City of Des Moines
Permit and Development Center
602 Robert D Ray Drive
Des Moines, IA 50309
Phone: 515-283-4200
https://www.dsm.city/pdc

RESIDENTIAL DECKS – Based on 2021 IRC

Questions: Permits@dmgov.org

Applications for deck permits must be done using the Customer Self Service portal at https://css.dmgov.org. Choose the "Residential Other Building Permit".

PLEASE NOTE:

1. The tables contained in this document are condensed. Complete tables for deck construction are available in the 2021 International Residential Code.
2. This handout does not include roofed deck construction.
3. Converting a deck to a covered porch or room may require larger footings as well as possible structural changes to the existing structure.
4. The information in this handout does not account for the installation of a hot tub. The installation of a hot tub on a deck will require structural engineering.
5. Decks are not allowed to be attached to house cantilevers or brick veneer without specialty fasteners or structural engineering.

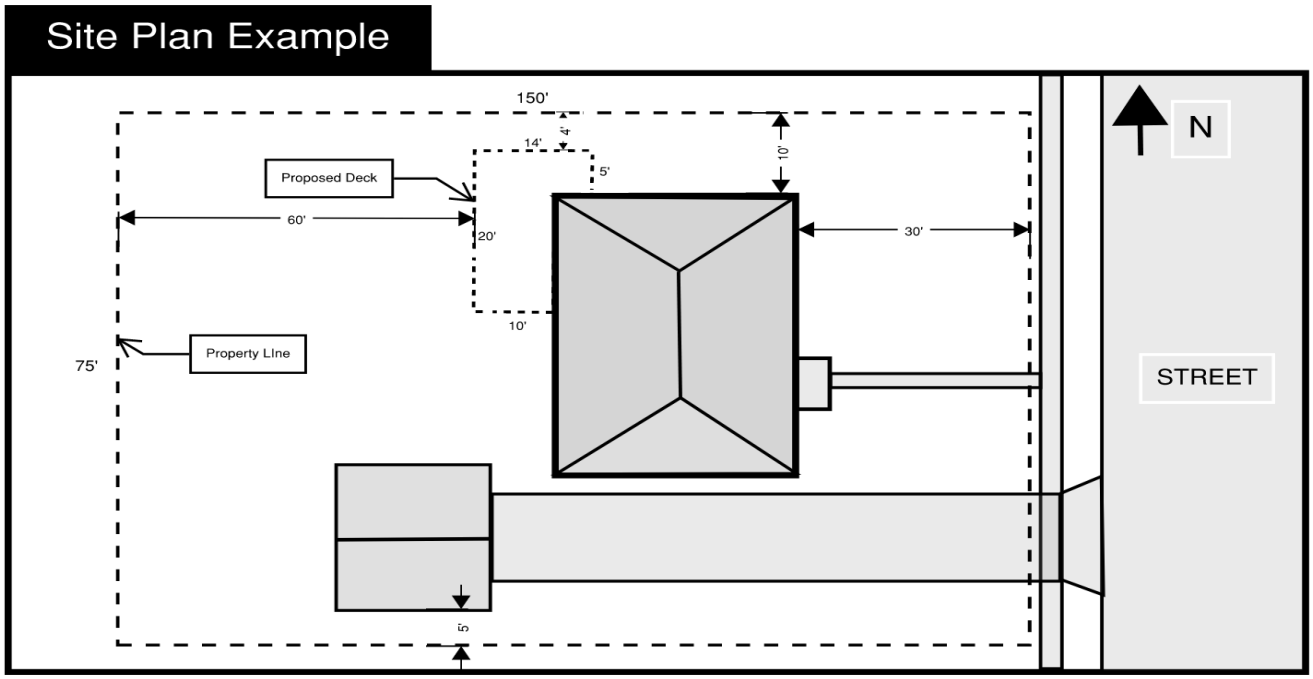
WHEN INSPECTIONS ARE REQUIRED: *Inspections should be requested from your permit page on the Customer Self Service Portal.*

1. **Footings/Post holes** – Prior to concrete placement when footings are dug, clean, and free from debris.
2. **Framing** – Deck structure is complete but not covered by deck boards or skirting. This may be done at same time as final inspection if not close to the ground and all framing connections are visible.
3. **Final** – Deck, stairs, guards, handrails, and landing all complete.
4. **Other inspections** – Separate electrical, plumbing, and mechanical inspections may be required if those systems are included in your project.

