

# Deck Residential

This handout is intended only as a guide in the design for the intended building project. Complete design and installation shall be in accordance with the 2020 Minnesota Residential Building Code, Chapter 1309 (MRC). For complete code requirements refer to code at: <https://codes.iccsafe.org/content/document/1581>.

**Important note:** Soils across Scott County are typically clay. The MRC identifies clay type soils to have a 1500 psf bearing capacity. It also identifies unknown shall bearing capacity be designed to 1500.

**ePermits**, prior to applying for a permit, see ePermit how-to documents at <https://www.co.scott.mn.us/1783/ePermit-Sign-In> for specific requirements to registering and applying through the portal.

**Permit Submittal Requirements for Residential Decks** – see additional details in this handout for design assistance

**Township Approval Form:** Use form to determine if township approval is required for project location. Submit completed form with township approval signature if applicable.

**Survey/Detail Site Plans:** shall include location of the dwelling and deck as well as other structures and septic tanks/system – include distance to septic tanks/system and property lines.

**Deck Plans** – See page 2 for a helpful checklist of required design details.

**Clearances:**

<b>Well:</b>	<b>3 feet to footing or deck overhang</b>
<b>Septic Tank:</b>	<b>10 feet</b>
<b>Drainfield:</b>	<b>20 feet</b>
<b>Overhead Electrical:</b>	<b>10 feet including drip leg</b>
<b>Existing Intakes/Exhausts:</b>	<b>Maintain manufacturers clearances</b>

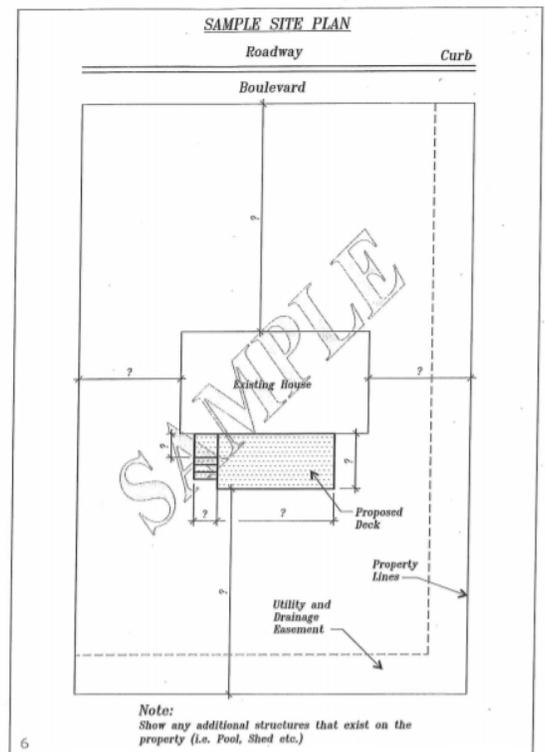
## Permits and Plans

### One- and Two-Family Residential Deck:

- A permit is required for all decks & deck repair (decking & guardrails) with the following exceptions:
- Building permits are not required for patios made of concrete or pavers on grade.
- Building permits are not required for decks not exceeding 200 square feet, and not more than 30 inches above grade at any point, and are not attached to a dwelling, and do not serve the required egress exit door.

### Manufactured Home Deck:

Manufactured homes require a building permit for all decks that will be used for the path of exit/entry into the dwelling. A park approval letter required for all permits and shall be submitted with application for permit.



### Did you know.....

**The most common reason for permit delays is due to missing or incomplete submittal documents**

**Permits applications with missing or incomplete submittals will be rejected.**

**TO AVOID DELAYS, ensure all required submittals are included with application for permit.**

# CHECKLIST FOR DECK PLANS

## Site Plan

- Street address and/or legal description shown
- North arrow shown
- Plan drawn to useable scale and scale used shown
- Size/location of existing buildings and septic tanks and system
- All lot dimensions and pin locations shown
- Location and size of proposed deck shown
- Distance to all lot lines from existing buildings and proposed deck

## Construction Plans

- Plans drawn to useable scale
- Scale indicated on plan
- Plan neat and legible

## Elevation (This could be illustrated on section drawings)

- Show side and front view of deck in relation to grade and dwelling
- Include railing height and design

## Framing Plan

- Floor joist size and spacing including species and grade
- Orientation of floor joists
- Cantilever of joists
- Bearing points for all joists
- Size and location of all beams including species and grade
- Cantilever of beams
- Size and location of ledger board including species and grade
- Size and location of all columns including species and grade
- Location of stairs
- Changes in elevation of deck floors or landings
- Unusual framing issues such as cantilevers of the dwelling floor

## Footings (This information may be included on section or framing plans)

- Footing depth and design
- Footing width, at base, is consistent with load for each footing location.

