City of Inver Grove Heights
8150 Barbara Avenue
Inver Grove Heights MN 55077
Inspections Department:
Phone: 651-450-2550
Fax: 651-450-2502
www.ci.inver-grove-heights.mn.us

DECKS

PERMIT (updated 8-22-07)

A building permit is required to construct a deck. The permit fee is based on the valuation of the project. Homeowners may do their own work. If a contractor is hired, they must be licensed by the State of Minnesota. To receive a permit, the following items must first be submitted for review:

1) A completed BUILDING PERMIT APPLICATION.

2) A SITE PLAN showing property lines, existing buildings and the proposed deck location with distances to property lines.

3) Two copies of CONSTRUCTION PLANS which must include the following information:

a) Size of deck
b) Size and depth of footings
c) Size and spacing of posts
d) Type of lumber
e) Size of beams
f) Size and spacing of joists
g) Type of floor boards
h) Height of deck off ground
i) Height and design of guardrail

Your plans will be reviewed for code compliance and you will be notified by phone when the permit is ready.

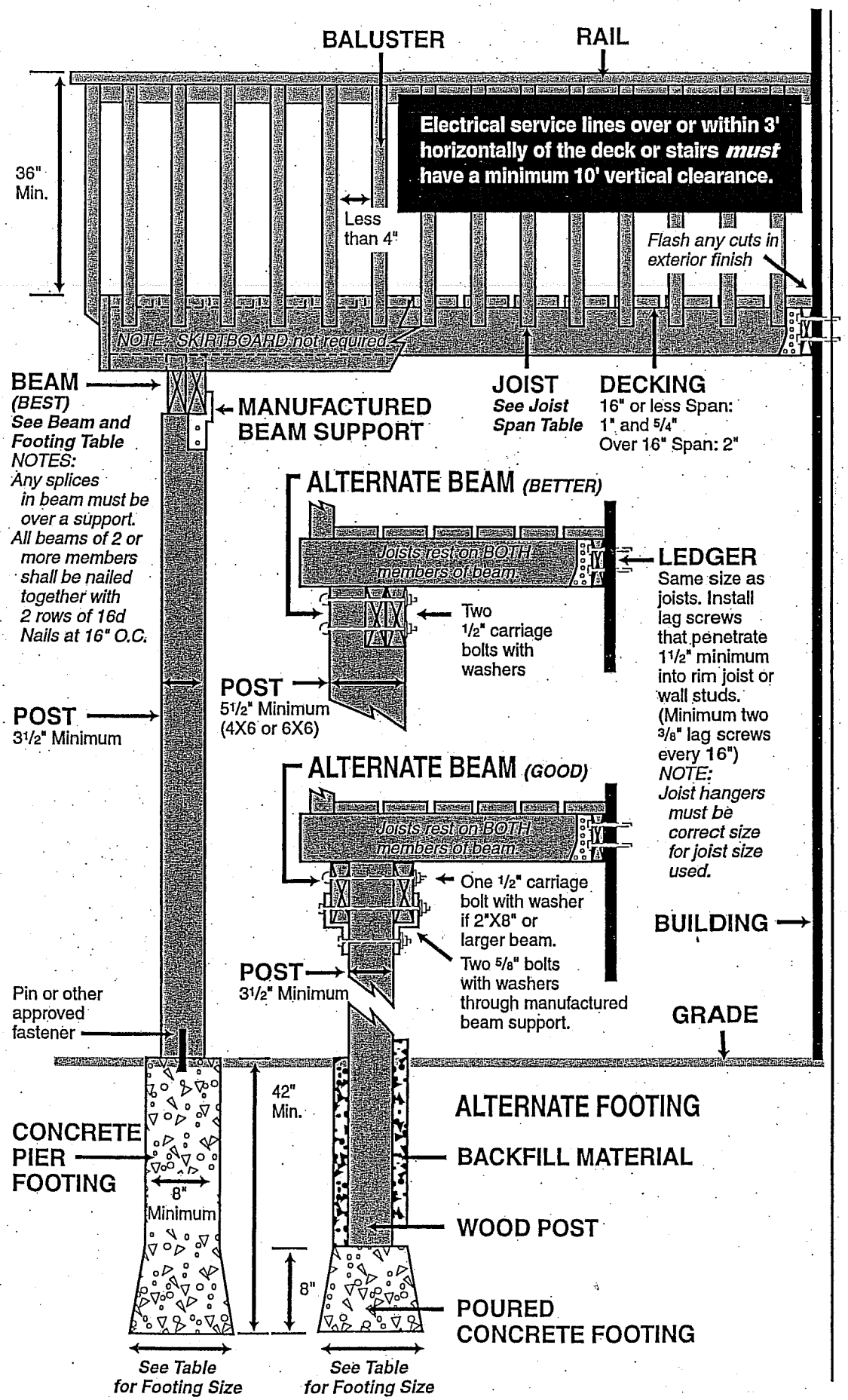
INSPECTIONS (scheduling 651-450-2550)

