

Residential Decks

Building Permits – Are required for any deck attached to a structure or any detached deck more than 30 inches above grade. To obtain a permit, provide the following: an application for permit, a site plan or survey, a deck plan with all structural details in sufficient clarity to determine code compliance.

Site Plan or Survey – Show the deck and all distances to property lines, structures, streets and alleys.

Design and Construction – Decks shall be positively anchored to the primary structure with fasteners not subject to withdraw. It shall be designed for both vertical and lateral loads and support 40 pounds per square foot live load. Ledger boards or rim joists must be attached directly to solid wood framing members of the house. Attachment to the house cantilever may require special design.

Overhanging Decks – Joists should not overhang beams by more than 2 feet for 2x10's, 18 inches for 2x8's, 12 inches for 2x6's. Beams shall be double members of joist size or another single member type of engineered wood for load. Beams shall not overhang post by more than 12 inches.

Materials – The type of deck materials to be used must be indicated on the plans. All exposed wood must be an approved treated wood or naturally resistant to decay. Lumber shall be of natural resistance to decay or of treated wood (.40 CCA ground contact or .60 in ground); fasteners shall be corrosion resistant. If using composite decking materials, check with the building department before purchasing. Some composite decking materials are not approved.

Special Fasteners – The use of pressure-treated wood requires appropriate fasteners and hardware such as stainless steel or hot dipped galvanized that are compatible with the chemical treatment of wood.

Frost Footings – Are required for any deck attached to a structure that has frost footings. Minimum depth shall be 60 inches below grade with a minimum 8 inch diameter at grade level. The bottom of the footing often needs to be more than 8 inches to be properly sized for the deck load, *refer to sizing chart*. Future plans for the roof and wall loads should be considered for proper sizing of footings.

Guards – Are required when decks are more than 30 inches above grade or walking surface below. They shall be at least 36 inches in height, support a 200 pound force and have less than 4 inch openings. Guards along open sides of stairs shall be at least 34 inches in height.

Stairs – Maximum riser height shall be 7 ¾ inches. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch. The minimum tread depth shall be 10 inches. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch.

Handrails – Handrails shall be provided on at least one side of each continuous run of treads or flight with four or more risers. Handrail height shall be not less than 34 inches and not more than 38 inches. All handrails shall be continuous for the full length of the flight. Handrail ends shall be returned or shall terminate in newel posts. Handrails shall have a space on not less than 1 ½ inches between the wall and handrail.

Guards Openings - Openings in guards shall be less than 4 inches. The triangular openings at the open side of stair, formed by the riser, tread and bottom rail of a guard, shall not allow passage of a sphere 6 inches in diameter.

Landings – An improved landing (3'x3') is required at grade level

Weather Protection – All connections between deck and dwelling shall be flashed and caulked.

Safety – Call Gopher One (811) at least 2 business days before you dig any holes for footings. They will provide a free service of locating buried lines.

Inspections – The approved plan and site drawing shall be on site and available for all inspections. Required inspections are: Site/Footing, before pouring concrete and Framing/Final after completed. To schedule an inspection call 320-983-3141 one day before you want the inspection, M-F 8:00-4:30