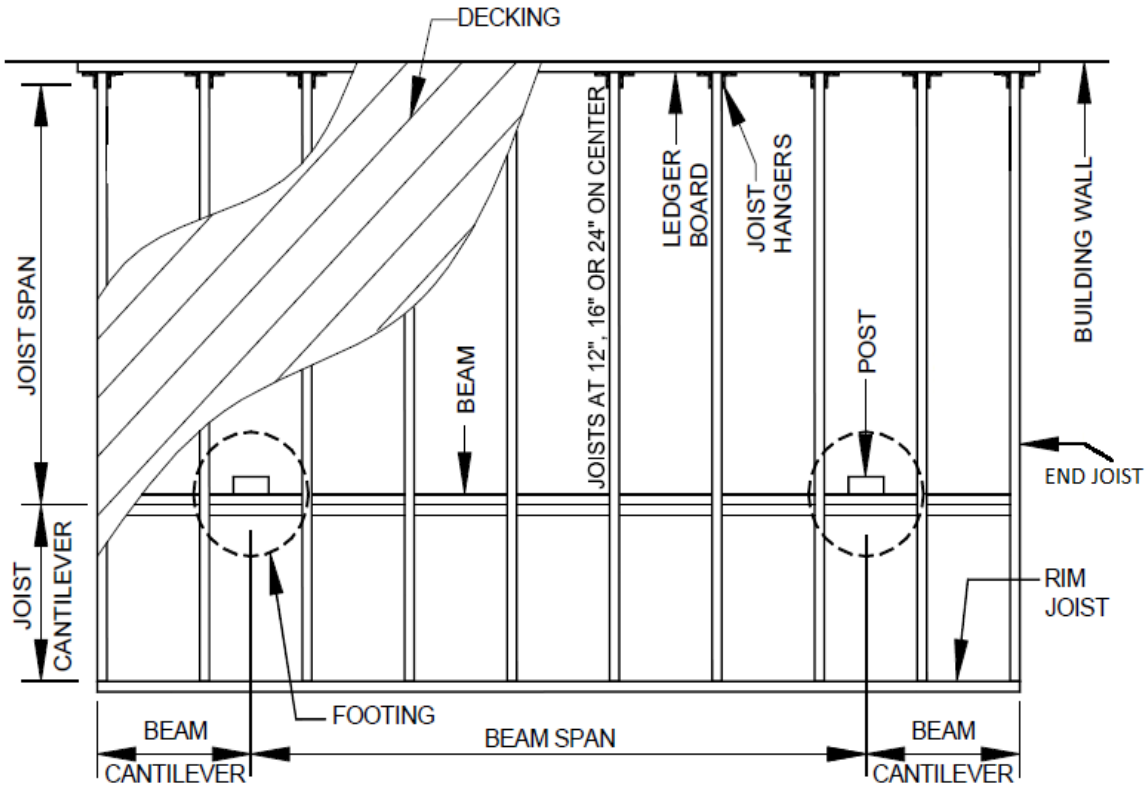
WHAT IS REQUIRED FOR PERMIT SUBMITTAL?

1. **Site Plan**: A site plan which shows your property, the location of the house on the property, and the proposed location of the new deck. Approximate distance to property lines should be noted on the site plan.
2. **Deck Plan**: Deck plan should show the elevation of the deck from the ground to the deck walking surface and the following information:
3. **Footings**: Footing size and locations
4. **Posts**: Structural support post sizes
5. **Beams**: Beam size, span, and post/beam connection
6. **Joists**: Joist size, span, cantilever distance, and joist/beam connection
7. **Decking**: Proposed decking material
8. **Stairs**: Stair details including stringer material, tread depths, and riser heights
9. **Guards**: Guard rail height, opening sizes, and connections to the deck
10. **Handrails**: Handrail material and elevations

