



# CITY OF MACEDONIA

## Building Department

9691 Valley View Road

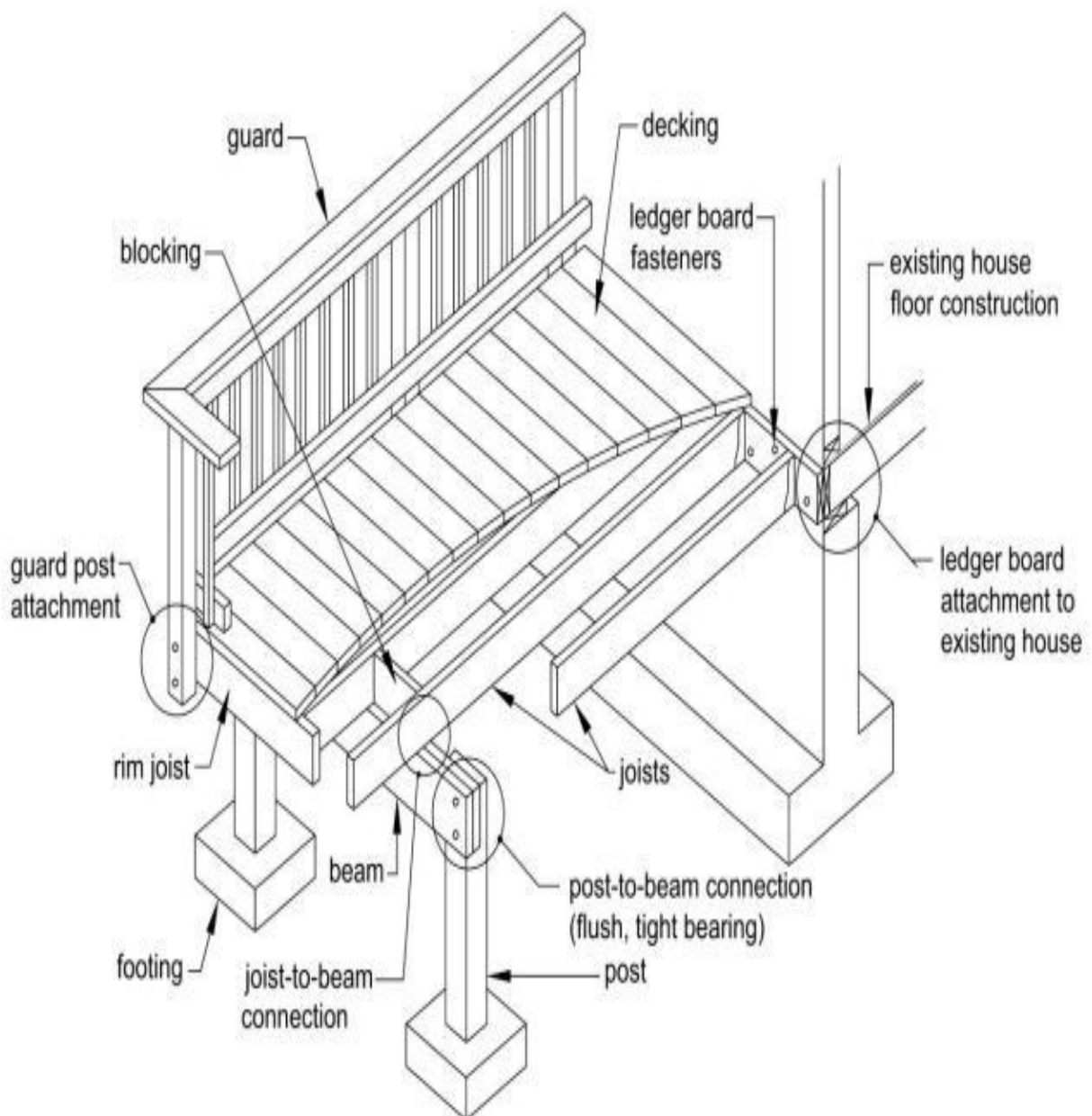
(330) 468-8360



# Residential Wood Deck Construction Guide

# DECK ANATOMY

Decks come in all shapes and sizes, but most are made from the same basic components. Before you can design a deck, you need to know the way a deck fits together and the names of all deck parts. This knowledge will also help you to communicate more clearly with building supply stores, so that you can order exactly what you need.



# GUIDE TO DECK PERMITS

## APPLICATION REQUIREMENTS

Completion of a Residential Zoning Certificate Application form.

## PLAN REQUIREMENTS

**Post Hole Layout** – The post layout shall include dimensions between each post hole and the distance between post holes and the existing dwelling.

**Post Hole Section** – The post hole shall be a minimum of 36 inches deep and be sized according to Table 507.3.1 of the 2019 Residential Code of Ohio. The post shall bear on top of a minimum of 6 inches of concrete; the remaining portion of the post hole may be filled with gravel or dirt. If the applicant desires, they may fill the entire post hole with concrete, however the post shall bear on top of the concrete in an approved anchoring device/bracket. See Figure 507.3.

**Framing Plan** – The framing plan shall include: ledger size; bolting type and method; floor joist size; span; spacing; beam size and attachment method to posts; and overall deck dimensions.

**Framing Sections** – The framing sections shall include connections of the beams to the posts. Figures 507.5.1(1) and 507.5.1(2) show a typical beam connection to a post. If the applicant intends on supporting one end of the floor joists using the existing dwelling, then refer to Figures 507.9.1.3(1) and 507.9.1.3(2) showing a typical ledger board section with anchorage requirements.

**Deck Elevation and Guards** – The deck elevation shall show the height of the deck floor surface from the adjacent grade. If the deck is 30 inches or greater from the adjacent grade, a guardrail system shall be shown on the plans (see Figure 24a Guard Detail). Guardrails shall be 36 inches high and shall have balusters, a cable system, or horizontal rails that will not allow the passage of a 4 inch sphere.

