

# CHRISTIAN COUNTY

**DEPARTMENT OF BUILDING INSPECTIONS  
100 W. CHURCH ST. ROOM 102  
OZARK, MO. 65721**



ONE & TWO FAMILY  
RESIDENTIAL CONSTRUCTION

GUIDELINES  
&  
INSPECTION CHECKLISTS

Based on the 2006 International Residential Code  
and the 2005 National Electric

**THIS IS A GUIDELINE ONLY IF YOU SHOULD HAVE  
ANY QUESTIONS PLEASE CALL OUR OFFICE!!**

BUILDING INSPECTIONS  
Office Hours: 8:00-4:30

Phone: 417-581-6064  
Fax: 417-581-6054

Cost: \$3.50 per booklet.

Dear Contractor:

The following pages contain information compiled primarily from the 2006 International Residential Code. The information contained herein is not intended to replace the actual 2006 IRC, nor is this publication a part of the Christian County building code ordinance. The purpose of this publication is to help aid the builder in quickly and easily locating typical code sections from the IRC regarding issues that come up during the inspection process.

Purchase of the 2006 International Residential Code book is encouraged. Code books are available on-line at [www.iccsafe.org](http://www.iccsafe.org), or by calling the International Code Council at 1-888-ICC-SAFE. (888-422-7233)

The deck details located at the conclusion of this informational book contain typical deck details that are acceptable to Christian County and have been adopted as Appendix R to the IRC. The IRC does not directly address deck attachment, and other construction issues regarding exterior decks. Decks not built to the typical deck details of Appendix R may require the services of a design professional to determine whether or not the construction meets the minimum standards of the IRC.

To request an inspection, please call 417-581-6064. Inspections will be scheduled for the following business day. If you call in after hours, please leave the following minimum information:

- Permit number.
- Type of inspection desired.
- Jobsite address.
- Call back number. (It is very important to leave us a way to contact you in case we have questions, problems arise, or other.)

In order to receive an inspection, the following items must be at the jobsite at all times for review by the inspector:

- Copy of approved plans.
- Building Permit.
- Jobsite card.
- All inspection receipts.

Whenever the project is complete, please make certain that the 'Final Inspection' sections of the jobsite card are signed and dated 'approved' for all required final inspections. Present the completed jobsite card to our offices prior to 3:30 p.m. any business day, and a Certificate of Occupancy will be issued. Office staff will not be able to issue a CO without verification that all of the required inspections were approved for occupancy.

Christian County Building Inspections Department

## TABLE OF CONTENTS

Required Inspections .....	1-2
Footings / Narrow Wall Detail .....	3-8
Foundation .....	9
Framing Construction Example & Allowable Spans for Floor Joists .....	10
Rafter Spans - Ceiling <b>Not</b> Attached .....	11
Rafter Spans - Ceiling Attached .....	12
Ceiling Joist Spans - Uninhabitable Attics <b>With</b> Limited Storage, Live Load .....	13
Ceiling Joist Spans - Uninhabitable Attics <b>Without</b> Storage .....	14
Floor Joist Spans - Residential <b>Sleeping</b> Areas .....	15
Floor Joist spans - Residential <b>Living</b> Areas .....	16
Girder & Header Spans - For <b>Exterior</b> Bearing Walls .....	17
Girder & Header Spans - For <b>Interior</b> Bearing Walls .....	18
Ground Snow Load .....	19
Framing / Wall Sheathing .....	20-21
Miscellaneous Requirements	
Attic Ventilation .....	22
Attic Access .....	22
Attached Garages .....	22
Landings .....	22
Stairs .....	22
Hand Rails (stairs) .....	22
Guard Rails (porches) .....	22
Ramps .....	22
Decks .....	23
Bathroom Vent .....	23
Clothes Dryer Exhaust .....	23
Zero Lot Line Dwelling .....	24
Duplexes .....	24
Temporary & Permanent Power Requirements .....	25
Electrical .....	26
Blank .....	27
Bathroom Branch Circuit .....	28
Bathroom Receptacle Circuit(s) .....	28
Small Appliance Grounding .....	28
Large Appliance Grounding .....	28

## TABLE OF CONTENTS CONTINUED

Plumbing .....	30
Mechanical .....	31
Blank .....	32
Contractor/Builder Responsibilities .....	33

### RESIDENTIAL INSPECTION CHECKLISTS

Residential Footing .....	34
Residential Foundation Wall .....	35
Temporary Electric .....	36
Residential Inground Plumbing .....	37
Residential Sewer Ditch .....	38
Blank .....	39
Residential Roof Framing .....	40
Residential Wall Framing .....	41-42
Residential Floor & Ceiling Framing .....	43
Residential Wall Sheathing .....	44
Residential Electrical Rough-in .....	45
Residential Mechanical Rough-in .....	46
Residential Plumbing Rough-in .....	47
Residential Permanent Electric .....	48
Residential Final Occupancy .....	49-51
<b>Appendix 'R'</b> <b>Christian County Typical Deck Details .....</b>	<b>52-69</b>

**This informational handout is based on the 2006 IRC one and two family dwelling code, the 2005 National Electric Code and other Christian County Ordinances.**

**The purpose of this handout is to better present and clarify code interpretation and enforcement for construction of a one or two family dwelling; however, it by no means attempts to address every code item.**

**The Building Inspection Department's purpose is to work with the Contractors and the public so that the consumer may purchase a quality home that meets or exceeds the requirements of Christian County.**

## **REQUIRED INSPECTIONS**

For on-site construction, the building department inspectors, upon notification from the permit holder or his agent, will make all necessary inspections and will either approve that portion of the construction as completed or disapprove that same portion, state why on an inspection slip and post the inspection slip in a conspicuous place. Inspections consist of but are not limited to the following items.

**Footing:** Commonly made after areas are excavated and forms erected and required steel is in place prior to the placing of concrete.

**SEE INSPECTION CHECKLIST**

**Foundation (Stem Wall):** Commonly made after footing concrete has been placed, forms erected and required steel is in place prior to placing of concrete; or during and upon completion of laying concrete block foundation.

**SEE INSPECTION CHECKLIST**

**Inground Plumbing:** Inspection required before any concealment, before pouring of concrete.

**SEE INSPECTION CHECKLIST**

**Plumbing, Rough-in Inspections:** Inspection required before any concealment, before fixtures are set.

**SEE INSPECTION CHECKLIST**

**Mechanical Rough-in Inspections:** Inspection required before any concealment, before fixtures are set.

**SEE INSPECTION CHECKLIST**

**Electrical Rough-in Inspections:** Inspection required before any concealment.

**SEE INSPECTION CHECKLIST**

**Framing/ Wall Sheathing Inspection:** Required after the roof, all framing, fire stopping, draft stopping and bracing are in place.

**SEE INSPECTION CHECKLIST**

**Permanent Electric:** After all rough-in inspections are approved, prior to insulation.

**SEE INSPECTION CHECKLIST**

**Final Inspection:** Commonly made after building is complete and yard and driveway are completed. **There shall be NO occupancy before final inspection has been approved.**

**SEE INSPECTION CHECKLIST**

**OCCUPANCY: No building shall be occupied until a final inspection is approved.**

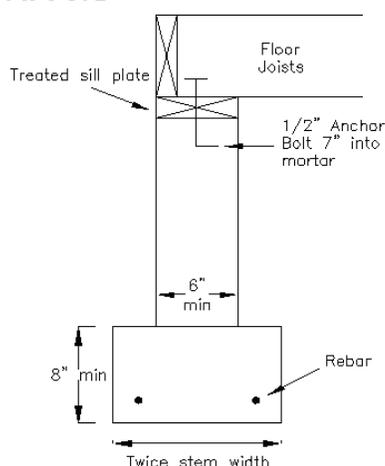
# FOOTINGS

The minimum dimensions for footings are based on loading and an assumed allowable soil pressure of 2000 pounds per square foot. Footing widths or the depth of footings below natural grade may have to be increased if the supporting soil is of a type not having an allowable bearing pressure of at least 2000 pounds per square foot.

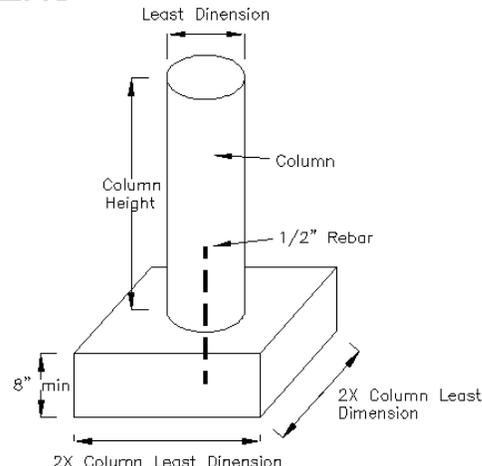
## THE FOLLOWING ARE MINIMUM REQUIREMENTS FOR FOOTINGS

- Concrete can only be placed on frost-free surfaces.
- Concrete footing shall be protected from freezing during depositing and for a period of not less than five days thereafter.
- Concrete in footings shall have a compressive strength of not less than 2500 lbs. per square inch for 28 days.
- The top of the footing shall be level. The bottom surface may have a slope not exceeding 1 in 10 fall.
- **Depth:** Footings are to be poured on a solid bearing surface. The bearing surface shall be a minimum of 18 inches below finished grade.
- **Width:** For conventional light-frame construction, Footings are to be a minimum of 12 inches wide for one (1) and two (2) story structures; 18 inches wide for three (3) stories. Brick homes or masonry structures may require greater width.
- **Thickness:** Footing for a single story residence shall be at least six (6) inches thick. Footing for a masonry fireplace should be minimum of twelve (12) inches thick.

## FOOTINGS



## PIERS



wall lines, where required, including areas above and below openings, bracing wall panel lengths shall be in accordance with Table R602.10.5. Wood structural panel sheathing shall be installed at corners in accordance with Figure R602.10.5. The bracing amounts in Table R602.10.1 for Method 3 shall be permitted to be multiplied by a factor of 0.9 for wall with a maximum opening height that does not exceed 85 percent of the wall height or a factor of 0.8 for walls with a maximum opening height that does not exceed 67 percent of the wall height.

**R602.10.6 Alternate braced wall panel construction methods.** Alternate braced wall panels shall be constructed in accordance with Sections R602.10.6.1 and R602.10.6.2.

**R602.10.6.1 Alternate braced wall panels.** Alternate braced wall lines constructed in accordance with one of the following provisions shall be permitted to replace each 4 feet (1219 mm) of braced wall panel as required by Section R602.10.4. The maximum height and minimum width of each panel shall be in accordance with Table R602.10.6:

1. In one-story buildings, each panel shall be sheathed on one face with  $\frac{3}{8}$ -inch-minimum-thickness (10 mm) wood structural panel sheathing nailed with 8d common or galvanized box nails in accordance with Table R602.3(1) and blocked at all wood structural panel sheathing edges. Two anchor bolts installed in accordance with Figure R403.1(1) shall be provided in each panel. Anchor bolts shall be placed at panel quarter points. Each panel end stud shall have a tie-down device fastened to the foundation, capable of providing an uplift capacity in accordance with Table R602.10.6. The tie down device shall be installed in accordance with the manufacturer's recommendations. The panels shall be supported directly on a

foundation or on floor framing supported directly on a foundation which is continuous across the entire length of the braced wall line. This foundation shall be reinforced with not less than one No. 4 bar top and bottom. When the continuous foundation is required to have a depth greater than 12 inches (305 mm), a minimum 12-inch-by-12-inch (305 mm by 305 mm) continuous footing or turned down slab edge is permitted at door openings in the braced wall line. This continuous footing or turned down slab edge shall be reinforced with not less than one No. 4 bar top and bottom. This reinforcement shall be lapped 15 inches (381 mm) with the reinforcement required in the continuous foundation located directly under the braced wall line.

2. In the first story of two-story buildings, each braced wall panel shall be in accordance with Item 1 above, except that the wood structural panel sheathing shall be installed on both faces, sheathing edge nailing spacing shall not exceed 4 inches (102 mm) on center, at least three anchor bolts shall be placed at one-fifth points.

**R602.10.6.2 Alternate braced wall panel adjacent to a door or window opening.** Alternate braced wall panels constructed in accordance with one of the following provisions are also permitted to replace each 4 feet (1219 mm) of braced wall panel as required by Section R602.10.4 for use adjacent to a window or door opening with a full-length header:

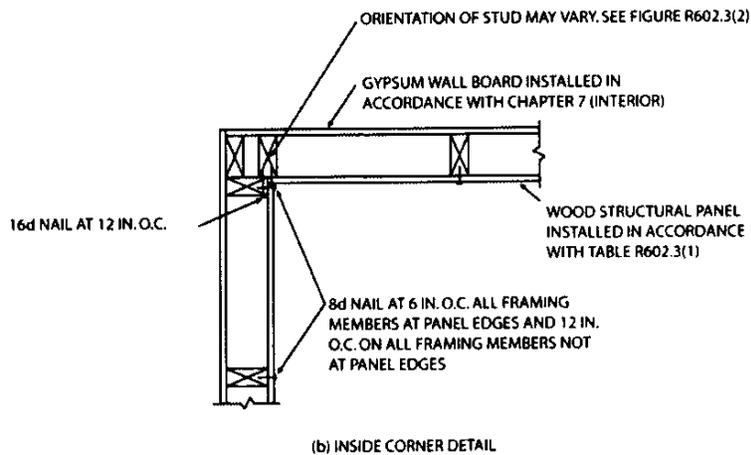
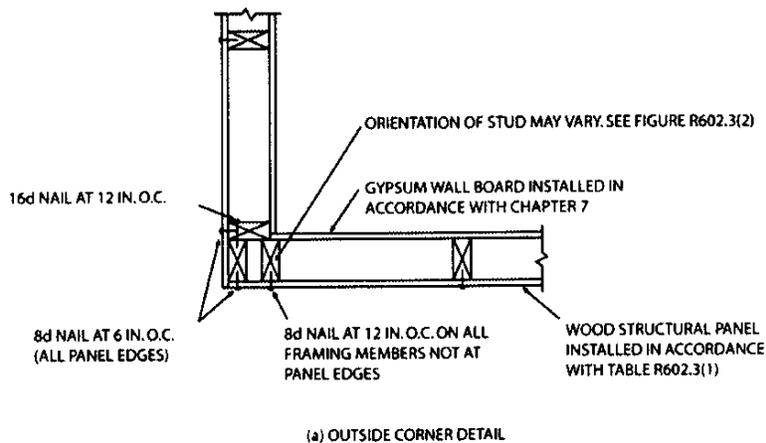
1. In one-story buildings, each panel shall have a length of not less than 16 inches (406 mm) and a height of not more than 10 feet (3048 mm). Each panel shall be sheathed on one face with a single layer of  $\frac{3}{8}$ -inch-minimum-thickness (10 mm)

**TABLE R602.10.5  
LENGTH REQUIREMENTS FOR BRACED WALL PANELS IN A CONTINUOUSLY SHEATHED WALL<sup>a, b, c</sup>**

MINIMUM LENGTH OF BRACED WALL PANEL (Inches)			MAXIMUM OPENING HEIGHT NEXT TO THE BRACED WALL PANEL (% of wall height)
8-foot wall	9-foot wall	10-foot wall	
48	54	60	100
32	36	40	85
24	27	30	65

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 pound per square foot = 0.0479 kPa.

- a. Linear interpolation shall be permitted.
- b. Full-height sheathed wall segments to either side of garage openings that support light frame roofs only, with roof covering dead loads of 3 psf or less shall be permitted to have a 4:1 aspect ratio.
- c. Walls on either or both sides of openings in garages attached to fully sheathed dwellings shall be permitted to be built in accordance with Section R602.10.6.2 and Figure R602.10.6.2 except that a single bottom plate shall be permitted and two anchor bolts shall be placed at 1/3 points. In addition, tie-down devices shall not be required and the vertical wall segment shall have a maximum 6:1 height-to-width ratio (with height being measured from top of header to the bottom of the sill plate). This option shall be permitted for the first story of two-story applications in Seismic Design Categories A through C.



For SI: 1 inch = 25.4 mm.  
Gypsum board nails deleted for clarity.

**FIGURE R602.10.5**  
**TYPICAL EXTERIOR CORNER FRAMING FOR CONTINUOUS STRUCTURAL**  
**PANEL SHEATHING; SHOWING REQUIRED STUD-TO-STUD NAILING**

wood structural panel sheathing nailed with 8d common or galvanized box nails in accordance with Figure R602.10.6.2. The wood structural panel sheathing shall extend up over the solid sawn or glued-laminated header and shall be nailed in accordance with Figure R602.10.6.2. Use of a built-up header consisting of at least two 2 x 12s and fastened in accordance with Table R602.3(1) shall be permitted. A spacer, if used, shall be placed on the side of the built-up beam opposite the wood structural panel sheathing. The header shall extend between the inside faces of the first full-length outer studs of each panel. The clear span of the header between the inner studs of each panel shall be not less than 6 feet (1829 mm) and not more than 18 feet (5486 mm) in length. A strap

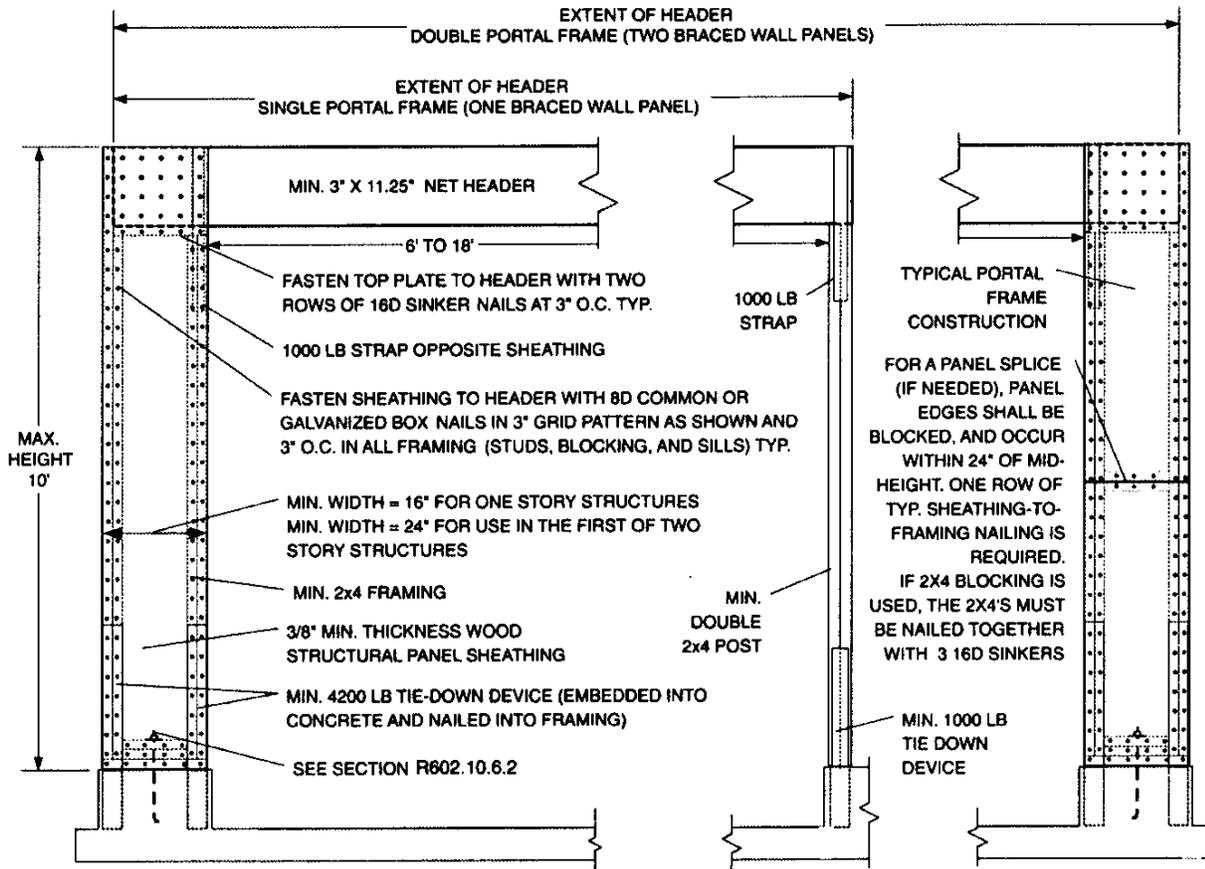
with an uplift capacity of not less than 1000 pounds (4448 N) shall fasten the header to the side of the inner studs opposite the sheathing. One anchor bolt not less than  $\frac{5}{8}$ -inch-diameter (16 mm) and installed in accordance with Section R403.1.6 shall be installed in the center of each sill plate. The studs at each end of the panel shall have a tie-down device fastened to the foundation with an uplift capacity of not less than 4,200 pounds (18 683 N).

Where a panel is located on one side of the opening, the header shall extend between the inside face of the first full-length stud of the panel and the bearing studs at the other end of the opening. A strap with an uplift capacity of not less than 1000 pounds (4448 N) shall fasten the header to the bearing

**TABLE R602.10.6  
MINIMUM WIDTHS AND TIE-DOWN FORCES OF ALTERNATE BRACED WALL PANELS**

SEISMIC DESIGN CATEGORY AND WINDSPEED	TIE-DOWN FORCE (lb)	HEIGHT OF BRACED WALL PANEL				
		Sheathed Width				
		8 ft. 2' - 4"	9 ft. 2' - 8"	10 ft. 2' - 8"	11 ft. 3' - 2"	12 ft. 3' - 6"
SDC A, B, and C Windspeed < 110 mph	R602.10.6.1, Item 1	1800	1800	1800	2000	2200
	R602.10.6.1, Item 2	3000	3000	3000	3300	3600
SDC D <sub>0</sub> , D <sub>1</sub> and D <sub>2</sub> Windspeed < 110 mph	R602.10.6.1, Item 1	Sheathed Width				
		2' - 8"	2' - 8"	2' - 8"	Note a	Note a
		1800	1800	1800	—	—
	R602.10.6.1, Item 2	3000	3000	3000	—	—

For St: 1 inch = 25.4 mm, 1 foot = 304.8 mm.  
a. Not permitted because maximum height is 10 feet.



**FIGURE R602.10.6.2  
ALTERNATE BRACED WALL PANEL ADJACENT TO A DOOR OR WINDOW OPENING**

studs. The bearing studs shall also have a tie-down device fastened to the foundation with an uplift capacity of not less than 1000 pounds (4448 N).

The tie-down devices shall be an embedded-strap type, installed in accordance with the manufacturer's recommendations. The panels shall be supported directly on a foundation which is continuous across the entire length of the braced wall line. The foundation shall be reinforced with not less than one No. 4 bar top and bottom.

Where the continuous foundation is required to have a depth greater than 12 inches (305 mm), a minimum 12-inch-by-12-inch (305 mm by 305 mm) continuous footing or turned down slab edge is permitted at door openings in the braced wall line. This continuous footing or turned down slab edge shall be reinforced with not less than one No. 4 bar top and bottom. This reinforcement shall be lapped not less than 15 inches (381 mm) with the reinforcement required in the continuous foundation located directly under the braced wall line.

2. In the first story of two-story buildings, each wall panel shall be braced in accordance with Item 1 above, except that each panel shall have a length of not less than 24 inches (610 mm).

**R602.10.7 Panel joints.** All vertical joints of panel sheathing shall occur over, and be fastened to, common studs. Horizontal joints in braced wall panels shall occur over, and be fastened to, common blocking of a minimum 1½ inch (38 mm) thickness.

**Exception:** Blocking is not required behind horizontal joints in Seismic Design Categories A and B and detached dwellings in Seismic Design Category C when constructed in accordance with Section R602.10.3, braced-wall-panel construction method 3 and Table R602.10.1, method 3, or where permitted by the manufacturer's installation requirements for the specific sheathing material.

**R602.10.8 Connections.** Braced wall line sole plates shall be fastened to the floor framing and top plates shall be connected to the framing above in accordance with Table R602.3(1). Sills shall be fastened to the foundation or slab in accordance with Sections R403.1.6 and R602.11. Where joists are perpendicular to the braced wall lines above, blocking shall be provided under and in line with the braced wall panels. Where joists are perpendicular to braced wall lines below, blocking shall be provided over and in line with the braced wall panels. Where joists are parallel to braced wall lines above or below, a rim joist or other parallel framing member shall be provided at the wall to permit fastening per Table R602.3(1).

