



## COMMUNITY DEVELOPMENT DEPARTMENT

Building Safety & Inspections Division

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## RESIDENTIAL DECKS AND LANDINGS

This handout is a guide only and may not contain all of the requirements of the City Ordinances. All proposed work is subject to Zoning and Building Safety code review.

*ANY DECK OR LANDING ATTACHED TO A BUILDING REQUIRES A BUILDING PERMIT NO MATTER HOW SMALL THE DECK OR LANDING.*

*ANY FREESTANDING DECK OR LANDING REQUIRES A BUILDING PERMIT UNLESS IT IS SMALLER THAN 120 SQUARE FEET IN AREA.*

*NO LANDING OR DECK MAY BE LOCATED ON AN EASEMENT, INCLUDING DRAINAGE AND UTILITY EASEMENTS OFTEN FOUND ALONG REAR OR SIDE LOT LINES.*

### **SOME ZONING ORDINANCE REGULATIONS APPLICABLE TO RESIDENTIAL DECKS:**

- Decks and landings located in the rear yard are considered structures for the purposes of calculating rear yard structure coverage. Please see the handout, *Rear Yard Coverage Limitations for Single-Family and Two-Family Dwellings*, for more information.
- Decks and landings attached to the principal structure must comply with the same minimum setback requirements as the principal structure, with some exceptions:
  - Front setback is typically 30 feet, except that attached decks need only be set back 22 feet from the front lot line if their cumulative encroachment into the 30 foot front setback does not exceed 200 square feet.
  - Rear setback is typically 30 feet, except that attached decks need only be set back 22 feet from the rear lot line if their cumulative encroachment into the 30 foot front setback does not exceed 200 square feet.
  - Side setback is typically 5 feet from the side lot line.
  - Side street setback is typically 10 feet from the side street lot line unless the side street is a collector or minor arterial street, in which case the setback is 15 feet. Please note that the side street setback is typically only applicable to corner lots. In such cases, the lot line with the shorter street frontage is considered the front lot line and the lot line with the longer street frontage is considered the side street lot line. This rule applies no matter which way the house faces and no matter how the property is addressed.
- Freestanding decks or landings located in the rear yard are typically permitted within 3 feet of the rear or side lot lines.

## **REQUIRED INFORMATION WHEN APPLYING FOR A PERMIT:**

- City of Crystal building permit application
- Two copies of a Certificate of Survey or two copies of a site plan drawn to scale, indicating:
  - ✓ lot dimensions
  - ✓ location and dimensions of existing structure(s), including all buildings, sheds, garages, decks, patios, sidewalks and driveways
  - ✓ location and dimensions of the proposed structure(s)
  - ✓ setback measurements from property lines (see site plan drawing)
- Two copies of a floor plan, drawn to scale, showing the design of proposed structure(s) and type of materials being used for construction of the structure(s), including:
  - ✓ size and spacing of floor joists
  - ✓ size of decking
  - ✓ size, location and spacing of posts
  - ✓ size of headers
  - ✓ type of lumber to be used
- Two copies of a rear or side elevation of the proposed structure, including:
  - ✓ height of structure from grade
  - ✓ diameter and depth of footings
  - ✓ guardrail height, if any
  - ✓ spacing of intermediate rails

## **BUILDING CODE REQUIREMENTS:**

All residential decks will be designed to support a live load of 40 pounds per square foot and balconies will be designed to support a live load of 60 pounds per square foot. Some deck designs may not support the addition of a screened or 3-season porch. This should be considered when choosing construction materials and structural design.

### **Materials**

- Decks, landings and balconies exposed to the weather will be constructed of approved wood with natural resistance to decay, such as redwood and cedar. Ledger beams will be fastened to the building structure using ½ inch diameter lag screws or approved fasteners.
- Pressure-preservative-treated wood will comply with the American Wood Preservers Association U1 Standard based on exposure (exterior) and use (above ground or ground contact). The lumber must bear the quality mark (stamp or end tag) of an approved inspection agency. Designers, builders and home owners will verify that appropriate hardware (hangers, nails, brackets) is used with the particular treatment of the lumber.
- Plastic and composite materials proposed for posts, beams, joists, decking and railings require submittal with the permit application of product specific ICC-ES evaluation reports, or of test reports from an approved testing agency, for review and approval by the Building Official. Decks using unapproved materials will not receive final approval and may require removal of unapproved materials.
- All exposed connections between the deck and the building structure will be flashed. Flashing materials will be corrosion resistant and compatible with other deck materials.