**Stair Details** – See Figure 24b Stair Guard Detail and Figure 24c Stair Detail. Stair risers shall have riser heights that do not exceed  $8 \frac{1}{4}$  inches. Additionally, riser heights on stairs shall not vary more than  $\frac{3}{8}$  of an inch in a stair run. Stair treads shall be a minimum of 9 inches. Note: four or more risers will require a continuous graspable handrail with the ends returned to the posts, and mounted between 34 and 38 inches above the stair nosing, and a graspable width of  $1 \frac{1}{4}$  inch minimum to  $2 \frac{3}{4}$  inch maximum (2019 Residential Code of Ohio Sections 311.7.8). Plans shall show the stair stringer attachment and support at the deck, and support at grade level; also, must list stringer lumber size.

## INSPECTIONS

**Footing** – After post holes are at frost depth. Prior to placement of concrete and the start of the framing.

**Framing** – After the installation of all structural framing (Post, beams, ledger, floor joists).

**Final Inspection** – After the completion of the project. (stairs, handrails, guardrails, decking boards, etc..)

# DECK FOOTINGS

The minimum size of concrete footings shall be in accordance with the Residential Code of Ohio Table 507.3.1, based on the tributary area and load bearing value of soils (assumed 2000 psf). Minimum post hole depth is 36 inches.

**TABLE R507.3.1**  
**Minimum Footing Sizes for Decks**

LIVE OR GROUND SNOW LOAD <sup>b</sup> (psf)	TRIBU-TARY AREA (sq. ft.)	LOAD BEARING VALUE OF SOILS <sup>a, c, d</sup> (psf)													
		1500 <sup>e</sup>			2000 <sup>e</sup>			2500 <sup>e</sup>			≥ 3000 <sup>e</sup>				
		Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)	Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)	Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)	Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)		
40	20	12	14	6	12	14	6	12	14	6	12	14	6		
	40	14	16	6	12	14	6	12	14	6	12	14	6		
	60	17	19	6	15	17	6	13	15	6	12	14	6		
	80	20	22	7	17	19	6	15	17	6	14	16	6		
	100	22	25	8	19	21	6	17	19	6	15	17	6		
	120	24	27	9	21	23	7	19	21	6	17	19	6		
	140	26	29	10	22	25	8	20	23	7	18	21	6		
	160	28	31	11	24	27	9	21	24	8	20	22	7		

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m<sup>2</sup>, 1 pound per square foot = 0.0479 kPa.

- a. Interpolation permitted, extrapolation not permitted.
- b. Based on highest load case: Dead + Live or Dead + Snow.
- c. Assumes minimum square footing to be 12 inches x 12 inches x 6 inches for 6 x 6 post.
- d. If the support is a brick or CMU pier, the footing shall have a minimum 2-inch projection on all sides.
- e. Area, in square feet, of deck surface supported by post and footings.



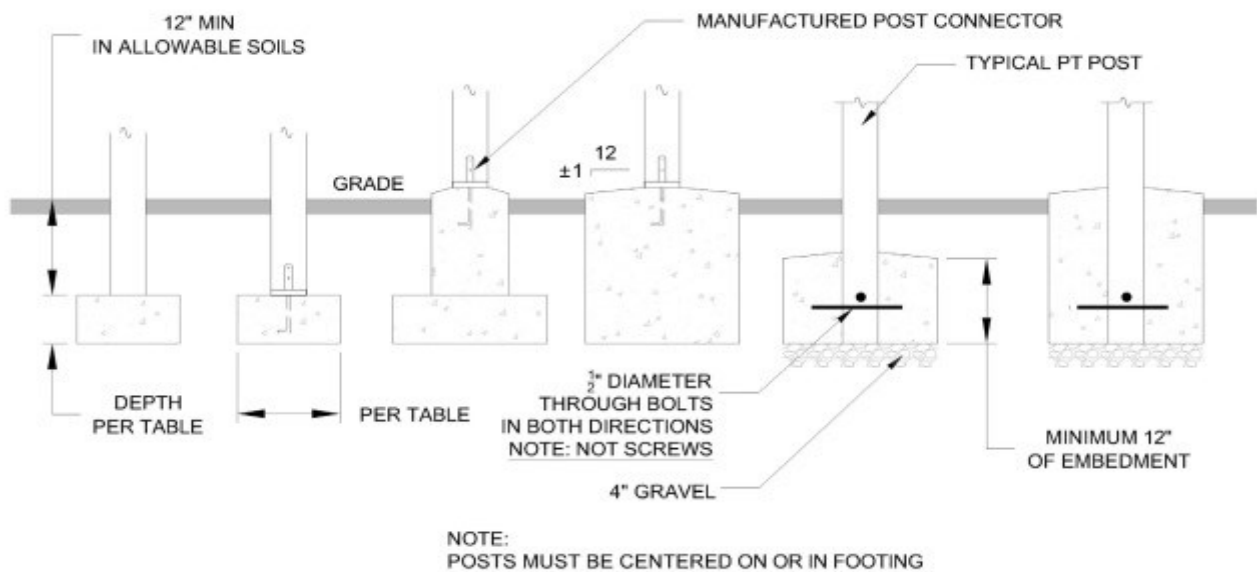
# DECK POSTS and CONNECTIONS

**Table 507.4**  
**Deck Post Height**

DECK POST SIZE	MAXIMUM HEIGHT <sup>a, b</sup>
4 x 4	6-9 <sup>c</sup>
4 x 6	8
6 x 6	14
8 x 8	14

- A. Measured to the underside of the beam.
- B. Based on 40 psf live load.
- C. The maximum permitted height is 8 feet for one-ply and two-ply beams.  
The maximum permitted height for three-ply beams on post cap is 6 feet 9 inches.