CITY OF MILACA

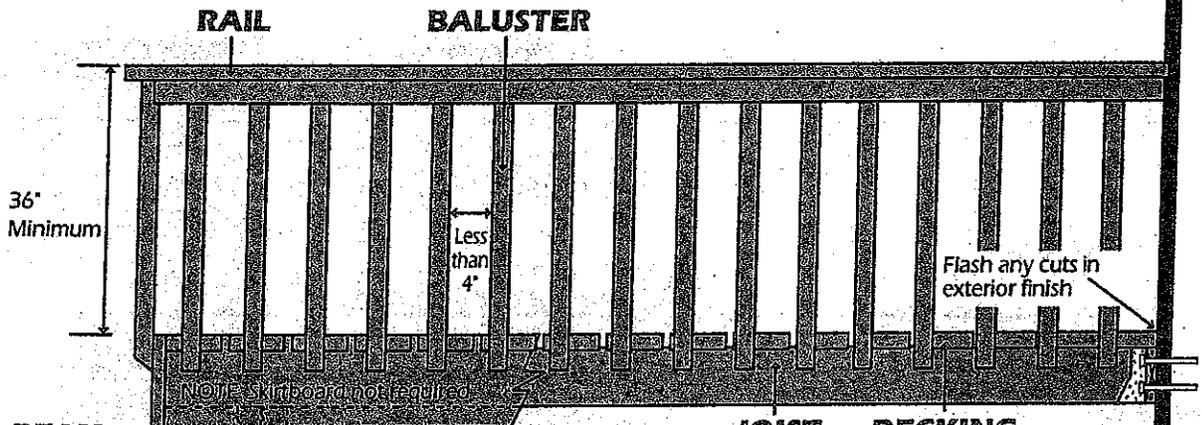
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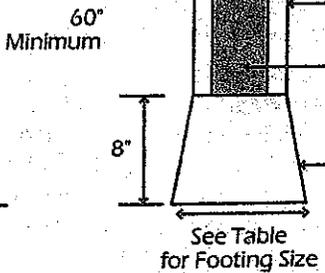
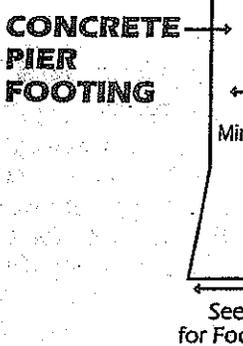
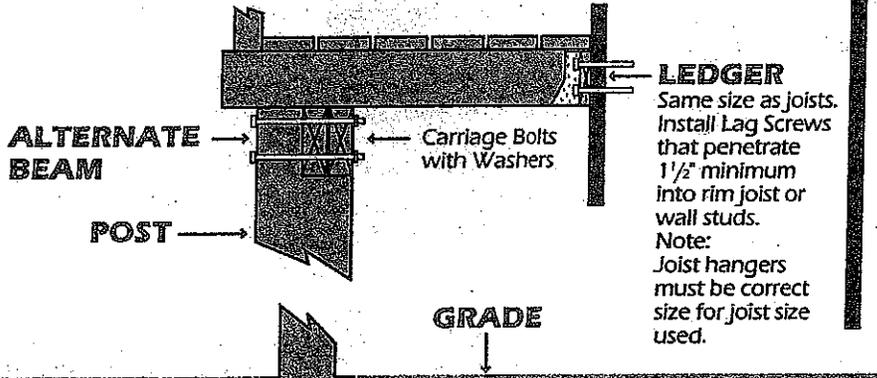
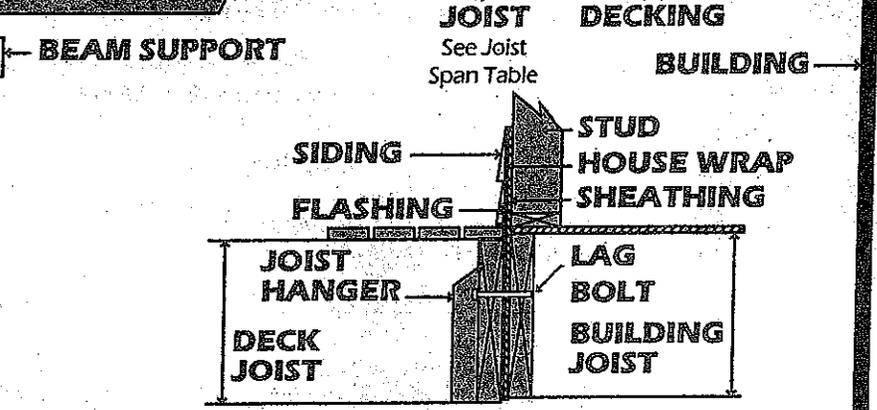
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BEAM
See Beam and Footing Table Notes:
- Any splices in beam must be over a support.
- All beams of 2 or more members shall be nailed together with 2 rows of 16d Nails at 16" O.C.

POST
3 1/2" Minimum



60" Minimum

*Decks 30" above grade must have a guardrail

36" Min Ht.

Less than 4" space

HOUSE

LEDGER BOARD:
Lags 16" o.c. w/ ledger fastened to solid wood (remove siding), flash and caulk, joist hangers req'd

DECKING:

- 2 x _ for 24" joist o/c.
- 5/4 x _ for 16" joist o/c.

POST/BEAM CONNECTION:
Notch post for direct bearing and bolt or lag together—4x6 or larger .40 CCA post (.60 CCA in ground) recommended.

BEAM: nail together 12" o/c; splice over posts; overhang beam 1' or less.