## Section(s)

- Section view(s) from bottom of footing to top of guard to show railing details; floor framing orientation; joist/beam orientation and bearing; column locations; connections; footing design, size, and depth; and height of deck floor above grade.

## Details

- Flashing at the ledger
- Joist bearing/hangers
- Ledger connection: Type, size spacing, and pattern of ledger fasteners. (Caution for dwelling floor cantilevers)
- Fasteners/connectors consistent with lumber and decking used.
- Column/beam connection
- Column/footing connection
- Type of decking and orientation (Caution for 5/4 or composite decking for spans more than 16" o.c. or installed diagonally)
- ES Report or mfg. specs for decking other than wood
- Stair stringer connection
- Lateral bracing (if required)

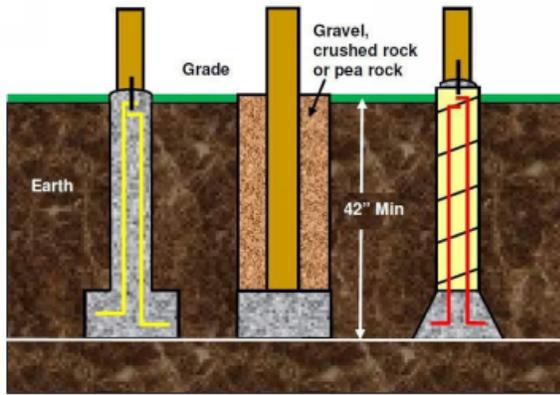
## Stairs

- Width of stairs
- Rise/run w/tolerance shown
- Number and size of stringers
- Open riser design
- Type and size of tread consistent with stringer spacing (Caution for decking use)
- Connection method for treads to stringers
- Handrails shown for stairs with 4 or more risers
- Handrail height shown on plan
- Handrail profile detailed
- Landing at bottom of stair

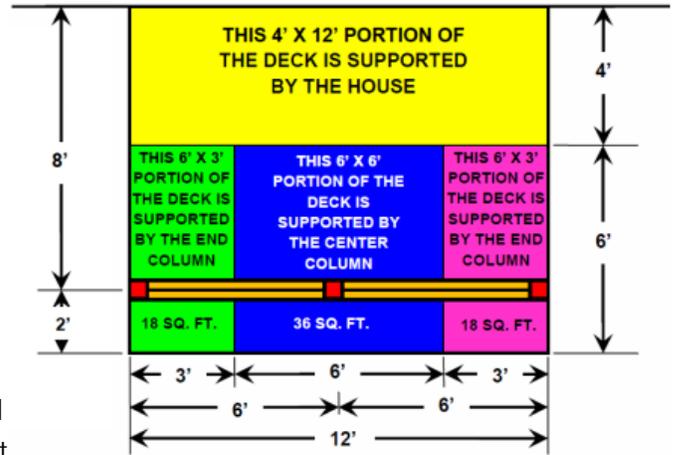
## Guards

- Guard height and opening dimensions
- Guard design/materials
- Guard attachment

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e here along with table R507.3.1, shall be designed to support

the structure. The footing size listed in the table is required at the base of the pier or pad footing.

Reminder: In the southern half of MN, the minimum depth from grade to the bottom of the footing is 42" for frost protection.

Table R507.3.1 (partial)  
MINIMUM FOOTING SIZE FOR DECKS  
LOAD BEARING VALUE OF SOILS<sup>acd</sup> (psf)

LIVE LOAD <sup>b</sup> (psf)	Tributary Area (sq. ft.)	1500 <sup>e</sup>			2000 <sup>e</sup>		
		Square Footing (inches)	Round Footing Diameter (inches)	Thickness (inches)	Square Footing (inches)	Round Footing Diameter (inches)	Thickness (inches)
40	20	12	14	6	12	14	6
	40	14	16	6	12	14	6
	60	17	19	6	15	17	6
	80	20	22	7	17	19	6
	100	22	25	8	19	21	6
	120	24	27	9	21	23	7
	140	26	29	10	22	25	8
	160	28	31	11	24	27	9

a. Interpolation permitted; extrapolation not permitted.  
b. Live load = 40 psf, dead load = 10 psf.  
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