1) Call for FOOTING INSPECTION after holes are dug, before pouring concrete.

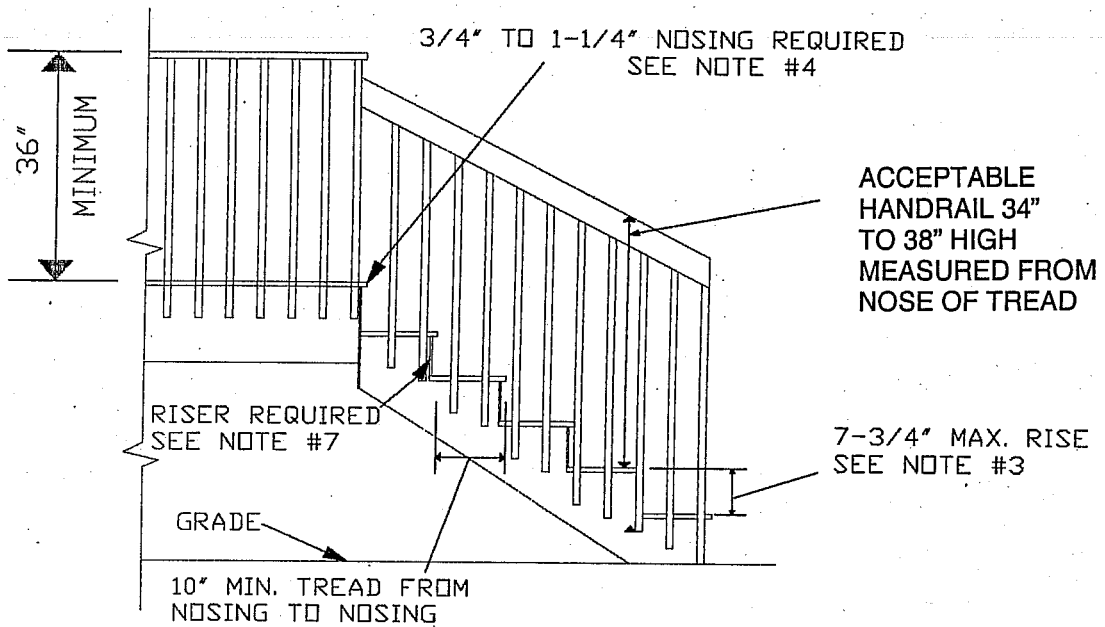
2) Call for FINAL INSPECTION when deck is complete.

STATE BUILDING CODE REQUIREMENTS

- Footings must be at least 42" deep. Posts must be anchored onto footings. (GOPHER STATE 651-454-0002)
- Beam ends and splices must be over posts. Minimum 1 1/2" of bearing.
- Deck ledger boards must be bolted to the house. Deck attachment at overhanging house rim boards may require additional consideration (see page titled "Attaching Decks to Cantilevered Rimboards".
- Joist hangers are required wherever joists do not have at least 1 1/2" of bearing.
- Handrails are required for four or more stair risers. See page titled "Stairway, Handrail and Guard Requirements".
- Wooden structural members of exterior decks must be pressure treated or heartwood of natural resistant wood. Decking and railings must be made of approved natural decay-resistant material (eg. pressure treated, cedar, or redwood).
- Joists and beams must be of the proper size and spacing to support the load. The following pages may be used in designing your deck.
- Fasteners & Hardware: Use only stainless steel, triple hot-dipped galvanized, or approved fasteners and hangers.
- If required egress windows are located under the deck, the bottom of the deck must not be less than 36" above grade.
- Depending on location of stairs and landings, safety glass may need to be installed in existing windows that are within 60" horizontally of top of stairs.