ALTERNATE BEAM:
Rim joist used as beam w/ post directly below and joist hangers- req'd with roof load (porches)

ALTERNATE FOOTING:
In-ground post to pad footing allowed w/ detailed drawing

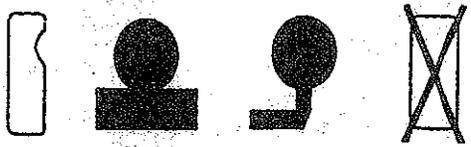
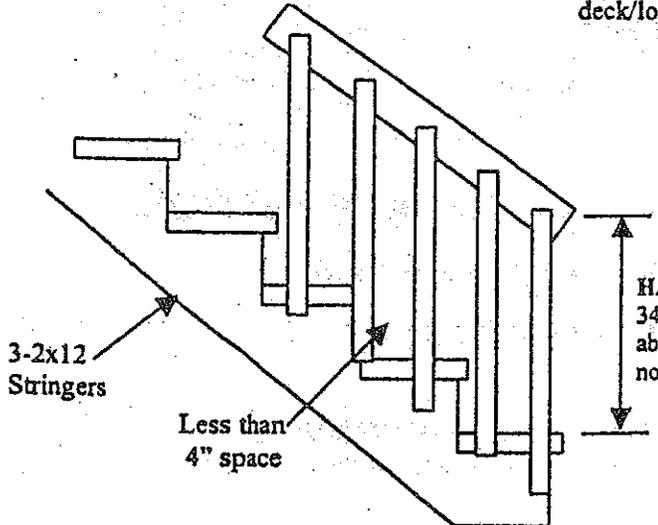
ANCHOR GRADE

ATTACHMENT TO A HOUSE CANTILEVER: A special design is req'd when applying the ledger board to a cantilever (i.e. patio door bumpout, bay window overhang, etc...).

60" Min.

Determined by size of deck/loading

HANDRAIL REQUIREMENTS:
Grippable handrail req'd with 4 or more risers.



2X4 OR 6 FLAT OR ON EDGE NOT ALLOWED W/OUT GRIPPABLE NOTCH. OVAL OR CUSTOMIZED MUST HAVE A 1 1/4" TO 2" CROSS SECTION.

All lumber shall be of natural resistance to decay or of treated wood (.40 CCA ground contact or .60 CCA in ground); fasteners shall be corrosion resistant.

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.

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: $a = 8'$, $b = 2'$, 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.

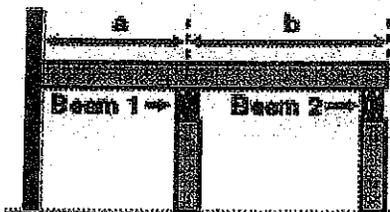
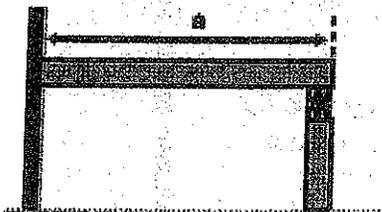
For sizing the beam, use a joist length of 12' ($8' + 4'$) and a post spacing of 10'. The **Beam and Footing Sizes** table indicates that the beam may be either two 2x10s or two 2x12s, depending on wood used. Depending on the type of soil, the footing diameter at the base must be a minimum of 15", 12" or 11" for the corner post and 20", 17" or 15" 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.

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. Depending on the type of soil, 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.



Beam and Footing Sizes

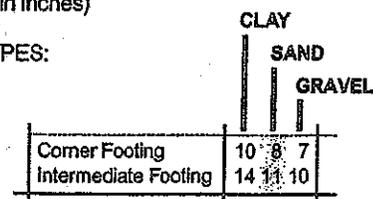
Based on No. 2 or better Ponderosa Pine and Southern Pine
(treated for weather and/or ground exposure)

		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	2-2x8	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	2-2x10	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 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	16 14 12
7'	Southern Pine Beam	1-2x6	1-2x6	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	2-2x10	2-2x10	2-2x10	2-2x12
	Ponderosa Pine Beam	1-2x6	1-2x6	1-2x8	2-2x8	2-2x8	2-2x10	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	13 11 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	18 15 13
8'	Southern Pine Beam	1-2x6	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x8	2-2x10	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	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 10 9	14 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 11	17 14 12	18 15 13	18 15 13	19 16 14
9'	Southern Pine Beam	1-2x6	1-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10	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	2-2x10	3-2x10	3-2x12	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 8	13 11 9	13 11 9	14 11 10	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	20 16 14
10'	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	3-2x10
	Ponderosa Pine Beam	1-2x6	1-2x6	2-2x8	2-2x8	2-2x10	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 8	13 11 9	14 11 10	14 11 10	15 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	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	3-2x10	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	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	16 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	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	3-2x10	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	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	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 19 16	23 19 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	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	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	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 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	Eng Bm	3-2x12	3-2x12
	Ponderosa Pine Beam	2-2x6	2-2x8	2-2x8	2-2x10	2-2x12	2-2x10	2-2x12	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 13 12	17 14 12	18 15 13
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	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	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	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	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	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	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	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 11	17 14 12	18 15 13	18 15 13	19 16 14
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	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:



DECK PLAN DETAILS

PLEASE FILL IN THE BLANKS WITH YOUR DECK DETAILS, FURNISH A SITE SURVEY AND COMPLETE A BUILDING APPLICATION.