**R602.10.9 Interior braced wall support.** In one-story buildings located in Seismic Design Category D<sub>2</sub>, interior braced wall lines shall be supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm). In two-story buildings located in Seismic Design Category D<sub>2</sub>, all interior braced wall panels shall be supported on continuous foundations.

**Exception:** Two-story buildings shall be permitted to have interior braced wall lines supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm) provided that:

1. The height of cripple walls does not exceed 4 feet (1219 mm).
2. First-floor braced wall panels are supported on doubled floor joists, continuous blocking or floor beams.
3. The distance between bracing lines does not exceed twice the building width measured parallel to the braced wall line.

**R602.10.10 Design of structural elements.** Where a building, or portion thereof, does not comply with one or more of the bracing requirements in this section, those portions shall be designed and constructed in accordance with accepted engineering practice.

**R602.10.11 Bracing in Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub>.** Structures located in Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub> shall have exterior and interior braced wall lines.

**R602.10.11.1 Braced wall line spacing.** Spacing between braced wall lines in each story shall not exceed 25 feet (7620 mm) on center in both the longitudinal and transverse directions.

**Exception:** In one- and two-story buildings, spacing between two adjacent braced wall lines shall not exceed 35 feet (10 363 mm) on center in order to accommodate one single room not exceeding 900 square feet (84 m<sup>2</sup>) in each dwelling unit. Spacing between all other braced wall lines shall not exceed 25 feet (7620 mm).

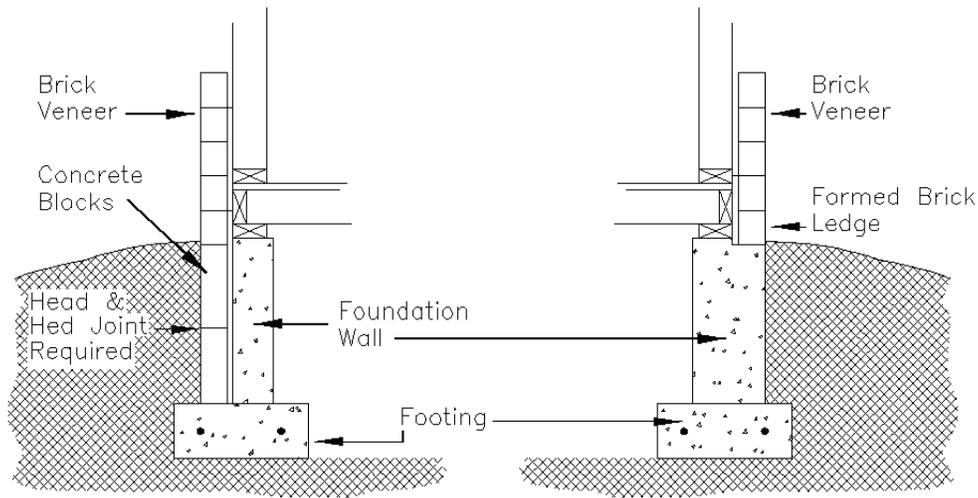
**R602.10.11.2 Braced wall panel location.** Exterior braced wall lines shall have a braced wall panel at each end of the braced wall line.

**Exception:** For braced wall panel construction Method 3 of Section R602.10.3, the braced wall panel shall be permitted to begin no more than 8 feet (2438 mm) from each end of the braced wall line provided the following is satisfied:

1. A minimum 24-inch-wide (610 mm) panel is applied to each side of the building corner and the two 24-inch (610 mm) panels at the corner shall be attached to framing in accordance with Figure R602.10.5; or
2. The end of each braced wall panel closest to the corner shall have a tie-down device fastened to the stud at the edge of the braced wall panel closest to the corner and to the foundation or framing below. The tie-down device shall be capable of providing an uplift allowable design value of at least 1,800 pounds (8 kN). The tie-down device shall be installed in accordance with the manufacturer's recommendations.

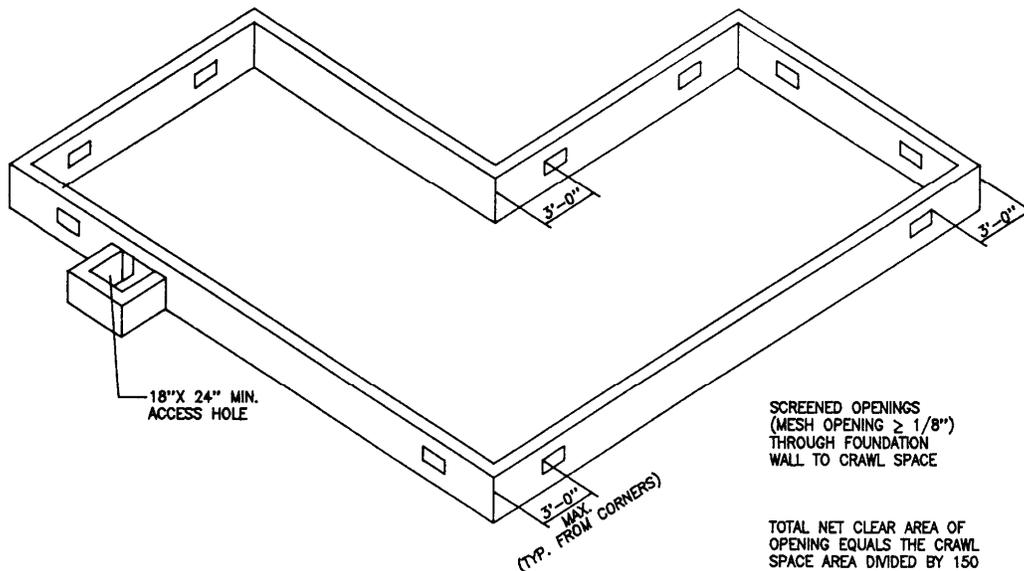
## BRICK LEDGE

- Brick or masonry veneers must be supported by the foundation and footings
- The brick ledge can be formed in the foundation wall or by concrete units bearing on the footing, head and bed joints are required.
- Sheathing under brick is required to be covered with felt, housewrap, or otherwise sealed.
- Wall ties to be spaced a maximum of 24 inches o.c. horizontal and vertical.



## CRAWL SPACE

- Minimum height of crawl space to bottom of floor joist is 18 inches.
- Minimum access hole required is 18"X24".
- Ventilation openings may be omitted on one side
- Ventilation opening is 1 square foot for each 150 square feet of crawl space



## **FOUNDATION**

- Foundation walls should be of sufficient heights to provide a minimum of 8 inches clearance between sill plate and finished grade. In all cases, this will result in the measurement from the bottom of the footing to the top of the stemwall to be at least 24" to accommodate for the 18" frost line and required clearances from finished grade to wood.
- Stem walls are to be a minimum of 6 inches wide for one (1) story.
- Stem wall height should be a minimum of one (1) foot above the street curb, depending on grade of lot.
- Foundation shall have 1/2 inch bolts at six (6) feet on center not more than 12 inches from each corner and seven (7) inches into concrete. (10" J-bolt minimum.)
- Foundation walls made of concrete or block of habitable rooms located below grade shall be water proofed.
- Drain lines shall be provided around all foundations enclosing usable or habitable space below grade, Drain lines shall discharge by natural means, or provide mechanical system when necessary.
- All bottom sill plates in contact with concrete and are less than 8 inches from exposed ground shall be treated wood or wood naturally resistant to decay.

- **DRAINAGE**

Lots shall be provided with adequate drainage and shall be graded so as to drain surface water away from foundation walls. The grade away from foundation walls shall fall a minimum of six (6) inches within the first ten (10) feet. Where the fall is restricted, the fall will be six (6) inches regardless of horizontal distance available.

- **GARAGE**

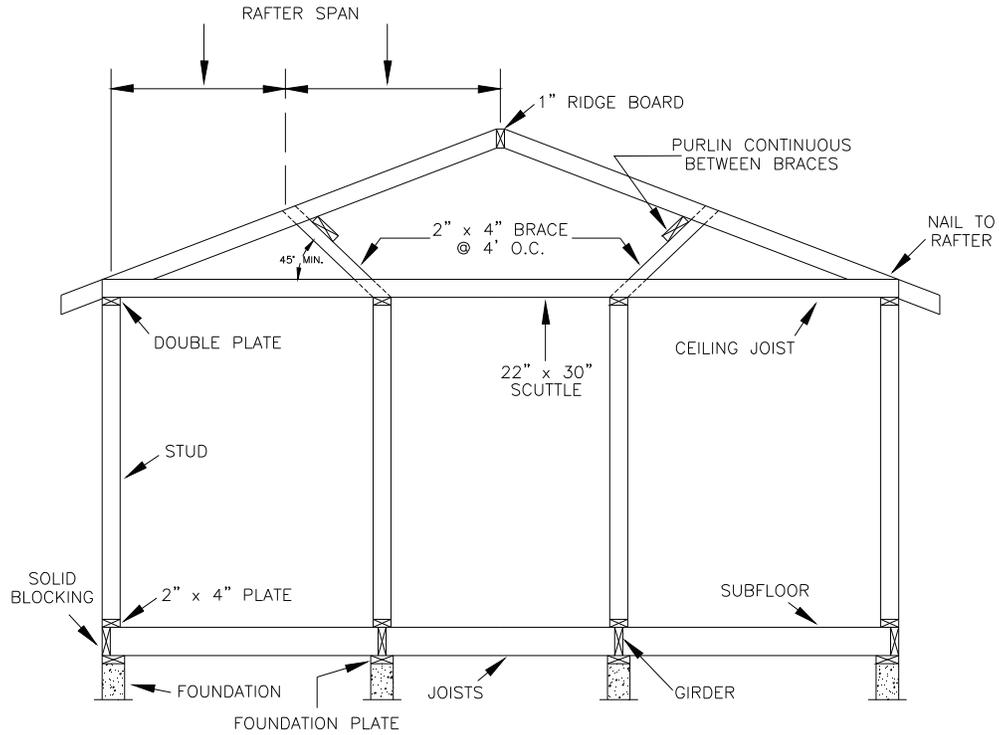
Garages shall have the driveway elevation so that at five (5) feet from the garage door opening, the driveway finished surface shall be a minimum of four (4) inches below the elevation of the garage floor.

## **PIERS AND COLUMNS**

Piers and columns are vertical members usually made of concrete, brick, block, steel, or wood and are used to support the floor system. Piers and columns may be used to support the complete structure or they may be used in conjunction with the foundation wall and provide intermediate support between ridgers and beams.

- The unsupported height of columns shall not exceed ten (10) times their least dimension. Block or hollow masonry unit columns are required to have the cells filled with concrete when their unsupported height exceeds four times their least dimension.
- Hollow columns shall be capped with four (4) inches thick solid masonry.
- Pier column to be at least eight (8) inches thick.
- Concrete columns shall be doweled to the pier with 1/2 inch rebar.
- Columns in basements shall be of treated wood, minimum 4X4 or steel posts not less than three (3) inches in diameter.
- Shims for floor joist or girders shall be of hardwood or steel plates. Shim width shall not be less than girder width.

# FRAMING CONSTRUCTION EXAMPLE



<b>ALLOWABLE SPANS FOR FLOOR JOISTS</b>		40 LBS. PER SQ. FT. LIVE LOAD, 10 LBS. PER SQ. FT. DEAD LOAD (Southern Pine) All rooms except those used for sleeping areas & attic floors			30 LBS. PER SQ. FT. LIVE LOAD, 10 LBS. PER SQ. FT. DEAD LOAD (Southern Pine) All rooms used for sleeping areas & attic floors		
		SPACING	#2 LUMBER	#3 LUMBER	SPACING	#2 LUMBER	#3 LUMBER
		12"	10'9"	9'4"	12"	11'10"	10'5"
	2"X6"	16"	9'9"	8'1"	16"	10'9"	9'0"
		24"	8'6"	6'7"	24"	9'4"	7'4"
		12"	14'2"	11'11"	12"	15'7"	13'3"
	2"X8"	16"	12'10"	10'3"	16"	14'2"	11'6"
		24"	11'0"	8'5"	24"	12'4"	9'5"
		12"	18'0"	14'0"	12"	19'10"	15'8"
	2"X10"	16"	16'1"	12'2"	16"	18'0"	13'7"
		24"	13'1"	9'11"	24"	14'8"	11'1"
		12"	21'9"	16'8"	12"	24'2"	18'8"
	2"X12"	16"	18'10"	14'6"	16"	21'1"	16'2"
		24"	15'5"	11'10"	24"	17'2"	13'2"

**TABLE R802.5.1(1)**  
**RAFTER SPANS FOR COMMON LUMBER SPECIES**  
 (Roof live load=20 psf, ceiling not attached to rafters, L/Δ=180)

RAFTER SPACING (inches)	SPECIE AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
			Maximum rafter spans <sup>a</sup>									
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Douglas fir-larch	SS	11-6	18-0	23-9	Note <sup>b</sup>	Note <sup>b</sup>	11-6	18-0	23-5	Note <sup>b</sup>	Note <sup>b</sup>
	Douglas fir-larch	#1	11-1	17-4	22-5	Note <sup>b</sup>	Note <sup>b</sup>	10-6	15-4	19-5	23-9	Note <sup>b</sup>
	Douglas fir-larch	#2	10-10	16-7	21-0	25-8	Note <sup>b</sup>	9-10	14-4	18-2	22-3	25-9
	Douglas fir-larch	#3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
	Hem-fir	SS	10-10	17-0	22-5	Note <sup>b</sup>	Note <sup>b</sup>	10-10	17-0	22-5	Note <sup>b</sup>	Note <sup>b</sup>
	Hem-fir	#1	10-7	16-8	21-10	Note <sup>b</sup>	Note <sup>b</sup>	10-3	14-11	18-11	23-2	Note <sup>b</sup>
	Hem-fir	#2	10-1	15-11	20-8	25-3	Note <sup>b</sup>	9-8	14-2	17-11	21-11	25-5
	Hem-fir	#3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
	Southern pine	SS	11-3	17-8	23-4	Note <sup>b</sup>	Note <sup>b</sup>	11-3	17-8	23-4	Note <sup>b</sup>	Note <sup>b</sup>
	Southern pine	#1	11-1	17-4	22-11	Note <sup>b</sup>	Note <sup>b</sup>	11-1	17-3	21-9	25-10	Note <sup>b</sup>
	Southern pine	#2	10-10	17-0	22-5	Note <sup>b</sup>	Note <sup>b</sup>	10-6	15-1	19-5	23-2	Note <sup>b</sup>
	Southern pine	#3	9-1	13-6	17-2	Note <sup>b</sup>	Note <sup>b</sup>	7-11	11-8	14-10	17-6	Note <sup>b</sup>
	Spruce-pine-fir	SS	10-7	16-8	21-11	20-3	24-1	10-7	16-8	21-9	Note <sup>b</sup>	20-11
	Spruce-pine-fir	#1	10-4	16-3	21-0	Note <sup>b</sup>	Note <sup>b</sup>	9-10	14-4	18-2	22-3	Note <sup>b</sup>
	Spruce-pine-fir	#2	10-4	16-3	21-0	25-8	Note <sup>b</sup>	9-10	14-4	18-2	22-3	25-9
	Spruce-pine-fir	#3	8-7	12-6	15-10	25-8	Note <sup>b</sup>	7-5	10-10	13-9	22-3	25-9
					19-5	22-6				16-9	19-6	
16	Douglas fir-larch	SS	10-5	16-4	21-7	Note <sup>b</sup>	Note <sup>b</sup>	10-5	16-0	20-3	24-9	Note <sup>b</sup>
	Douglas fir-larch	#1	10-0	15-4	19-5	23-9	Note <sup>b</sup>	9-1	13-3	16-10	20-7	23-10
	Douglas fir-larch	#2	9-10	14-4	18-2	22-3	25-9	8-6	12-5	15-9	19-3	22-4
	Douglas fir-larch	#3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10
	Hem-fir	SS	9-10	15-6	20-5	Note <sup>b</sup>	Note <sup>b</sup>	9-10	15-6	19-11	24-4	Note <sup>b</sup>
	Hem-fir	#1	9-8	14-11	18-11	23-2	Note <sup>b</sup>	8-10	12-11	16-5	20-0	23-3
	Hem-fir	#2	9-2	14-2	17-11	21-11	25-5	8-5	12-3	15-6	18-11	22-0
	Hem-fir	#3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10
	Southern pine	SS	10-3	16-1	21-2	Note <sup>b</sup>	Note <sup>b</sup>	10-3	16-1	21-2	Note <sup>b</sup>	Note <sup>b</sup>
	Southern pine	#1	10-0	15-9	20-10	25-10	Note <sup>b</sup>	10-0	15-0	18-10	22-4	Note <sup>b</sup>
	Southern pine	#2	9-10	15-1	19-5	23-2	Note <sup>b</sup>	9-1	13-0	16-10	20-1	Note <sup>b</sup>
	Southern pine	#3	7-11	11-8	14-10	17-6	20-11	6-10	10-1	12-10	15-2	18-1
	Spruce-pine-fir	SS	9-8	15-2	19-11	25-5	Note <sup>b</sup>	9-8	14-10	18-10	23-0	Note <sup>b</sup>
	Spruce-pine-fir	#1	9-5	14-4	18-2	22-3	25-9	8-6	12-5	15-9	19-3	22-4
	Spruce-pine-fir	#2	9-5	14-4	18-2	22-3	25-9	8-6	12-5	15-9	19-3	22-4
	Spruce-pine-fir	#3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10
24	Douglas fir-larch	SS	9-1	14-4	18-10	23-4	23-4	8-11	13-1	16-7	20-3	23-5
	Douglas fir-larch	#1	8-7	12-6	15-10	19-5	19-5	7-5	10-10	13-9	16-9	19-6
	Douglas fir-larch	#2	8-0	11-9	14-10	18-2	18-2	6-11	10-2	12-10	15-8	18-3
	Douglas fir-larch	#3	6-1	8-10	11-3	13-8	13-8	5-3	7-8	9-9	11-10	13-9
	Hem-fir	SS	8-7	13-6	17-10	22-9	22-9	8-7	12-10	16-3	19-10	23-0
	Hem-fir	#1	8-4	12-3	15-6	18-11	18-11	7-3	10-7	13-5	16-4	19-0
	Hem-fir	#2	7-11	11-7	14-8	17-10	17-10	6-10	10-0	12-8	15-6	17-11
	Hem-fir	#3	6-1	8-10	11-3	13-8	13-8	5-3	7-8	9-9	11-10	13-9
	Southern pine	SS	8-11	14-1	18-6	23-8	23-8	8-11	14-1	18-6	22-11	Note <sup>b</sup>
	Southern pine	#1	8-9	13-9	17-9	21-1	21-1	8-3	12-3	15-4	18-3	21-9
	Southern pine	#2	8-7	12-3	15-10	18-11	18-11	7-5	10-8	13-9	16-5	19-3
	Southern pine	#3	6-5	9-6	12-1	14-4	14-4	5-7	8-3	10-6	12-5	14-9
	Spruce-pine-fir	SS	8-5	13-3	17-5	21-8	21-8	8-4	12-2	15-4	18-9	21-9
	Spruce-pine-fir	#1	8-0	11-9	14-10	18-2	18-2	6-11	10-2	12-10	15-8	18-3
	Spruce-pine-fir	#2	8-0	11-9	14-10	18-2	18-2	6-11	10-2	12-10	15-8	18-3
	Spruce-pine-fir	#3	6-1	8-10	11-3	13-8	13-8	5-3	7-8	9-9	11-10	13-9

b. Check sources for availability of lumber in lengths greater than 20 feet.

**TABLE R802.5.1(2)**  
**RAFTER SPANS FOR COMMON LUMBER SPECIES**  
**(Roof live load=20 psf, ceiling attached to rafters, L/Δ=240)**

RAFTER SPACING (inches)	SPECIE AND GRADE	DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
		2x4	2x6	2x8	2x10	2x12	2x4	2x6	2x8	2x10	2x12
		Maximum rafter spans <sup>a</sup>									
		(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Douglas fir-larch SS	10-5	16-4	21-7	Note <sup>b</sup>	Note <sup>b</sup>	10-5	16-4	21-7	Note <sup>b</sup>	Note <sup>b</sup>
	Douglas fir-larch #1	10-0	15-9	20-10	Note <sup>b</sup>	Note <sup>b</sup>	10-0	15-4	19-5	23-9	Note <sup>b</sup>
	Douglas fir-larch #2	9-10	15-6	20-5	25-8	Note <sup>b</sup>	9-10	14-4	18-2	22-3	25-9
	Douglas fir-larch #3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
	Hem-fir SS	9-10	15-6	20-5	Note <sup>b</sup>	Note <sup>b</sup>	9-10	15-6	20-5	Note <sup>b</sup>	Note <sup>b</sup>
	Hem-fir #1	9-8	15-2	19-11	25-5	Note <sup>b</sup>	9-8	14-11	18-11	23-2	Note <sup>b</sup>
	Hem-fir #2	9-2	14-5	19-0	24-3	Note <sup>b</sup>	9-2	14-2	17-11	21-11	25-5
	Hem-fir #3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
	Southern pine SS	10-3	16-1	21-2	Note <sup>b</sup>	Note <sup>b</sup>	10-3	16-1	21-2	Note <sup>b</sup>	Note <sup>b</sup>
	Southern pine #1	10-0	15-9	20-10	Note <sup>b</sup>	Note <sup>b</sup>	10-0	15-9	20-10	25-10	Note <sup>b</sup>
	Southern pine #2	9-10	15-6	20-5	Note <sup>b</sup>	Note <sup>b</sup>	9-10	15-1	19-5	23-2	Note <sup>b</sup>
	Southern pine #3	9-1	13-6	17-2	Note <sup>b</sup>	Note <sup>b</sup>	7-11	11-8	14-10	17-6	20-11
	Spruce-pine-fir SS	9-8	15-2	19-11	20-3	24-1	9-8	15-2	19-11	25-5	Note <sup>b</sup>
	Spruce-pine-fir #1	9-5	14-9	19-6	24-10	Note <sup>b</sup>	9-5	14-4	18-2	22-3	25-9
	Spruce-pine-fir #2	9-5	14-9	19-6	24-10	Note <sup>b</sup>	9-5	14-4	18-2	22-3	25-9
	Spruce-pine-fir #3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
16	Douglas fir-larch SS	9-6	14-11	19-7	25-0	Note <sup>b</sup>	9-6	14-11	19-7	24-9	Note <sup>b</sup>
	Douglas fir-larch #1	9-1	14-4	18-11	23-9	Note <sup>b</sup>	9-1	13-3	16-10	20-7	23-10
	Douglas fir-larch #2	8-11	14-1	18-2	22-3	25-9	8-6	12-5	15-9	19-3	22-4
	Douglas fir-larch #3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10
	Hem-fir SS	8-11	14-1	18-6	23-8	Note <sup>b</sup>	8-11	14-1	18-6	23-8	Note <sup>b</sup>
	Hem-fir #1	8-9	13-9	18-1	23-1	Note <sup>b</sup>	8-9	12-11	16-5	20-0	23-3
	Hem-fir #2	8-4	13-1	17-3	21-11	25-5	8-4	12-3	15-6	18-11	22-0
	Hem-fir #3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10
	Southern pine SS	9-4	14-7	19-3	24-7	Note <sup>b</sup>	9-4	14-7	19-3	24-7	Note <sup>b</sup>
	Southern pine #1	9-1	14-4	18-11	24-1	Note <sup>b</sup>	9-1	14-4	18-10	22-4	Note <sup>b</sup>
	Southern pine #2	8-11	14-1	18-6	23-2	Note <sup>b</sup>	8-11	13-0	16-10	20-1	23-7
	Southern pine #3	7-11	11-8	14-10	17-6	Note <sup>b</sup>	6-10	10-1	12-10	15-2	18-1
	Spruce-pine-fir SS	8-9	13-9	18-1	23-1	20-11	8-9	13-9	18-1	23-0	Note <sup>b</sup>
	Spruce-pine-fir #1	8-7	13-5	17-9	22-3	Note <sup>b</sup>	8-6	12-5	15-9	19-3	22-4
	Spruce-pine-fir #2	8-7	13-5	17-9	22-3	25-9	8-6	12-5	15-9	19-3	22-4
	Spruce-pine-fir #3	7-5	10-10	13-9	16-9	25-9	6-5	9-5	11-11	14-6	16-10
24	Douglas fir-larch SS	8-3	13-0	17-2	21-10	Note <sup>b</sup>	8-3	13-0	16-7	20-3	23-5
	Douglas fir-larch #1	8-0	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
	Douglas fir-larch #2	7-10	11-9	14-10	18-2	21-0	6-11	10-2	12-10	15-8	18-3
	Douglas fir-larch #3	6-1	8-10	11-3	13-8	15-11	5-3	7-8	9-9	11-10	13-9
	Hem-fir SS	7-10	12-3	16-2	20-8	25-1	7-10	12-3	16-2	19-10	23-0
	Hem-fir #1	7-8	12-0	15-6	18-11	21-11	7-3	10-7	13-5	16-4	19-0
	Hem-fir #2	7-3	11-5	14-8	17-10	20-9	6-10	10-0	12-8	15-6	17-11
	Hem-fir #3	6-1	8-10	11-3	13-8	15-11	5-3	7-8	9-9	11-10	13-9
	Southern pine SS	8-1	12-9	16-10	21-6	Note <sup>b</sup>	8-1	12-9	16-10	21-6	Note <sup>b</sup>
	Southern pine #1	8-0	12-6	16-6	21-1	25-2	8-0	12-3	15-4	18-3	21-9
	Southern pine #2	7-10	12-3	15-10	18-11	22-2	7-5	10-8	13-9	16-5	19-3
	Southern pine #3	6-5	9-6	12-1	14-4	17-1	5-7	8-3	10-6	12-5	14-9
	Spruce-pine-fir SS	7-8	12-0	15-10	20-2	24-7	7-8	12-0	15-4	18-9	21-9
	Spruce-pine-fir #1	7-6	11-9	14-10	18-2	21-0	6-11	10-2	12-10	15-8	18-3
	Spruce-pine-fir #2	7-6	11-9	14-10	18-2	21-0	6-11	10-2	12-10	15-8	18-3
	Spruce-pine-fir #3	6-1	8-10	11-3	13-8	15-11	5-3	7-8	9-9	11-10	13-9

a. Check sources for availability of lumber in lengths greater than 20 feet.