BALUSTER
RAIL
Electrical service lines over or within 3' horizontally of the deck or stairs must have a minimum 10' vertical clearance.
36" Min.
Less than 4"
Flash any cuts in exterior finish
NOTE: SKIRTBOARD not required
BEAM
(BEST)
See Beam and Footing Table
NOTES:
Any splices in beam must be over a support.
All beams of 2 or more members shall be nailed together with 2 rows of 16d Nails at 16" O.C.
MANUFACTURED BEAM SUPPORT
JOIST
See Joist Span Table
DECKING
16" or less Span: 1" and 5/4"
Over 16" Span: 2"
ALTERNATE BEAM (BETTER)
Joists rest on BOTH members of beam
LEDGER
Same size as joists. Install lag screws that penetrate 1 1/2" minimum into rim joist or wall studs. (Minimum two 3/8" lag screws every 16")
NOTE:
Joist hangers must be correct size for joist size used.
Two 1/2" carriage bolts with washers
POST
5 1/2" Minimum
(4X6 or 6X6)
POST
3 1/2" Minimum
ALTERNATE BEAM (GOOD)
Joists rest on BOTH members of beam
One 1/2" carriage bolt with washer if 2"X8" or larger beam.
Two 5/8" bolts with washers through manufactured beam support.
BUILDING
POST
3 1/2" Minimum
Pin or other approved fastener
GRADE
42" Min.
ALTERNATE FOOTING
CONCRETE PIER FOOTING
8" Minimum
BACKFILL MATERIAL
WOOD POST
8"
POURED CONCRETE FOOTING
See Table for Footing Size
See Table for Footing Size

STAIRWAY, HANDRAIL, AND GUARD REQUIREMENTS



1. Any deck walking surface more than thirty (30) inches above grade shall be protected by a minimum thirty-six (36) inch high guard. Any open spaces in a guard shall be less than four (4) inches except along stairways where spacing shall be less than four and three-eights (4-3/8) inches.
2. A continuous handrail is required for any stairway with four (4) or more risers. When stairway treads are more than thirty (30) inches above grade, a guard is also required. The handgrip portion of the handrail shall be no less than thirty-four (34) inches nor more than thirty-eight (38) inches above the tread nosing. The handgrip portion of the handrail shall be similar to those shown on the following page.
3. Stair risers shall not be greater than seven and three-quarter (7-3/4) inches high. The greatest riser heights shall not exceed the smallest by more than 3/8 inch (this includes the top and bottom risers).
4. The tread run shall not be less than ten (10) inches. The greatest tread run shall not exceed the smallest by more than 3/8 inch. Stair treads require a nosing. The nosing shall extend past the riser a minimum of ¾ inch and a maximum of 1 ¼ inch and all nosing must be equal. If the treads are eleven (11) inches or wider a nosing is not required.
5. Stairways shall be a minimum of thirty-six (36) inches wide above the handrail. Stairways may be thirty-one and one half (31-½) inches wide at or below the handrail.
6. Any triangular shaped opening created by a stair step riser, tread and guardrail shall be less than six (6) inches in diameter.
7. Open risers over thirty (30) inches above grade shall not have any open spaces over four (4) inches in diameter.
8. Illumination: All exterior stairways shall be illuminated at the landing to the stairway. Illumination shall be controlled from inside the dwelling or automatically activated.

