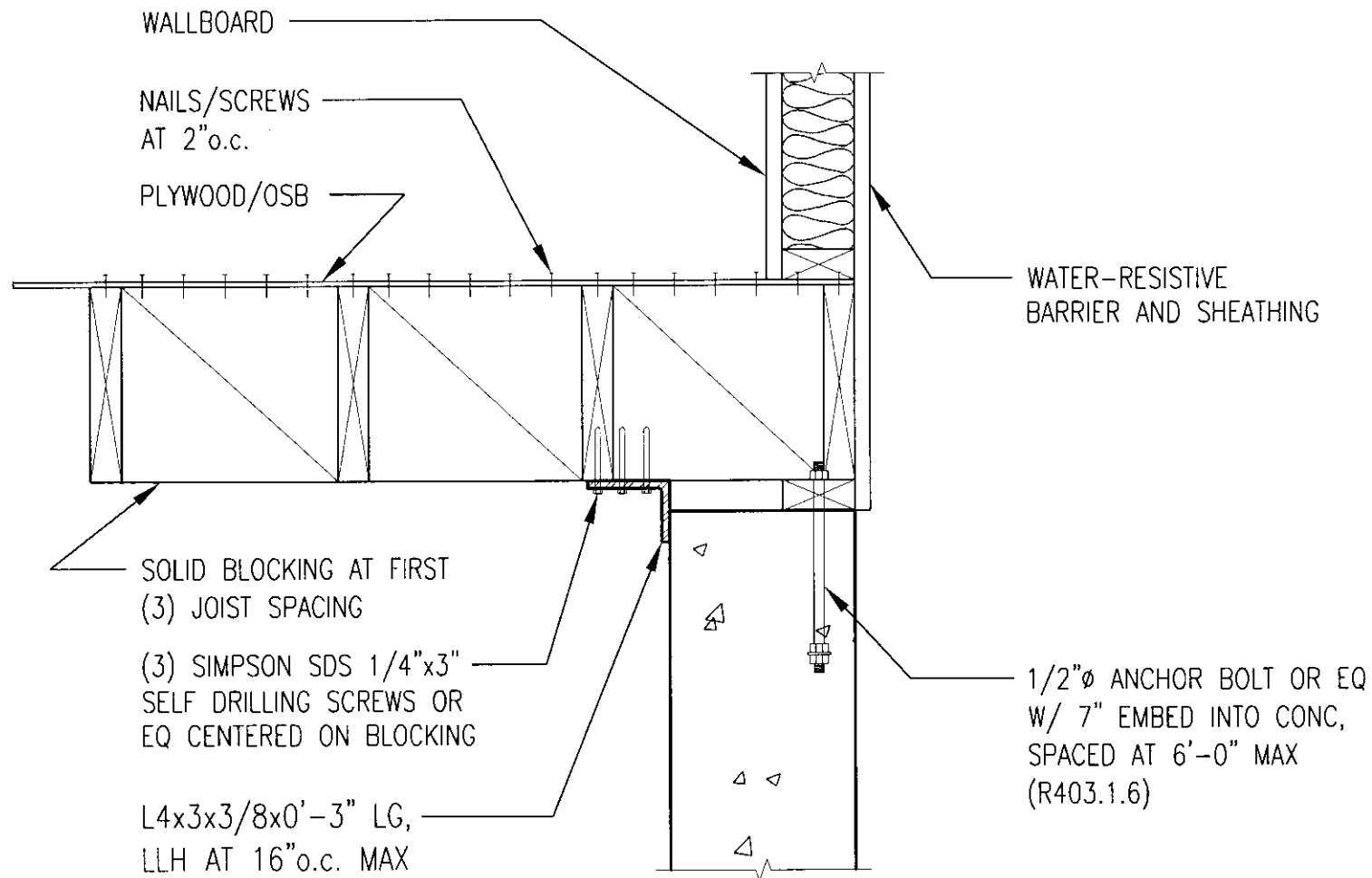
## Joist Parallel to Wall W/O Brick

2012 IRC

Section R404 Foundations and Retaining Walls

Section R404.1 Concrete and Masonry Foundation Walls

\* This figure is provided as an example. This is not an all inclusive list of code requirements.