## **Footings and Piers**

- \* Frost footings are required for decks and landings attached to a building or structure that has frost footings. All frost footings will be a minimum of 42 inches below finished grade.
- \* Individual concrete or masonry piers shall project a minimum of 6 inches above finished grade, and project 8 inches above finished grade when supporting cedar or redwood. Cylindrical concrete pier diameters will be as listed on the Beam and Footing Sizes table. Minimum concrete pier diameter will be 8 inches.

## **Joists and Framing**

- \* Wood joists within 18 inches of finished grade or wood beams within 12 inches of finished grade and their supports shall be redwood, cedar or an approved decay-resistant material.
- \* Floor joist spacing at 24 inches on center requires 2 x decking. Spacing at 16 inches on center permits 1 x decking.
- \* Joists should not overhang (cantilever) beams by more than 2 feet and beams should not overhang posts by more than 1 foot.
- \* Header beams and joists that frame into ledgers or beams must be supported by approved framing anchors (joist hangers) of appropriate size.

## **Stairways**

- \* If a stairway is to be provided, it must be no less than 36 inches in width. Stairways may be constructed having a 7  $\frac{3}{4}$  inch maximum rise (height) and a 10 inch minimum run (length). The dimensions of any one tread run or riser may not vary from the dimensions of any other tread run and rise by more than  $\frac{3}{8}$ ".
- \* Stairway illumination is required by the code.
- \* Open risers are permitted, provided the opening between the treads does not permit the passage of a 4 inch diameter sphere.

## **Guards and Handrails**

- \* Decks, landings, ramps, balconies and porches greater than 30 inches above grade will be protected by a guard no less than 36 inches in height. Openings in guards will be less than 4 inches. Openings for required guards on the sides of stair treads will be less than 4  $\frac{3}{8}$  inches.

### **Guards and Handrails continued...**

- \* Handrails are required on all stairways having 4 or more risers. All required handrails shall be 1 ¼ inches minimum in diameter and not greater than 2 inches maximum.
- \* Handrails shall be placed not less than 34 inches or more than 38 inches above the nosing of the stair treads. Handrails shall be continuous the full length of stairs from a point directly above the top riser of a flight to a point directly above the lowest riser of the flight.
- \* Handrail ends must be returned to a wall or post.
- \* The handgrip must have a smooth surface with no sharp corners; edges shall have a minimum radius of 1/8 ".
- \* Handrails adjacent to a wall shall have a space not less than 1½" between the wall and the handrail.

# Beam and Footing Sizes

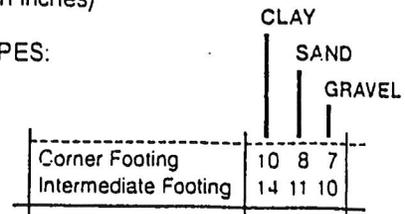
Based on No. 2 or better Ponderosa Pine and Southern Pine  
(Treated for weather and/or ground exposure)

		Post Spacing										
		4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'
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	2-2x10	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" or more, add 1" 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:



# Joist Span

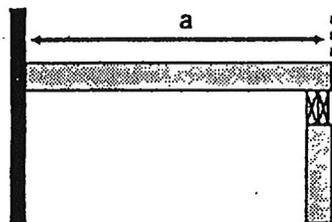
Based on No. 2 or better wood grades.

(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:



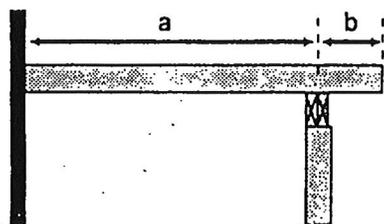
Refer to tables for joist, beam and footing size requirements.

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

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

Use the **Beam and Footing Sizes** table and find the 8' post spacing column. With a 12' 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", 10" or 9" for the corner post and 17", 14" or 12" for all intermediate posts.