**Posts:** To determine the size of the post you would use the table below. Posts must be anchored to the footing or embedded a minimum of 12 inches in the soil or concrete piers

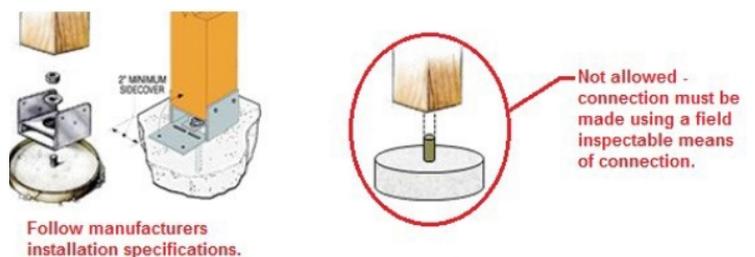
TABLE R507.4  
DECK POST HEIGHT\*

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

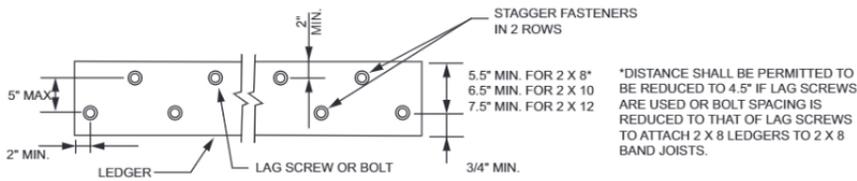
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

- 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.

**ANCHORING POST BASE**

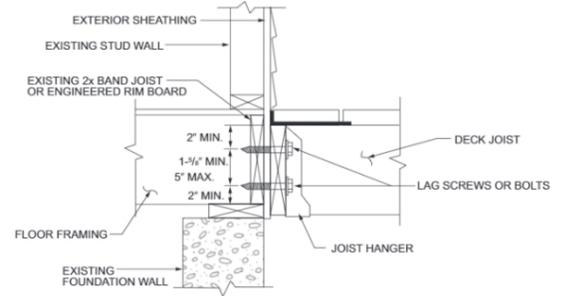


**Ledger Connection:** Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed to resist both vertical and lateral loads. Refer to the tables below for fastener spacing for ledger



For SI: 1 inch = 25.4 mm.

FIGURE R507.9.1.3(1)  
PLACEMENT OF LAG SCREWS AND BOLTS IN LEDGERS



For SI: 1 inch = 25.4 mm.

FIGURE R507.9.1.3(2)  
PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS

board.

LEDGER CONNECTION TO BAND JOIST <sup>a</sup>							
Deck Live Load = 40 psf, Deck Dead Load = 10 psf							
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 <sup>4,5</sup>							
½-inch diameter lag screw with ½-inch maximum sheathing <sup>bc</sup>	30	23	18	15	13	11	10
½-inch diameter bolt with ½-inch maximum sheathing <sup>bc</sup>	36	36	34	29	24	21	19
½-inch diameter bolt with 1-inch maximum sheathing <sup>d</sup>	36	36	29	24	21	18	16

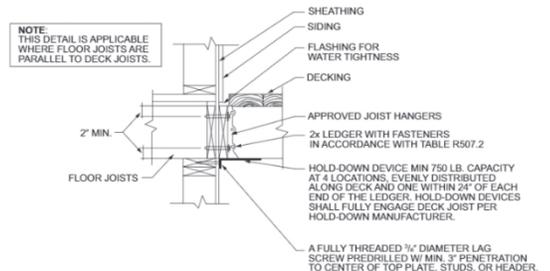
a. Ledgers shall be flashed in accordance with Section R703.4 to prevent water from contacting the house band joist.

b. The tip of the lag screw shall fully extend beyond the inside face of the band joist.

c. Sheathing shall be wood structural panel or solid sawn lumber.

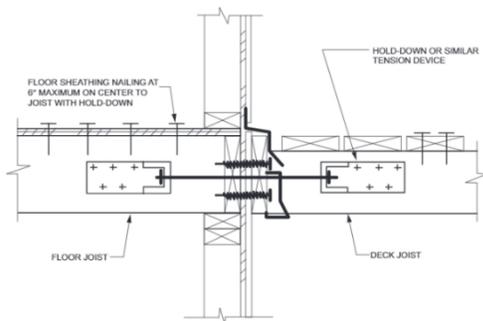
d. Sheathing shall be permitted to be wood structural panel sheathing, gypsum board, fiberboard, lumber, or foam sheathing. Up to ½-inch thickness of stacked washers shall be permitted to substitute for up to ½-inch of allowable sheathing thickness where combined with wood structural panel or lumber sheathing.