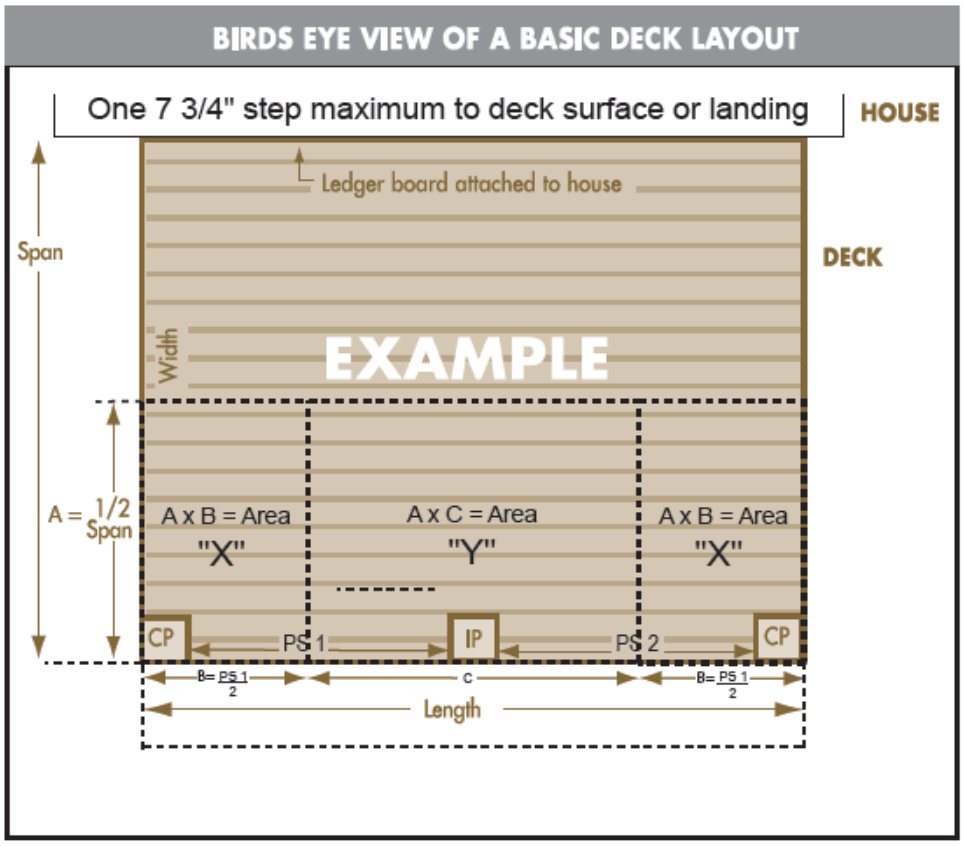
1. SITE PLAN



2. DECK PLAN



3. FOOTINGS



FOOTING SIZE TABLE								
40 psf Live Load	Maximum Tributary Area (Sq. Ft.)							
	10	20	30	40	50	60	70	80
	Required minimum Diameter of a Round Footing (inches)							
	8	10	12	14	16	18	18	20
Frost Depth is 42". Minimum thickness is 12" for all footings.								
Tributary area figured as X or Y in diagram above.								
Assumed 2000 psf soil bearing.								
Non-frost-protected, free standing deck footing sizes shall be determined by this table.								

Example: On a 12' x 12' deck:

A = 6'

B = 3'

C = 6'

The corner footings would support 18 SF (A x B) and would be minimum 10" round footings. The center footing would support 36 SF (A x C) and would be a minimum 14" footing.

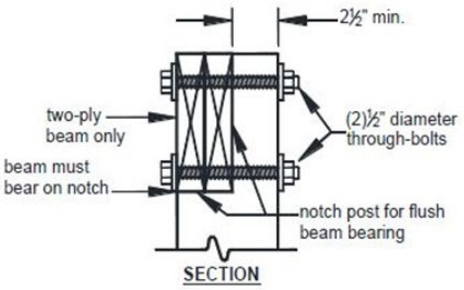
4. POSTS

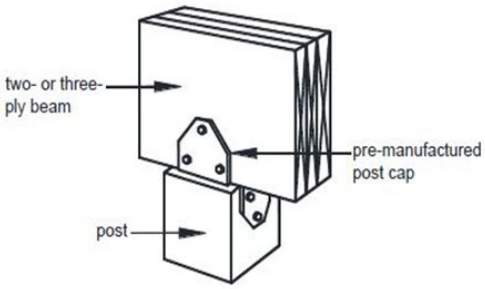
Deck Post Height	
Deck Post Size	**Maximum Height**
4x4	8'*
4x6	8'
6x6	14'
*6'-9" for 3-ply beam	