### CASE II SOLUTION:



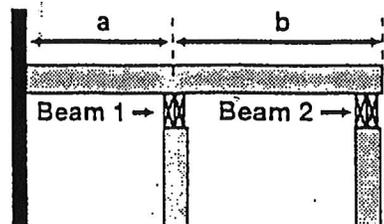
Use "a" to determine joist size and "a" + "b" to determine beam and footing sizes. The length of "b" is restricted by both the length of "a" and the size of the joists.

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

Refer to the **Joist Span** table. For an 8' joist span, either 2x8s at 24" O.C. or 2x6s 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 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 13", 11" or 10" for the corner post and 18", 15" or 13" for all intermediate posts. Note that because of the 2' cantilever all footing sizes were increased by 1" as required by footnote 2 at the end of the table.

### CASE III SOLUTION:

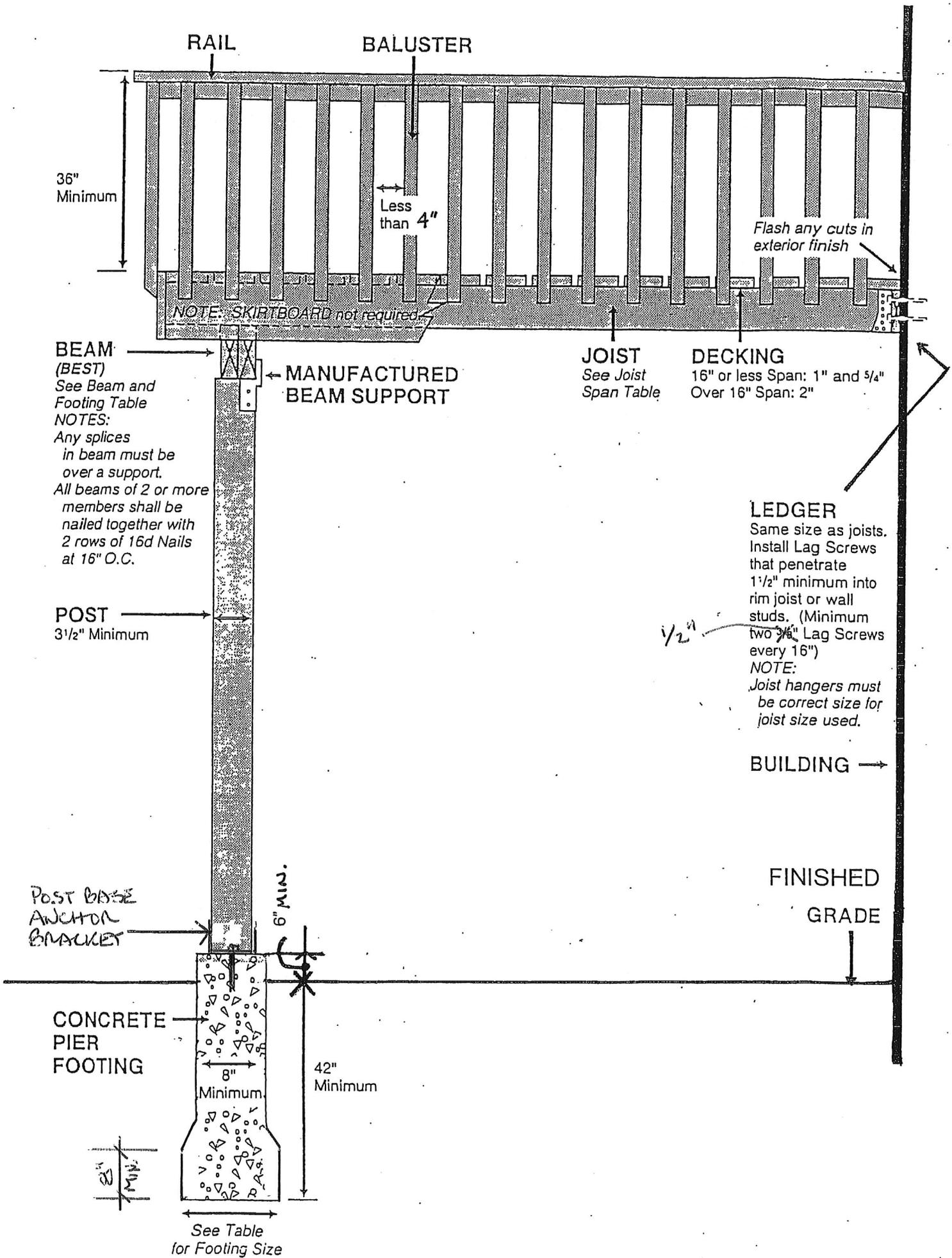


Use "a" or "b", whichever is greater, to determine joist size. Use "a" + "b" to determine the size of Beam 1 and the post footing size for the posts supporting Beam 1. Use joist length "b" to determine both the size of Beam 2 and the post footing size for the posts supporting Beam 2.