**TABLE R802.4(2)**  
**CEILING JOIST SPANS FOR COMMON LUMBER SPECIES**  
**(Uninhabitable attics with limited storage, live load = 10 psf, L/Δ = 240)**

CEILING JOIST SPACING (inches)	SPECIE AND GRADE		DEAD LOAD = 10 psf			
			2x4	2x6	2x8	2x10
			Maximum ceiling joist spans			
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Douglas fir-larch	SS	10-5	16-4	21-7	Note <sup>a</sup>
	Douglas fir-larch	#1	10-0	15-9	20-1	24-6
	Douglas fir-larch	#2	9-10	14-10	18-9	22-11
	Douglas fir-larch	#3	7-8	11-2	14-2	17-4
	Hem-fir	SS	9-10	15-6	20-5	Note <sup>a</sup>
	Hem-fir	#1	9-8	15-2	19-7	23-11
	Hem-fir	#2	9-2	14-5	18-6	22-7
	Hem-fir	#3	7-8	11-2	14-2	17-4
	Southern pine	SS	10-3	16-1	21-2	Note <sup>a</sup>
	Southern pine	#1	10-0	15-9	20-10	Note <sup>a</sup>
	Southern pine	#2	9-10	15-6	20-1	23-11
	Southern pine	#3	8-2	12-0	15-4	18-1
	Spruce-pine-fir	SS	9-8	15-2	19-11	25-5
	Spruce-pine-fir	#1	9-5	14-9	18-9	22-11
	Spruce-pine-fir	#2	9-5	14-9	18-9	22-11
	Spruce-pine-fir	#3	7-8	11-2	14-2	17-4
16	Douglas fir-larch	SS	9-6	14-11	19-7	25-0
	Douglas fir-larch	#1	9-1	13-9	17-5	21-3
	Douglas fir-larch	#2	8-9	12-10	16-3	19-10
	Douglas fir-larch	#3	6-8	9-8	12-4	15-0
	Hem-fir	SS	8-11	14-1	18-6	23-8
	Hem-fir	#1	8-9	13-5	16-10	20-8
	Hem-fir	#2	8-4	12-8	16-0	19-7
	Hem-fir	#3	6-8	9-8	12-4	15-0
	Southern pine	SS	9-4	14-7	19-3	24-7
	Southern pine	#1	9-1	14-4	18-11	23-1
	Southern pine	#2	8-11	13-6	17-5	20-9
	Southern pine	#3	7-1	10-5	13-3	15-8
	Spruce-pine-fir	SS	8-9	13-9	18-1	23-1
	Spruce-pine-fir	#1	8-7	12-10	16-3	19-10
	Spruce-pine-fir	#2	8-7	12-10	16-3	19-10
	Spruce-pine-fir	#3	6-8	9-8	12-4	15-0
24	Douglas fir-larch	SS	8-3	13-0	17-1	20-11
	Douglas fir-larch	#1	7-8	11-2	14-2	17-4
	Douglas fir-larch	#2	7-2	10-6	13-3	16-3
	Douglas fir-larch	#3	5-5	7-11	10-0	12-3
	Hem-fir	SS	7-10	12-3	16-2	20-6
	Hem-fir	#1	7-6	10-11	13-10	16-11
	Hem-fir	#2	7-1	10-4	13-1	16-0
	Hem-fir	#3	5-5	7-11	10-0	12-3
	Southern pine	SS	8-1	12-9	16-10	21-6
	Southern pine	#1	8-0	12-6	15-10	18-10
	Southern pine	#2	7-8	11-0	14-2	16-11
	Southern pine	#3	5-9	8-6	10-10	12-10
	Spruce-pine-fir	SS	7-8	12-0	15-10	19-5
	Spruce-pine-fir	#1	7-2	10-6	13-3	16-3
	Spruce-pine-fir	#2	7-2	10-6	13-3	16-3
	Spruce-pine-fir	#3	5-5	7-11	10-0	12-3

**TABLE R802.4(1)**  
**CEILING JOIST SPANS FOR COMMON LUMBER SPECIES**  
(Uninhabitable attics without storage, live load = 10 psf, L/Δ= 240)

CEILING JOIST SPACING (inches)	SPECIE AND GRADE	DEAD LOAD = 5 psf			
		2x4	2x6	2x8	2x10
		Maximum ceiling joist spans			
		(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Douglas fir-larch SS	13-2	20-8	Note <sup>a</sup>	Note <sup>a</sup>
	Douglas fir-larch #1	12-8	19-11	Note <sup>a</sup>	Note <sup>a</sup>
	Douglas fir-larch #2	12-5	19-6	25-8	21-3
	Douglas fir-larch #3	10-10	15-10	20-1	Note <sup>a</sup>
	Hem-fir SS	12-5	19-6	25-8	Note <sup>a</sup>
	Hem-fir #1	12-2	19-1	25-2	Note <sup>a</sup>
	Hem-fir #2	11-7	18-2	24-0	21-3
	Hem-fir #3	10-10	15-10	20-1	Note <sup>a</sup>
	Southern pine SS	12-11	20-3	Note <sup>a</sup>	Note <sup>a</sup>
	Southern pine #1	12-8	19-11	Note <sup>a</sup>	Note <sup>a</sup>
	Southern pine #2	12-5	19-6	25-8	Note <sup>a</sup>
	Southern pine #3	11-6	17-0	21-8	22-2
	Spruce-pine-fir SS	12-2	19-1	25-2	Note <sup>a</sup>
	Spruce-pine-fir #1	11-10	18-8	24-7	Note <sup>a</sup>
	Spruce-pine-fir #2	11-10	18-8	24-7	Note <sup>a</sup>
	Spruce-pine-fir #3	10-10	15-10	20-1	21-3
16	Douglas fir-larch SS	11-11	18-9	24-8	Note <sup>a</sup>
	Douglas fir-larch #1	11-6	18-1	23-10	Note <sup>a</sup>
	Douglas fir-larch #2	11-3	17-8	23-0	Note <sup>a</sup>
	Douglas fir-larch #3	9-5	13-9	17-5	24-6
	Hem-fir SS	11-3	17-8	23-4	Note <sup>a</sup>
	Hem-fir #1	11-0	17-4	22-10	Note <sup>a</sup>
	Hem-fir #2	10-6	16-6	21-9	Note <sup>a</sup>
	Hem-fir #3	9-5	13-9	17-5	24-6
	Southern pine SS	11-9	18-5	24-3	Note <sup>a</sup>
	Southern pine #1	11-6	18-1	23-1	Note <sup>a</sup>
	Southern pine #2	11-3	17-8	23-4	Note <sup>a</sup>
	Southern pine #3	10-0	14-9	18-9	25-7
	Spruce-pine-fir SS	11-0	17-4	22-10	Note <sup>a</sup>
	Spruce-pine-fir #1	10-9	16-11	22-4	Note <sup>a</sup>
	Spruce-pine-fir #2	10-9	16-11	22-4	Note <sup>a</sup>
	Spruce-pine-fir #3	9-5	13-9	17-5	24-6
24	Douglas fir-larch SS	10-5	16-4	21-7	Note <sup>a</sup>
	Douglas fir-larch #1	10-0	15-9	20-1	24-6
	Douglas fir-larch #2	9-10	14-10	18-9	22-11
	Douglas fir-larch #3	7-8	11-2	14-2	17-4
	Hem-fir SS	9-10	15-6	20-5	Note <sup>a</sup>
	Hem-fir #1	9-8	15-2	19-7	23-11
	Hem-fir #2	9-2	14-5	18-6	22-7
	Hem-fir #3	7-8	11-2	14-2	17-4
	Southern pine SS	10-3	16-1	21-2	Note <sup>a</sup>
	Southern pine #1	10-0	15-9	20-10	Note <sup>a</sup>
	Southern pine #2	9-10	15-6	20-1	23-11
	Southern pine #3	8-2	12-0	15-4	18-1
	Spruce-pine-fir SS	9-8	15-2	19-11	25-5
	Spruce-pine-fir #1	9-5	14-9	18-9	22-11
	Spruce-pine-fir #2	9-5	14-9	18-9	22-11
	Spruce-pine-fir #3	7-8	11-2	14-2	17-4

**TABLE R502.3.1(1)**  
**FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES**  
 (Residential sleeping areas, live load=30 psf, L/Δ=360)

			DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			2x6	2x8	2x10	2x12	2x6	2x8	2x10	2x12
			Maximum floor joist spans							
12	Douglas fir-larch	SS	12-6	16-6	21-0	25-7	12-6	16-6	21-0	25-7
	Douglas fir-larch	#1	12-0	15-10	20-3	24-8	12-0	15-7	19-0	22-0
	Douglas fir-larch	#2	11-10	15-7	19-10	23-0	11-6	14-7	17-9	20-7
	Douglas fir-larch	#3	9-8	12-4	15-0	17-5	8-8	11-0	13-5	15-7
	Hem-fir	SS	11-10	15-7	19-10	24-2	11-10	15-7	19-10	24-2
	Hem-fir	#1	11-7	15-3	19-5	23-7	11-7	15-2	18-6	21-6
	Hem-fir	#2	11-0	14-6	18-6	22-6	11-0	14-4	17-6	20-4
	Hem-fir	#3	9-8	12-4	15-0	17-5	8-8	11-0	13-5	15-7
	Southern pine	SS	12-3	16-2	20-8	25-1	12-3	16-2	20-8	25-1
	Southern pine	#1	12-0	15-10	20-3	24-8	12-0	15-10	20-3	24-8
	Southern pine	#2	11-10	15-7	19-10	18-8	11-10	15-7	18-7	21-9
	Southern pine	#3	10-5	13-3	15-8	18-8	9-4	11-11	14-0	16-8
	Spruce-pine-fir	SS	11-7	15-3	19-5	23-7	11-7	15-3	19-5	23-7
	Spruce-pine-fir	#1	11-3	14-11	19-0	23-0	11-3	14-7	17-9	20-7
Spruce-pine-fir	#2	11-3	14-11	19-0	23-0	11-3	14-7	17-9	20-7	
Spruce-pine-fir	#3	9-8	12-4	15-0	17-5	8-8	11-0	13-5	15-7	
16	Douglas fir-larch	SS	11-4	15-0	19-1	23-3	11-4	15-0	19-1	23-0
	Douglas fir-larch	#1	10-11	14-5	18-5	21-4	10-8	13-6	16-5	19-1
	Douglas fir-larch	#2	10-9	14-1	17-2	19-11	9-11	12-7	15-5	17-10
	Douglas fir-larch	#3	8-5	10-8	13-0	15-1	7-6	9-6	11-8	13-6
	Hem-fir	SS	10-9	14-2	18-0	21-11	10-9	14-2	18-0	21-11
	Hem-fir	#1	10-6	13-10	17-8	20-9	10-4	13-1	16-0	18-7
	Hem-fir	#2	10-0	13-2	16-10	19-8	9-10	12-5	15-2	17-7
	Hem-fir	#3	8-5	10-8	13-0	15-1	7-6	9-6	11-8	13-6
	Southern pine	SS	11-2	14-8	18-9	22-10	11-2	14-8	18-9	22-10
	Southern pine	#1	10-11	14-5	18-5	22-5	10-11	14-5	17-11	21-4
	Southern pine	#2	10-9	14-2	18-0	21-1	10-5	13-6	16-1	18-10
	Southern pine	#3	9-0	11-6	13-7	16-2	8-1	10-3	12-2	14-6
	Spruce-pine-fir	SS	10-6	13-10	17-8	21-6	10-6	13-10	17-8	21-4
	Spruce-pine-fir	#1	10-3	13-6	17-2	19-11	9-11	12-7	15-5	17-10
Spruce-pine-fir	#2	10-3	13-6	17-2	19-11	9-11	12-7	15-5	17-10	
Spruce-pine-fir	#3	8-5	10-8	13-0	15-1	7-6	9-6	11-8	13-6	
24	Douglas fir-larch	SS	9-11	13-1	16-8	20-3	9-11	13-1	16-2	18-9
	Douglas fir-larch	#1	9-7	12-4	15-0	17-5	8-8	11-0	13-5	15-7
	Douglas fir-larch	#2	9-1	11-6	14-1	16-3	8-1	10-3	12-7	14-7
	Douglas fir-larch	#3	6-10	8-8	10-7	12-4	6-2	7-9	9-6	11-0
	Hem-fir	SS	9-4	12-4	15-9	19-2	9-4	12-4	15-9	18-5
	Hem-fir	#1	9-2	12-0	14-8	17-0	8-6	10-9	13-1	15-2
	Hem-fir	#2	8-9	11-4	13-10	16-1	8-0	10-2	12-5	14-4
	Hem-fir	#3	6-10	8-8	10-7	12-4	6-2	7-9	9-6	11-0
	Southern pine	SS	9-9	12-10	16-5	19-11	9-9	12-10	16-5	19-11
	Southern pine	#1	9-7	12-7	16-1	19-6	9-7	12-4	14-7	17-5
	Southern pine	#2	9-4	12-4	14-8	17-2	8-6	11-0	13-1	15-5
	Southern pine	#3	7-4	9-5	11-1	13-2	6-7	8-5	9-11	11-10
	Spruce-pine-fir	SS	9-2	12-1	15-5	18-9	9-2	12-1	15-0	17-5
	Spruce-pine-fir	#1	8-11	11-6	14-1	16-3	8-1	10-3	12-7	14-7
Spruce-pine-fir	#2	8-11	11-6	14-1	16-3	8-1	10-3	12-7	14-7	
Spruce-pine-fir	#3	6-10	8-8	10-7	12-4	6-2	7-9	9-6	11-0	

**TABLE R502.3.1(2)**  
**FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES**  
 (Residential living areas, live load=40 psf, L/Δ=360)

		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf				
		2x6	2x8	2x10	2x12	2x6	2x8	2x10	2x12	
		Maximum floor joist spans								
JOIST SPACING (inches)	SPECIE AND GRADE	(ft.-in.)	(ft.-in.)	(ft.-in.)	(ft.-in.)	(ft.-in.)	(ft.-in.)	(ft.-in.)	(ft.-in.)	
12	Douglas fir-larch	SS	11-4	15-0	19-1	23-3	11-4	15-0	19-1	23-3
	Douglas fir-larch	#1	10-11	14-5	18-5	22-0	10-11	14-2	17-4	20-1
	Douglas fir-larch	#2	10-9	14-2	17-9	20-7	10-6	13-3	16-3	18-10
	Douglas fir-larch	#3	8-8	11-0	13-5	15-7	7-11	10-0	12-3	14-3
	Hem-fir	SS	10-9	14-2	18-0	21-11	10-9	14-2	18-0	21-11
	Hem-fir	#1	10-6	13-10	17-8	21-6	10-6	13-10	16-11	19-7
	Hem-fir	#2	10-0	13-2	16-10	20-4	10-0	13-1	16-0	18-6
	Hem-fir	#3	8-8	11-0	13-5	15-7	7-11	10-0	12-3	14-3
	Southern pine	SS	11-2	14-8	18-9	22-10	11-2	14-8	18-9	22-10
	Southern pine	#1	10-11	14-5	18-5	22-5	10-11	14-5	18-5	22-5
	Southern pine	#2	10-9	14-2	18-0	21-9	10-9	14-2	16-11	19-10
	Southern pine	#3	9-4	11-11	14-0	16-8	8-6	10-10	12-10	15-3
	Spruce-pine-fir	SS	10-6	13-10	17-8	21-6	10-6	13-10	17-8	21-6
	Spruce-pine-fir	#1	10-3	13-6	17-3	20-7	10-3	13-3	16-3	18-10
	Spruce-pine-fir	#2	10-3	13-6	17-3	20-7	10-3	13-3	16-3	18-10
	Spruce-pine-fir	#3	8-8	11-0	13-5	15-7	7-11	10-0	12-3	14-3
16	Douglas fir-larch	SS	10-4	13-7	17-4	21-1	10-4	13-7	17-4	21-0
	Douglas fir-larch	#1	9-11	13-1	16-5	19-1	9-8	12-4	15-0	17-5
	Douglas fir-larch	#2	9-9	12-7	15-5	17-10	9-1	11-6	14-1	16-3
	Douglas fir-larch	#3	7-6	9-6	11-8	13-6	6-10	8-8	10-7	12-4
	Hem-fir	SS	9-9	12-10	16-5	19-11	9-9	12-10	16-5	19-11
	Hem-fir	#1	9-6	12-7	16-0	18-7	9-6	12-0	14-8	17-0
	Hem-fir	#2	9-1	12-0	15-2	17-7	8-11	11-4	13-10	16-1
	Hem-fir	#3	7-6	9-6	11-8	13-6	6-10	8-8	10-7	12-4
	Southern pine	SS	10-2	13-4	17-0	20-9	10-2	13-4	17-0	20-9
	Southern pine	#1	9-11	13-1	16-9	20-4	9-11	13-1	16-4	19-6
	Southern pine	#2	9-9	12-10	16-1	18-10	9-6	12-4	14-8	17-2
	Southern pine	#3	8-1	10-3	12-2	14-6	7-4	9-5	11-1	13-2
	Spruce-pine-fir	SS	9-6	12-7	16-0	19-6	9-6	12-7	16-0	19-6
	Spruce-pine-fir	#1	9-4	12-3	15-5	17-10	9-1	11-6	14-1	16-3
	Spruce-pine-fir	#2	9-4	12-3	15-5	17-10	9-1	11-6	14-1	16-3
	Spruce-pine-fir	#3	7-6	9-6	11-8	13-6	6-10	8-8	10-7	12-4
24	Douglas fir-larch	SS	9-0	11-11	15-2	18-5	9-0	11-11	14-9	17-1
	Douglas fir-larch	#1	8-8	11-0	13-5	15-7	7-11	10-0	12-3	14-3
	Douglas fir-larch	#2	8-1	10-3	12-7	14-7	7-5	9-5	11-6	13-4
	Douglas fir-larch	#3	6-2	7-9	9-6	11-0	5-7	7-1	8-8	10-1
	Hem-fir	SS	8-6	11-3	14-4	17-5	8-6	11-3	14-4	16-10 <sup>a</sup>
	Hem-fir	#1	8-4	10-9	13-1	15-2	7-9	9-9	11-11	13-10
	Hem-fir	#2	7-11	10-2	12-5	14-4	7-4	9-3	11-4	13-1
	Hem-fir	#3	6-2	7-9	9-6	11-0	5-7	7-1	8-8	10-1
	Southern pine	SS	8-10	11-8	14-11	18-1	8-10	11-8	14-11	18-1
	Southern pine	#1	8-8	11-5	14-7	17-5	8-8	11-3	13-4	15-11
	Southern pine	#2	8-6	11-0	13-1	15-5	7-9	10-0	12-0	14-0
	Southern pine	#3	6-7	8-5	9-11	11-10	6-0	7-8	9-1	10-9
	Spruce-pine-fir	SS	8-4	11-0	14-0	17-0	8-4	11-0	13-8	15-11
	Spruce-pine-fir	#1	8-1	10-3	12-7	14-7	7-5	9-5	11-6	13-4
	Spruce-pine-fir	#2	8-1	10-3	12-7	14-7	7-5	9-5	11-6	13-4
	Spruce-pine-fir	#3	6-2	7-9	9-6	11-0	5-7	7-1	8-8	10-1

**TABLE R502.5(1)**  
**GIRDER SPANS AND HEADER SPANS FOR EXTERIOR BEARING WALLS**  
 (Maximum header spans for douglas fir-larch, hem-fir, southern pine  
 and spruce-pine-fir and required number of jack studs)

HEADERS SUPPORTING	SIZE	GROUND SNOW LOAD (psf) <sup>e</sup>					
		30			50		
		Building width <sup>c</sup> (feet)					
		20		28		36	
Span	NJ <sup>d</sup>	Span	NJ <sup>d</sup>	Span	NJ <sup>d</sup>		
Roof and ceiling	2-2x4	3-6	1	3-2	1	2-10	1
	2-2x6	5-5	1	4-8	1	4-2	1
	2-2x8	6-10	1	5-11	2	5-4	2
	2-2x10	8-5	2	7-3	2	6-6	2
	2-2x12	9-9	2	8-5	2	7-6	2
	3-2x8	8-4	1	7-5	1	6-8	1
	3-2x10	10-6	1	9-1	2	8-2	2
	3-2x12	12-2	2	10-7	2	9-5	2
	4-2x8	7-0	1	6-1	2	5-5	2
	4-2x10	11-8	1	10-6	1	9-5	2
4-2x12	14-1	1	12-2	2	10-11	2	
Roof, ceiling and one center-bearing floor	2-2x4	3-1	1	2-9	1	2-5	1
	2-2x6	4-6	1	4-0	1	3-7	2
	2-2x8	5-9	2	5-0	2	4-6	2
	2-2x10	7-0	2	6-2	2	5-6	2
	2-2x12	8-1	2	7-1	2	6-5	2
	3-2x8	7-2	1	6-3	2	5-8	2
	3-2x10	8-9	2	7-8	2	6-11	2
	3-2x12	10-2	2	8-11	2	8-0	2
	4-2x8	5-10	2	5-2	2	4-8	2
	4-2x10	10-1	1	8-10	2	8-0	2
4-2x12	11-9	2	10-3	2	9-3	2	
Roof, ceiling and one clear span floor	2-2x4	2-8	1	2-4	1	2-1	1
	2-2x6	3-11	1	3-5	2	3-0	2
	2-2x8	5-0	2	4-4	2	3-10	2
	2-2x10	6-1	2	5-3	2	4-8	2
	2-2x12	7-1	2	6-1	3	5-5	3
	3-2x8	6-3	2	5-5	2	4-10	2
	3-2x10	7-7	2	6-7	2	5-11	2
	3-2x12	8-10	2	7-8	2	6-10	2
	4-2x8	5-1	2	4-5	2	3-11	2
	4-2x10	8-9	2	7-7	2	6-10	2
4-2x12	10-2	2	8-10	2	7-11	2	