**Lateral Restraint:** Lateral load connection devices shall be installed in not less than two locations per deck, within 24 inches of each end of the deck. Each device shall have an allowable stress design capacity of not less than 1,500 pounds. Lateral load connection can be achieved by using 4 connectors achieving a total stress design capacity of 3000 pounds (750 LBS per connection). Alternative types may also be used but must be able to achieve a stress design capacity of 1,500 pounds per connection and a minimum 2 locations per deck. Diagonal bracing can also be used for lateral restraint



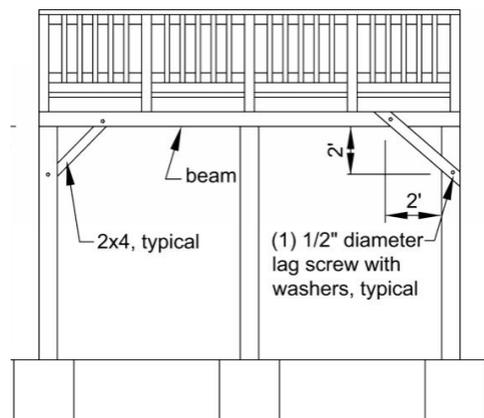
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R507.9.2(2)  
DECK ATTACHMENT FOR LATERAL LOADS



For SI: 1 inch = 25.4 mm.

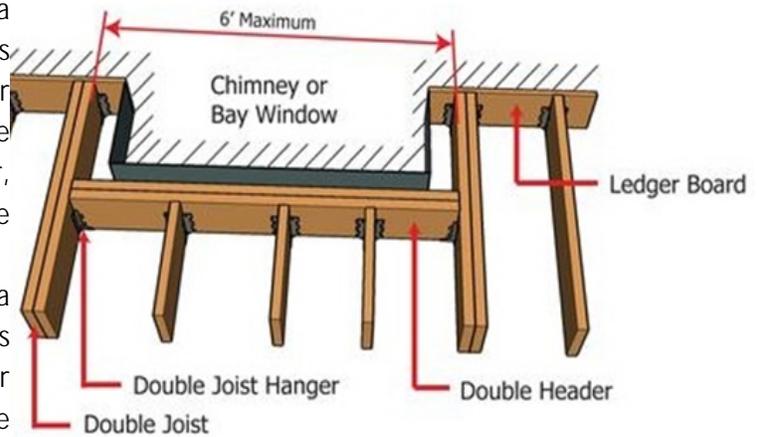
FIGURE R507.9.2(1)  
DECK ATTACHMENT FOR LATERAL LOADS



DIAGONAL BRACING PARALLEL TO BEAM

Note: Diagonal Bracing is prohibited on center posts.

**Cantilevered house floors:** Decks loads shall not bear on a cantilevered floor of a house unless floor framing members were designed to carry additional deck loads. If the floor cantilever is less than 6 feet the deck design may include boxing around it or adding posts and beam near the cantilever, optionally truss mfg. or engineer's acceptance of the additional loads place on the cantilever will also be accepted.



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**General:**

- All connections between deck and dwelling shall be weatherproof. Any cuts in exterior finish shall be flashed.
- All joist to beam, beam to post, and post to footing connections must have a positive connection to resist lateral displacement.
- A minimum of 36" clear space is required above emergency escape and rescue openings.
- All exposed wood used in the construction of decks is required to be a type with natural resistance to decay (redwood, cedar, etc.) or approved treated wood. This includes posts, beams, joists, decking and railings. If wood is to be used below or in contact with grade, it must be approved for ground contact.
- Field-cut ends, notches, and drilled holes of preservative-treated wood shall be treated in the field in accordance with AWPA M4.
- Fasteners - all fasteners (nails, bolts, screws, hangers, etc.) must be corrosion resistant as required by the code.
- All (round) joist hanger holes must be filled with nails/screws approved for joist hanger structural connections.