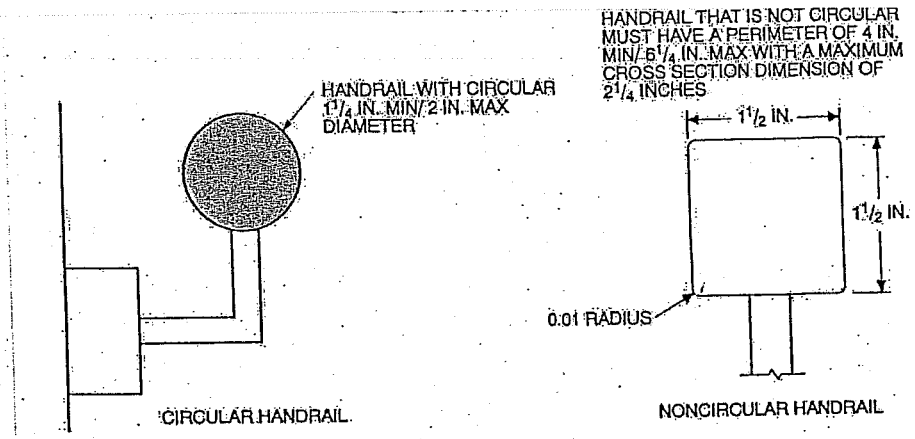
See GRASPABLE HANDRAIL styles on back.

GRASPABLE HANDRAILS

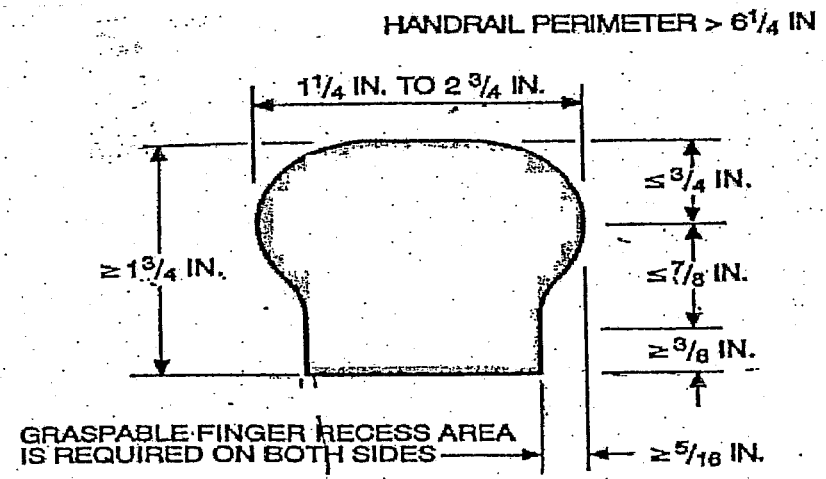
International Residential Code "R311.5.6.3 Handrail grip size. All required handrails shall be of one of the following types or provide equivalent graspability."

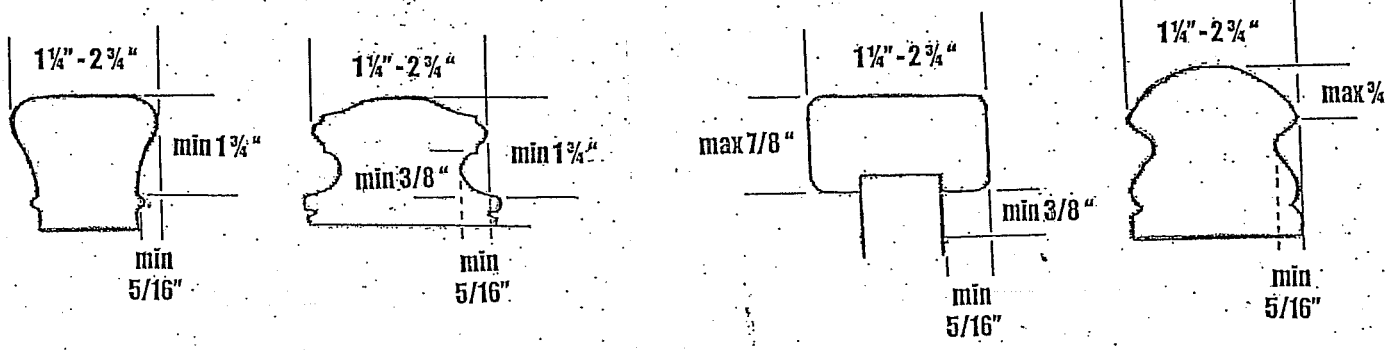
ENDS OF HANDRAILS MUST BE RETURNED TO A WALL OR POST

TYPE I - Handrails with a circular cross section shall have an outside diameter of at least 1-¼ inches and not greater than 2 inches. If the handrail is not circular it shall have a perimeter dimension of at least 4 inches and not greater than 6-¼ with a maximum cross section dimension of 2-¼ inches.