**TABLE R502.5(2)**  
**GIRDER SPANS AND HEADER SPANS**  
**FOR INTERIOR BEARING WALLS**  
 (Maximum header spans for douglas fir-larch, hem-fir, southern pine  
 and spruce-pine-fir and required number of jack studs)

HEADERS AND GIRDERS SUPPORTING	SIZE	BUILDING WIDTH <sup>c</sup> (feet)					
		20		28		36	
		Span	NJ <sup>d</sup>	Span	NJ <sup>e</sup>	Span	NJ <sup>e</sup>
One floor only	2-2x4	3-1	1	2-8	1	2-5	1
	2-2x6	4-6	1	3-11	1	3-6	1
	2-2x8	5-9	1	5-0	2	4-5	2
	2-2x10	7-0	2	6-1	2	5-5	2
	2-2x12	8-1	2	7-0	2	6-3	2
	3-2x8	7-2	1	6-3	1	5-7	2
	3-2x10	8-9	1	7-7	2	6-9	2
	3-2x12	10-2	2	8-10	2	7-10	2
	4-2x8	5-10	1	5-1	2	4-6	2
	4-2x10	10-1	1	8-9	1	7-10	2
4-2x12	11-9	1	10-2	2	9-1	2	
HEADERS AND GIRDERS SUPPORTING	SIZE	BUILDING WIDTH <sup>c</sup> (feet)					
		20		28		36	
		Span	NJ <sup>d</sup>	Span	NJ <sup>e</sup>	Span	NJ <sup>e</sup>
Two floors	2-2x4	2-2	1	1-10	1	1-7	1
	2-2x6	3-2	2	2-9	2	2-5	2
	2-2x8	4-1	2	3-6	2	3-2	2
	2-2x10	4-11	2	4-3	2	3-10	3
	2-2x12	5-9	2	5-0	3	4-5	3
	3-2x8	5-1	2	4-5	2	3-11	2
	3-2x10	6-2	2	5-4	2	4-10	2
	3-2x12	7-2	2	6-3	2	5-7	3
	4-2x8	4-2	2	3-7	2	3-2	2
	4-2x10	7-2	2	6-2	2	5-6	2
4-2x12	8-4	2	7-2	2	6-5	2	

HEADERS SUPPORTING	SIZE	GROUND SNOW LOAD (psf) <sup>e</sup>					
		30			50		
		Building width <sup>c</sup> (feet)					
		20		28		36	
Span	NJ <sup>d</sup>	Span	NJ <sup>d</sup>	Span	NJ <sup>d</sup>		
Roof, ceiling and two center-bearing floors	2-2x4	2-7	1	2-3	1	2-0	1
	2-2x6	3-9	2	3-3	2	2-11	2
	2-2x8	4-9	2	4-2	2	3-9	2
	2-2x10	5-9	2	5-1	2	4-7	3
	2-2x12	6-8	2	5-10	3	5-3	3
	3-2x8	5-11	2	5-2	2	4-8	2
	3-2x10	7-3	2	6-4	2	5-8	2
	3-2x12	8-5	2	7-4	2	6-7	2
	4-2x8	4-10	2	4-3	2	3-10	2
	4-2x10	8-4	2	7-4	2	6-7	2
4-2x12	9-8	2	8-6	2	7-8	2	

## FRAMING / WALL SHEATHING

### GIRDERS

- Girders are the main horizontal support members upon which the floor system is laid. They are supported by posts, beam pockets, and piers.
- The arrangement of the girders under the floor system is dependent on the design of the floor system itself and the load it is expected to carry. Some girders are positioned to carry only floor load while others will have to support floors, walls and roof structures. This can result in girders of various size and spacing. The most common method of laying out girders is to determine the size of the largest girder required and use girders of like size in all locations where they will be needed. This results in a uniform design and makes the job of framing easier.

### FLOORS

- All lumber for joists, beams and girders shall be grade marked by an approved agency and shall be minimum of grade 3#.
- The ends of each joist, beam, or girder shall have not less than 1 1/2 inches bearing on wood or metal and not less than three (3) inches on concrete or masonry.
- Joists attached into the sides of a wood girder shall be supported by approved framing anchors.
- Notches in the top or bottom of joist shall not exceed 1/6th the depth of the joist and can not be located in the middle 1/3 of the span.
- Holes bored in joists shall not be larger in diameter than 1/3rd the depth of the joist.
- Joists under bearing walls shall be doubled. Double joists which are separated to permit installation of piping or vents shall be solid blocked at maximum spacing of four (4) feet on center.
- The clear span of floor joist shall not exceed the values set forth in IRC Tables appendix.
- Openings over four (4) feet shall be framed with a header and double trimmer joists.
- Floor trusses shall be designed and installed in accordance with approved engineering practices. Floor trusses shall not be drilled, cut notched, or altered in any manner unless so designed.
- Joist having a depth-to-thickness ratio exceeding 6 to 1 based on nominal dimensions shall be supported laterally by solid blocking, diagonal bridging or by 1X3 bridging nailed to the bottom of the joist at intervals not exceeding 10 feet.

### WALLS

- Load-bearing dimension lumber for studs and plates and headers shall be grade-marked by an approved agency.
- Studs are to be a minimum grade 3#.
- A stud can not be cut or notched more than 25% of its width.
- Drilling and notching. Where top plates are cut, drilled or notched due to piping or duct work more than 50% of its width, the plates shall be reinforced with 24 gauge steel or equivalent support.
- Fire stopping shall be provided to cut off all concealed draft openings both horizontal and vertical.
  - In concealed spaces of stud walls and partitions including furred spaces, at the ceiling and floor level.
  - At all soffits, drop ceilings, cove ceilings
  - In concealed spaces between stair stringers at the top of bottom of the run.
- Draft stop at openings around vents, pipes, ducts, chimneys and fireplaces at ceiling and floor level.
- Wall bracing every 25 feet of wall length by 1X4 let in, metal straps or structural sheathing.
- Cripple walls shall be framed of studs not less in size with studding above, with a minimum length of 14 inches or shall be framed of solid blocking. When exceeding four (4) feet, studs will be sized for an additional story.

## **CEILING AND ROOF**

- New concepts in ceiling design have brought about new configurations in framing methods and introduced assemblies such as stiffbacks, A-frames and trusses to enable the new concepts in ceiling design to be accomplished. Some of these designs are so complex that it is necessary to consult with an engineer to insure structural integrity.
- All load-bearing dimension lumber for ceiling joists shall be grade marked by an approved agency and shall be a minimum of grade #3.
- Dimension lumber used for the fabrication of stiffback, A-frames, truss assemblies or other load-bearing assemblies shall be a minimum grade #3.
- Load-bearing dimension lumber used in roof framing shall be grade marked and shall be a minimum of grade #3. This would include all rafters, purlins, purlin bracing and all hip and valley rafters and ridge boards.
- Beams used to support raised ceilings shall have solid support to bottom plate.
- Rafters shall be nailed to ceiling joists to form a continuous tie between exterior walls. Where rafters are not parallel, they shall be tied with rafter ties, located as near the plate as practical. Rafter ties shall not be spaced more than four (4) feet on center
- Bearing: The ends of each rafter or joist shall not have less than 1 1/2 inch bearing on wood or metal and three (3) inches on concrete.
- Cutting and notching: Notching at the ends of the rafters or ceiling joists shall not exceed 1/4 the depth. Notches in the top or bottom of the joists shall not exceed 1/6 of the depth and shall not be located in the middle 1/3 of the span.
- Bored Holes: Holes bored in rafter and ceiling joists shall not be within two (2) inches of the top and bottom. Their diameter shall not exceed 1/3 the depth of the member.
- Ridge boards shall be at least one (1) inch nominal thickness and depth shall not be less than the cut at end of the rafter.
- Hips and valley rafters: There shall be a hip or valley rafter not less than two (2) inches nominal thickness and not less in depth than the cut at the end of the rafter at every hip and valley. All hip and valley rafters shall be supported at the ridge by a brace to a bearing partition or be designed to carry and distribute the specific load at that point.
- Lateral support and bridging: Rafter and ceiling joists shall be provided with lateral support at points of bearing to prevent rotation. Rafters and ceiling joists having a depth-to-thickness ratio exceeding 6 to 1 (based on nominal dimensions of 2"X12" or wider) shall be supported laterally by solid blocking, diagonal wood or metal bridging or a 1" X 3" bridging nailed to the rafter or ceiling joist at intervals not exceeding ten (10) feet.

## **PURLINS**

- The unsupported span of rafters shall not exceed the values set forth in span tables. Intermediate support of long rafters shall be provided with purlins or interior walls. The maximum rafter span is the maximum distance between the exterior or interior wall support and the purlin, or between the ridge member and the purlin or between purlins.
- Purlins shall never be smaller in dimension than the rafters that they support
- They should be braced at no more than four (4) feet on center.
- Braces for purlins shall not rise to support the purlin of less than 45 degrees above ceiling joists or over 60 degrees.
- Purlin braces exceeding 6 feet in length are required to be double or teed.
- Braces are to bear on interior walls or beams designed to carry the load.
- Do not brace to ceiling joists or stiffbacks except where these members are directly over a wall.

## MISCELLANEOUS REQUIREMENTS

### ATTIC VENTILATION

- Enclosed attics and rafter spaces where ceilings are applied directly to the under side of roof rafters shall have cross ventilation for each separate space.
- The net free ventilating area shall not be less than 1 to 150 of the area of the space ventilated except that the area may be 1 to 300, provided at least 50% of the required ventilating area has ventilators located in the upper portion of the space to be ventilated, at least 3' above eave or cornice vents.

### ATTIC ACCESS

- A readily accessible attic access framed opening, not less than 22 inches by 30 inches, shall be provided to any attic area having a clear height of over 30 inches.

### ATTACHED GARAGES

- Openings from a garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and residence shall be equipped with either solid wood doors, not less than 1 3/8" thickness or 20-minute fire rated doors or equivalent. No window is allowed in the door.
- The garage shall be completely separated from the residence and its attic area by means of 1/2" gypsum board or equivalent applied to the garage side.
- Habitable spaces above a garage shall be separated by a minimum of 5/8" type X gypsum board.

### LANDINGS

- A minimum 3'X3' landing shall be required on each side of an egress door. The floor or landing shall not be more than 1 1/2" lower than the top of the threshold. EXCEPTION: The landing at the exterior of an exterior doorway shall not be more than 7 3/4" below the top of the threshold, provided that the door does not swing over the landing.

### STAIRS

- Stairways shall not be less than 3 feet in clear width and the minimum headroom shall not be less than 6' 8". The maximum riser height shall not be more than 7 3/4" and the minimum tread width shall not be less than 10". The greatest riser height in any set of stairs shall not exceed the smallest by more than 3/8".

### HAND RAILS

- Hand rails shall be provided on all stairs having 4 or more risers. Handrails shall be continuous the full length of the stairs, without interruption. The end shall be returned or terminate in newel posts or safety terminals.
- Handrails are to be provided on at least one side of the stair and on the outside radius of spiral or wider stairs. Hand rails projecting from a wall shall have a space of not less than 1 1/2" between the hand rail and the wall. A 34" minimum and a 38" maximum height is required.

### GUARD RAILS

- Guard rails shall be provided on porches, balconies or raised floor surfaces located more than 30" above the floor or grade below and shall be at least 34" in height. Openings in vertical and horizontal members shall be such that a 4" sphere cannot pass through.

### RAMPS

- All egress ramps shall have a maximum slope of one unit vertical in eight units horizontal 12.5% slope.

**DECKS**

- **SEE CHRISTIAN COUNTY DECK DETAILS PGS. 52-69**

**BATHROOM VENTILATION**

- Bathrooms, water closet compartments and other similar rooms shall be provided with aggregate glazing area in windows of not less than 3 square feet, one-half of which must be openable. Exception: The glazed areas shall not be required where artificial light and an approved mechanical ventilation system capable of producing a change of air every 12 minutes are provided. Bathroom exhausts shall be vented to the outside. Attic or crawl space areas are not considered to be outside.

**CLOTHES DRYER EXHAUST**

- Dryer vent systems shall be independent of all other systems and shall convey the products of combustion and moisture to the outdoors. The maximum length of a 4 inch diameter exhaust vent shall not exceed 25 feet from the dryer location to wall termination. A reduction in maximum length of 2.5 feet for each 45 degree bend and 5 feet for each 90 degree bend shall apply, where length is exceeded.

## **ZERO LOT LINE DWELLINGS**

**Zero lot line dwellings also known as townhouses and patio homes have yards which are part of the real estate and are owned by the dwelling owner. Each townhouse or patio home shall be considered a separate building and separated by separate walls meeting the requirements of the following.**

### **COMMON WALL**

A common 2-hour fire-resistance rated wall is permitted for townhouses or patio homes if such walls do not contain plumbing or mechanical equipment, ducts or vents in the cavity of the common wall. Electrical installations are limited to electrical wire installed in raceways and electrical outlet boxes.

### **CONTINUITY**

The common wall for townhouses or patio homes shall be continuous from the foundation to the underside of the roof sheathing, deck or slab and shall extend the full length of the common wall.

### **PARAPETS**

Parapets shall be provided for townhouses or patio homes when roof surfaces adjacent to the wall are at the same elevation. The parapet shall extend not less than 30" above the roof surfaces.

### **EXCEPTIONS**

A parapet is not required when the roof decking is of noncombustible material or approved fire-retardant treated wood for a distance of 4' on each side of the wall.

## **DUPLEXES**

**Dwelling units in two-family dwellings are required to be separated from each other by wall and/or floor assemblies of not less than 1-hour fire-resistive rating (2 layers of 5/8" type X sheet rock) from the crawl space or basement up through the attic to the roof. Fire-resistive, floor/ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend to the underside of the roof sheathing.**

### **SOUND INSULATION**

Wall and floor assemblies separating dwelling units shall provide airborne and impact sound insulation for floor/ceiling assemblies. These assemblies shall meet a sound transmission class of 45.

### **Electrical Services**

One and two family dwellings shall be supplied by only one service.

# TEMPORARY AND PERMANENT POWER REQUIREMENTS

## TEMPORARY POWER

- #8 Copper ground from meter base to grounding rod
- G.F.I. protected receptacles
- Weather-proof enclosure (NEMA 3R)
- Interior cover around breaker

## PERMANENT POWER

- Cover shield over panelboard.
- Roof must be completed
- No building will be approved with wet wiring
- House numbers must be on house before the electric service will be hooked up.
- Meter base height from ground level must be between 5 and 5 1/2 feet.
- Any building with more than one meter shall have address permanently marked on meter base before permanent electric will be hooked up.

## ELECTRICAL

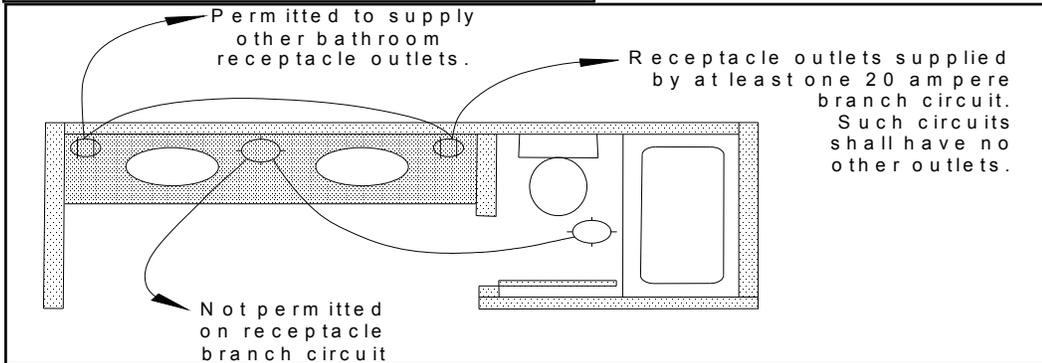
### All electrical work to conform to the 2005 National Electric Code, and Chapters 33 through 42 of the 2006 IRC.

- All 125 volt, single phase, 15 & 20 amp receptacles in these areas shall be GFCI protected:  
Bathrooms, garages, crawl spaces, unfinished basements, kitchen where the receptacles are installed to serve the countertop surfaces, laundry, utility, wet bar sinks where the receptacles are within 6' of the outside edge of the sink, boathouses. *Exception:* Outdoor receptacles not readily accessible.
- All 120 volt, single phase, 15 & 20 amp branch circuits supplying outlets installed in dwelling unit bedrooms shall be protected by a listed arc-fault circuit interrupter.
- One 20 AMP (12-2 wire) branch circuit shall be provided to supply the laundry circuit. This circuit shall have no other outlet.
- Receptacles are to be computed at a load of 1 1/2 AMPS each and limited to 80% of the rating. Example: 15AMP at 80%=12 AMPS (1,440 W) which limits receptacles to 8. 20 AMP=10 receptacles.
- Large appliance grounding must have 4 conductors , including an insulated neutral.
- All electrical wiring must have nail protection (shield plates) across all studs, top and bottom plates where wires pass within one and one quarter inch of the edge. N.E.C. 300-4(a)(1)
- **SMOKE DETECTORS**  
Smoke detectors B920.3.1 Use group R-1: Single or multiple station smoke detectors shall be installed and maintained in the following locations.
  - (1)In all sleeping areas
  - (2)In every room in the path of the means of egress from the sleeping area to the door leading from the guestroom or suite
  - (3)At each story and within the guestroom or suite, including basements.For guestrooms or suites with split levels and without an intervening door between the adjacent levels, a smoke detector installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full story below the upper level.  
Smoke detectors shall be interconnected in such a manner that actuation of one alarm will actuate all of the alarms. B920.5 Battery backup is required in addition to AC primary source.
- Large appliance grounding changes 250-140, page 28.
- Small appliance branch circuit 210.11(C)1, page 28.
- Bathroom branch circuits 210-11(3), page 28.



# ELECTRICAL

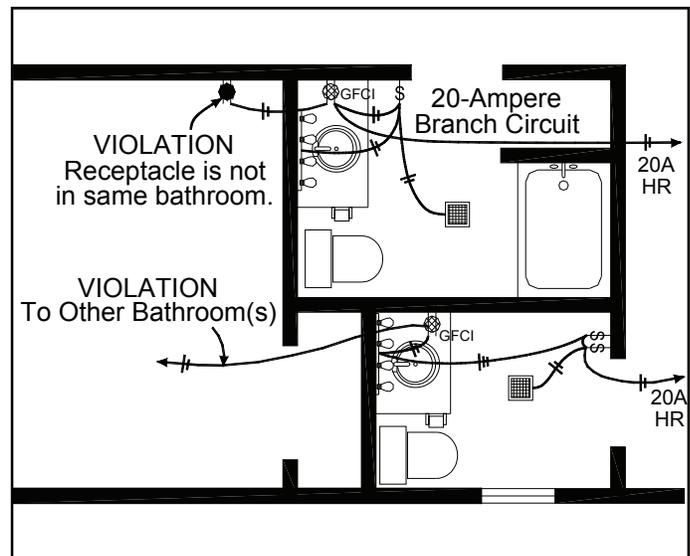
## BATHROOM BRANCH CIRCUIT



## BATHROOM RECEPTACLE CIRCUIT(S)- Dwelling

Section 210-11(C)(3) Exception

Where a 20-ampere circuit supplies a single bathroom, outlets for other equipment within the same bathroom can be supplied in accordance with Section 210-23(a)



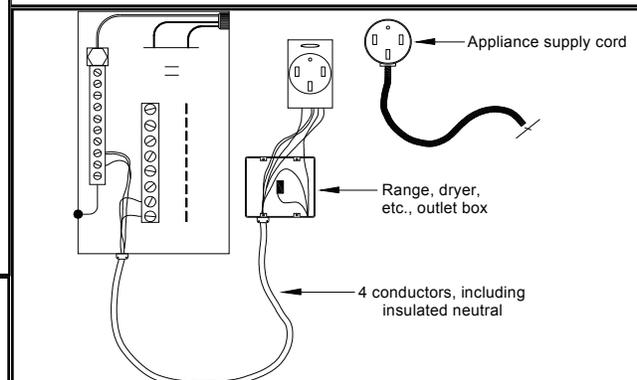
Two small appliance branch circuits limited generally to supplying wall and counter space receptacle outlets. 210-52(b)(2) Ex. No. 1, Clock Ex. No. 2, Gas appliances

An additional dedicated 15-ampere or greater branch circuit permitted for refrigeration equipment 210-52(b)(1) Ex. No. 2

Outdoor receptacle outlets no longer permitted on small appliance branch circuits

## SMALL APPLIANCE GROUNDING

## LARGE APPLIANCE GROUNDING



# ELECTRICAL

SERVICE CONDUCTOR TYPES AND SIZES		
COPPER (AWG)	ALUMINUM (AWG)	ALLOWABLE AMPS (Max Load)
4	2	100
3	1	110
2	1/0	125
1	2/0	150
1/0	3/0	175
2/0	4/0 or two sets of 1/0	200
3/0	250 KCMIL or 2 sets of 1/0	225
4/0 or 2 sets of 1/0	300 KCMIL or 2 sets of 3/0	250
250 KCMIL or 2 sets of 2/0	350 KCMIL or 2 sets of 4/0	300
350 KCMIL or 2 sets of 3/0	500 KCMIL or 2 sets of 250 kcmil	350
400 KCMIL or 2 sets of 4/0	600 KCMIL or 2 sets of 300kcmil	400

## PLUMBING CONSIDERATIONS

**Inspection required:** New plumbing work and parts of existing systems affected by new work or alterations shall be inspected by the building inspector to ensure compliance with the requirements of this code.

**Concealment:** A plumbing or drainage system or part thereof shall not be covered, concealed or put into use until it has been tested, inspected and approved by the Building Inspector.

**Size:** The water service pipe shall be of sufficient size to furnish water to the dwelling in required quantities and pressures, but in no case shall it be less than 3/4 inch nominal diameter.

**Service Valve:** Each dwelling unit shall be provided with an accessible main shut off valve near the entrance of the water service. The valve shall be of a full way type.

**Relief valve:** Equipment used for heating or storing hot water shall be protected by a relief valve and shall have a discharge tube on relief valve down to within 6" of the floor.

**Clean-out:** There shall be a Clean-out near the junction of the building drain and building sewer. Such clean-outs may be installed outside of the building within 5 feet of the building wall, the accessible, minimum clearance in front shall be 18 inches on 3 inch on larger pipes and 12 inches on smaller pipes.

**Horizontal drainage piping slope:** Horizontal drainage piping shall be installed in uniform alignment at uniform slopes not less than 1/4 inch per foot for 3 inch diameter and less, and not less than 1/8 inch per foot for diameters of 4 inches or more.

**Required drain and vent stack:** Building shall have at least one soil stack running from the building drain up through the building, with the stack terminating outdoors above the topmost branch.

**Vent stack connection at base:** Vent stacks shall connect full size at their base to the drainage system, below the lowest fixture branch.

**Vent slope:** All vent pipes shall be sloped and connected so as to drain back to the soil or waste pipe by gravity. All drain waist-vent piping must have nail protection (shield plates) across all studs, top and bottom plates where these pipes pass through within one and one half inch of the edges (IPC305.8)

**Drain waste vent:** All drain waste-vent piping must have nail protection (shield plates) across all studs, top and bottom plates where these pipes pass through within one and one-half inches of the edges. All water supply piping must have the same protection described above. IPC305.8. All pipes going under the footing should be incased in gravel and all pipes going through the footing should be in a sleeve

**Shower and bathtub control valves:** All bath tubs and showers shall be equipped with control valves of the pressure balance, the thermostatic mixing or the combination pressure balance/thermostatic mixing valve types with high limit stops, set to a maximum temperature of 120 degree F.

**Floor Drains:** Floor drains shall have a waste outlet not less than 2 inches in diameter with removable strainer.

**Whirlpool Bathtubs:** Access panel, a door or panel of sufficient size shall be installed to provide access to the pump for repair and/or replacement.

## **MECHANICAL CONSIDERATIONS**

The installation of all HVAC appliances shall conform to the conditions of their label and the manufacturer's installation instructions. The manufacturer's installation and operating instructions shall remain attached to the appliances.