**Joists:** Deck Joist spans shall be as listed in the MN Residential Deck Joist Span Table shown below. Composite deck boards often have reduced spans, particularly when used for stair treads. Please have the manufacturers installation specifications for final inspection or a re-inspection fee may be incurred

**TABLE R507.6  
DECK JOIST SPANS FOR COMMON LUMBER SPECIES (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>e</sup> (inches)		
		12	16	24	12	16	24
Southern pine	2 × 6	9-11	9-0	7-7	1-3	1-4	1-6
	2 × 8	13-1	11-10	9-8	2-1	2-3	2-5
	2 × 10	16-2	14-0	11-5	3-4	3-6	2-10
	2 × 12	18-0	16-6	13-6	4-6	4-2	3-4
Douglas fir-larch <sup>d</sup> , hem-fir <sup>d</sup> spruce-pine-fir <sup>d</sup> ,	2 × 6	9-6	8-8	7-2	1-2	1-3	1-5
	2 × 8	12-6	11-1	9-1	1-11	2-1	2-3
	2 × 10	15-8	13-7	11-1	3-1	3-5	2-9
	2 × 12	18-0	15-9	12-10	4-6	3-11	3-3
Redwood, western cedars, ponderosa pine <sup>e</sup> , red pine <sup>e</sup>	2 × 6	8-10	8-0	7-0	1-0	1-1	1-2
	2 × 8	11-8	10-7	8-8	1-8	1-10	2-0
	2 × 10	14-11	13-0	10-7	2-8	2-10	2-8
	2 × 12	17-5	15-1	12-4	3-10	3-9	3-1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a. No. 2 grade with wet service factor.

b. Live load = 40 psf, dead load = 10 psf,  $L/\Delta = 360$ .

c. 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 to end.

d. Includes incising factor.

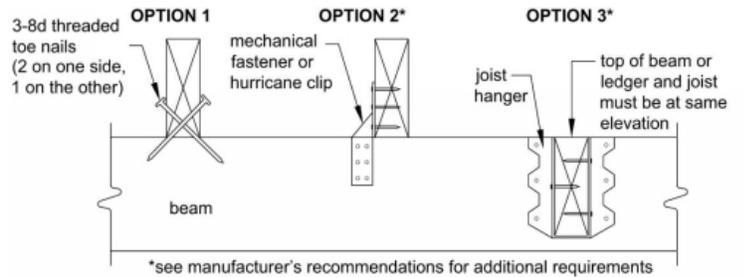
e. Northern species with no incising factor.

f. Cantilevered spans not exceeding the nominal depth of the joist are permitted.

M  
N  
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Joists may be supported on the beam or hung from the beam using the approved joist hanger.

**Beams:** Beams can be sized by using the table below from the MN Residential Code.



**TABLE R507.5**  
**DECK BEAM SPAN LENGTHS<sup>2,3,4</sup> (feet - inches)**

SPECIES <sup>5</sup>	SIZE <sup>6</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	
Douglas fir-larch <sup>7</sup> , hem-fir <sup>7</sup> , spruce-pine-fir <sup>7</sup> , redwood, western cedars, ponderosa pine <sup>7</sup> , red pine <sup>7</sup>	3 x 6 or 2 - 2 x 6	5-5	4-8	4-2	3-10	3-6	3-1	2-9
	3 x 8 or 2 - 2 x 8	6-10	5-11	5-4	4-10	4-6	4-1	3-8
	3 x 10 or 2 - 2 x 10	8-4	7-3	6-6	5-11	5-6	5-1	4-8
	3 x 12 or 2 - 2 x 12	9-8	8-5	7-6	6-10	6-4	5-11	5-7
	4 x 6	6-5	5-6	4-11	4-6	4-2	3-11	3-8
	4 x 8	8-5	7-3	6-6	5-11	5-6	5-2	4-10
	4 x 10	9-11	8-7	7-8	7-0	6-6	6-1	5-8
	4 x 12	11-5	9-11	8-10	8-1	7-6	7-0	6-7
	3 - 2 x 6	7-4	6-8	6-0	5-6	5-1	4-9	4-6
	3 - 2 x 8	9-8	8-6	7-7	6-11	6-5	6-0	5-8
	3 - 2 x 10	12-0	10-5	9-4	8-6	7-10	7-4	6-11
	3 - 2 x 12	13-11	12-1	10-9	9-10	9-1	8-6	8-1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a. Live load = 40 psf, dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever with a 220-pound point load applied at the end.

b. Beams supporting deck joists from one side only.

c. No. 2 grade, wet service factor.

d. Beam depth shall be greater than or equal to depth of joists with a flush beam condition.

e. Includes incising factor.

f. Northern species. Incising factor not included.

g. Beam cantilevers are limited to the adjacent beam's span divided by 4.