**Table 507.3**  
**Deck Post to Deck Footing Connection**



# JOIST and BEAM SPANS

Figure R507.6

## Maximum Allowable Spans

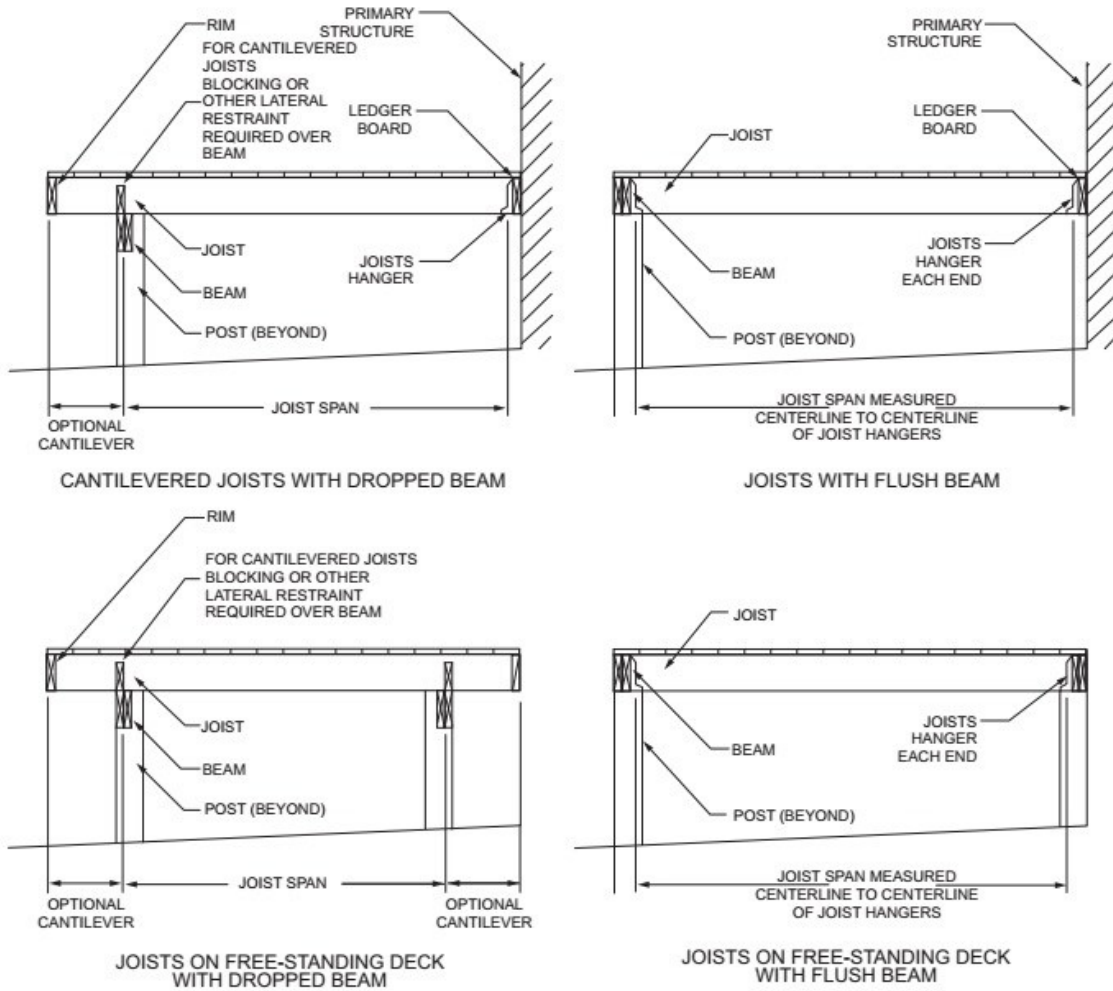
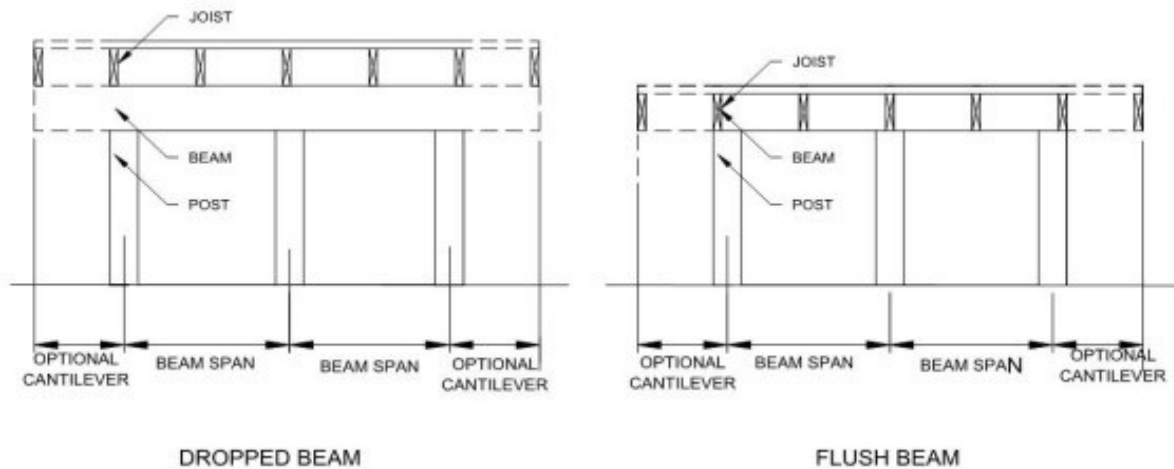


Table R507.6

## Deck Joist Spans for Southern Pine (ft.—in.)

SPECIES <sup>a</sup>	SIZE	ALLOWABLE JOIST SPAN <sup>b</sup>			MAXIMUM CANTILEVER <sup>c, f</sup>		
		SPACING OF DECK JOISTS (inches)			SPACING OF DECK JOISTS WITH CANTILEVERS <sup>c</sup> (inches)		
		12	16	24	12	16	24
Southern Pine	2 x 6	9-11	9-0	7-7	1-3	1-4	1-6
	2 x 8	13-1	11-10	9-8	2-1	2-3	2-5
	2 x 10	16-2	14-0	11-5	3-4	3-6	2-10
	2 x 12	18-0	16-6	13-6	4-6	4-2	3-4