TYPE II – Handrails with a perimeter greater than 6 ¼ inches shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of ¾ inch measured vertically from the tallest portion of the profile and achieve a depth of at least 5/16 inch within 7/8 inch below the widest portion of the profile. This required depth shall continue for at least 3/8 inch to a level that is not less than 1 ¾ inches below the tallest portion of the profile. The minimum width of the handrail above the recess shall be 1 ¼ inches to a maximum of 2 ¾ inches. Edges shall have a minimum radius of 0.01 inches.

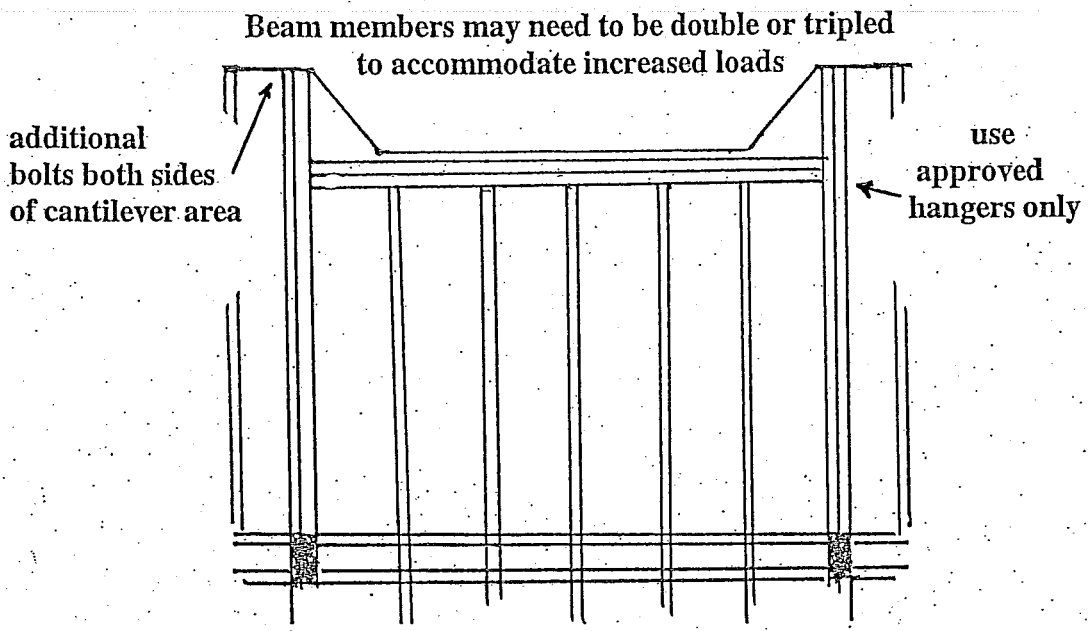




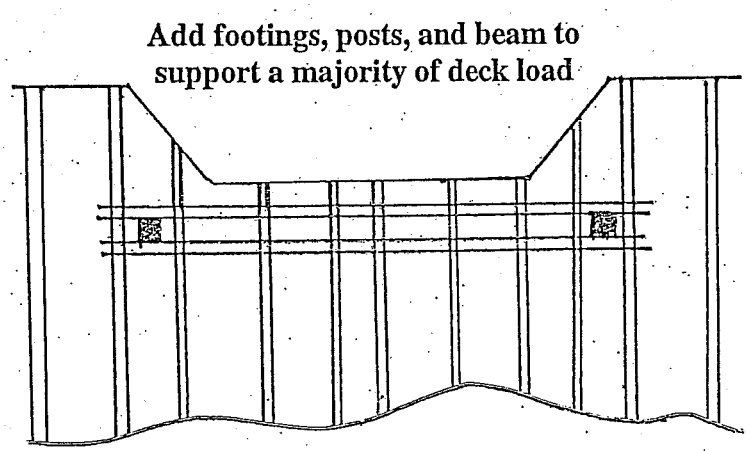
Attaching Decks to Cantilevered Rimboards

Unless the floor system was designed by an engineer to handle a future deck attachment, one of the options below will probably need to be applied.

