

**THIEF RIVER FALLS**  
**Building Department**  
405 Third Street East, P.O. Box 528, Thief River Falls, MN 56701  
Phone: 218-681-2500 Fax: 218-681-6223

**Residential Decks**  
**1 & 2 Family Dwellings and Townhomes**  
Based on the 2003 Minnesota State Building Code



MR = Minnesota State Building Code extracted from 2003 Minnesota Rules  
IRC = International Residential Code  
NEC = National Electrical Code

**Residential Decks**

**Building Permit Requirements:** Building permits are required for the construction of all decks that are attached to the home. Building permits are also required for freestanding decks that are elevated 30" or more above grade with supporting beams, joists, or posts. Deck construction shall meet the requirements of the 2003 Minnesota State Building Code which adopts and amends the 2000 International Residential Code.

**Zoning Requirements:** Decks are also required to meet the land use and setback requirements of the zoning code. Zoning questions should be directed to the Thief River Falls Community Development Department at 218-681-2500.

**Permit Fees:** The building permit fees are based on the size of the deck and are designed to cover the cost of the plan review and field inspections that will be performed during construction. An estimate of the permit costs (based on the size of the deck) may be obtained by calling the Building Department. The cost of the building permit includes the permit fee, plan review fee, zoning fee and Minnesota surcharge.

**Plan Review & Inspections:** The plan review is done by the plans examiner in order to spot potential problems or pitfalls that may arise prior to construction. Typically the plan review for a residential deck will be done at the counter during normal work hours. Construction inspections will be done during the project to ensure code compliance and that the materials used are installed correctly. The plan review and inspections are not designed to be a guarantee of the work but they are done to provide a reasonable degree of review and observation so the project will be successful, safe and long lasting.

**Submittals for permit:** The following information is necessary for the Building Department to do a proper plan review and to help the project go as smoothly as possible. **Note: Sample plans provided with this information are intended as a guide only.**

- A completed building permit application form.
- Two copies of the site plan. The site plan should indicate the existing structure, proposed deck location and lot dimensions (see sample site plan on [exhibit 4](#)). A copy of the existing site plan may be obtained from the Building Department if one is on file.

- Two copies of the construction plans showing the proposed design and materials. Plans shall be drawn to scale and indicate the following information:

A. A floor plan including the following: (see sample plan [exhibit 5](#))

1. Proposed deck size with dimensions. (see sample plan [exhibit 5](#))
2. Size and spacing of floor joists. (see [exhibit 9](#))
3. Size and type of decking material.
4. Size, location and spacing of posts including post connection to footing (see sample plan [exhibit 5](#))
5. Size of beams (see [exhibit 10](#)). Also indicate post/beam connection (see beam connection details [exhibit 6](#))
6. Species and grade of lumber to be used and proper connectors to be used.

B. Elevations indicating the following: (see sample elevation [exhibit 6](#))

1. Height of structure from established grade.
2. Diameter and depth of footings.
3. Guard height and spacing of intermediates (see [exhibits 6 & 7](#))
4. Stairway rise/run and handrail requirements (see [exhibits 7 & 8](#))
5. Clearance to overhead wires, if applicable. (see [exhibit 6](#))

**Land-use Requirements:** Contact the Thief River Falls Community Development Department at 218-681-2500 for setback requirements and other zoning requirements.