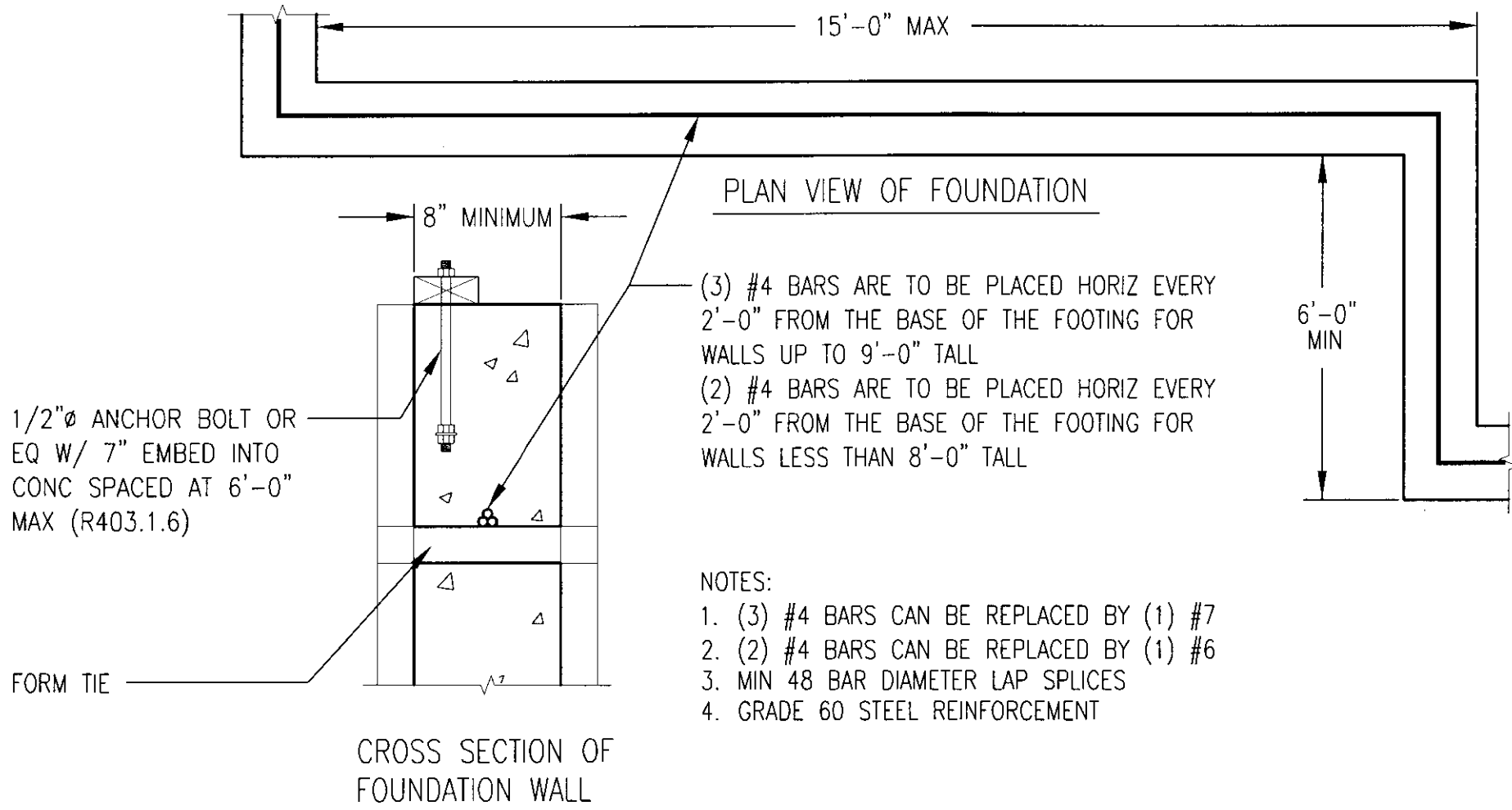
# ALTERNATIVE 4

2012 IRC

Section R404 Foundations and Retaining Walls

Section R404.1 Concrete and Masonry Foundation Walls

\* This figure is provided as an example. This is not an all inclusive list of code requirements.



# FOUNDATION DRAINAGE

## FIGURE R405.1

2012 IRC

Section R405 Foundation Drainage

Section R406 Foundation Waterproofing and Dampproofing

- \* This figure is provided as an example. This is not an all inclusive list of code requirements.
- \*\* Either a filter fabric sock around drintile or filter fabric on the gravel shall be required, not both unless desired by the contractor.