**Figure R507.5**  
**Typical Deck Joist Spans**



**Table R507.5**  
**Deck Beam Span Lengths<sup>a, b, g</sup> (feet-inches)**

Species <sup>c</sup>	Size <sup>d</sup>	Deck Joist Span Less Than or Equal To:						
		(feet)						
		6	8	10	12	14	16	18
Southern Pine	1 - 2 x 6	4-11	4-0	3-7	3-3	3-0	2-10	2-8
	1 - 2 x 8	5-11	5-1	4-7	4-2	2-10	3-7	3-5
	1 - 2 x 10	7-0	6-0	5-5	4-11	4-7	4-3	4-0
	1 - 2 x 12	8-3	7-1	6-4	5-10	5-5	5-0	4-9
	2 - 2 x 6	6-11	5-11	5-4	4-10	4-6	4-3	4-0
	2 - 2 x 8	8-9	7-7	6-9	6-2	5-9	5-4	5-0
	2 - 2 x 10	10-4	9-0	8-0	7-4	6-9	6-4	6-0
	2 - 2 x 12	12-2	10-7	9-5	8-7	8-0	7-6	7-0
	3 - 2 x 6	8-2	7-5	6-8	6-1	5-8	5-3	5-0
	3 - 2 x 8	10-10	9-6	8-6	7-9	7-2	6-8	6-4
	3 - 2 x 10	13-0	11-3	10-0	9-2	8-6	7-11	7-6
	3 - 2 x 12	15-3	13-3	11-10	10-9	10-0	9-4	8-10

- Ground snow load, live load = 40 psf, dead load = 10 psf,  $L/\Delta = 360$  at main span,  $L/\Delta = 180$  at cantilever with a 220-pound point load applied at the end.
- Beams supporting deck joists from one side only.
- No. 2 grade, wet service factor.
- Beam depth shall be greater than or equal to depth of joists with a flush beam condition.
- Includes incising factor.
- Northern species. Incising factor not included.
- Beam cantilevers are limited to the adjacent beam's span divided by 4.

# CONNECTIONS

FIGURE 507.5.1(1)

## Deck Beam to Deck Post

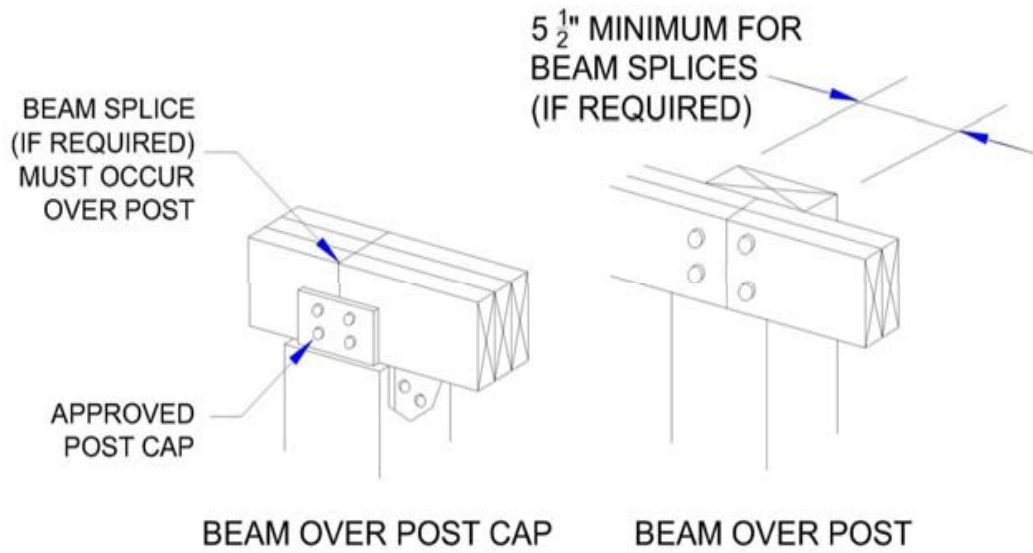
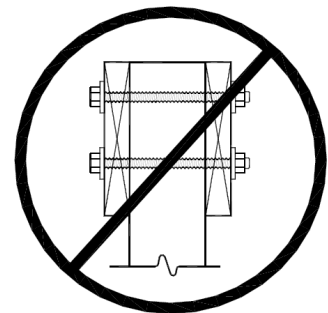
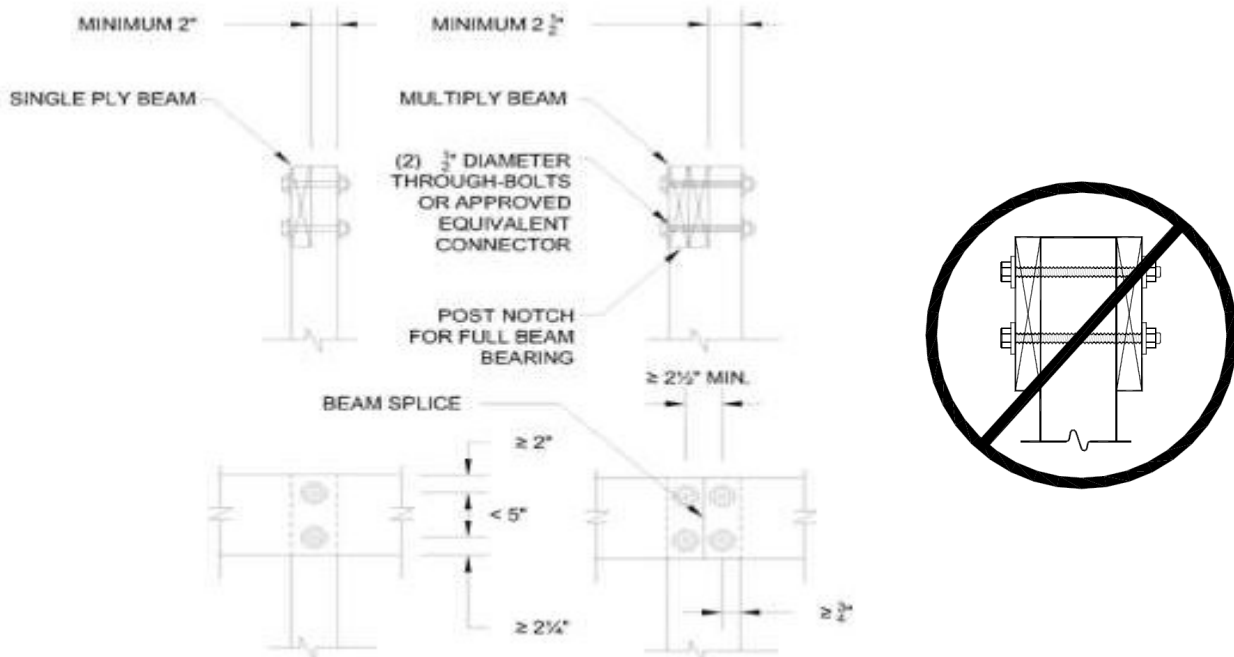