5. BEAMS

BEAM SIZING TABLE							
Beam Size	Deck Joist Span Less than or Equal To: (feet)						
	6	8	10	12	14	16	18
Beam Spans (feet-inches)							
(1) 2x6	4-7	4-0	3-7	3-3	3-0	2-10	2-8
(1) 2x8	5-11	5-1	4-7	4-2	3-10	3-7	3-5
(1) 2x10	7-0	6-0	5-5	4-11	4-7	4-3	4-0
(1) 2x12	8-3	7-1	6-4	5-10	5-5	5-0	4-9
(2) 2x6	6-11	5-11	5-4	4-10	4-6	4-3	4-0
(2) 2x8	8-9	7-7	6-9	6-2	5-9	5-4	5-0
(2) 2x10	10-4	9-0	8-0	7-4	6-9	6-4	6-0
(2) 2x12	12-2	10-7	9-5	8-7	8-0	7-5	7-0
(3) 2x6	8-6	7-5	6-8	6-1	5-8	5-3	4-11
(3) 2x8	10-11	9-6	8-6	7-9	7-2	6-8	6-4
(3) 2x10	13-0	11-2	10-0	9-2	8-6	7-11	7-6
(3) 2x12	15-3	13-3	11-10	10-9	10-0	9-4	8-10
Beams may cantilever ¼ of the adjacent beam span							
Engineered beam spans per manufacturer's information or structural engineering							

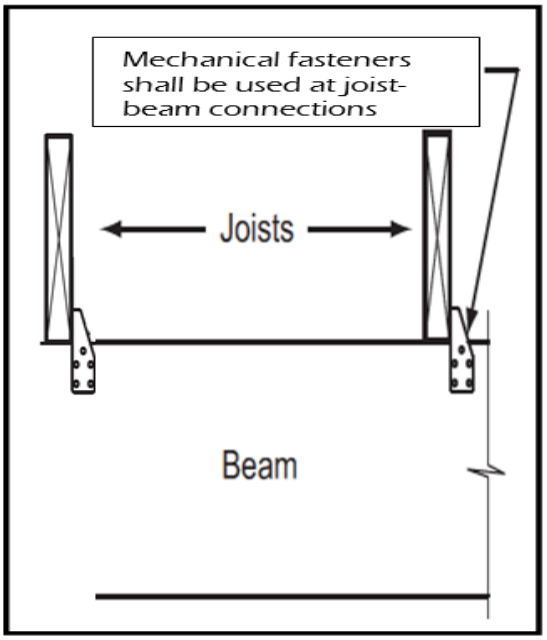
Post/ Beam Connection





6. JOISTS

JOIST SPANS			
Joist Size	**Spacing (o.c. = on center)**	**Allowable Joist Span**	**Maximum Cantilever***
2x6	**12" o.c.**	**9-11**	**1-3**
	16" o.c.	**9-0**	**1-4**
	24" o.c.	**7-7**	**1-6**
2x8	**12" o.c.**	**13-1**	**2-1**
	16" o.c.	**11-10**	**2-3**
	24" o.c.	**9-8**	**2-5**
2x10	**12" o.c.**	**16-2**	**3-4**
	16" o.c.	**14-0**	**3-6**
	24" o.c.	**11-5**	**2-10**
2x12	**12" o.c.**	**18-0**	**4-6**
	16" o.c.	**16-6**	**4-2**
	24" o.c.	**13-6**	**3-4**
***Maximum cantilever is ¼ of the joist span or tabular value, whichever is less**			
Minimum ledger size for all attached decks is 2x8.			