**Guards:**  
Guards are required

on all decks more than 30" above grade or floor below. Guardrail must be 36" minimum in height. Open guardrails must have intermediate rails or an ornamental pattern that a 4" sphere cannot pass through. The top section of guardrails must be built to withstand 200 lbs of load applied from any direction. Spindles and/or ornamental fill must withstand 50 lbs of applied force. If using a manufactured product must have installation specifications on site for final inspection or you may incur a re-inspection fee.

Stair Exception: Guardrails on stairs must be 34" minimum in height. Open guardrails on stairs must have intermediate rails or an ornamental pattern that a 4-3/8-inch sphere cannot pass through. The triangular opening formed by the riser, tread, and bottom element of a guardrail may be sized so that a 6-inch sphere cannot pass through.

**Stairways**

smallest by more than 3/8". Open risers are permitted permit the passage of a 4" sphere, or the stair is less than 1-1/4" shall be provided with solid risers (unless smallest by more than 3/8". Open risers are permitted, provide the passage of a 4" sphere, or the stair is less than 30" above 1/4" shall be provided with solid risers (unless the tread depth

- Stairways must be attached to supporting construction with
- Lighting must be provided to illuminate the stairway and shall landing of the stairway.
- Handrails are required on at least one side of any stairway with the top of the handrail is between 34 and 38" measured above the nosing must be continuous the full length of stairs to include ALL landings have a smooth surface with no sharp corners, must be between 34" and 38" above the nosing.
- Landings are required at the top and bottom of each stairway. Minimum size of a landing shall be 3' in the direction of travel, by the width of the stair served. Landings can be natural ground as long as it meets the size requirements and is a 2% grade or less.

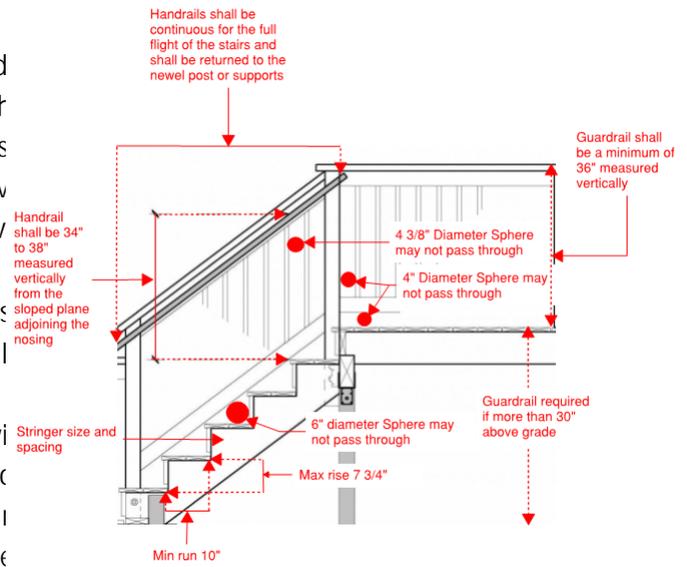
#### Required Inspections:

The permit applicant is responsible to ensure all inspections are completed and approved prior to proceeding.

- **Footing:** After holes are excavated per plan, before concrete is installed.
- **Mid-Framing:** Separate mid-framing inspection is required for decks less than 36" above grade for inspection of framing before decking is installed.
- **Framing and Final:** After all work is completed per plan including decking, railings, graspable handrail at stair system, and completed landings at the bottom of the stairway (ground may be used as a landing at the bottom of the stairway).

#### Other Related Items:

- Review the approved permit documents for specific requirements prior to beginning construction. The "approved" plan shall be kept on the site and available to the inspector.
- Permit applicant and property owner are responsible for complying with Scott County ordinances, Minnesota building codes, manufacturer's specifications, building permit details, and "Approved" plans.
- "Approved" plans and specification shall not be changed, modified or altered without prior approval from the Building Inspection Department.
- Expiration occurs 180 calendar days after permit is issued or inspection with a positive outcome. Reactivation fees will be incurred for expired permits. If the project is expected to go beyond the 180 days, submit completed Request for Extension form along with explanation of cause for delay to [buildinginspections@co.scott.mn.us](mailto:buildinginspections@co.scott.mn.us) prior to expiration.



**HANDRAILS MUST RETURN TO NEWEL POST AND BE CONTINUOUS WITHOUT INTERRUPTION FOR THE LENGTH OF THE FLIGHT INTERUPTION FOR THE LENGTH OF THE FLIGHT**