WIDTH _____

JOIST SIZE _____
SPACING _____

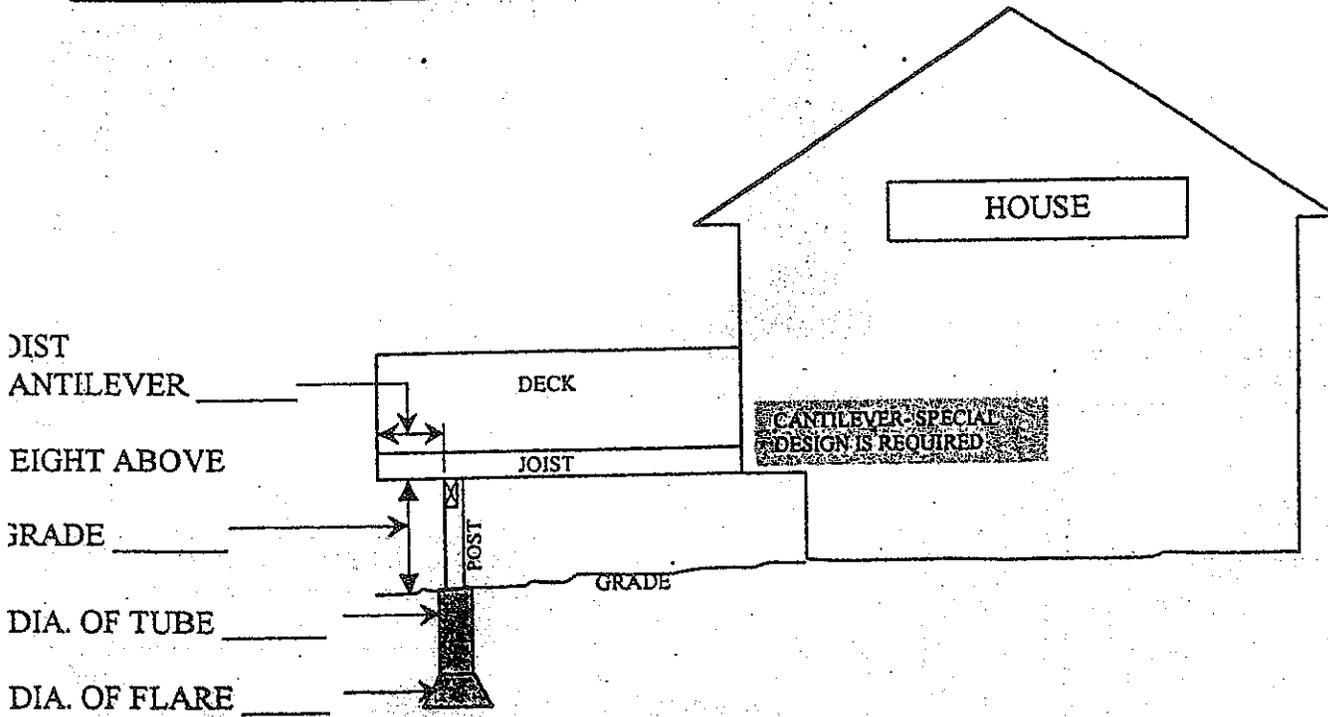
LENGTH _____

NUMBER OF POSTS _____ SIZE OF BEAM _____

POST SPACING _____ SIZE OF POSTS _____
(recommend 4x6 or larger for direct bearing)

1' Max.

LOCATE STAIRS ON SURVEY



APPLICATION CHECKLIST Y N

1. Is a future porch being considered?
2. Will there be a hot tub or spa on the deck?
3. Is the deck being attached to a house cantilever? Yes, provide a special design.
4. Is a guardrail required (over 30" above grade)?
5. Is a handrail required on the stairs (4 or more risers)?
6. Is the deck drawn on the site survey? Show the distance to relevant property lines, identify building and streets or alleys.