**Building Code Requirements:**

- Footings shall be designed and constructed below frost depth. A 60" minimum ground cover is required from bottom of footing to grade. (see [exhibits 5 & 6](#)) MR 1303.1600 **Call Gopher One at least 2 full days before you dig at 1-800-252-1166 or send an email to <http://www.gopherstateonecall.org>.**
- Decks exposed to the weather must be constructed with wood of natural resistance to decay or treated wood. This includes horizontal members such as beams, joists, ledger boards and decking; and vertical members such as posts, poles, guards, handrails and columns. Other man made products are subject to approval by the Building Department before use. MR 1303.2000
- Columns and posts supporting decks exposed to the weather or water splash must be supported and connected to concrete piers or metal pedestals. Columns and posts in contact with the ground or embedded in concrete must be of pressure treated wood approved for ground contact. IRC R323.1.3
- Decks shall be designed and constructed to support a minimum live load of 40 pounds per square foot. The dead load is assumed to be a minimum of 10 pounds per square foot for a total design load of 50 pounds per square foot. IRC R301.4 & R502.3.1(2) Additional loads shall be considered if a spa is to be placed on the deck.
- Ledger boards shall be bolted or lagged to the existing building framing with a minimum of two 3/8" x 5" lag screws or bolts at 16" on center. All connections between the deck and dwelling must be flashed with corrosion-resistive flashing. (see [exhibit 5](#)) IRC R502.2. Solid blocking must be provided for the attachment of the deck ledger board. IRC R602.3
- Fasteners and hangers to be hot dipped galvanized steel, stainless steel or copper. Due to new treating processes additional requirements may apply. (check with lumber supplier)
- Joists shall not overhang beams by more than 2'-0", nor should beams overhang posts by more than 1'-0" at each end. IRC 502.2
- Floor joists and stair stringers spaced at 24" inches on center require a minimum 2" nominal decking. For floor joists and stair stringers spaced at 16" inches on center, 1" decking or 5/4" decking may be used. However, 16" joist spacing cannot be used if 1" or 5/4" decking is placed diagonally. IRC R502.2
- All decks, balconies or porches which are more than 30" above grade or a floor below must be protected by a guard a minimum of 36" above the finished deck surface. Guards and stair railings shall have horizontal, vertical, diagonal or other ornamental intermediate rails through which a sphere 4" in diameter cannot pass through. (see [exhibits 6 & 7](#)) IRC R316
- The electrical code requires overhead power lines to be located a minimum of 10'-0" above decks and platforms. Existing lines may need to be raised if a new deck is to be installed beneath them. Contact Thief River Falls Electrical Department at 218-681-5816 with any questions regarding relocation of power lines. (see [exhibit 6](#)) NEC

- Decks built to support a future porch should be constructed so that all potential imposed loads are taken into consideration; full porch plans should be submitted for future reference.
- If the deck will encroach on public utilities call the following for regulations on clear space requirements.

Water - City of TRF      218 681-3809  
 Wastewater - City of TRF 218 681-4425  
 Electric - City of TRF    218 681-5816  
 Gas - Aquila                218 681-3226

**Required Inspections:**

Every effort is made to perform all inspections the next business day following the request. Inspection requests must be received prior to 4:30 pm if the request is for next day service. Call Thief River Falls Community Development Department at 218-681-2500 to schedule an inspection. Please have your permit number and address available when you call. Inspector work schedules fill up fast at certain times of the year, so if you can call more than a day in advance, you may avoid any potential delays in the progress of your project.

- Footings: To be made after the holes are dug to required depth and size, but **prior to pouring of the concrete!!**
- Final: To be made upon completion of the deck and finish grading.
- Other Inspections: In addition to the above inspections, the inspector may require other inspections to ensure compliance with the code.