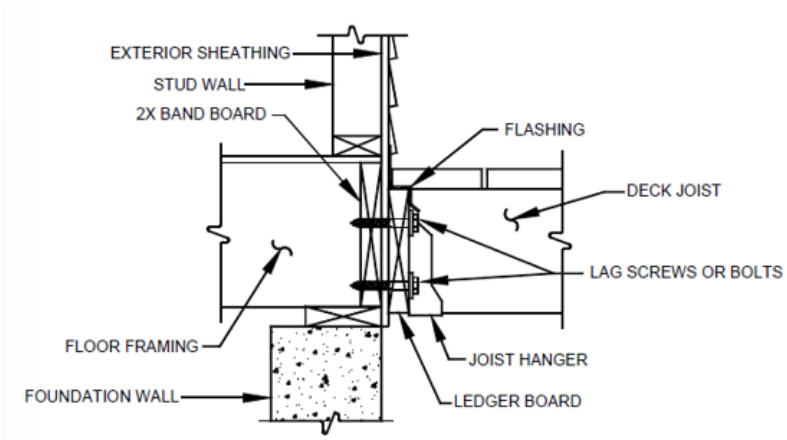
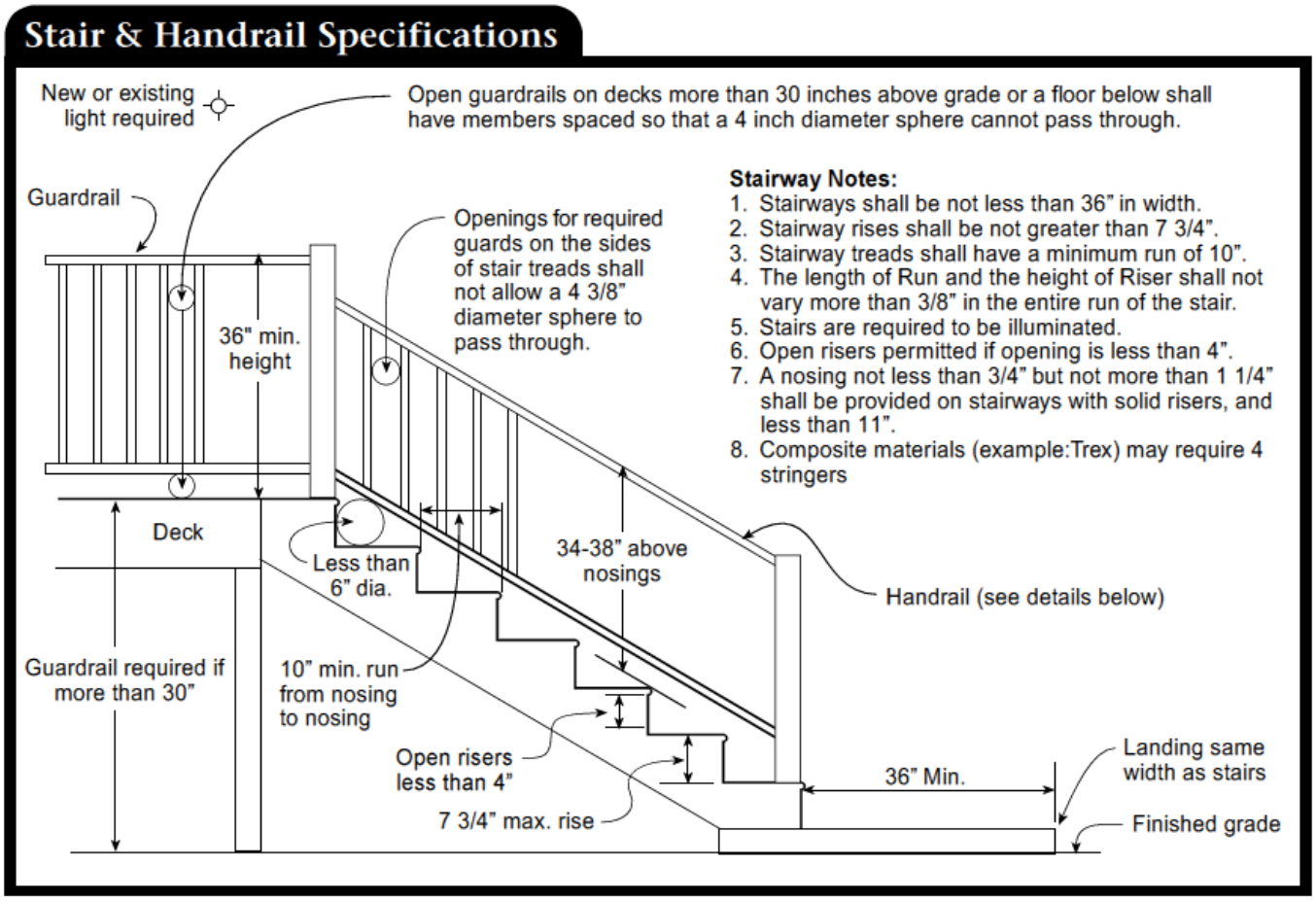