### **Equipment Located in Garages**

- Appliances that generate a glow, spark or flame capable of igniting flammable vapors and located in a garage or basement shall be installed with the burners, burner ignition devices or heating elements and switches at least 18 inches above the floor level.
- These appliances shall have combustion air taken from and the products of combustion discharged to, the exterior of the garage.
- Doors from garage to living area shall be solid core wood minimum 1 3/8 or steel door with a minimum 20 minute rating.
- Doors on furnace rooms that open into the garage shall have a threshold or a sweep.

### **Equipment Located in Attic or Crawl Space**

- When equipment is located in attic or crawl space an opening or passageway of 22 inches wide by 30 inches high minimum (or larger to accommodate equipment) is required within 20' of equipment for access and servicing.
- Flooring shall extend a minimum 30 inches in width along the control side of equipment with a 30 inch high clear working space on all sides, and no less than 24" wide at all other points.
- A permanent electric outlet and lighting fixture shall be provided near the equipment which shall be controlled by a switch located at the passageway opening.

### **Appliance and Gas Connection**

- Gas appliances and equipment shall be connected by rigid pipe, tubing or flexible connectors. A union shall be installed between the appliance and the appliance shut off valve.
- Appliance connection every gas outlet shall have an individual shut off valve.

### **Fireplaces**

- Zero clearance fireplaces shall be installed according to manufacturers' installation instructions.

### **Chimneys and Vents**

- Termination chimneys shall extend at least 2 feet higher than any portion of the building within 10 ft. but shall not be less than 3 ft.
- The horizontal run of an un-insulated connector to a natural draft chimney shall not exceed 75% of the height of the vertical portion of the chimney above the connector. Insulated connector not to exceed 100% of vertical portion.

### **Combustion Air**

- Volume of space where furnace is located must be greater than 50 cubic feet per 1,000 BTU/h.
- If space does not meet requirement; two openings (one within 12" of the top and one within 12" of the bottom) are required. Each will have an area equal to 1 square inch for each 1000 BTU/h.



## **CONTRACTOR/BUILDER RESPONSIBILITIES**

- All houses shall have address posted on property during construction. Permanent address must be posted before occupancy.
- Electric ditch must be 30 inches deep and cleaned out at both ends, conduit must come to bottom of ditch which may require chipping out of footing.
- All holes that penetrate the top plates (wires, piping, etc.) must have draft stopping.
- All materials that are used must be approved by U.L. or equal agency.

# RESIDENTIAL FOOTING CHECKLIST

- Permit #, address, and lot # posted. (R105.7)
- Copy of stamped approved plans shall be on site and must coincide with footing layout. (R106.2)(R106.3.1)
- Exposed pins and marking stakes with lines strung between all stakes. (R109.1.5)
- Setbacks clearly staked and marked.
- Check for undisturbed native soil OR engineered fill. (R403.1)
- Check for consistency of soil in footprint of footing. (R401.4)
- There should be no standing water or debris in footprint of footing. 1805.4.2.4
- Footings shall be at least 6" thick. (R403.1.1)
- Footing is proper width. (min. of 12" wide for single & 2 story; and 18" for 3 story for soils with 2000 PSI load bearing capacity). (Table R403.1)
- Check pier pads. (R403.1.1)
- Check re-bar for proper installation. Re-bar must be supported by chairs, concrete block or tied to re-bar stake. No brick, rock, or similar. (R602.10.6)
- Concrete is placed in min. of 18" below finish yard grade. (R403.1.4)
- Footer is continuous. (R602.10.6)(R404.1.5.1)
- Top of footing shall be level and bottom of footing has no more than 1:10 slope or it is properly stepped. (R403.1.5)
- Check plat for easements and unusual setbacks.

**Note:** Concrete cannot be placed on frozen ground and must be protected from freezing for not less than 5 days. Approved blankets or other provision must be used and must be on site at time of footing inspection. (Table R403.1, Commentary Vol. 1)(IBC 1805.4.2.6)

Comments \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

This is only a list of typical non-compliance issues and is NOT intended to contain all sections that are applicable to the building process.

# RESIDENTIAL FOUNDATION WALL CHECKLIST

- Permit #, address, and lot # posted. (R105.7)
- Copy of stamped, approved plans are on site. (R106.2)(R106.3.1)
- Foundation walls are centered on footing. (R403.1.1)
- Foundation walls are a minimum of 6" wide. (R404.1.2)(R404.1.5)
- Foundation wall height is a minimum of one foot above the street curb, depending on grade of lot. (R403.1.7.3)
- Foundation walls must have emergency egress openings formed in when applicable. (R310.1)**
- Foundation walls have vertical and horizontal re-bar installed properly. (R404.1.2)
- No dirt or other debris that adversely affect bonding capability on rebar or footing. (IBC 1907.4.1)(R106.1.2)

- **Note:** Concrete in foundation wall shall be protected from freezing for not less than 5 days. Approved blankets or other provision must be used and must be on site at time of wall inspection.

(IBC 1805.4.2.5)(R106.1.2)

- **Note:** Brick ledge can be formed in the foundation wall or solid concrete block bearing on footing. Head and bed joints are required.

- **Note:** Walls shall have ½" bolts at six feet on center, and not more than 12" from each corner. Bolts must be set 7" into concrete and extend a min. of 2" above the wall. (10" bolt minimum.) (R403.1.6)

- **Note:** Perimeter drain and waterproofing will be checked at inground plumbing inspection. (R405.1)

- **Note:** Foundation wall height should be so that there is 6" from sill plate to finish yard grade. (R404.1.6)

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\*\* This is only a list of typical non-compliance issues and is NOT intended to contain all sections that are applicable to the building process.

## RESIDENTIAL WALL SHEATHING CHECKLIST

- Approved stamped plans are on site. (R106.2 & R106.3.1)
- Permit #, address, and lot # is posted. (R105.7)
- Exterior covering (**Section R703**)
- Wall sheathing (**Table R703.4**)
- Fastener schedule (**Table R602.3(1)**)
- Brace walls (**R602.10.6**)
- Flashing masonry (**R703.7.5**)

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\*\* This is only a list of typical non-compliance issues and is NOT intended to contain all sections that are applicable to the building process.

# TEMPORARY ELECTRIC CHECKLIST

- Permit #, address, and lot # posted. (R105.7)
  - Temporary pole, meter base, and panel is secure and pole must have brace legs. (E3304.7)(NEC 99 110-13a)
  - A minimum of a #8 grounding electrode conductor is required and it must be attached to a min. 8"x 5/8", copper clad grounding electrode with an approved and listed clamp. (E3509.4)
  - Open knockout spaces in equipment or open breaker spaces are effectively closed. (E 3304.5)
  - Neutral conductors are identified with white, continuous yellow stripe, or a gray natural finish on both sides of neutral lug in meter base, panel interior, and at the end of the whip used for utility hookup.
  - All 15 & 20 amp, 125 volt receptacles shall be GFCI protected and have working weatherproof covers. (E3902.9)
  - For overhead service, the weather head is secured to the pole with 2' of service leads. (E3504); For underground service, liquid tight flex conduit is provided with enough length to get into vault or transformer.
  - Pole must be placed in utility easement between curb & utilities so it does not conflict with sewer and electric ditch and shall be maintained in a safe working manor.
- 
- Note: Panel and meter base must be listed equipment. (E3304.10)
  - Note: All cables should be properly terminated at meter base.
  - Note: All parts of the electrical equipment must be of the (NEMA 3R) type or weatherproofing including enclosures, device boxes, covers, approved raceway, and connectors rated for outdoor use.(E3304.10 & E3807.1)

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\*\* This is only a list of typical non-compliance issues and is NOT intended to contain all sections that are applicable to the building process.

# INGROUND PLUMBING CHECKLIST

- Permit #, address, and lot # posted. (R105.7)
  - Vegetation, topsoil, and foreign material have been removed from within the areas that the footing and slab are to be placed. (R506.2)
  - The base material is at least four (4) inches thick and consists of clean graded sand, gravel, crushed stone, or crushed slag. (R506.2.2)
  - The slab is a minimum of 3 ½ inches thick. (R506.1)
  - Primer and glue is on all PVC pipe fitting connections. (P2904.9.1.3)
  - Check for proper fall, (1/4 inch per foot fall for all pipe). (Table P3005.3)
  - Sleeves in foundation where needed. (P2603 & P2603.5)
  - Floor drain traps are in place. (Table P3201.7)
  - Check PVC pipe for proper weight and grade; schedule 40. (Tables P3002.1 & P3002.2)
  - DWV has either water test or air test (5 psi, 15 min.) ready for verification. (P2503.5.1)
  - Where sewer gravity flows out of basement, (no grinder pump), and the next upstream manhole is higher than the downstairs fixtures, a backwater valve must be installed to protect only the fixtures lower than upstream manhole, (downstairs fixtures) (P3008.1)
  - Perimeter drain tiles or pipe are installed on at least 2 inches of gravel that is larger than pipe perforations or joints and is level with or below area to be protected. (R405.1)
  - Foundation walls that enclose habitable or useable space, have an approved bituminous damp-proofing material applied from footing to finish grade. (R406.1)
- Note: 6 mill vapor barrier required in all areas. (R506.2.3)
  - Note: Any pipe penetrations through footings or walls must be sleeved. Footings must be able to maintain 6" thickness, all re-bar must maintain minimum 3" cover in any direction.
  - Note: Perimeter drain tiles or pipe are covered with at least 6 inches of gravel and any open joints are to be covered with building paper. (R405.1)

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

\*\* This list is only a list of typical non-compliance issues and is NOT intended to contain all sections that are applicable to the building process.

# RESIDENTIAL SEWER DITCH INSPECTION

The Christian County Health Department will inspect all sewer lines from the clean-out adjacent to the house to the septic system.

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



## RESIDENTIAL ROOF FRAMING CHECKLIST

- Approved stamped plans are on site. (R106.2 & R106.3.1)
- Permit #, address, and lot # posted. (R105.7)
- Locate the grade mark on the rafter to determine species and grade. (R802.1)
- Measure and determine size, span and spacing of the rafter, compare to (Tables R802.4.1(1) thru R802.5.1(1))
- Verify that all members are not over-notched or notched in middle 1/3 of the span. (R802.7.1)
- Verify that placement and size of bored holes meet code. (R802.7.1)
- Examine bored holes more than 2 inches from top or bottom of rafter to determine that the hole diameter does not exceed 1/3 the depth of the rafter. (R802.7.1)
- Examine rafters that parallel ceiling joists, verify that joists are nailed to each rafter maximum every 4 feet on center to form a continuous tie between exterior walls. (R804.3.3.1)
- Determine the roof rafters are properly toe nailed to plate. (R602.3(1) Table)
- Determine if rafter / ceiling joist heel joint connections meet requirements in (Table R802..3.1)
- Examine ridge board and hip and valley rafters to determine that thickness is at least 1 inch nominal and that the depth is not less than cut end of rafter. (R802.3)
- Determine that roof rafters are toe nailed or face nailed properly to ridge board. (R602.3(1)Table)
- Determine if all hip and valley rafters are supported at the ridge by a brace to a bearing partition or are designed to carry and distribute the specific load at that point. (R802.3)
- Determine if the roof rafters are toe nailed to hip and valley rafters properly. (R602.3(1)Table)
- Determine if the end of each rafter has at least 1 ½ inches of bearing on wood or 3 inches of bearing on masonry. (R802.6)
- If a header in the roof opening is 4 feet or less, then verify that it is a single member the same size as the rafter, and that the trimmer rafters are doubled. (R802.9)
- Determine if roof truss is built to comply with accepted engineering practices. Verify mark and truss drawing and that trusses are properly installed as per drawing. (R802.10.1)
- Check that no roof truss member is cut, notched, spliced, or altered, unless approved by a Registered Design Professional. (R802.7.2)
- Determine if the correct fastening of truss to top plate conforms to the design drawings or truss drawings. (R802.10.1)

**\*\*This is only a list of typical non-compliance issues and is NOT intended to contain all sections that are applicable to the building process.**

## RESIDENTIAL WALL FRAMING

- Approved stamped plans are on site. (R106.2 & R106.3.1)
- Permit #, address, and lot # is posted. (R105.7)
- Examine the bearing studs to determine grade and species. (R602.1)
- Determine nominal size and spacing of studs and compare actual studs (size, spacing, and species) to Table R602.3(5). If 2x4 stud length is greater than 12', then verify that the stud size and spacing conform to Table R602.3.1
- If exterior walls have a top plate that is doubled, then the plates must overlap at corners and intersections with bearing walls. The top plate must have a 24" min. offset. (R602.3.2)
- If a single top plate is used, check for code compliance (R602.3.2)
- Examine foundation studs in cripple walls to check that the studs are the same size dimensional lumber as studs above the foundation. (R602.9)
- If cripple walls are less than 14" in height, then inspect to check that they are sheathed with plywood or structural panels on at least 1 side and attached to both top and bottom wall plates or constructed of solid blocking (R602.9)
- If top plate notches exceed 50% of their width, then verify that the top plate is reinforced with a galvanized metal tie not less than 0.054 (16gauge) inch thick and 1 1/2" wide fastened across the cut plate with 8, 16d nails (3 at each end). (R602.6.1 & Figure R602.6.1)
- Inspect bearing or exterior wall studs to verify that the notches do not exceed 25% of the stud width. (R602.6 & Figure R602.6(1))
- Inspect interior non-bearing partitions to verify that notches in studs do not exceed 40%. (R602.6 & Figure R602.6(1))
- If the diameter of the hole in a bearing or exterior wall is greater than 40%, but less than 60%, then the bored stud must be doubled. (R602.6 & Figure R602.6(1))
- If there are bored studs which are doubled, then determine that there are not more than 2 successive doubled bored studs. (R602.6 & Figure R602.6(1))
- Determine the grade of headers from the grade mark on the lumber. Note ground snow load and building width. Measure the clear span of the headers, then determine the depth of the header and what the header is supporting. Locate the max. header span from (Table R502.5(2) for exterior headers or Table R502.5(2) for interior headers on determined information.
- Determine if a 1x4" let-in or approved metal strap bracing is located at each corner (end) and at least every 25' on center, but not less than 16% of the braced length. A and B or exposed to wind speeds of 100 mph or less and the wall is located on: A one story building; the top of a 2 or 3 story building; the 1<sup>st</sup> story of a 2 story building; or the second story of a 3 story building. (Table R602.10.3)

- Determine if a 1x4" let-in or approved metal strap bracing is located at each corner (end) and at least every 25' on center, but not less than 16% of the braced length. In seismic design category C or exposed to wind speeds of 110 mph or less and the wall is located on: a one story building or the top of a 2 or 3 story building. (Table R602.10.1)
- Determine if each 1x4 " brace is: placed at an angle from horizontal between 45 and 60 degrees; let into both top and bottom plates and adjoining studs, correctly fastened. (R602.10.3)
- Examine all concealed spaces of stud walls and partitions to determine if fire blocking is provided between floor and ceiling/roof intersections. (R602.8 & R602.8.1)
- Examine all interconnections between concealed vertical and horizontal framing to determine if fire blocking is provided. (R602.8 & R602.8.1)
- Examine all concealed spaces between stair stringers at the top and bottom of the run to determine if fire blocking material is in place. (R602.8 & R602.8.1)
- Examine all openings around vents, pipes, chimneys, and fireplaces at ceiling and floor level to determine if noncombustible fire blocking is in place. (R602.8 & R602.8.1)
- Determine if required emergency escape and rescue windows are installed in basements with habitable space and every sleeping room. Every sleeping room shall have at least one emergency escape and rescue window or exterior door opening for emergency escape and rescue. The sill height shall be no more than 44" above floor. (R310.1)
- All emergency escape and rescue openings shall have a min. net clear opening of 24" in height and 20" wide and 5.7 square feet. Exception: Grade floor openings shall have a min. net clear opening of 5 square feet. (R310.1.2-310.1.3)
- Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools. (R310.2)
- Check for proper crawl space ventilation. 1 square foot for each 150 square feet of under floor space area. One such vent opening shall be within 3' of each corner of said building. (R408.1)
- Check foundation bolts. The wood sole plate at exterior walls shall be anchored to the foundation with anchor bolts space a max. of 6' on center, located within 12" of the ends of each plate section. Bolts shall be at least ½" diameter and shall extend a min. of 7" into masonry or concrete. A nut and washer shall be tightened on each bolt to the plate. (R403.1.6) Sills and sole plates shall be protected against decay and termites where required by Sections R319& R320.

FRAMING COMMENTS: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**\*\* This is only a list of typical non-compliance issues and is NOT intended to contain all sections that are applicable to the building process.**

## RESIDENTIAL FLOOR & CEILING FRAMING CHECKLIST

- Approved stamped plans are on site. (R106.2 & R106.3.1)
- Permit #, address, and lot # is posted. (R105.7)
- Verify span of floor joists. (R502.1, Table R502.3.1(1) & R502.3.1(2))
- Verify girders, beam, and headers. (R502.3.5(1) & R502.3.1(2))
- Determine if length of the bearing point for floor joist, beam or girder is at least 1 ½” if the supporting element is wood or metal OR at least 3” if the supporting element is masonry. (R502.6)
- Determine if there is at least a 3” overlap or the opposing floor joists are tied together in an approved manner. (R502.6.1)
- Determine if the floor joists are supported by an approved and properly installed joist hanger or ledger strips at least 2”x2”, where joists are framed into the side of a wood beam or girder. (R502.6.2)
- Verify that all members are not over-notched or notched in middle 3<sup>rd</sup> of the span. (R502.8 & Figure R502.8)
- Verify that placement and size of bored holes meet code. (R502.8 & Figure R502.8)
- Nailing should be done as per faceting schedule in 2006 ICC. (Table R602.3(1))
- If posts are used to support beams and girders, then determine if positive connections are installed. (R502.9)
- Determine if the header span is 4’ or less. If so, then the header may be a single member the same size as the floor joists. (R502.10 and R802.9)
- Determine if the ends of the joists not over an intermediate support are laterally supported by full depth, 2” thick solid blocking, a header band, band or rim joist, or to adjoining stud. (R502.7)
- Locate the grade stamp on the ceiling joist to determine grade, species, and moisture content. (R802.1)
- Measure and determine size, clear span, allowable span and spacing of ceiling joists. Verify that the actual ceiling joist is equal to or greater than that specified. (Table R502.3.1(1) & (2))
- If ceiling joists are used to resist rafter thrust, then determine if they are face nailed together with 3, 10d nails at lap over partitions, (min. lap 3”) (Table R602.3(1) or Table R802.5.1(9) if applicable
- Determine if the tail joists exceed 12’. If so, then the tail joists at header must have approved hangers or be on a 2”x2” ledger. (R802.9)
- Determine if attic access opening is at least 22” by 30” and has at least 30” of clear height. (R807.1)

This is only a list of typical non-compliance issues and is NOT intended to contain all sections that are applicable to the building process.

## RESIDENTIAL ELECTRICAL ROUGH-IN CHECKLIST

- Permit #, address, and lot # posted. (R105.7)
- Approved stamped plans must be on site. (R106.2 & R106.3.1)
- All switch outlets must be made up and box fill is appropriate. (E3805.12)
- Dryer and stove receptacles must be 4 wire. (E3808.8.3)
- Kitchen must have a minimum of 2 small appliance branch circuits with nothing else on them. (E3801.3)
- All bathroom vanities require one GFCI outlet. For double bowl vanities, receptacle may be located in between or one at each end. (E3801.6)
- Whirlpool tub motors are required to be bonded if copper pipe is used. (E4109.4)
- All lighting fixtures must be placed in an approved location. (E3903.8)
- Maximum number of fixtures, etc. per circuit. (E3602.3)
- Spacing of convenience outlets along all wall spaces must be within 6' unbroken. (E3801.2.1)
- Switch controlled lighting must be in each room, hall, stairway, and garage. (E3803.3)
- Stairway, (6 or more risers), lighting switch must be provided at each level. (E3803.3)
- Lighting outlets must be provided in attic and under-floor storage or equipment spaces. (E3803.4)
- Lighting outlet in closets meet clearance requirements. (E3903.11)
- Receptacle outlets are required in garage & basement. (E3801.9 & E3802.2)
- Receptacle outlets are required for counters longer than 12" and along counter space within 24". (E3801.4.1)
- Outside receptacles are required at front and back grade level. (E3802.3)
- Smoke detectors must be hard-wired and interconnected with battery back-up and installed in proper location. (R313.1 & 313.2)
- Proper wire size must be used throughout house. (Table 3605.1)
- All wires must terminate in a box. (E3805.1)
- All wires fasten per code. (E3805.32)
- Maximum allowed on bends. (E3702.5)
- The minimum clearance from edge of wood member to cable is acceptable. (Table E3702.1)
- Cold water bond required on metal piped houses. (E3509.6)
- Laundry circuit required. (E3603.3)

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

This is only a list of typical non-compliance issues and is NOT intended to contain all sections that are applicable to the building process.

## RESIDENTIAL MECHANICAL ROUGH-IN CHECKLIST

- Permit #, address, and lot # posted. (R105.7)
- Approved stamped plans must be on site. (R106.2 & R106.3.1)

### GAS SERVICE

- Approved piping material must be used. (G2413.1 (402.1)
- Pressure test must hold 10 lbs. for 10 minutes. (406.4.1 & G2417.4.1)
- Sediment trap is properly installed. (G2419.4)(408.4)
- There must be no piping through ductwork, clothes chutes, chimneys, vents, etc. (G2415.1)(404.1)
- All gas appliances should be installed to manufacturer specifications and shall have a gas shut-off valve in the same room no further than 6' from appliance.(G2419.5)

### FURNACE / OTHER MECHANICAL

- Heat source is: Gas ( ) or Electric ( )
- Furnace must be installed in an approved location. (G2406.1, 2406.2)(303.1 & 303.3)
- Meets minimum clearance requirements. (G2409.4.6 & 308.4.4)
- Condensate drain must be properly installed. (M1411.3 & P2801.5.1)
- Return air locations are appropriate. (M1602)
- Bathroom exhaust fans shall exhaust directly to the outside.(R303.3)
- Dryer vents must be 0.16" rigid 4" metal pipe and be taped, *not screwed*, joints in flow direction and run a maximum of 25' to the outside.(M1502.5 & M1502.6 & M1501.3)
- All supply air ducts must be properly installed and secured with approved straps as code requires. (M1601.3.2)
- Fire blocking must be placed around air conditioner plenum and water heater exhaust at ceiling of furnace room.(R602.8)
- Flue pipe must be properly installed and supported through the roof.(G2426.6.1 thru G2426.6.6)
- Combustion air requirements (G2407(304)

### WATER HEATER

- Water heater is in an approved location. (M2005.2)
- T & P valve piping adequately sized. (P2803.6.1)
- Water heater pan is supplied and drainage lines for the pan and the T&P valve are properly installed and terminate to indirect waste, etc. (P2801.5.2, P2803.6.1.)
- Meets minimum clearance requirements. (M2001.2)

\*\* This is only a list of typical non-compliance issues and is NOT intended to contain all sections that are applicable to the building process.

## RESIDENTIAL PLUMBING ROUGH-IN CHECKLIST

- Permit #, address, and lot # posted. (R105.7)
- Approved, stamped plans must be on site. (R106.2 & 106.3.1)
- The juncture of each pipe with the roof line shall be made watertight by an approved flashing. (P3103.3)
- Every building shall have at least one vent pipe that extends to the outdoors. (P3102.2)
- Venting must be supported properly and have proper fall. (P2605)
- Each fixture shall be trapped separately. (P3201.6)
- All pipes must be strapped and have nail plates present. (P2603.2.1 & P2605.1)
- The main shut-off valve must be located inside the house. (P2903.9.1)
- There shall be no compromising of studs by notching or over-cutting. (P2603.2)
- Pipe material- ASTM. (Table P3002.1)
- Min. of one soil stack extending through house. (P3102.1)
- Approved vent terminals. (P3103.1)
- Cleanout at base of all stacks. (P3005.2.6)
- No inaccessible slip joints. (P2704.1)
- Proper fittings are present. (P3005.1)
- Approved connections to stack vent, if applicable. (P3109.1)
- Branches adequately sized for DFU load. (Table P3004.1)
- All fixtures vented. (P3101.2.1)
- Vent headers above highest flood level rim for floor. (P3104.5)
- Common vents properly sized if fixtures connected at different levels. (P3107.3)
- Vents above centerline of horizontal drain lines. (P3104.3)
- Washer standpipe within min./max. length requirements. (P2706.2)
- Building subdrains vented separately from gravity system, if applicable. (P3007.2.1)
- Slope of horizontal piping ¼" per foot. (P3005.3)
- Water valve at or near water heater. (P2903.9.2)

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

• This is only a list of **typical non-compliance issues** and is NOT intended to contain all sections that are applicable to the building process.