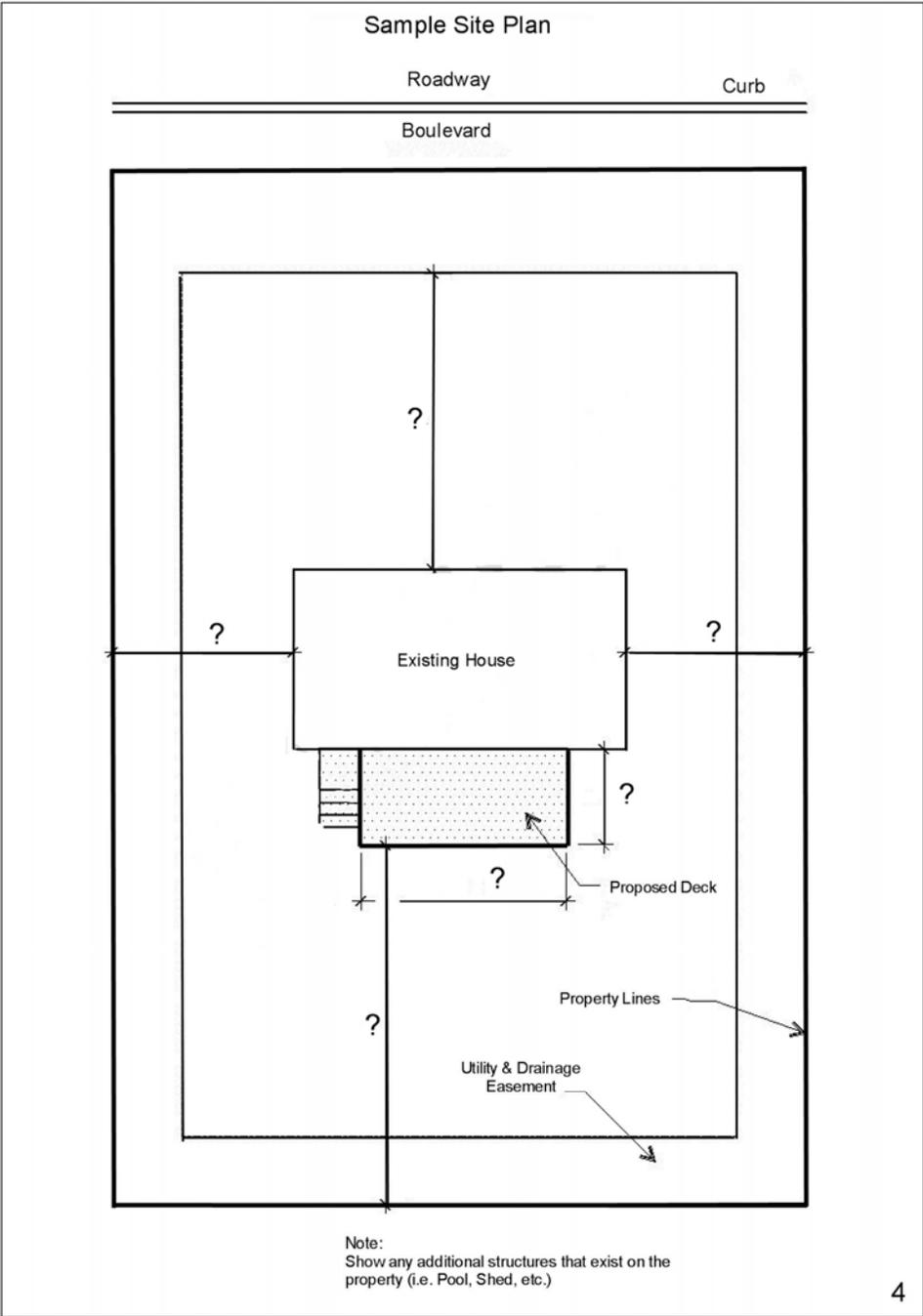
**General Notes**

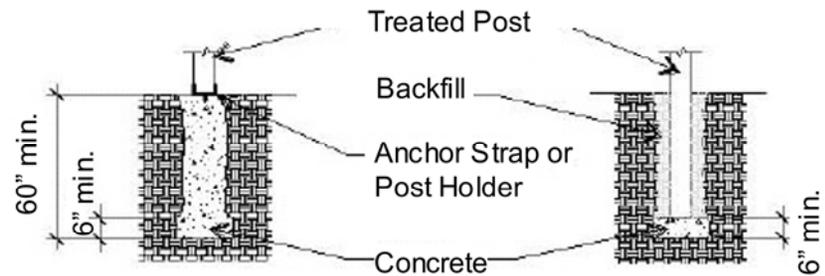
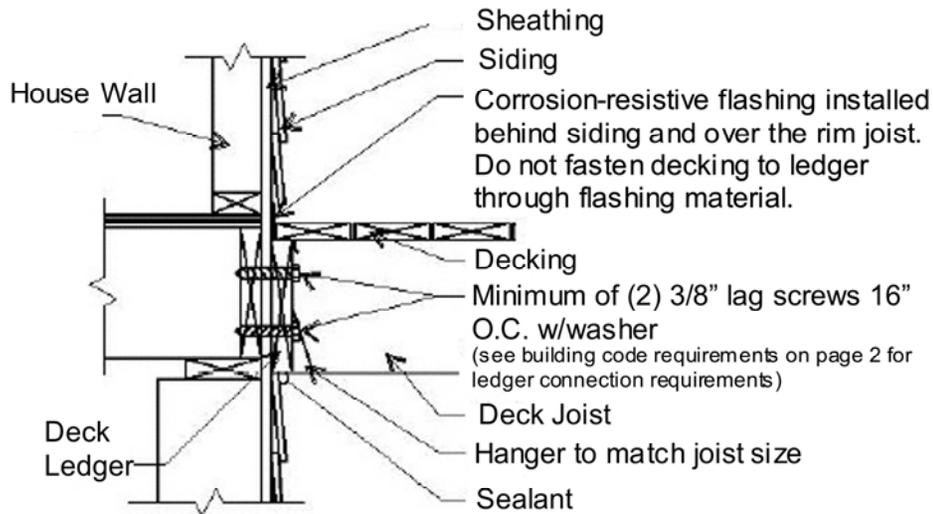