FIGURE R507.9.1.1
LEDGER BOARD TO BAND BOARD ATTACHMENT

7. DECKING

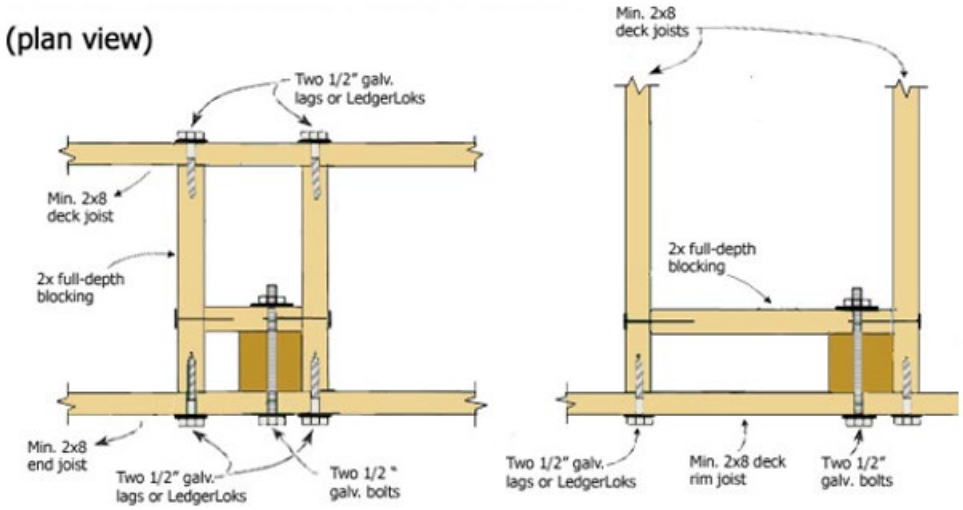
DECKING MATERIAL SPANS		
Decking Material	**Maximum joist spacing when decking is installed:**	
	Perpendicular to joist	**Diagonal on joist**
5/4 Decking	**16”**	**12”**
Nominal 2” Decking	**24”**	**16”**
Composite Decking	**Follow manufacturer specifications**	

8. STAIRS



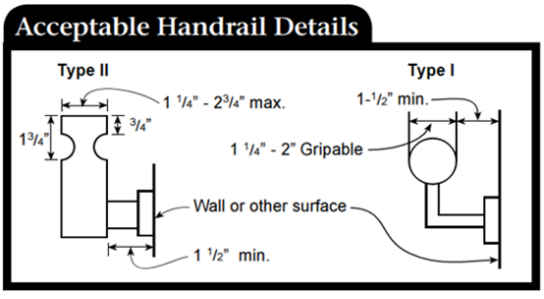
9. Guards

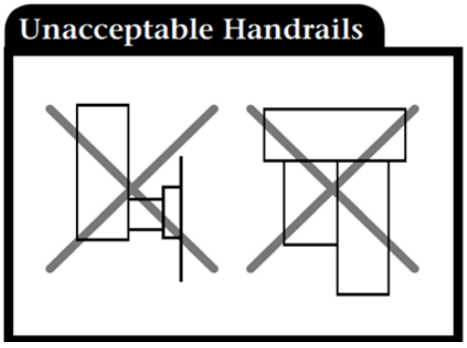
1. Guard posts may not be notched.
2. Guards shall be no less than 36" tall on the deck and 34" tall from a line connecting the stair nosings on the open sides of stairs.
3. When guards are supported by the deck framing, the guard loads shall be transferred to the deck framing. Diagrams below are examples of how this may be accomplished.
4. If guards are supported on top of the deck framing, they must be installed per manufacturer's instructions.
5. Guard posts shall be set no more than 6' on center.
6. Required guards shall not allow the passage of a 4" sphere between any horizontal or vertical guard members or between the guard and deck surface.
7. The opening formed by the riser, tread, and guard may not allow passage of a 6" sphere.

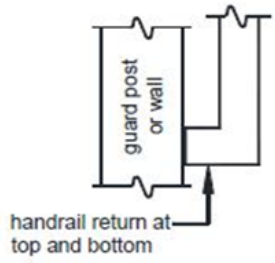


10. Handrails

1. Handrails are required on at least one side of the stairs when the stairway has four or more risers.
2. The handrail must be continuous from the nose of the bottom riser to the nose of the top riser.
3. The top of the handrails must be between 34" and 38" above the nose of each stair tread.
4. Handrails must be returned to a wall, guard, post, or walking surface at the top and bottom of a flight of stairs.







Handrail Return Example