## RESIDENTIAL PERMANENT ELECTRIC CHECKLIST

- Permit #, address, and lot # posted. (RI05.7)
- Incoming service conductors are correctly installed, terminated, and identified. (E3307.3)
- The grounding electrode conductor is terminated at meter base or inside the electric panel with the grounding bar as the termination point. (E3509.4)
- Breaker box panel is protected with at least cardboard. (E3304.8)
- Grounding electrode(s) must be a min. 8"x5/8" and driven at a maximum of 45 degrees or laid in a ditch that meets or exceeds depth requirements. (E3508.1.4.1)
- Where a single electrode does not have a resistance to ground of 25 ohms or less it shall be augmented with an additional electrode at a minimum of 6' apart. (E3508.4)
- Size of grounding electrode conductor or "ground wire" is minimum #6. See Table E3503.1
- The conductors from power source to meter base are connected properly and identified. Neutral must be marked with white tape.
- Size of meter base is min. 200 amp continuous for underground service. A meter main disconnect must be installed for extended services exceeding 6' from the nearest point of entrance of the service conductors. (E3501.6.2)
- Any exposed conduit from meter base to finish yard grade is a min. schedule 80, heavy wall PVC, galvanized rigid metallic, IMC or equivalent. (E3505.5)
- All open knockouts in service equipment are effectively closed. (E3807.5)
- Grounding electrode conductor or "ground wire" is secured to conduit riser. (E3510.2)
- There is 35' of conductor left if terminated at pole.
- Conduit riser from weatherhead to meter base is effectively connected to service equipment with an approved hub. (E3504)
- Overhead conductors meet utilities' overhead clearances as specified in (E3504)
- Where cables enter metallic nipples, conduit plastic bushings shall be provided for protection against physical damage. (E3505)

Note: All rough-in inspections must have passed before permanent electric can be inspected.

Note: 3' of conductor shall be left inside electric vault with the neutral identified.

Note: Conduit riser is secured to the structure

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- This is only a list of **typical non-compliance** issues and is NOT intended to contain all sections that are applicable to the building process.

# RESIDENTIAL FINAL CHECKLIST

## OUTSIDE OF HOUSE

- House numbers of the proper size should be displayed on front of house, or acceptable location for emergency personnel. (R321.1)
- Finish yard grade should be in, either: seed and straw, hydro-seed, or sod.
- Proper lot drainage away from house on all sides should be a minimum of 6" in first 10'. (R401.3)
- Crawl space should be vented properly: 1 sq ft. of ventilation for every 150 sq. ft. of crawl space. (R408.1)
- Crawl space access hole should be a min. of 18" x 24". (R408.4)
- Decks and porches with an elevation change of more than 30" above yard final grade, or other floor, must have a guardrail of at least 36" tall, with the openings in the vertical and horizontal members such that a 4" sphere cannot pass through. (R312.1 & R312.2)
- Deck rim joist should be properly attached, (bolted), to house and should be properly flashed. (R502.2.2)
- Handrails are required on at least one side of all stairs having 4 or more risers. Handrails projecting from the wall shall have a space of not less than 1 1/2" and a min. of 34" and a max. of 38" in height. (R311.5.6 thru R311.5.6.3)
- All outside receptacles, (at least one on front and one on back of house), shall be GFCI protected. (E3802.3 & E3801.7)
- Dryer vent shall terminate outside. (M1502.2)
- A/C condensing unit should be in place and properly installed. (Copper lines and electrical)
- Hose bibs must be secured to the house.
- All penetrations through exterior wall must be sealed. (R703.1)

## UNDERNEATH HOUSE

- Crawl space must not have standing water. (R408.6)
- PVC plumbing pipes should all be properly attached and supported. (Table P2605.1)
- Water supply lines should all be properly attached and supported. (PEX, Copper, etc.) (Table P2605.1 & M2101.9)
- Gas lines should all be properly supported. (Table G2424.1)
- Electrical wires should all be properly supported. (E3702)
- A/C condensing unit lines should be properly attached and supported. (Table M2101.9)
- Dryer vent should be 4" metal duct (no sheet metal screws in joints) and should be no more than 25' in length and should be properly attached and supported. (M1502.5 & M5102.6)
- Trash and construction debris should all be removed. (R408.5)
- Foundation bolts should be properly spaced and all should have nuts and washers tightened. (R403.1.6)
- Floor joists should not be notched within the center 1/3 of the span and should never be more than 25% for any reason. (R502.8)
- Girders should be properly supported (shimmed) the full width of the pier on

which it sits.

- INSIDE OF HOUSE**
- All receptacles must be operable.
- Smoke alarms are required in all sleeping rooms, outside each sleeping area, and at least one on each story of a dwelling. They are required to be hard wired with battery backup and are to be interconnected. (R313)
- Sleeping room egress windows must have a net clear opening of 5.7 sq. ft. (for above grade windows and 5.0 sq. ft. for grade windows). The min. net clear opening height is 24" and the min. net clear opening width is 20". Window sills shall be no higher than 44" above floor. (R310.1 thru R310.1.4)
- A Sleeping room is any room that is 70 sq. ft. or greater with a minimum dimension of 7' in any direction with a ceiling height at least 7', and contains a closet, regardless of the use by the prospective owner.
- Sleeping room closet, top shelf must be a min. of 12" from an incandescent ceiling light fixture. (E3903.11)
- Sleeping room outlets are protected by arc-fault breakers. (E3802.12)
- Exits from dwelling, at least one shall be a 3'0 x 6'8" egress door and shall be readily operable from the side from which egress is to be made, without the use of key or special knowledge or effort. (R311.1 & R311.2)
- Stair tread depth is a min. of 10", stair risers should be no more than 7 3/4" and should not vary more than 3/8" from one to another. (R311.5.3.1 thru R311.5.3.3)
- Garage shall be completely separated from the residence and its attic area by means of 1/2" gypsum board or equivalent applied to garage side. If there is habitable space above garage, ceiling shall be covered with 5/8" type X gypsum board. (R309.2)
- Appliances having an ignition source shall be elevated such that the source of ignition is not less than 18" above the floor in garages. For the purpose of this section, rooms or spaces that are not part of the living space of a dwelling unit and that communicate with a private garage through openings shall be considered to be part of the garage. (M1307.3)
- Gas appliance combustion air shall be provided by 2 sources. One source should be within 12" of the ceiling and one within 12" of the floor. (Combustion air in ceiling shall have a sleeve up to 6" above insulation.) (M1703.2 & Figure M1703.2(2))
- All gas fired appliances shall have an individual gas shut off adjacent to the appliance. (G2420)
- Prohibited location for water heaters. (M2005.2)
- Water heater shall have a discharge pipe on the pressure relief valve, down to within 6" of floor and shall not go through the floor. (P2803.6.1)
- Breakers should be served by the appropriate wire size (15 amp breakers – 14 gauge wire, 20 amp breakers – 12 gauge wire, etc.) (Table E3605.1)
- Breakers in the panel box shall all be labeled as to what circuit they belong to. (E3304.11)
- Unused openings in panel should be closed to afford protection against shock hazard. (E3304.5)
- GFCI protection is required on all receptacles in: kitchens, bathrooms, garages, crawl spaces, unfinished basements, and outside; with the exception of one receptacle in the garage for a freezer. (E3802.1 thru E3802.7)

- Bathroom GFCI receptacles may tie together,( 2 or more bathrooms), or light, fan, and receptacles all in the same bathroom may tie together with nothing else on that circuit. (E3603.4)
- Bathrooms with a double bowl vanity should have a receptacle at each end of vanity or one in between the bowls. (E3801.6)
- Hydro massage tubs should have a door or panel of sufficient size to provide access to the pump motor repairs or replacement. (P2720.1)
- Bathroom exhaust fan should be functional. *Exhaust fan not required if bathroom has an openable window.* (M1507)
- Islands and peninsula countertops with a long dimension of a min. 24” and a short dimension of 12” are required to have a GFCI receptacle either above countertop or below within 12” of top. (E3801.4.2 & E3801.4.3)
- A min. of 2 kitchen countertop GFCI circuits are required. (E3603.2)
- Furnace rm. should have the proper draft stop around flue pipe and plenum at ceiling. Should have at least one receptacle and a light. (R602.8 & E3803.4)
- Electric dryer and kitchen range 220 receptacles shall be 4 pronged grounded receptacles.
- Light switches for lighting over stairs are required at top and bottom of all stairs with six or more risers. (E3803.3)

Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

•This is only a list of typical non-compliance issues and is NOT intended to contain all sections that are applicable to the building process.

# Christian County

## Typical Deck Details

For One and Two Family Residential Decks

Appendix 'R' of the Christian County Building Code

### CONTENTS

General Notes.....	53	Ledger Board Fasteners.....	60
Decking Requirements.....	53	Free-Standing Decks.....	62
Joist Size.....	53	Lateral Support of Free-Standing Decks.....	62
Beam Size & Assembly Requirements.....	55	Guard Requirements.....	63
Deck Framing Plan.....	56	Guard Post Attachments.....	63
Joist-to-Beam Connection.....	56	Stair Requirements.....	66
Joist Hangers.....	57	Stair Handrail Requirements.....	67
Post Requirements.....	57	Stair Footing Requirements.....	68
Rim Joist Requirements.....	57	Footings.....	58
Ledger Attachment Requirements.....	58	Stair Lighting Requirements.....	68
Prohibited Leger Attachments.....	60	Framing at Chimney or Bay Windows.....	68
Additional Info.....	69		

**THE USE OF THIS PACKAGE IN LIEU OF SUBMITTED DRAWINGS APPLIES TO SINGLE SPAN, SINGLE LEVEL, RESIDENTIAL DECKS ONLY. DECKS MUST BE CONSTRUCTED IN STRICT CONFORMANCE WITH THE DETAILS CONTAINED HEREIN. A COPY OF THIS DECK DETAIL MUST BE ON THE JOB SITE AND AVAILABLE TO THE INSPECTOR DURING THE INSPECTION PROCESS**

\*Note: The use of 'pressure blocks' is not an acceptable method of joist attachment to ledger or rim board. All connections must be with approved mechanical fastening.

## TYPICAL DECK DETAILS

### **GENERAL NOTES**

1. All lumber shall be southern pine, grade #2 or better and shall be pressure treated ACQ or CA-B in accordance with American Wood-Preservers' Association standards. All lumber in contact with the ground shall be rated as "ground-contact."
2. All nails shall be spiral or annular grooved.
3. Chemicals used in pressure treatment methods will prematurely corrode standard fasteners, hardware, and flashing when in contact with lumber. To combat corrosion, the following is required.
  - ◆ All screws and nails shall be hot-dipped galvanized or stainless steel.
  - ◆ All hardware (joist hangers, cast-in-place post anchors, etc.) shall be galvanized with 1.85 oz/sf of zinc (G-185 coating) or shall be stainless steel. Look for products such as "Zmax" from Simpson Strong-Tie or "Triple Zinc" from USP.
4. Decks constructed according to this appendix are not approved for future hot tub installations.
5. Deviations from this handout and conditions which do not meet the details shown herein require a plan submission.
6. Inspections:
  - ◆ A footing, framing, and final inspection is required on all decks.
  - ◆ Footing inspections are required PRIOR to the placement of concrete.
  - ◆ Framing and final inspections may be combined if all portions of the deck framing and mechanical attachments are at least 42" above grade.
  - ◆ Inspections are required by law. Failure to receive any and all inspections can result in the issuance of violations which may lead to legal action.
7. It is the responsibility of the permit holder or the permit holder's representative to notify the County when the stages of construction are reached that require an inspection. Inspection requests may be made by contacting the Christian County Department of Building Inspections at 417-581-6064, 8:00 a.m. to 4:30 p.m., Monday—Friday.
8. Decks shall not be used or occupied until a final inspection approval is obtained.

### **DECKING REQUIREMENTS**

All decking material shall be composed of 2x6 or 5/4 ("five-quarter") board. Attach decking to each joist with 2-8d nails or 2-#8 screws. See FIGURE 10 for decking connection requirements at the rim joist. Decking may be placed from an angle perpendicular to the joists to an angle of 45 degrees to the joists. Each piece of decking must bear on a minimum of 4 joists.

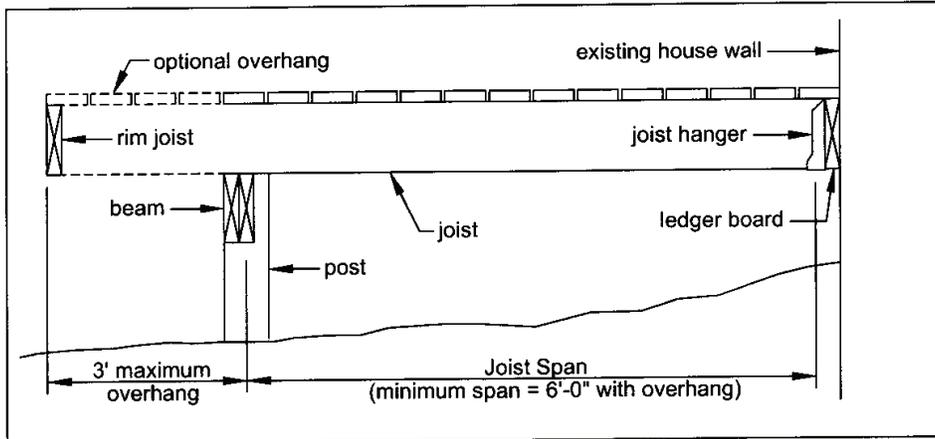
Decking composed of foreign lumber, plastic or manufactured material may be substituted only when the product has an approved evaluation report from an accredited testing laboratory which has listed the product.

The evaluation report must be on the jobsite and available to the Inspector during the inspection process. Installation and span lengths of the substituted material must be in strict conformance with the evaluation report and the manufacturer's instructions. All decking products must be capable of supporting a live load of 40 pounds per square feet.

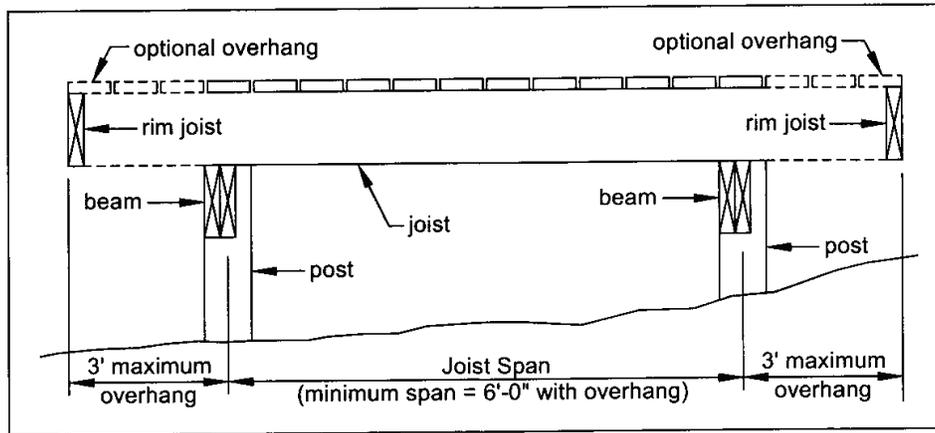
TYPICAL DECK DETAILS

**JOIST SIZE**

The span of a joist is measured from the centerline of bearing at one end of the joist to the centerline of bearing at the other and does not include the length of the overhangs. Use TABLE 1 to determine your joist span based on lumber size and joist spacing. See FIGURE 1 and FIGURE 2 for joist span types.



**FIGURE 1: JOIST SPAN - DECK ATTACHED AT HOUSE**



**FIGURE 2: JOIST SPAN - FREE-STANDING DECK**

**TABLE 1: MAXIMUM JOIST SPANS**

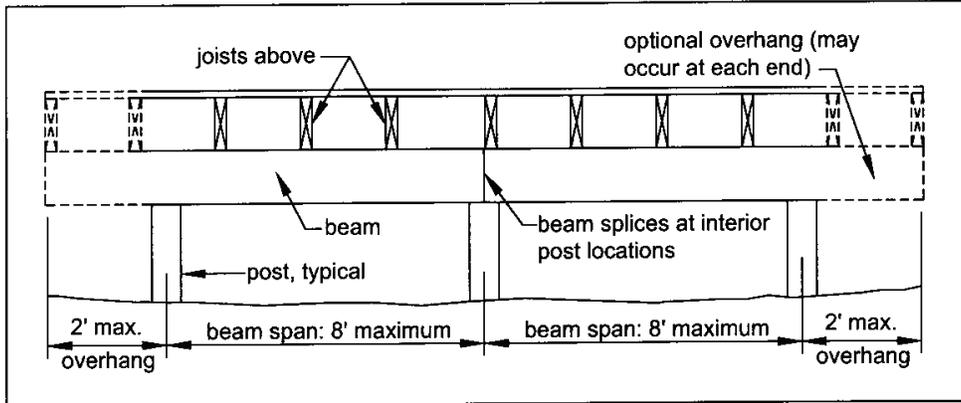
Joist Size	Joist Spacing, on center	Joist Span <sup>1</sup> excludes overhangs
2x6	16"	9'-4"
2x6	24"	7'-10"
2x8	16"	12'-2"
2x8	24"	10'-1"
2x10	16"	15'-9"
2x10	24"	13'-1"
2x12	16"	18'-0"
2x12	24"	15'-4"

<sup>1</sup> Spans based on 40 PSF live load, 10 PSF dead load, southern pine #2, normal loading duration, wet service conditions and deflection:  $\Delta = l/360$ .

TYPICAL DECK DETAILS

**BEAM SIZE & ASSEMBLY REQUIREMENTS**

The determination of beam size is based on your joist span characteristics. Use TABLE 2 if your joists do not overhang or TABLE 3 if your joists overhang. See FIGURE 3 for beam span types.



**FIGURE 3: BEAM SPAN TYPES**

Joists may bear atop the beam, as shown in FIGURE 3 above, and extend past the beam centerline up to 3'-0", as shown in FIGURE 2 and FIGURE 3, or the joists may attach to the side of the beam with joist hangers. See JOIST-TO-BEAM CONNECTION details, FIGURE 6 on Sheet 5.

**TABLE 2: MINIMUM BEAM SIZE WHEN JOISTS HAVE NO OVERHANGS**

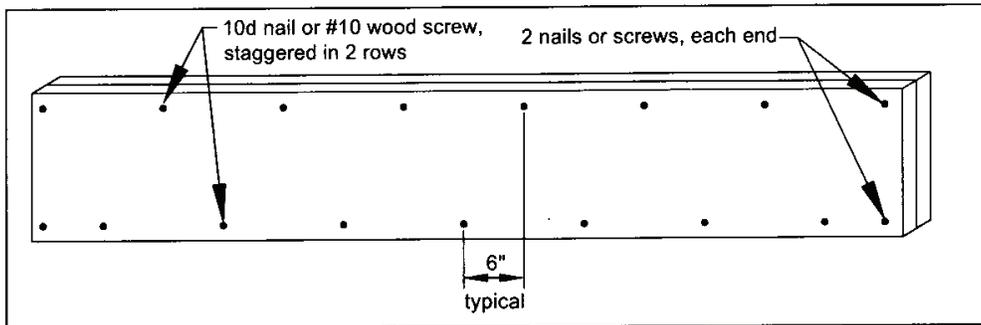
Joist Span	Beam Size
0 - 6'-8"	(2) 2x6*
6'-9" - 11'-2"	(2) 2x8*
11'-3" - 16'-0"	(2) 2x10*
16'-1" - 18'-0"	(2) 2x12

**TABLE 3: MINIMUM BEAM SIZE WHEN JOISTS OVERHANG**

Joist Span	Beam Size
0 - 6'-0"	(2) 2x8*
6'-1" - 12'-8"	(2) 2x10*
12'-9" - 18'-0"	(2) 2x12

\* You may substitute a larger beam size for the one shown in the table. For instance, if the table requires (2) 2x8, you may substitute a (2) 2x10 or (2) 2x12.

The deck's beam is assembled by attaching the two members identified in the tables above in accordance with FIGURE 4.

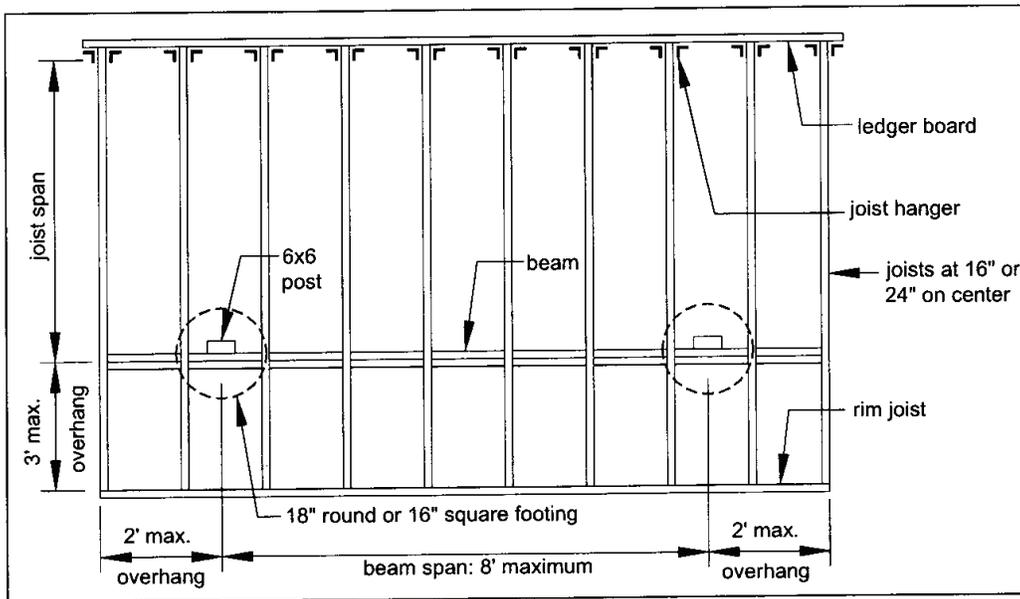


**FIGURE 4: BEAM ASSEMBLY DETAIL**

TYPICAL DECK DETAILS

**DECK FRAMING PLAN**

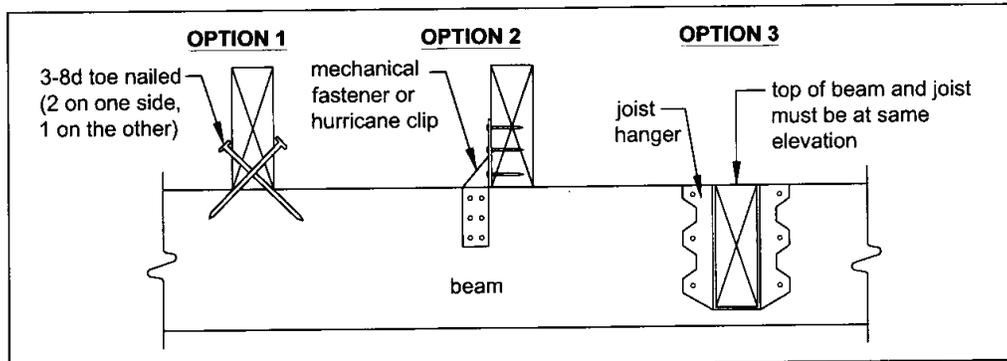
A framing plan shows a bird's-eye view of the joist and beam layout; the location of the ledger board, posts and footings, and the type, size and spacing of the ledger board fasteners. See FIGURE 5 for an example of a typical deck framing plan.



**FIGURE 5: TYPICAL DECK FRAMING PLAN**

**JOIST-TO-BEAM CONNECTION**

Each joist shall be attached to the beam as shown in FIGURE 6. Joists may bear on and overhang past the beam a maximum of 3'-0". Use Option 1 or Option 2 to attach the joist to the beam. Joists may also attach to the side of the beam with joist hangers. See JOIST HANGERS on Sheet 6 for more information. Hangers, clips and mechanical fasteners shall be galvanized with 1.85 oz/sf of zinc (G-185 coating) or shall be stainless steel.