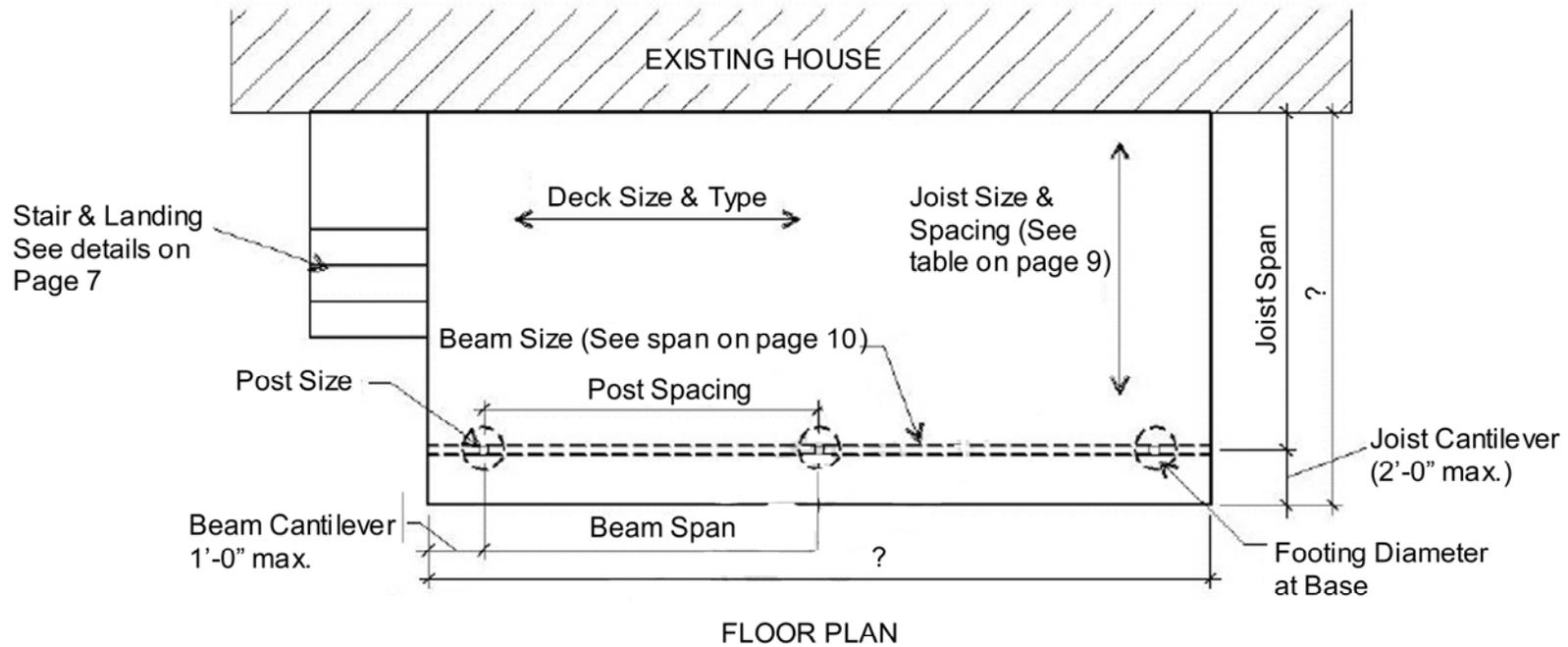
The approved set of plans, survey & inspection card shall be kept on the job site until the final inspection has been made and approved.