Option A



Option B



Note: Doubled or Tripled joists acting as beams need to be nailed or bolted together adequately to act as one

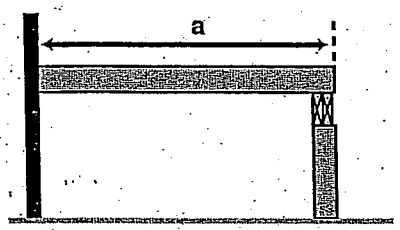
Joist span

Based on No. 2 or better wood grades.
(Design Load = 40#LL + 10#DL, Deflection= L/360)

	Ponderosa pine			Southern pine			Western cedar		
	12"OC	16"OC	24"OC	12"OC	16"OC	24"OC	12"OC	16"OC	24"OC
2x6	9-2	8-4	7-0	10-9	9-9	8-6	9-2	8-4	7-3
2x8	12-1	10-10	8-10	14-2	12-10	11-0	12-1	11-0	9-2
2x10	15-4	13-3	10-10	18-0	16-1	13-5	15-5	13-9	11-3
2x12	17-9	15-5	12-7	21-9	19-0	15-4	18-5	16-0	13-0

Sample calculations for using joist span, beam size and footing size tables

Case I solution:



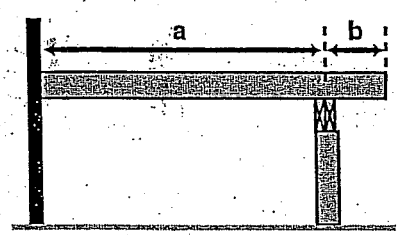
Refer to tables for joist, beam and footing size requirements.

Example: a = 12 feet; Post spacing = 8 feet

Use the **joist span** table to find the acceptable joist sizes for a 12 foot span, 2x8s at 12 inches O.C., 2x10s at 16 inches O.C. or 2x12s at 24 inches O.C.

Use the **Beam and footing sizes** table and find the 8 foot post spacing column. With a 12 foot deck span, the beam may be either two 2x8s or two 2x10s, depending on wood used. Depending on the type of soil, the footing diameter at the base must be a minimum of 12 inches, 10 inches or 9 inches for the corner post and 17 inches, 14 inches or 12 inches for all intermediate posts.

Case II solution:



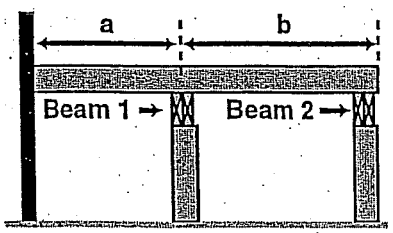
Use "a" to determine joist size and "a" + "2b" to determine beam and footing sizes. The length of "b" is restricted by both the length of "a" and the size of the joists.

Example: a = 8 feet, b = 2 feet, Post spacing = 10 feet

Refer to the **joist span** table. For an 8 foot joist span, either 2x8s at 24 inches O.C. or 2x6s at 16 inches O.C are acceptable.

For sizing the beam, use a joist length of 12 feet (8 feet + 4 feet) and a post spacing of 10 feet. The **beam and footing sizes** table indicates that the beam may be either two 2x10s or two 2x12s, depending on wood used. Depending on the type of soil, the footing diameter at the base must be a minimum of 15 inches, 12 inches or 11 inches for the corner post and 20 inches, 17 inches or 15 inches for all intermediate posts. Note that because of the 2 foot cantilever all footing sizes were increased by 1 inches as required by footnote 2 at the end of the table.

Case III solution:



Use "a" or "b", whichever is greater, to determine joist size. Use "a" + "b" to determine the size of Beam 1 and the post footing size for the posts supporting Beam 1. Use joist length "b" to determine both the size of Beam 2 and the post footing size for the posts supporting Beam 2.

Example: a = 6 feet, b = 7 feet, Post spacing = 9 feet

Joist size is determined by using the longest span joist (7 feet). The **joist span** table indicates that 2x6s at 24" O.C. would be adequate for this span.