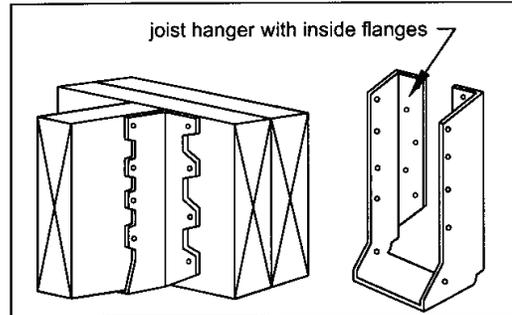
**FIGURE 6: JOIST-TO-BEAM DETAIL**

TYPICAL DECK DETAILS

**JOIST HANGERS**

Joist hangers, as shown in FIGURE 7, shall each have a minimum capacity of 1000 lbs. The depth and width of the joist hanger shall equal the dimensions of the joist or header it is carrying. Joist hangers shall be galvanized with 1.85 oz/sf of zinc (G-185 coating) or stainless steel.

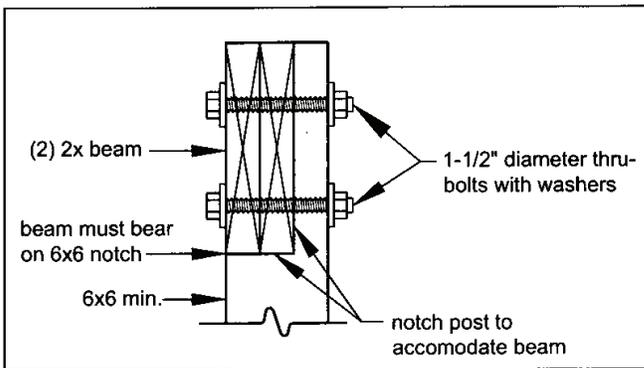
Use joist hangers with inside flanges when clearances to the edge of the beam or ledger board dictate. **Do not use clip angles or brackets to support framing members.**



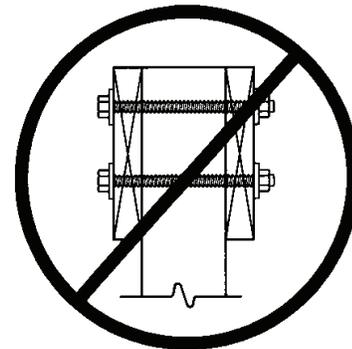
**FIGURE 7: TYPICAL JOIST HANGERS**

**POST REQUIREMENTS**

All deck post sizes shall be 6x6, and the maximum height shall be 14'-0". The beam shall be attached to the post by notching the 6x6 as shown in FIGURE 8. All thru-bolts shall have washers at the bolt head and nut. Attachment of the beam to the side of the post without notching is prohibited; see FIGURE 9.



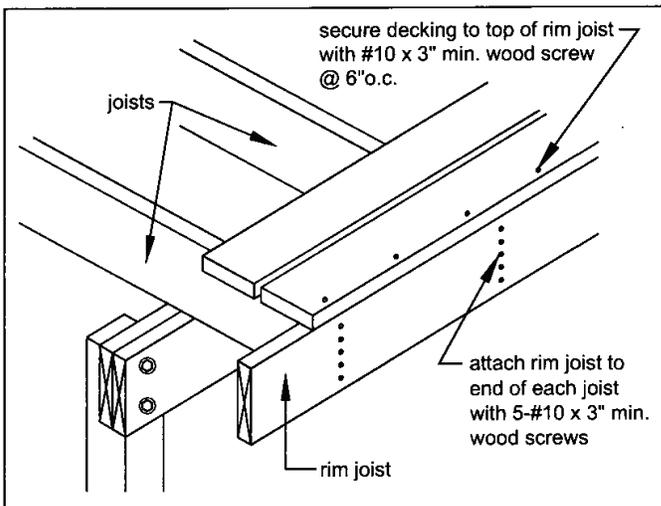
**FIGURE 8: POST-TO-BEAM REQUIREMENTS**



**FIGURE 9: PROHIBITED POST-TO-BEAM ATTACHMENT CONDITION**

**RIM JOIST REQUIREMENTS**

Attach a continuous rim joist to the ends of joists as shown in FIGURE 10. Attach decking to the rim joist as shown in FIGURE 10. For more decking attachment requirements, see DECKING REQUIREMENTS on Sheet 2.



**FIGURE 10: RIM JOIST CONNECTION DETAILS**

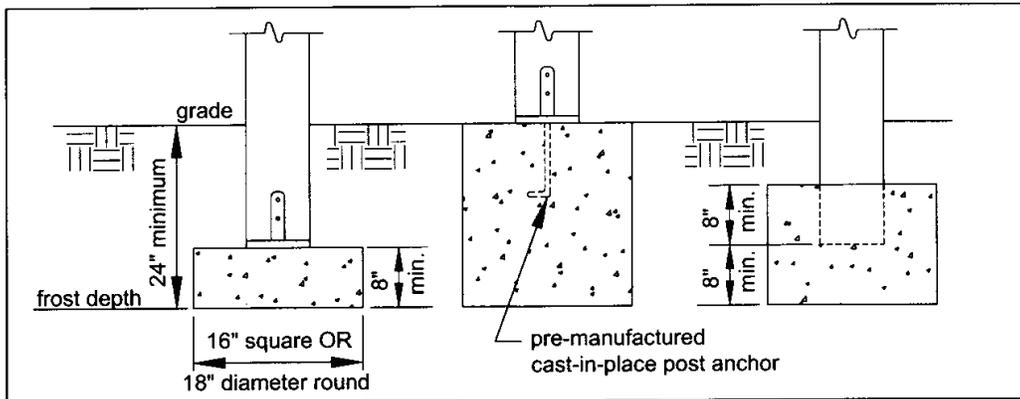
## TYPICAL DECK DETAILS

### **FOOTINGS**

See FIGURE 11 for footing size, footing thickness and post attachment options and requirements. All footings shall bear on solid ground; bearing conditions shall be verified in the field by county inspectors prior to placement of concrete. DECK FOOTINGS CLOSER THAN 5'-0" TO AN EXISTING EXTERIOR HOUSE WALL MUST BEAR AT THE SAME ELEVATION AS THE FOOTING OF THE EXISTING HOUSE FOUNDATION.

**Do not construct footings over utility lines or enclosed meters. Call 1-800-DIG-RITE (1-800-344-7483)**

Pre-manufactured post anchors shall be galvanized with 1.85 oz/sf of zinc (G-185 coating) or shall be stainless steel.



**FIGURE 11: TYPICAL FOOTING DETAILS**

### **LEDGER ATTACHMENT REQUIREMENTS**

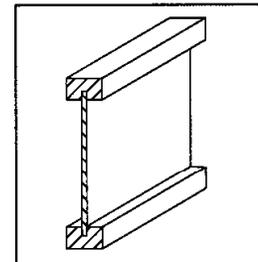
**GENERAL:** Attach the ledger board, which shall be equal to or greater than the joists size, to the existing exterior wall in accordance with FIGURE 13 through FIGURE 15. When attachments are made to the existing house band board, the band board shall be capable of supporting the new deck. If this cannot be verified or conditions at the existing house differ from the details herein, then a free-standing deck is required. See FREE-STANDING DECKS on Sheet 11.

YOU MUST VERIFY THE EXISTING CONDITIONS IN THE FIELD PRIOR TO APPLYING FOR A BUILDING PERMIT. COMPLIANCE WITH ALL THE REQUIREMENTS HEREIN IS CRITICAL TO ENSURE THE STRUCTURAL STABILITY OF YOUR DECK AND THE SAFETY OF YOU AND YOUR FAMILY.

**SIDING AND FLASHING:** House siding, or the exterior finish system, must be removed prior to the installation of the ledger board. Flashing is required at any ledger board connection to a wall of wood framed construction and shall be composed of copper (attached using copper nails), stainless steel, UV resistant plastic or galvanized steel coated with 1.85 oz/sf of zinc (G-185 coating). See FIGURE 13 for continuous flashing with drip edge.

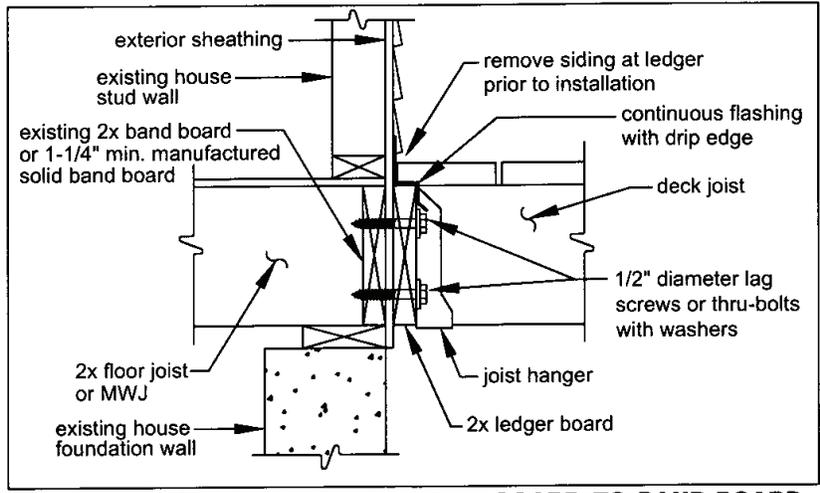
**MANUFACTURED WOOD JOIST:** The term "MWJ" denotes manufactured wood "I" joists; see FIGURE 12. Examples of manufactured wood joists are TJI, GPI, and LPI.

Many new homes constructed with MWJs include a 1-1/4" manufactured solid band board that can support the attachment of a deck; see FIGURE 13. However, older homes constructed with MWJs may only include a plywood band board which cannot support a deck. In such cases a free-standing deck or a full plan submission is required.

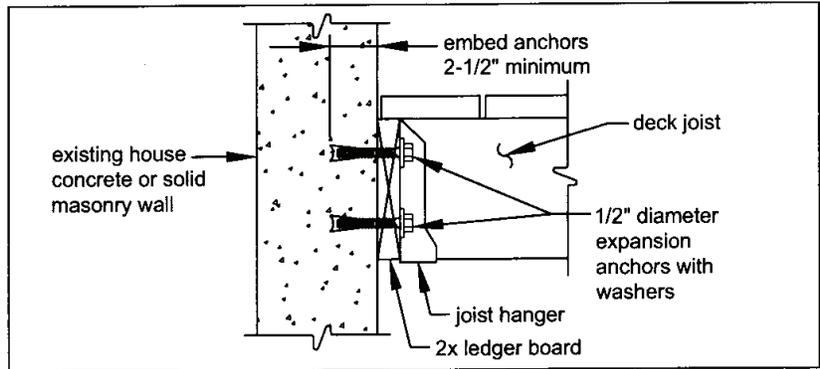


**FIGURE 12: MWJ PROFILE**

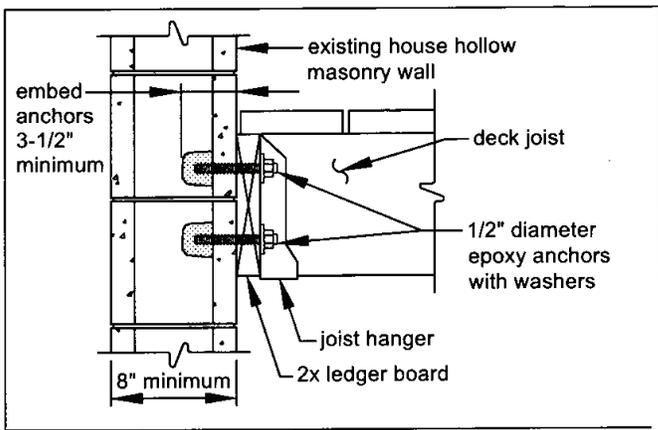
TYPICAL DECK DETAILS



**FIGURE 13: ATTACHMENT OF LEDGER BOARD-TO-BAND BOARD**



**FIGURE 14: ATTACHMENT OF LEDGER BOARD-TO-FOUNDATION WALL (CONCRETE OR SOLID MASONRY)**

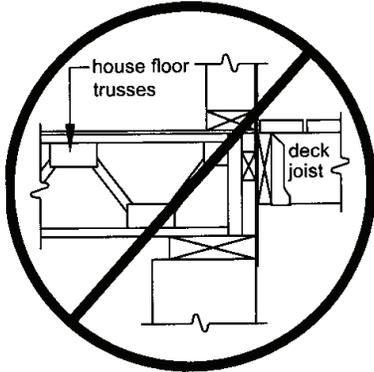


**FIGURE 15: ATTACHMENT OF LEDGER BOARD-TO-FOUNDATION WALL (HOLLOW MASONRY)**

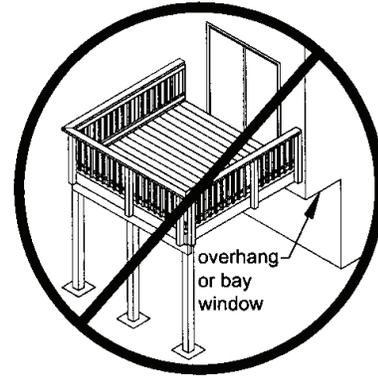
TYPICAL DECK DETAILS

**PROHIBITED LEDGER ATTACHMENTS**

Attachments to the ends of pre-manufactured open web joists, to bay windows, and to house overhangs are strictly prohibited; see FIGURE 16 through FIGURE 18. In such cases the deck shall be free-standing. See FREE-STANDING DECKS on Sheet 11.



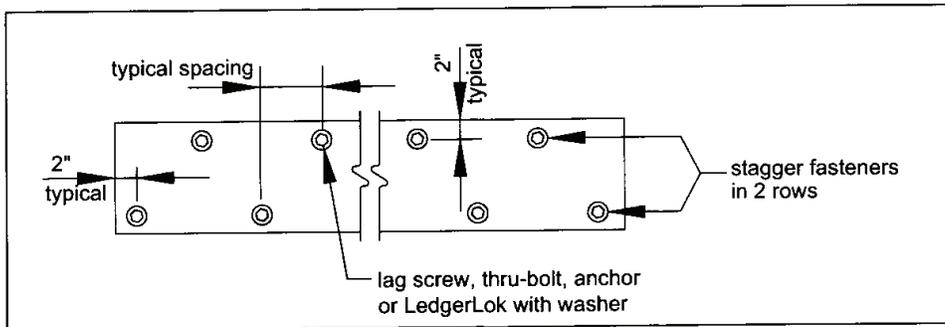
**FIGURE 16: NO ATTACHMENT TO OPEN WEB TRUSSES**



**FIGURE 18: NO ATTACHMENT TO HOUSE OVERHANG**

**LEDGER BOARD FASTENERS**

The spacing between ledger board fasteners is dependent on the span length of the joists. Use TABLE 4 to determine fastener spacing and install in the configuration shown in FIGURE 19. All fasteners shall be installed with washers and must be thoroughly tightened. Adequacy of connections will be verified by city inspectors. If a ladder is required to access the ledger board, one must be provided by the property owner, permit holder, or their representative.



**FIGURE 19: LEDGER BOARD FASTENER SPACING AND CLEARANCES**

**TABLE 4: LEDGER BOARD FASTENER SPACING**

Joist Span	Fastener spacing, on center		
	Lag Screws*	LedgerLok*	Thru-bolts, Expansion Anchors, Epoxy Anchors*
0 - 6'-0"	30"	16"	36"
6'-1" - 8'-0"	23"	12"	36"
8'-1" - 10'-0"	18"	10"	34"
10'-1" - 12'-0"	15"	8"	29"
12'-1" - 14'-0"	13"	7"	24"
14'-1" - 16'-0"	11"	6"	21"
16'-1" - 18'-0"	10"	5"	19"

\*See Sheet 10 for fastener specifications.

TYPICAL DECK DETAILS

Thru-Bolts

Thru-bolts shall have a minimum diameter of 1/2". Pilot holes for thru-bolts shall be 17/32" to 9/16" in diameter. Thru-bolts must be equipped with washers at the bolt head and nut.

Expansion Anchors

Use expansion anchors when attaching a ledger board to a concrete or solid masonry wall as shown in FIGURE 14. Bolt diameters of the anchors shall be a minimum of 1/2"; in some cases, this may require an anchor size of 5/8". Minimum embedment length shall be 2-1/2". Expansion anchors must have washers.

Epoxy Anchors

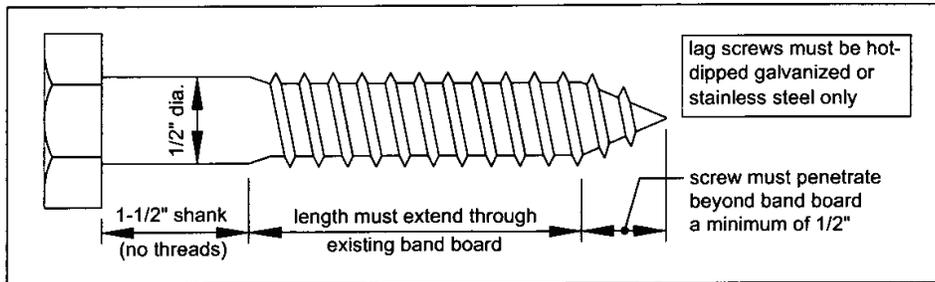
When attaching to hollow masonry, fill the cells with grout and use expansion anchors, or use one of the approved epoxy anchors listed in TABLE 5 and install as shown in FIGURE 15. Epoxy anchors shall have a minimum diameter of 1/2" and minimum embedment length of 3-1/2". Installation shall be in strict conformance to the manufacturer's instructions. Epoxy anchors must have washers.

**TABLE 5: APPROVED EPOXY ANCHORS**

Manufacturer	Product
ITW Ramset/Red Head	Epcon Acrylic 7
Hilti	HY-20

Lag Screws

Lag screws shall have a minimum diameter of 1/2" and shall be hot-dipped galvanized or stainless steel. Lag screws may be used only when the field conditions match those shown in FIGURE 13. **You must verify the existing conditions in the field prior to applying for a building permit and installing lag screws. Compliance with all the requirements herein is critical to ensure the structural stability of your deck.** See FIGURE 20 for lag screw length and shank requirements. All lag screws shall be installed with washers.



**FIGURE 20: LAG SCREW REQUIREMENTS**

**Lag screw installation requirements:** Each lag screw shall have pilot holes drilled as follows: 1) Drill a 1/2" diameter hole in the ledger board, 2) Drill a 5/16" diameter hole into the solid connection material of the existing house. **DO NOT DRILL A 1/2" DIAMETER HOLE INTO THE SOLID CONNECTION MATERIAL.**

The threaded portion of the lag screw shall be inserted into the pilot hole by turning. **DO NOT DRIVE WITH A HAMMER.** Use soap or a wood-compatible lubricant as required to facilitate tightening. Each lag screw shall be thoroughly tightened.

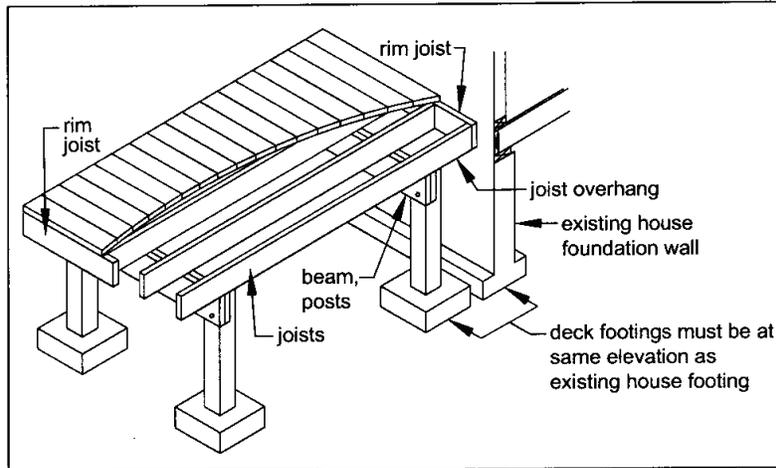
LedgerLok

LedgerLok by FastenMaster, a proprietary fastener listed by ICC-ES, is similar to a lag screw. LedgerLoks have a diameter less than 1/4" and an integrated washer. No pilot hole is required for installation. LedgerLoks shall be of sufficient length to fully penetrate the existing house band board and shall be installed in strict conformance with the manufacturer's instructions.

TYPICAL DECK DETAILS

**FREE-STANDING DECKS**

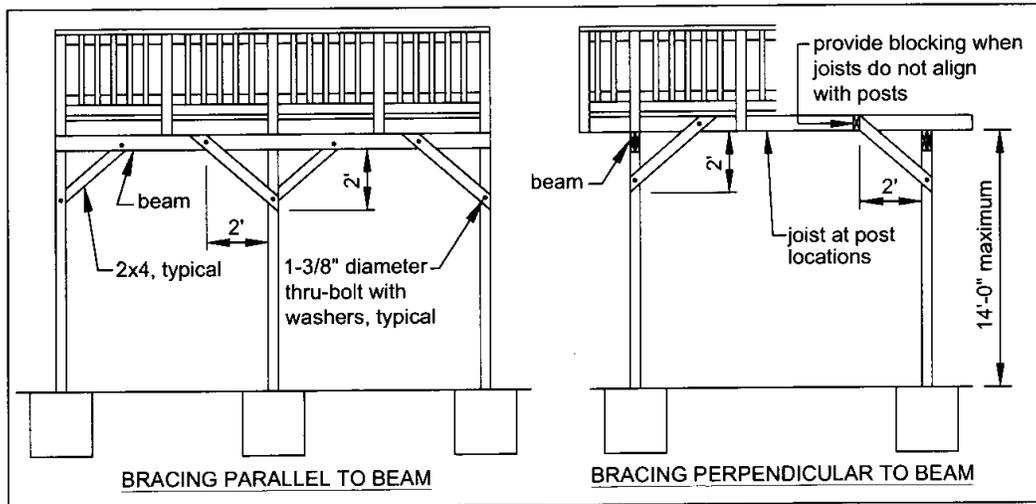
Decks which are free-standing do not utilize the exterior wall of the existing house to support vertical loads; instead, an additional beam with posts is provided at or within 3'-0" of the existing house. THE ASSOCIATED DECK POST FOOTINGS SHALL BE PLACED AT THE SAME ELEVATION AS THE EXISTING HOUSE FOOTING. See FIGURE 2 and FIGURE 21. Beam size is determined by TABLE 2 or TABLE 3.



**FIGURE 21: FREE-STANDING DECK**

**LATERAL SUPPORT OF FREE-STANDING DECKS**

Free standing decks greater than 2 feet above grade shall resist lateral loading and horizontal movement by providing diagonal bracing or by attaching to the exterior wall of the house.

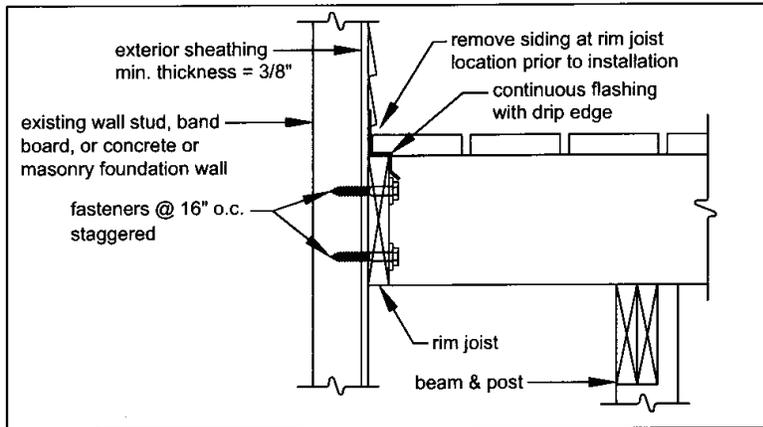


**FIGURE 22: DIAGONAL BRACING REQUIREMENTS**

**Diagonal Bracing:** Provide diagonal bracing both parallel and perpendicular to the beam at each post as shown in FIGURE 22. When parallel to the beam, the bracing shall be bolted to the post at one end and beam at the other. When perpendicular to the beam, the bracing shall be bolted to the post at one end and a joist at the other. When a joist does not align with the bracing location, provide blocking between the next adjacent joists.