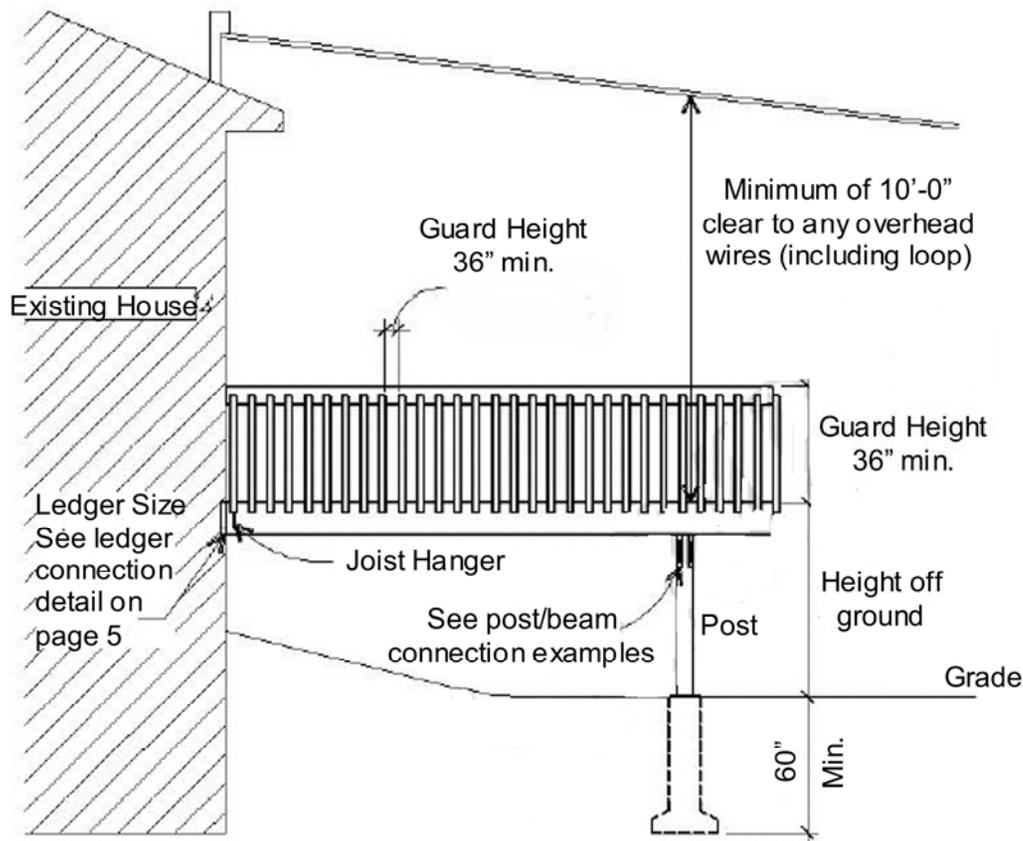
Any contractor used must be licensed by the State of Minnesota, or have a Certificate of Exemption from the State of Minnesota.

Call Gopher One at least 2 full days before you dig at 1-800-252-1166 or send an email to <http://www.gopherstateonecall.org>

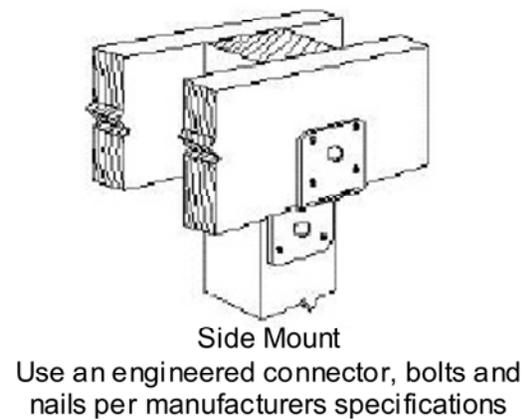
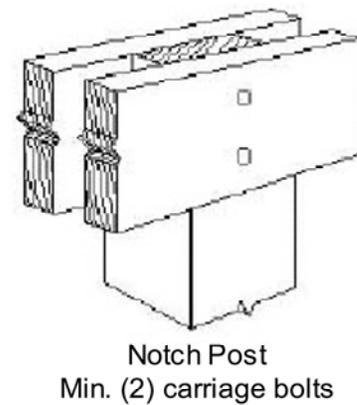
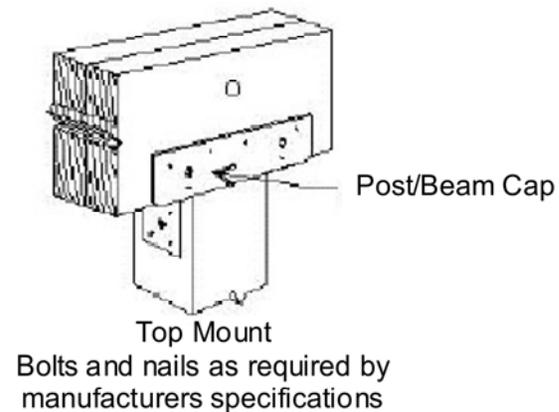
Exhibit 4	Sample Site Plan
Exhibit 5	Ledger Connection Detail, Footing Examples, Floor Plan
Exhibit 6	Post Beam Connection, Side Elevation
Exhibit 7	Stair and Landing Requirements
Exhibit 8	Acceptable Handrail Examples
Exhibit 9	Joist Span Table
Exhibit 10	Beam Size Table