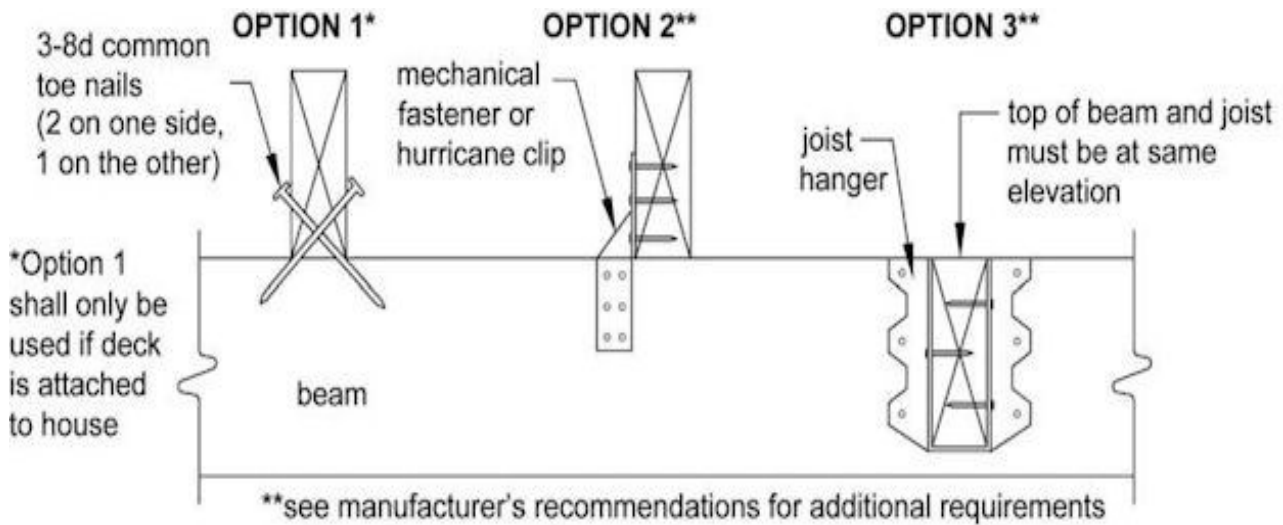
FIGURE 507.5.1(2)

## Notched Post-to-Beam Connection





**FIGURE 6**  
**Joist to Beam**



**TABLE 507.9.1.3(1)**  
**Deck Ledger Connection to Band Joist<sup>a, b</sup>**

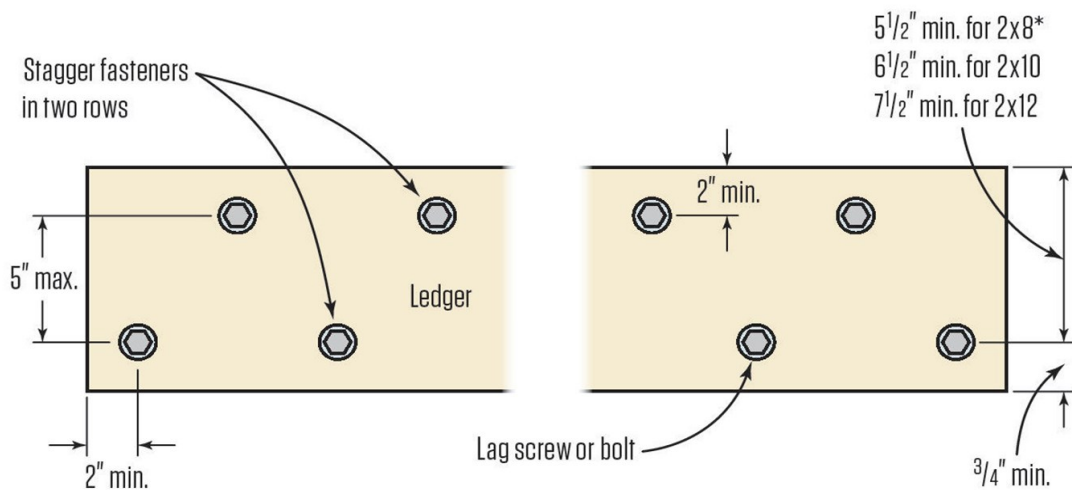
Connection Details	Joist Span						
	6' and less	6'1" to 8'	8'1" to 10'	10'1" to 12'	12'1" to 14'	14'1" to 16'	16'1" to 18'
	On-Center Spacing of Fasteners						
1/2-inch diameter lag screw with 1/2-inch maximum sheathing	30	23	18	15	13	11	10
1/2-inch diameter bolt with 1/2-inch maximum sheathing	36	36	34	29	24	21	19
1/2-inch diameter bolt with 1-inch maximum sheathing	36	36	29	24	21	18	16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

- Ledgers shall be flashed in accordance with Section R703.4 to prevent water from contacting the house band joist.
- Snow load shall not be assumed to act concurrently with live load.
- The tip of the lag screw shall fully extend beyond the inside face of the band joist.
- Sheathing shall be wood structural panel or solid sawn lumber.
- Sheathing shall be permitted to be wood structural panel, gypsum board, fiberboard, lumber or foam sheathing. Up to 1/2-inch thickness of stacked washers shall be permitted to substitute for up to 1/2 inch of allowable sheathing thickness where combined with wood structural panel or lumber sheathing.