TYPICAL DECK DETAILS

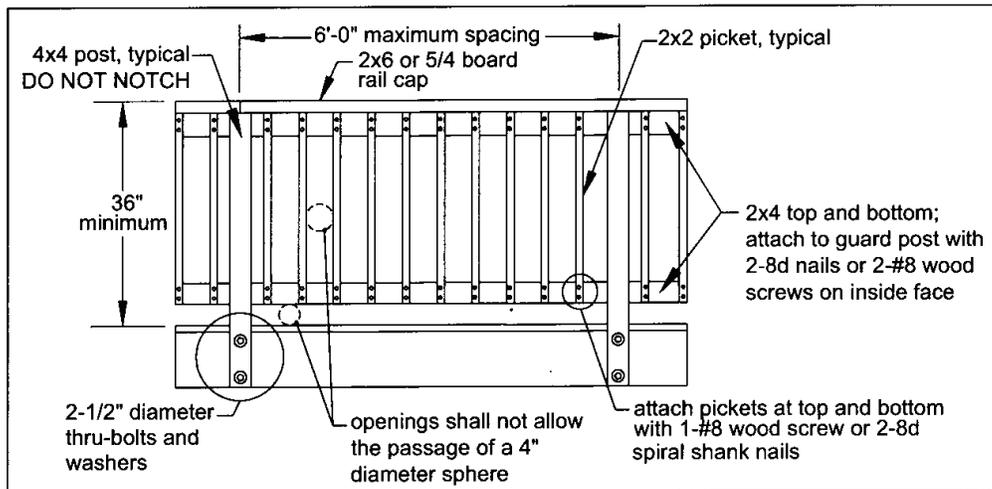
**Attachment to House:** Attach the deck rim joist to the existing house exterior wall as shown in **FIGURE 23**. The wall must be sheathed with a minimum  $\frac{3}{8}$ " structural panel sheathing. Use lag screws or thru-bolts when fastening to an existing band board or wall stud; use expansion anchors or epoxy anchors when fastening to concrete or masonry. **DO NOT ATTACH TO BRICK VENEERS. YOU MUST VERIFY THIS CONDITION IN THE FIELD PRIOR TO UTILIZING THIS METHOD.** Fasteners shall be 16" on center and staggered in 2 rows. Flashing over the rim joist is required and must be installed in accordance with the flashing provisions on Sheet 7.



**FIGURE 23: ATTACHMENT TO HOUSE LATERAL SUPPORT**

**GUARD REQUIREMENTS**

All decks greater than 30" above grade are required to have a guard. If you are providing a guard when one is not required, it must meet these requirements. All guards shall be constructed in strict conformance with details herein; any deviations require a plan submission.



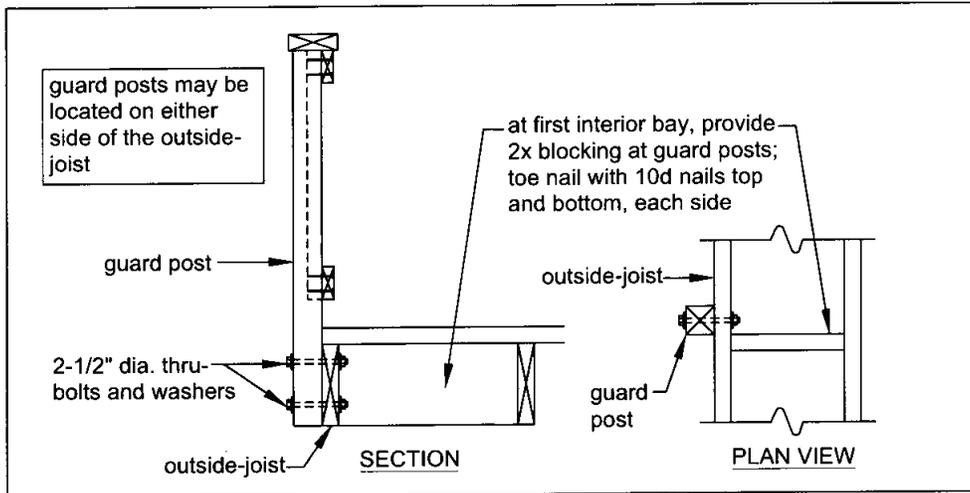
**FIGURE 24: TYPICAL GUARD DETAIL**

Any pre-fabricated wood, plastic, composite or manufactured guard system purchased from a home center store, lumber company or similar will also require a plan submission.

**ONLY THOSE PLASTIC, COMPOSITE OR MANUFACTURED GUARD SYSTEMS LISTED BY AN ACCREDITED TESTING AGENCY ARE APPROVED FOR USE IN THE CITY OF NIXA.**

**GUARD POST ATTACHMENTS**

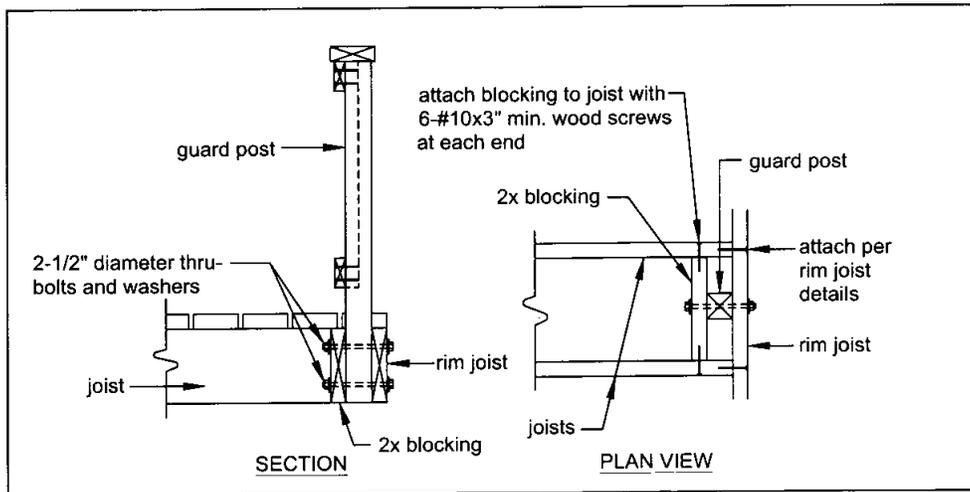
**GUARD POST TO OUTSIDE-JOIST:** Guard posts for guards which run parallel to the deck joists (side of deck) shall be attached to the outside-joist per FIGURE 25.



**FIGURE 25: GUARD POST TO OUTSIDE JOIST DETAIL**

**GUARD POST TO RIM JOIST:** Use one of the options shown in FIGURE 26 through FIGURE 28 to attach a guard post to a rim joist. See FIGURE 10 for rim joist-to-deck joist and decking-to-rim joist attachment requirements.

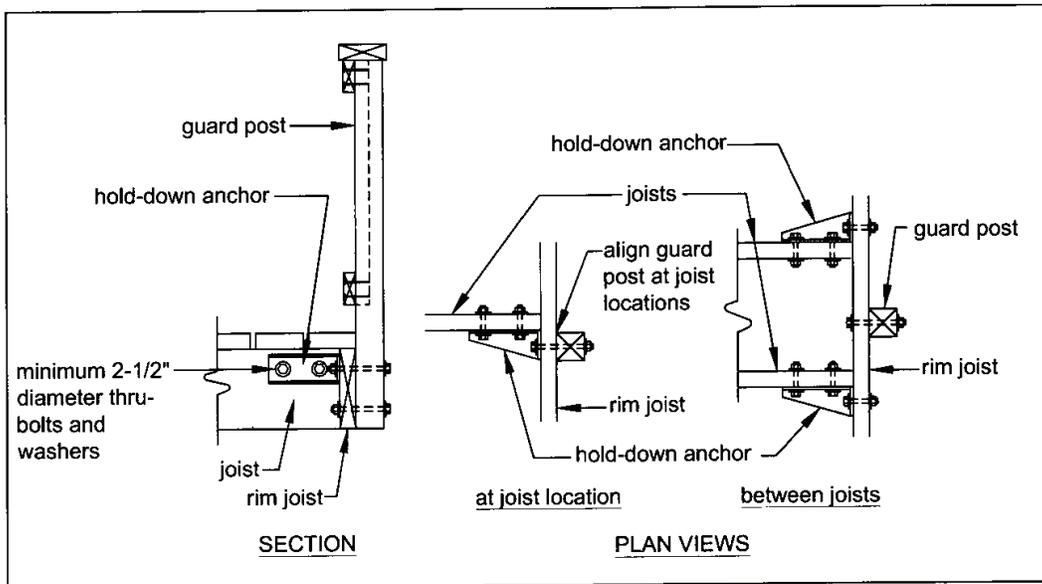
**OPTION 1:** As shown in FIGURE 26, guard posts are attached to the inside face of the rim joists. To attach guard post to the outside of the rim joist, see OPTION 2 or OPTION 3.



**FIGURE 26: GUARD POST TO RIM JOIST DETAIL, OPTION 1**

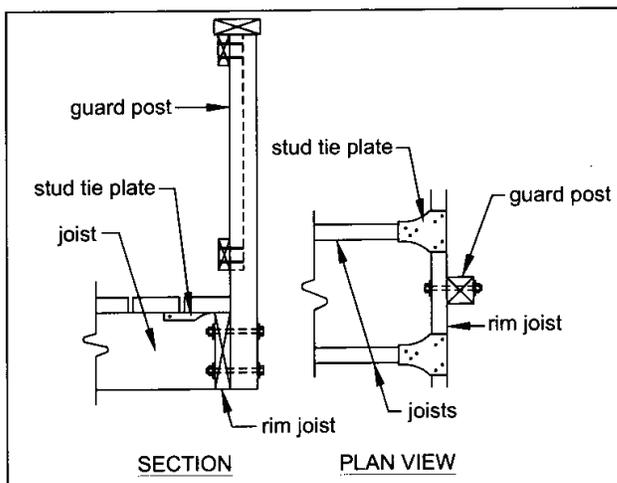
TYPICAL DECK DETAILS

**OPTION 2:** As shown in FIGURE 27, *hold-down anchors* must be installed to attach the rim joist to the deck joists. Hold-down anchors must be galvanized with 1.85 oz/sf of zinc (G-185 coating) or shall be stainless steel. There shall be a minimum of two bolts at the anchors' attachment to the joist. Look for model number HD2A in a Zmax coating from Simpson Strong-Tie, model number HD2A in a Triple Zinc coating from USP, or the hot-dipped galvanized DeckLok by Morse Technologies. Other hold-down anchor models meeting the minimum requirements may also be used.



**FIGURE 27: GUARD POST TO RIM JOIST DETAIL, OPTION 2**

**OPTION 3:** As shown in FIGURE 28, the rim joist must be fastened to deck joists with two 20 gage *stud tie plates* attached per the manufacturer's instructions with hot-dipped galvanized or stainless steel fasteners. Stud tie plates must be galvanized with 1.85 oz/sf of zinc (G-185 coating) or shall be stainless steel. Look for model number SP1 in a Zmax coating from Simpson Strong-Tie or model number SPT22 in a Triple Zinc coating from USP. Other stud tie plate models meeting the minimum requirements may also be used.

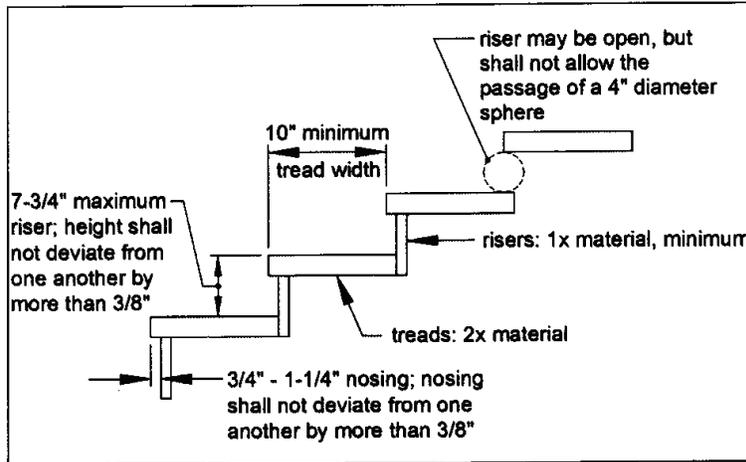


**FIGURE 28: GUARD POST TO RIM JOIST DETAIL, OPTION 3**

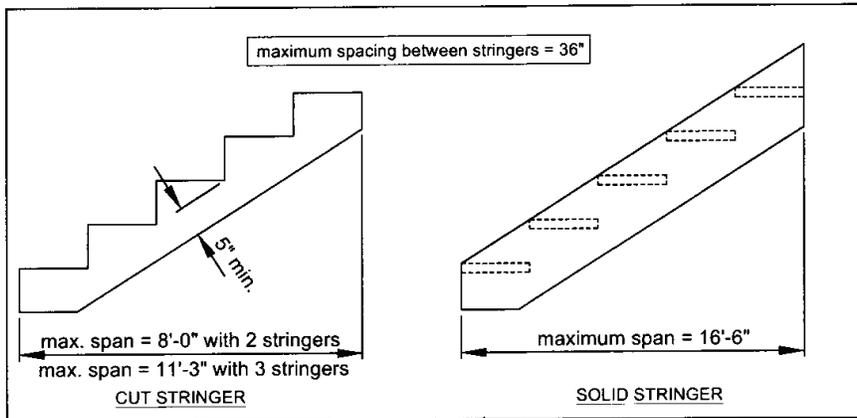
TYPICAL DECK DETAILS

**STAIR REQUIREMENTS**

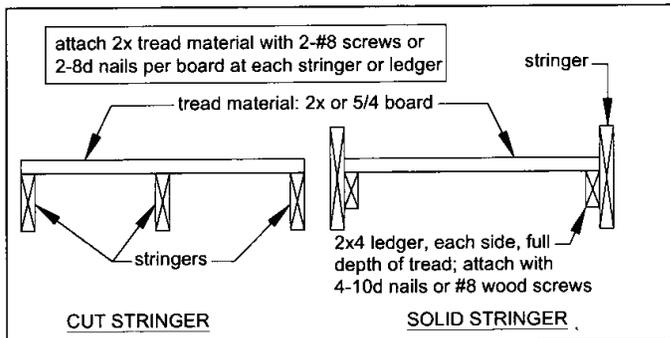
Stairs, stair stringers, and stair guard shall meet the requirements shown in FIGURE 29 through FIGURE 36. All stringers shall be 2x12. Stair stringers shall not span more than the dimensions shown in FIGURE 30. If the stringer span exceeds these dimensions, then an intermediate landing will be required. All intermediate stair landings must be designed and constructed as a free-standing deck using the details in this package.



**FIGURE 29: TREAD AND RISER DETAIL**

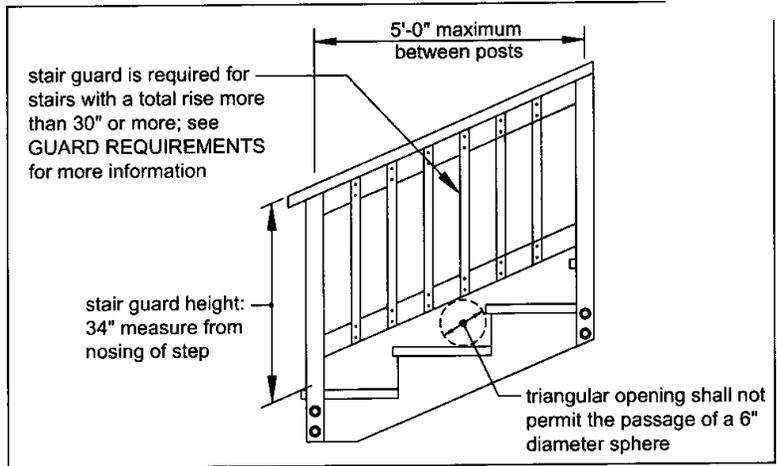


**FIGURE 30: STAIR STRINGER REQUIREMENTS**

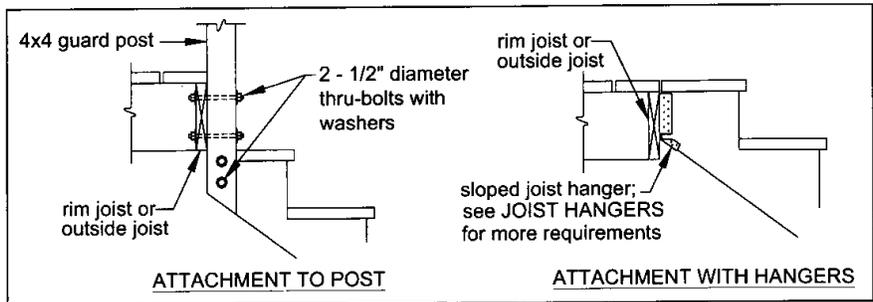


**FIGURE 31: TREAD CONNECTION REQUIREMENTS**

TYPICAL DECK DETAILS



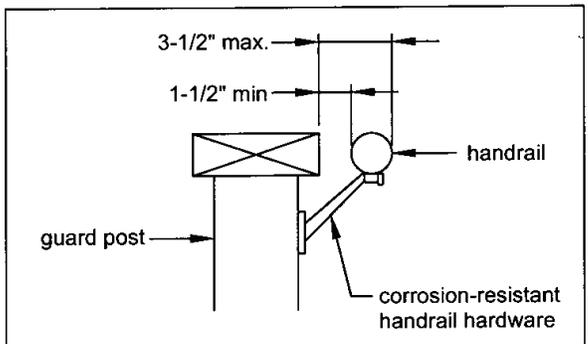
**FIGURE 32: STAIR GUARD REQUIREMENTS**



**FIGURE 33: STAIR STRINGER ATTACHMENT DETAIL**

**STAIR HANDRAIL REQUIREMENTS**

All stairs with 4 or more risers shall have a handrail on one side. See FIGURE 34. Handrails shall be graspable and shall be composed of decay-resistant and/or corrosion resistant material. The hand grip portion, if circular, shall be between 1-1/4" and 2-1/4" in diameter. Shapes other than circular shall have a perimeter dimension between 4" and 6-1/4" with a maximum cross sectional dimension of 2-1/4". All shapes shall have a smooth surface with no sharp corners. Handrails shall run continuously from a point directly over the lowest riser to a point directly over the highest riser and shall return to the guard at each end; see FIGURE 35. Handrails may be interrupted by guard posts only at a turn in the stair.

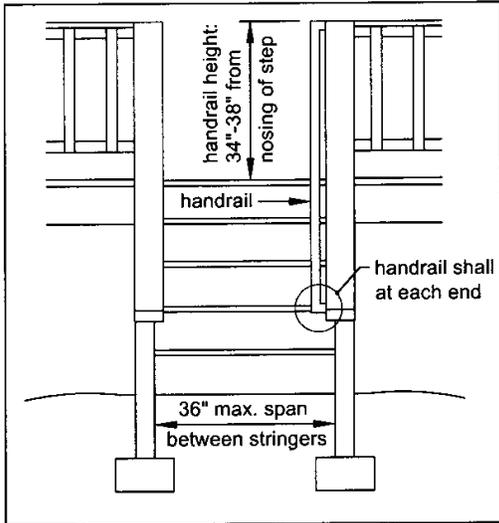


**FIGURE 34: HANDRAIL REQUIREMENTS**

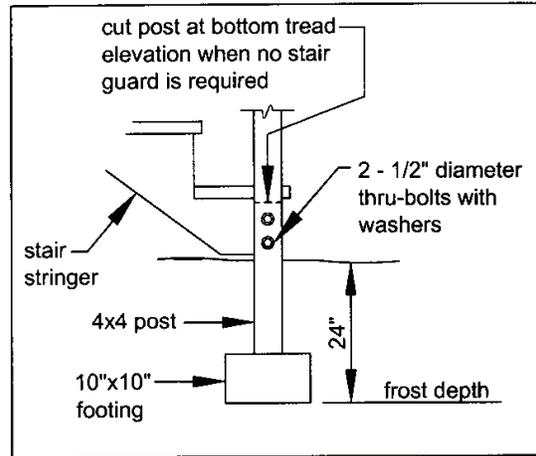
TYPICAL DECK DETAILS

**STAIR FOOTING REQUIREMENTS**

Where the stairway meets grade, attach the stringers to the stair guard posts as shown in FIGURE 36. Posts shall bear on footings below frost depth. Stringers shall not bear on new or existing concrete pads or patios that are not founded below frost depth. When guards are not required, see GUARD REQUIREMENTS on Sheet 12, posts may terminate below the bottom tread elevation.



**FIGURE 35: MISC. STAIR REQUIREMENTS**



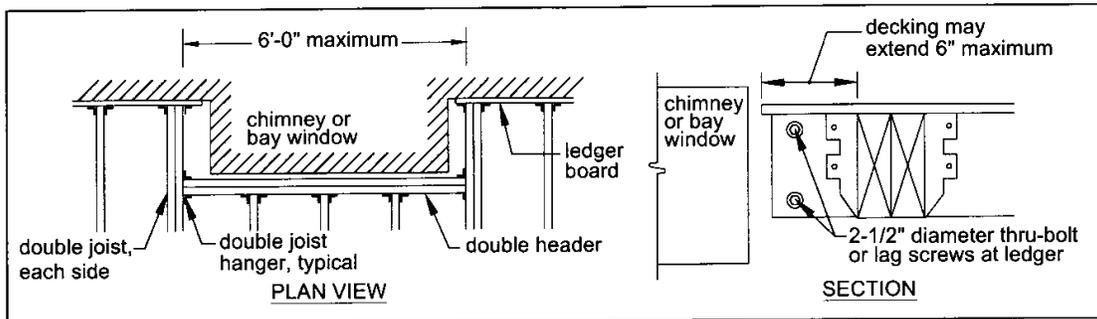
**FIGURE 36: STAIR FOOTING DETAIL**

**STAIR LIGHTING REQUIREMENTS**

Stairways shall have a light source located at the top landing such that all stairs and landings are illuminated. The light switch shall be operated from inside the house. However, motion detected or timed switches are acceptable.

**FRAMING AT CHIMNEY OR BAY WINDOW**

All members at a chimney or bay window shall be framed in accordance with FIGURE 37. Headers may span a maximum of 6'-0". When a chimney or bay window is wider than 6'-0", one or more 6x6 posts may be added to reduce header spans to less than 6'-0". In such cases, the post footing must meet the requirements on Sheet 7. Headers with a span length greater than 6'-0" require a plan submission.



**FIGURE 37: REQUIREMENTS FOR FRAMING AT CHIMNEY OR BAY WINDOW**

## TYPICAL DECK DETAILS

The guidelines on the previous pages are for single-level deck construction. Other deck design or decks supporting additional loads may be subject to an approved engineered design. All exterior decks are considered as permanent structures and required to follow the guidelines as described in this document.

**Exception:** Decks for manufactured housing (mobile homes) are required to be free standing and are subject to approval at the final inspection.

The proposed deck or decks shall be included on the required floor plan when applying for a one or two-family residential building permit. The deck plan shall include the size, location and dimensions.

### DESIGN LOADS:

Decks are required to be designed to support a live load of 40 pounds per square foot. Guardrails are required to be designed to support a load of 200 pounds applied to a concentrated point along the top of the rail.

### DECK MATERIAL:

All lumber shall be #2 grade or better. Decks shall be constructed of either naturally decay-resistant or pressure-treated lumber according to American Wood-Preservers' Association. All lumber in contact with the ground shall be rated as "approved for ground contact". Alternate construction material must have prior approval by the Chief Building Inspector.

### CONNECTORS:

All connectors shall be hot-dipped galvanized or stainless steel. These connectors include bolts, screws, nails, joist hangers, post anchors, flashings and all other connectors.

### FLASHING:

Flashing is required to be placed under the siding or exterior finish system prior to the installation of the ledger board. Flashing is required at any ledger board connection to a wall of wood framed construction. The flashing shall extend over the top of the ledger. Flashing material shall be copper (attached using copper nails), stainless steel, UV resistant plastic or zinc plated (1.85 oz/sf) galvanized steel.