Example:  $a = 6'$ ,  $b = 7'$ , Post Spacing = 9'

Joist size is determined by using the longest span joist (7'). 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' ( $6' + 7'$ ) and a post spacing of 9'. 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", 11" or 9" for the corner (outside) post and 19", 15" or 13" for all intermediate posts. For Beam 2 and footings use a joist length of 7' and post spacing of 9'. The beam may be two 2x8s or two 2x10s, depending on wood used. The footing diameters for Beam 2 shall be 10", 8" or 7" for the corner posts, and 14", 11" or 10" for all intermediate posts.



36" Minimum

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"

**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.

**POST**  
3 1/2" Minimum

**BUILDING** →

**FINISHED GRADE**

POST BASE ANCHOR BRACKET

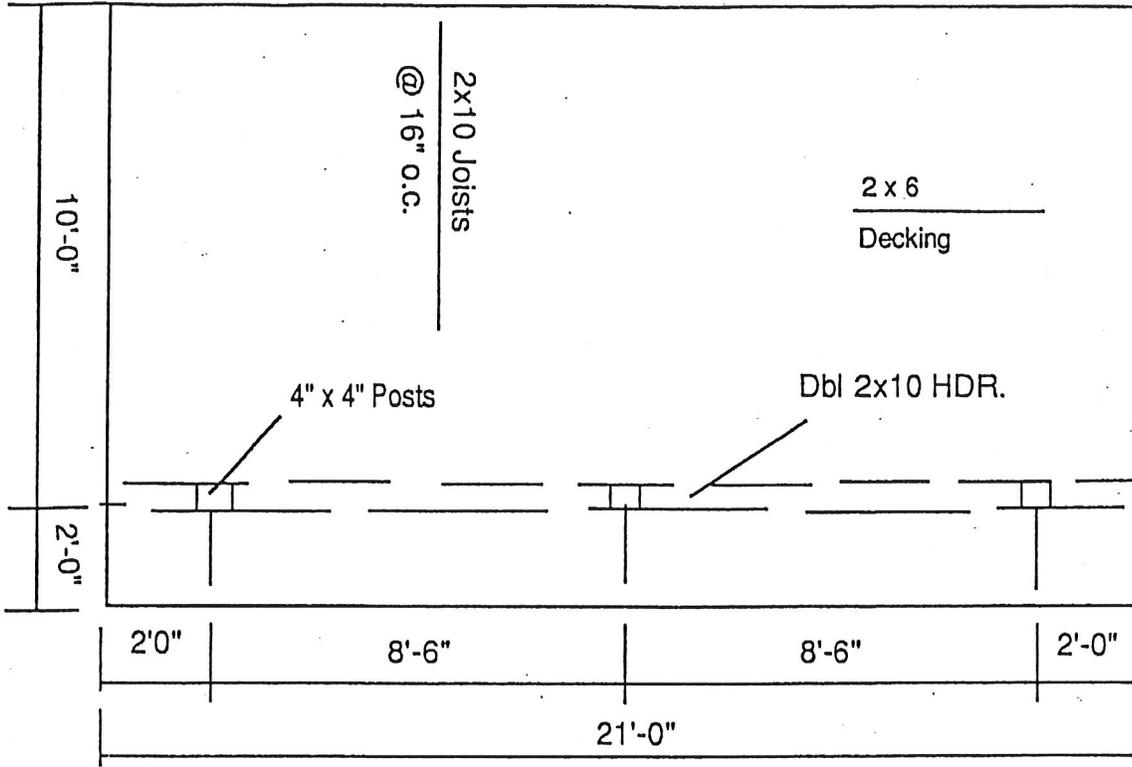
6" MIN.