**FIGURE 507.9.1.3(1)**

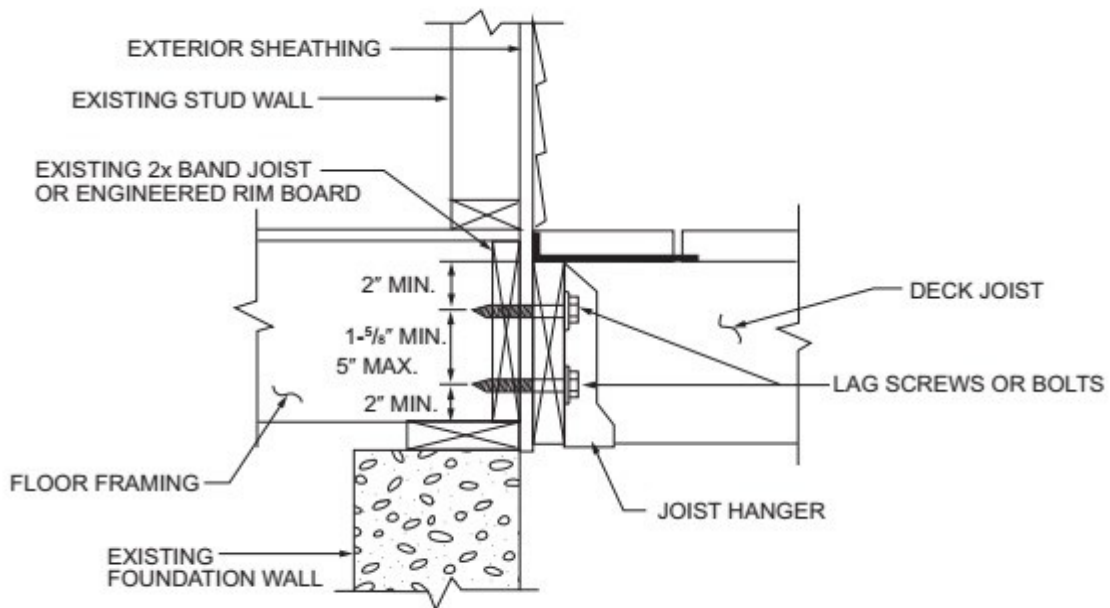
## Placement of Lag Screws and Bolts in Ledgers



\* Distance can be reduced to 4 1/2" if lag screws are used or bolt spacing is reduced to that of lag screws to attach 2x8 ledgers to 2x8 band joists.

**FIGURE 507.9.1.3(2)**

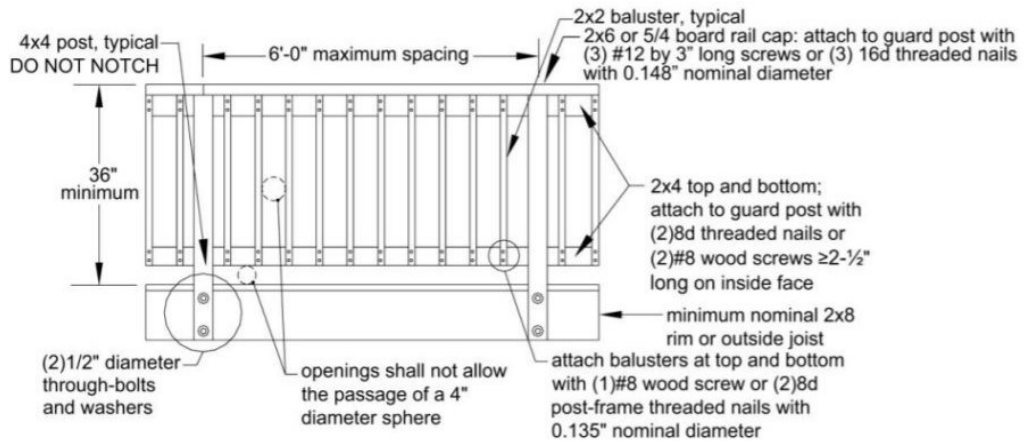
## Placement of Lag Screws and Bolts in Band Joist



1. Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure.
2. Ledger boards shall be equal to or greater than the joist depth.
3. Ledger boards shall not be attached to veneers — brick, stone, masonry; or to cantilevered floors or windows.
4. Exterior finish (siding) shall be removed prior to the placement of a ledger board.
5. Continuous flashing is required when the ledger board is attached to wood-framed construction.

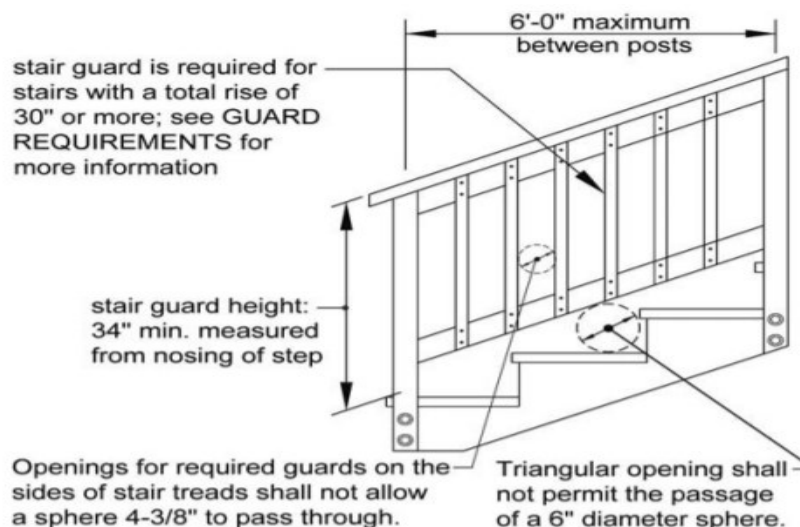
# GUARDS

**FIGURE 24a**  
**Guard Detail**



1. A guard is required when a deck is greater than 30" above grade measured vertically at any point within 36" measured horizontally along the deck edge. (2019 Residential Code of Ohio 312.1)
2. The height of the guard shall be not less than 36" measured vertically above the walking surface. (2019 Residential Code of Ohio 312.1.2)
3. Required guards shall not have openings from the walking surface to the required guard height which allow the passage of a sphere 4" in diameter. (2019 Residential Code 312.1.3)
4. Guard posts shall be 4x4 minimum.