For Beam 1 and footings, use a joist length of 13 feet (6 feet + 7 feet) and a post spacing of 9 feet. The **beam and footing sizes** table indicates that the beam may be two 2x10s or two 2x12s, depending on the wood used. Depending on the type of soil, the footing diameters for Beam 1 posts shall be 13 inches, 11 inches or 9 inches for the corner (outside) post and 19 inches, 15 inches or 13 inches for all intermediate posts. For Beam 2 and footings use a joist length of 7 feet and post spacing of 9 feet. The beam may be two 2x8s or two 2x10s, depending on wood used. Depending on the type of soil, the footing diameters for Beam 2 shall be 10 inches, 8 inches or 7 inches for the corner posts, and 14 inches, 11 inches or 10 inches for all intermediate posts.

Beam and footing sizes

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

Joist Length			Post spacing 4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'
	6'	Southern Pine Beam	1-2x6	1-2x6	1-2x6	2-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x10
		Ponderosa Pine Beam	1-2x6	1-2x6	1-2x8	2-2x8	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12	3-2x10
		Corner Footing	6 5 4	7 6 5	7 6 5	8 7 6	9 7 6	9 7 6	10 8 7	10 8 7	10 9 7	11 9 8	11 9 8
		Intermediate Footing	9 8 7	10 8 7	10 9 7	11 9 8	12 10 9	13 10 9	14 11 10	14 12 10	15 12 10	15 13 11	16 13 11
	7'	Southern Pine Beam	1-2x6	1-2x6	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x10	2-2x12
		Ponderosa Pine Beam	1-2x6	1-2x6	1-2x8	2-2x8	2-2x8	2-2x10	2-2x10	2-2x10	2-2x12	3-2x10	3-2x10
		Corner Footing	7 5 5	7 6 5	8 7 6	9 7 6	9 8 7	10 8 7	10 8 7	11 9 8	11 9 8	12 10 9	12 10 9
		Intermediate Footing	9 8 7	10 8 7	11 9 8	12 10 9	13 11 9	14 11 10	15 12 10	15 13 11	16 13 11	17 14 12	17 14 12
	8'	Southern Pine Beam	1-2x6	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12
		Ponderosa Pine Beam	1-2x6	2-2x6	2-2x8	2-2x8	2-2x8	2-2x10	2-2x10	2-2x10	3-2x10	3-2x10	3-2x12
		Corner Footing	7 6 5	8 6 6	9 7 6	9 8 7	10 8 7	10 8 7	11 9 8	11 9 8	12 10 9	13 10 9	13 11 9
		Intermediate Footing	10 8 7	11 9 8	12 10 9	13 11 9	14 11 10	15 12 10	16 13 11	16 13 12	17 14 12	18 15 13	18 15 13
	9'	Southern Pine Beam	1-2x6	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12	3-2x10
		Ponderosa Pine Beam	1-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x10	3-2x10	3-2x10	3-2x12	3-2x12
		Corner Footing	7 6 5	8 7 6	9 7 6	10 8 7	10 9 7	11 9 8	12 10 8	12 10 9	13 10 9	13 11 9	14 11 10
		Intermediate Footing	10 9 7	12 10 8	13 10 9	14 11 10	15 12 10	16 13 11	17 14 12	17 14 12	18 15 13	19 15 13	20 16 14
	10'	Southern Pine Beam	1-2x6	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	2-2x12	3-2x10	3-2x10
		Ponderosa Pine Beam	1-2x6	1-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	3-2x10	3-2x12	3-2x12	Eng Bm
		Corner Footing	8 6 6	9 7 6	10 8 7	10 8 7	11 9 8	12 10 8	12 10 9	13 11 9	14 11 10	14 12 10	15 12 10
		Intermediate Footing	11 9 8	12 10 9	14 11 10	15 12 10	16 13 11	17 14 12	17 14 12	18 15 13	19 16 14	20 16 14	21 17 15
	11'	Southern Pine Beam	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12	3-2x10	3-2x12