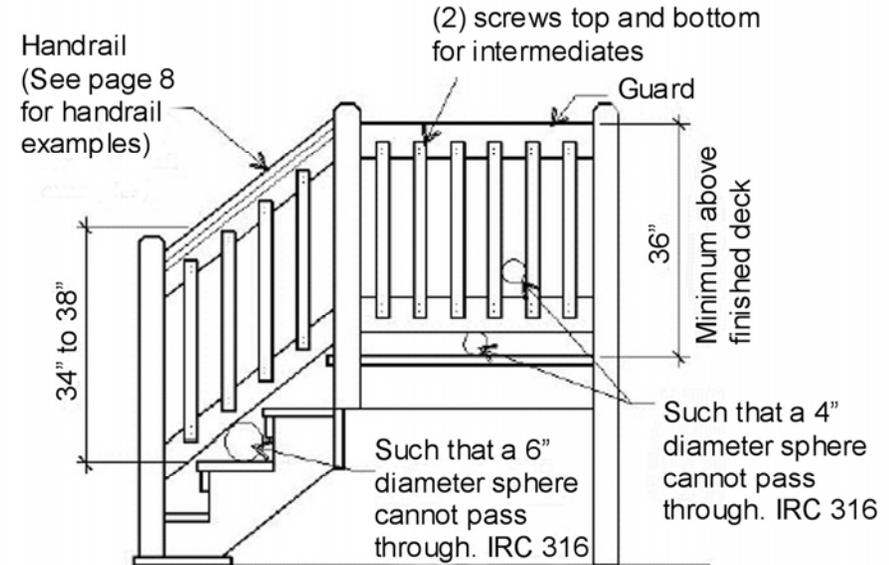
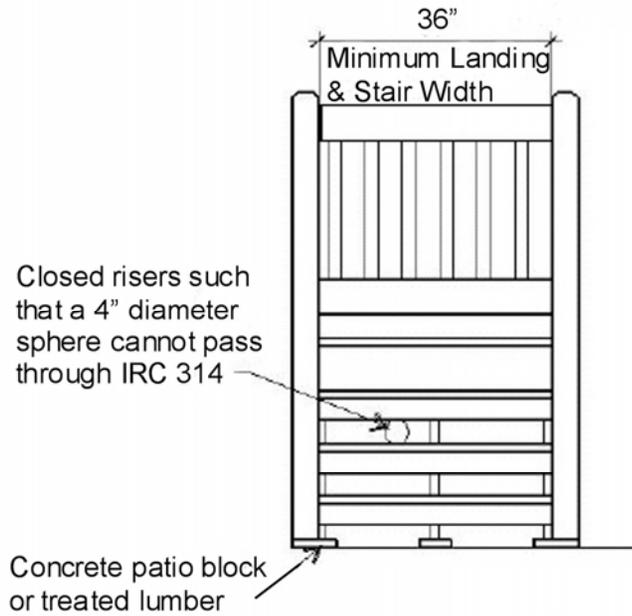