**FIGURE 24b**  
**Stair Guard Detail**

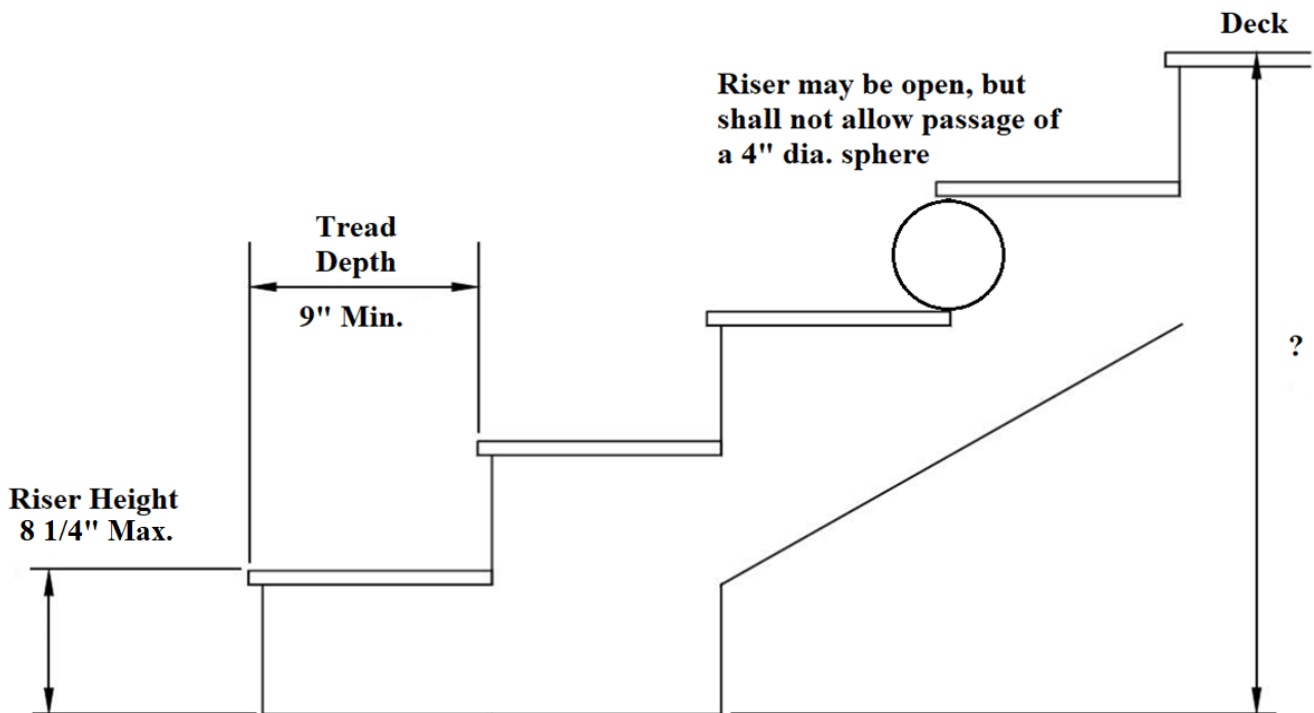


1. Guards on opens sides of stairs shall have a height of not less than 34 inches measured vertically from a line connecting the nosings (2019 Residential Code of Ohio 312.1.2)
2. Where the top of the guard serves as a handrail on the open sides of the stairs, the top of the guard shall be not less than 34 inches and not more than 38 inches measured vertically from a line connecting the nosings. (2019 Residential Code of Ohio 312.1.2)