**CONCRETE PIER FOOTING**

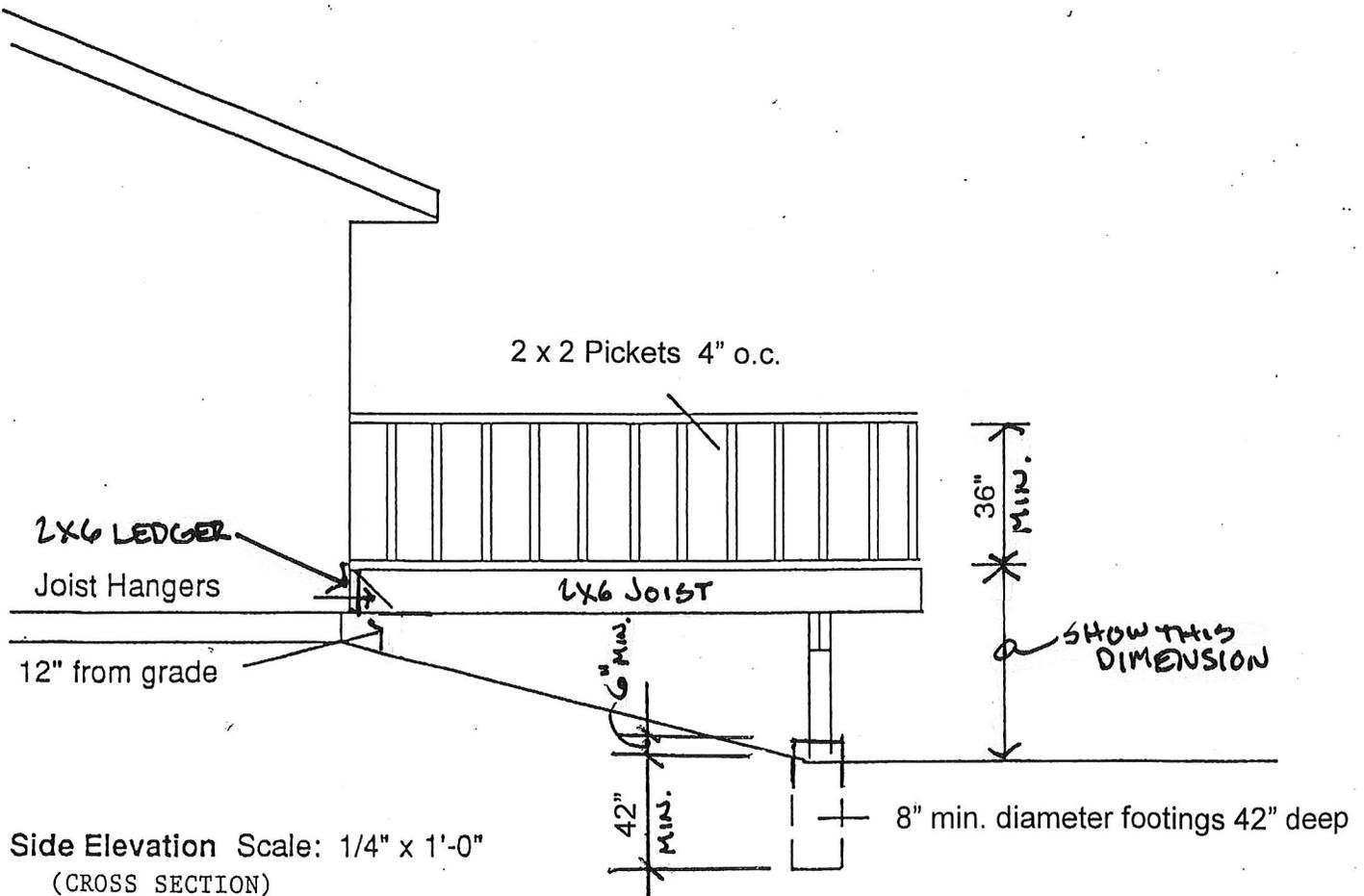
8" Minimum

42" Minimum

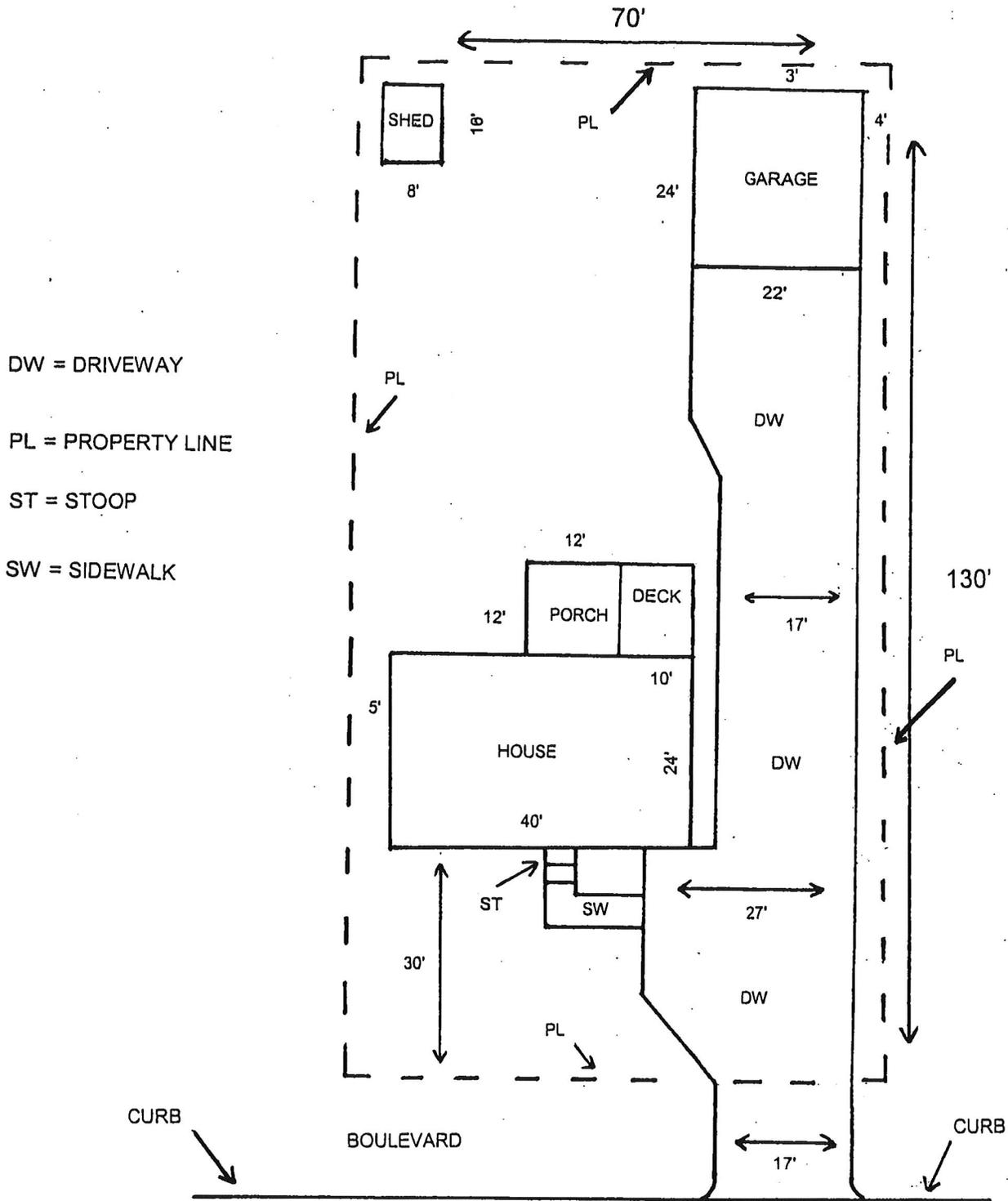
See Table for Footing Size



Floor Plan Scale: 1/4" = 1'-0"  
 (FLOOR PLAN)



Side Elevation Scale: 1/4" x 1'-0"  
 (CROSS SECTION)



DW = DRIVEWAY  
 PL = PROPERTY LINE  
 ST = STOOP  
 SW = SIDEWALK

NORTH →  
 SCALE 1" = 20'

STREET

SAMPLE SITE PLAN