SIDE ELEVATION



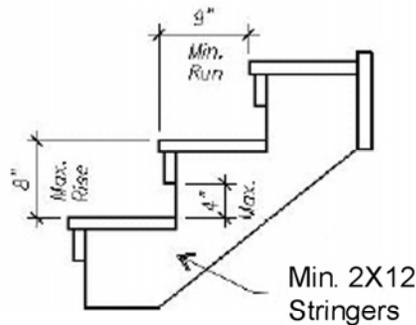
POST BEAM CONNECTIONS

# Stair and Landing Requirements

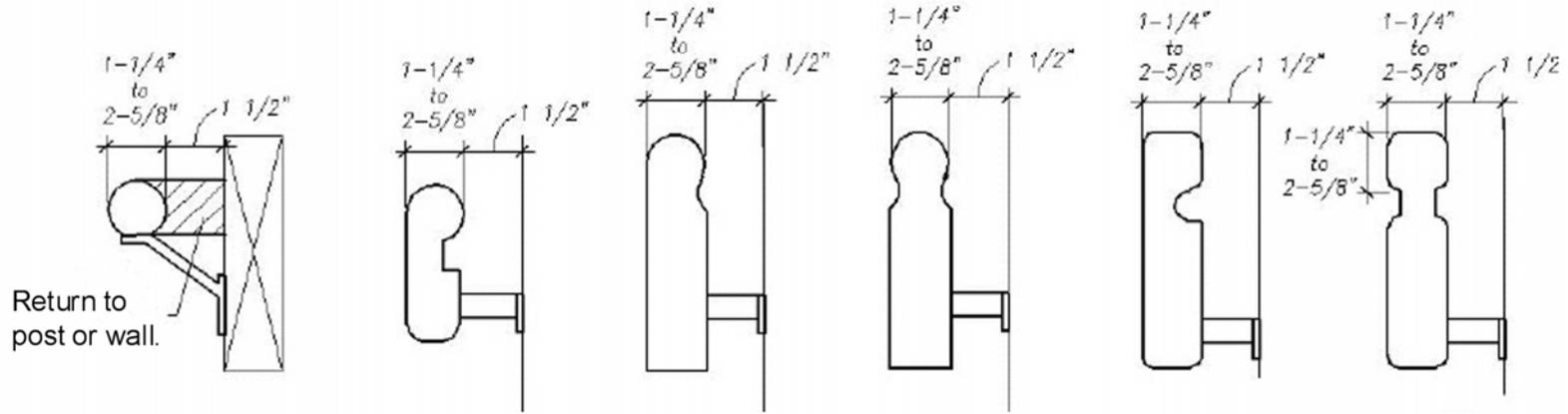


## General Building Code Requirements

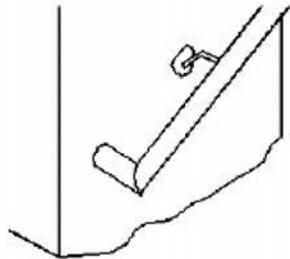
1. Stairways shall be supported on concrete or treated lumber footings.
2. Stairways to have a minimum width of 36" with a max. rise of 8" and a min. run of 9". The greatest riser height or tread depth in a flight of stairs shall not exceed the smallest by more than 3/8". IRC R314
3. A stairway with 4 or more risers shall have a handrail 34" to 38" above the nose of the tread to the top of the handrail. IRC R315
4. The handrail shall be continuous the full length of the stairway and shall terminate at a newel post or safety terminal. IRC R315
5. A minimum 36" X 36" landing is required at the top of stairs. A landing or flat ground may be used at the bottom of stairs. IRC R312
6. The triangle area between the stair riser and tread at the bottom of the guard must be such that a sphere 6" in diameter cannot pass through. IRC R316
7. All decks, balconies, or porches which are more than 30" above grade or a floor below must be protected by a guard a minimum of 36" above the finished surface. Guards and stair railings shall have horizontal, vertical, or diagonal intermediate rails through which a sphere 4" in diameter cannot pass through. IRC R316



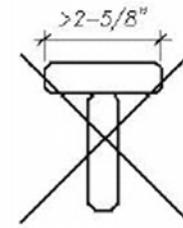
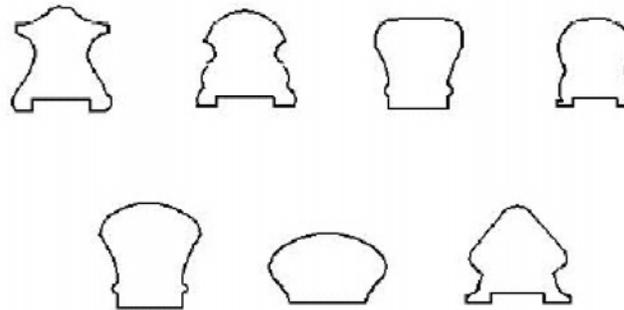
Acceptable Handrail Examples



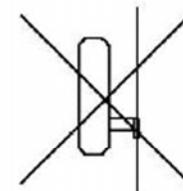
Return to post or wall.



Handrail returned to newel post or wall.



Not Acceptable



Not Acceptable

IRC R315.2: Handrail Grip Size

The handgrip portion of handrails shall have a circular cross section of  $1-1/4"$  minimum to  $2-5/8"$  maximum. Other handrail shapes that provide an equivalent grasping surface are permissible. Edges shall have a minimum radius of  $1/8"$ .

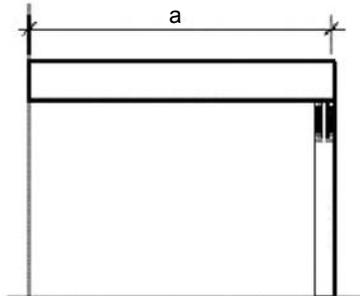
## Joist Span Table

Based on No. 2 or better wood grades.  
 (Design load = 40#LL = 10#DL Deflection = 1/360)

	Ponderosa Pine			Southern Pine		
	12" O.C.	16" O.C.	24" O.C.	12" O.C.	16" O.C.	24" O.C.
2X6	9'-2"	8'-4"	7'-10"	10'-4"	9'-5"	7'-10"
2X8	12'-1"	11'-0"	9'-0"	13'-8"	12'-5"	10'-2"
2X10	16'-5"	13'-6"	11'-0"	17'-5"	16'-10"	13'-1"
2X12	18'-1"	15'-8"	12'-10"	21'-2"	10'-10"	15'-5"

Joists shall be supported laterally at the ends by full depth solid blocking not less than 2" nominal thickness. IRG R502.7

### Samples Calculations for Using Joist Span and Beam Size Tables



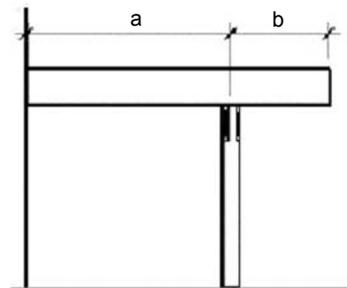
Refer to tables for joist and beam requirements.

Example  $a=12'$  Post Spacing  $=8'$

Use the Joist Span Table to find the acceptable joist sizes for a 12' span. 2X8's at 12" O.C., 2X10's at 16" O.C. or 2X12's at 24" O.C.

Use the Beam Table (see Exhibit 10) to find the 8' post spacing column.

With a 12' deck span, the beam may be either two 2X8's or two 2X10's, depending on the wood used.



Example  $a=8'$ ,  $b=2'$ , Post Spacing  $=10'$

Use "a" to determine joist size and "a+b" to determine beam size. The length of "b" is restricted by both the length of "a" and the size of the joists.

Refer to the Joist Span Table. For an 8' joist span, either 2X8's at 24" O.C. or 2X6's at 16" O.C. are acceptable.

For sizing the beam, use a joist length of 10' ( $8'+2'$ ) and a post spacing of 10'. The beam table indicates that the beam may be either two 2X10's or two 2X12's, depending on the wood used.

## Beam Size Table

Based on No. 2 or better Ponderosa Pine and Southern Pine  
Treated for weather and/or ground exposure

			POST SPACING										
			4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'
JOIST LENGTH	6'	Southern Pine	1-2x6	1-2x6	1-2x6	2-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x10
		Ponderosa Pine	1-2x6	1-2x6	1-2x8	2-2x8	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12	3-2x10
	7'	Southern Pine	1-2x6	1-2x6	1-2x6	2-2x6	2-2x6	2-2x6	2-2x8	2-2x10	2-2x10	2-2x10	2-2x12
		Ponderosa Pine	1-2x6	1-2x6	1-2x8	2-2x8	2-2x8	2-2x10	2-2x10	2-2x10	2-2x12	3-2x10	3-2x10
	8'	Southern Pine	1-2x6	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12
		Ponderosa Pine	1-2x6	2-2x6	2-2x8	2-2x8	2-2x8	2-2x10	2-2x10	2-2x10	3-2x10	3-2x10	3-2x12
	9'	Southern Pine	1-2x6	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12	3-2x10
		Ponderosa Pine	1-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x10	3-2x10	2-2x12	3-2x12	3-2x12
	10'	Southern Pine	1-2x6	2-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	2-2x12	3-2x10	3-2x10
		Ponderosa Pine	1-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	3-2x10	3-2x12	3-2x12	ENG BM
	11'	Southern Pine	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12	3-2x10	3-2x12
		Ponderosa Pine	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	2-2x12	3-2x10	3-2x12	3-2x12	ENG BM
	12'	Southern Pine	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12	2-2x12	3-2x12
		Ponderosa Pine	2-2x6	2-2x6	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12	3-2x12	3-2x12	ENG BM	ENG BM
	13'	Southern Pine	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	2-2x12	3-2x12	3-2x12	3-2x12
		Ponderosa Pine	2-2x6	2-2x6	2-2x8	2-2x10	2-2x10	2-2x12	3-2x12	3-2x12	ENG BM	ENG BM	ENG BM
	14'	Southern Pine	1-2x6	2-2x6	2-2x6	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12	3-2x12	3-2x12	3-2x12
		Ponderosa Pine	2-2x6	2-2x6	2-2x8	2-2x10	2-2x12	3-2x10	3-2x12	3-2x12	ENG BM	ENG BM	ENG BM
	15'	Southern Pine	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	2-2x12	3-2x10	3-2x12	3-2x12	ENG BM
		Ponderosa Pine	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	3-2x10	3-2x12	3-2x10	ENG BM	ENG BM	ENG BM
	16'	Southern Pine	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	2-2x12	3-2x10	3-2x12	3-2x12	ENG BM
		Ponderosa Pine	2-2x6	2-2x8	2-2x10	2-2x10	3-2x10	3-2x10	3-2x12	3-2x12	ENG BM	ENG BM	ENG BM

14"

16"

18"

20"

22"

XX" = Required footing diameter at the base of center columns

Note:

Joist length is the total length of the joist including any cantilevers.