# STAIRS

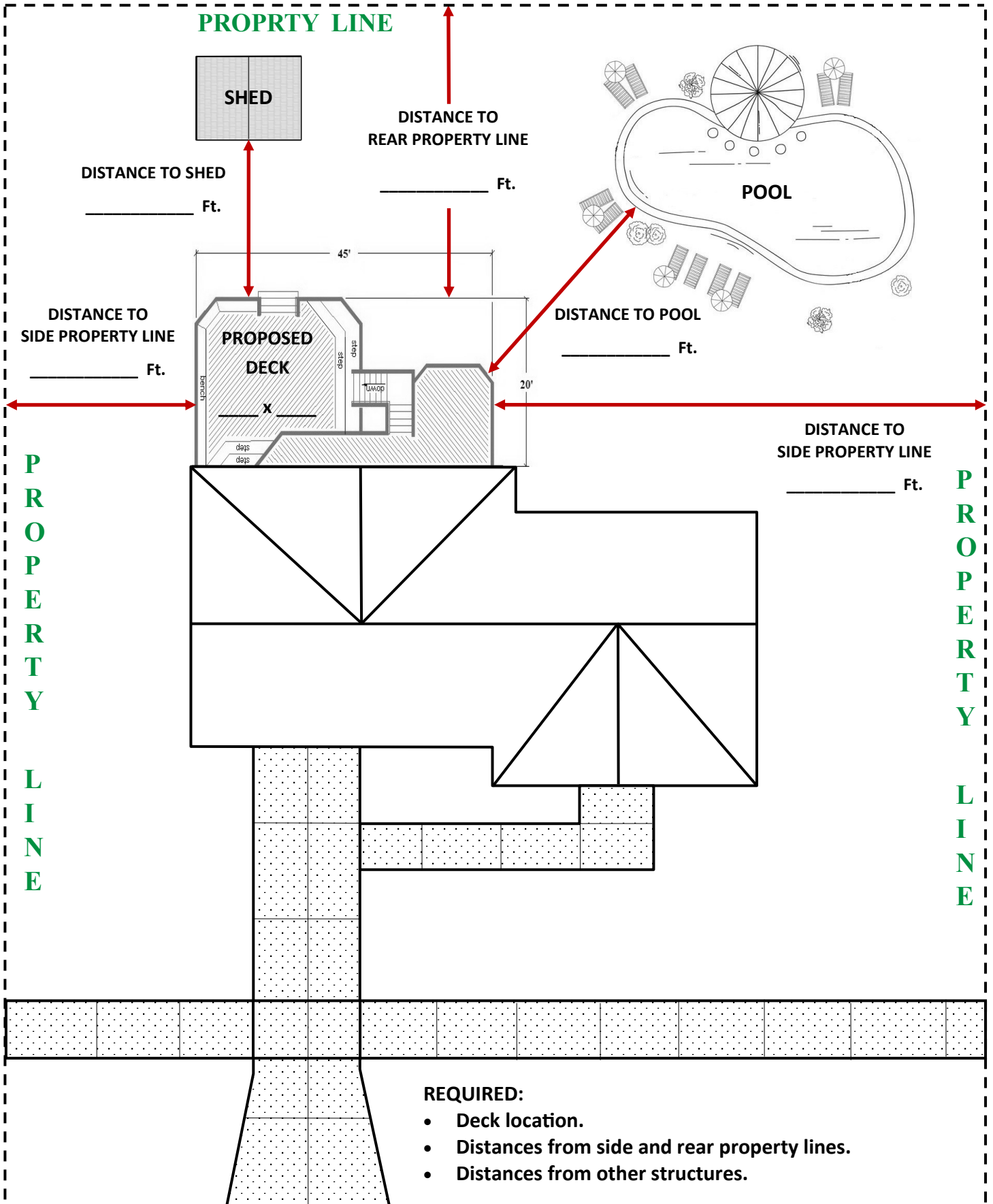
FIGURE 24c

## Tread and Riser Detail



1. Stairs shall have a minimum clear width 36". (2019 RCO 311.7.1)
2. The maximum riser height shall be 8 1/4". (2019 RCO 311.7.5.1)
3. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8". (2019 RCO 311.7.5.1)
4. The minimum tread depth shall be 9". (2019 RCO 311.7.5.2)
5. At open risers, openings located more than 30 inches, as measured vertically, to the floor or grade below shall not permit the passage of a 4-inch-diameter sphere. (2019 RCO 311.7.5.1)

# SITE PLAN DETAIL



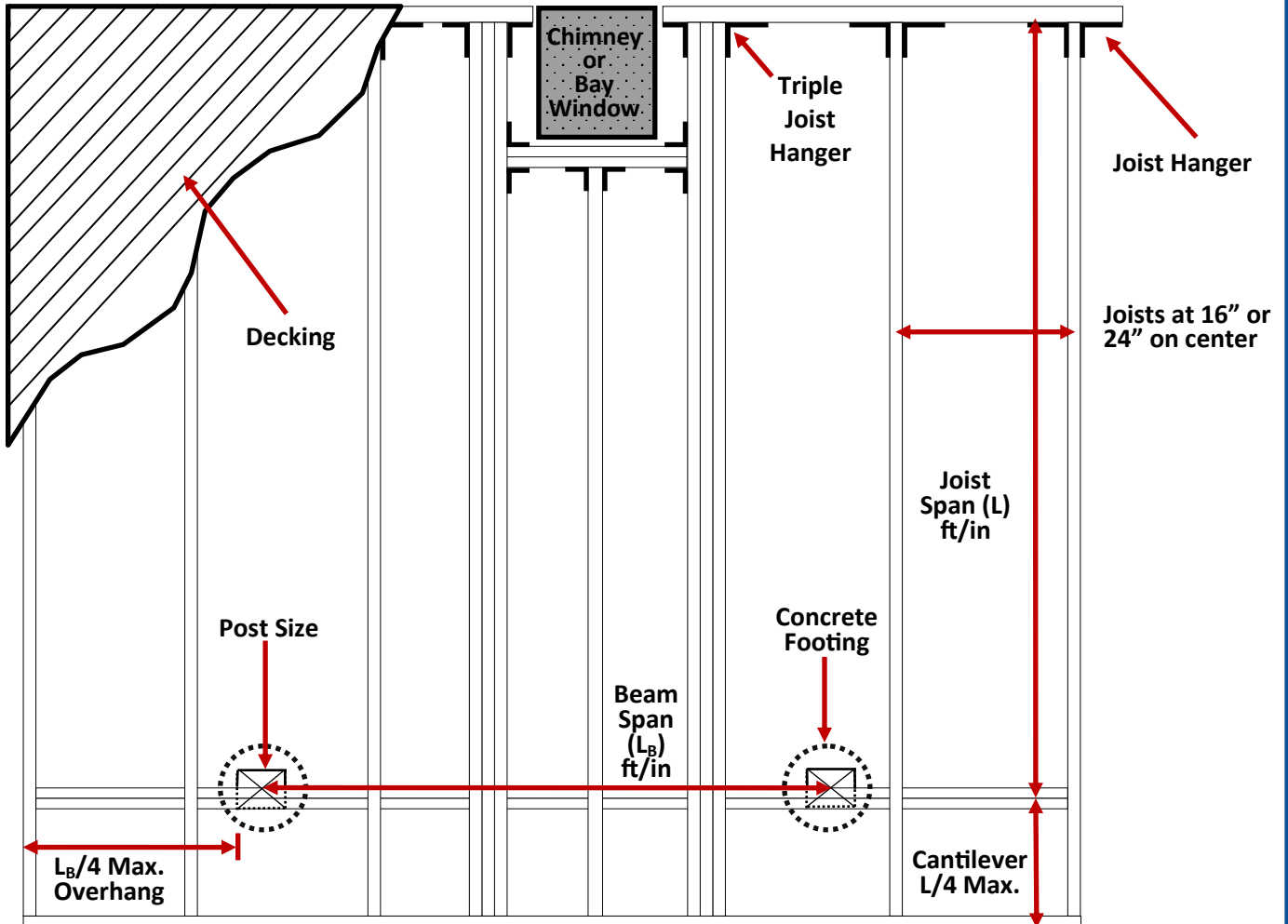
**REQUIRED:**

- Deck location.
- Distances from side and rear property lines.
- Distances from other structures.



**Figure 5**  
**Typical Deck Framing Plan**

**Ledger Board / Attachment Details**



⇒ Overall Deck Size: \_\_\_\_\_ x \_\_\_\_\_

⇒ Deck Flooring Size: \_\_\_\_\_ x \_\_\_\_\_

⇒ Footing Depth: \_\_\_\_\_  
Minimum 36" below grade

⇒ Concrete Footing (6" minimum thickness)  
\_\_\_\_\_ x \_\_\_\_\_  
Thickness      Diameter

⇒ Post Size: \_\_\_\_\_ x \_\_\_\_\_  
Labeled for ground contact

⇒ Ledger Board: \_\_\_\_\_ x \_\_\_\_\_

⇒ Joist Size: \_\_\_\_\_ x \_\_\_\_\_ @ \_\_\_\_\_ OC

⇒ Joist Span (L): \_\_\_\_\_

⇒ Beam Size: 2- \_\_\_\_\_ x \_\_\_\_\_

⇒ Beam Span ( $L_B$ ): \_\_\_\_\_

⇒ Railing Guard Details where required  
(see Figure 24a)

⇒ Stair Guard Details where required  
(see Figure 24b)