		Ponderosa Pine Beam	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	2-2x12	3-2x10	3-2x12	3-2x12	Eng Bm
		Corner Footing	8 7 6	9 7 6	10 8 7	11 9 8	12 9 8	12 10 9	13 11 9	14 11 10	14 12 10	15 12 10	15 13 11
		Intermediate Footing	12 9 8	13 11 9	14 12 10	15 12 10	16 13 11	17 14 12	17 14 12	18 15 13	19 16 14	20 16 14	21 17 15
	12'	Southern Pine Beam	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	3-2x10	3-2x10	3-2x12
		Ponderosa Pine Beam	2-2x6	2-2x6	2-2x8	2-2x10	2-2x10	2-2x12	2-2x12	3-2x12	3-2x12	Eng Bm	Eng Bm
		Corner Footing	9 7 6	10 8 7	10 9 7	11 9 8	12 10 9	13 10 9	14 11 10	14 12 10	15 12 10	15 13 11	16 13 11
		Intermediate Footing	12 10 9	14 11 10	15 12 10	16 13 11	17 14 12	18 15 13	19 16 14	20 16 14	21 17 15	22 18 15	23 18 16
	13'	Southern Pine Beam	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x12	3-2x10	3-2x12	3-2x12
		Ponderosa Pine Beam	2-2x6	2-2x6	2-2x8	2-2x10	2-2x12	2-2x12	2-2x12	3-2x12	3-2x12	Eng Bm	Eng Bm
		Corner Footing	9 7 6	10 8 7	11 9 8	12 10 8	13 10 9	13 11 9	14 12 10	15 12 10	15 13 11	16 13 11	17 14 12
		Intermediate Footing	13 10 9	14 12 10	15 13 11	17 14 12	18 15 13	19 15 13	20 16 14	21 17 15	22 18 15	23 19 16	24 19 17
	14'	Southern Pine Beam	1-2x6	2-2x6	2-2x6	2-2x8	2-2x10	2-2x10	2-2x12	3-2x10	3-2x12	3-2x12	3-2x12
		Ponderosa Pine Beam	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	3-2x10	3-2x12	3-2x12	Eng Bm	Eng Bm	Eng Bm
		Corner Footing	9 8 7	10 8 7	11 9 8	12 10 9	13 11 9	14 11 10	15 12 10	15 13 11	16 13 11	17 14 12	17 14 12
		Intermediate Footing	13 11 9	15 12 10	16 13 11	17 14 12	18 15 13	20 16 14	21 17 15	22 18 15	23 18 16	24 19 17	24 20 17
	15'	Southern Pine Beam	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	2-2x12	3-2x10	3-2x12	3-2x12	Eng Bm
		Ponderosa Pine Beam	2-2x6	2-2x8	2-2x8	2-2x10	3-2x10	3-2x10	3-2x12	3-2x12	Eng Bm	Eng Bm	Eng Bm
		Corner Footing	10 8 7	11 9 8	12 10 8	13 10 9	14 11 10	14 12 10	15 12 11	16 13 11	17 14 12	17 14 12	18 15 13
		Intermediate Footing	14 11 10	15 12 11	17 14 12	18 15 13	19 16 14	20 17 14	21 17 15	22 18 16	23 19 17	24 20 17	25 21 18
	16'	Southern Pine Beam	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	2-2x12	3-2x10	3-2x12	3-2x12	Eng Bm
		Ponderosa Pine Beam	2-2x6	2-2x8	2-2x10	2-2x10	3-2x10	3-2x10	3-2x12	3-2x12	Eng Bm	Eng Bm	Eng Bm
		Corner Footing	10 8 7	11 9 8	12 10 9	13 11 9	14 11 10	15 12 10	16 13 11	16 13 12	17 14 12	18 15 13	18 15 13
		Intermediate Footing	14 11 10	16 13 11	17 14 12	18 15 13	20 16 14	21 17 15	22 18 16	23 19 16	24 20 17	25 21 18	26 21 18

Notes:

1. Joist length is total length of joist, ***including*** any cantilevers.
2. When joist extends (cantilevers) beyond support beam by 18 inches or more, add 1 inches to footing dimensions shown.
3. Requirements for future 3-season porches or screen porches:
   a. Increase corner footing size shown by 90%.
   b. Increase center footing size shown by 55%.
   c. Locate all footings at extremities of deck (no cantilevers).
   d. Beam sizes indicated need not be altered.
4. All footing sizes above are base diameters (in inches) and are listed for THREE SOIL TYPES: