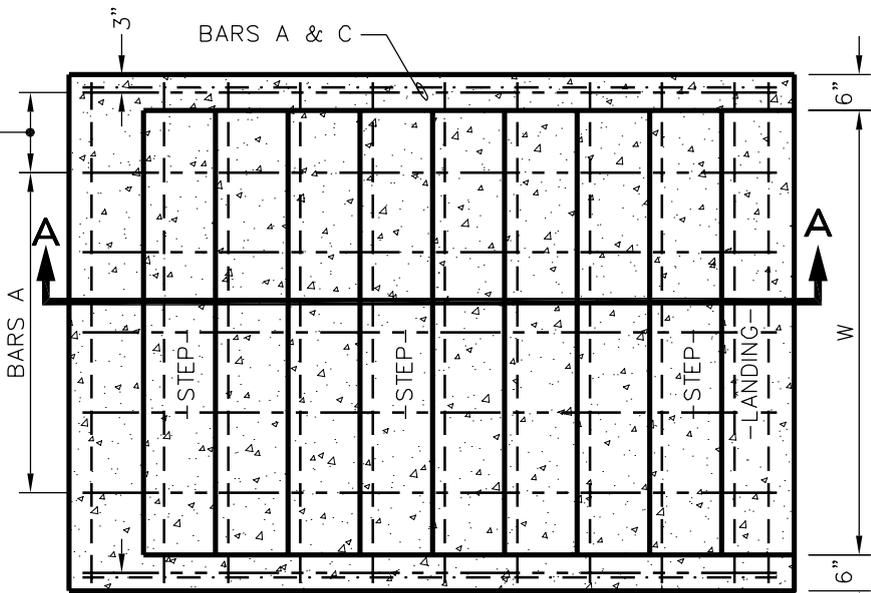
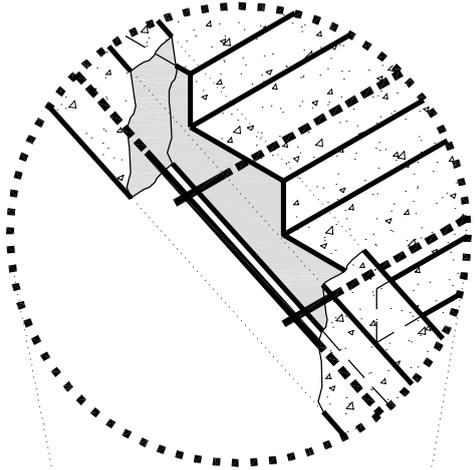
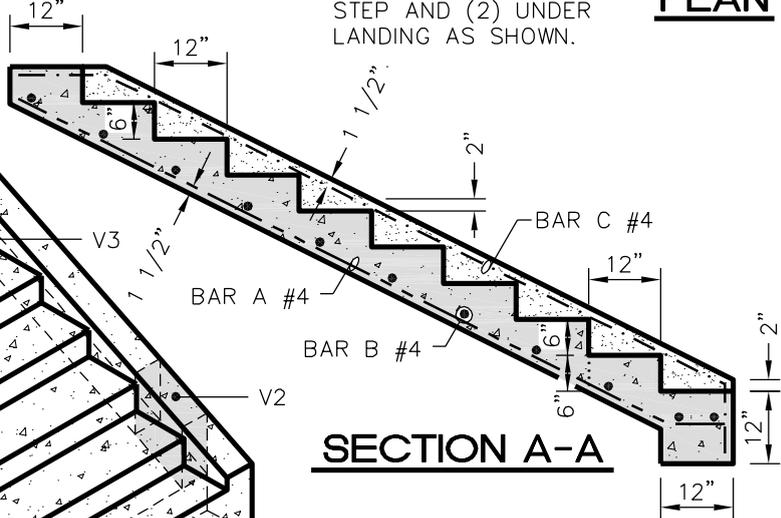
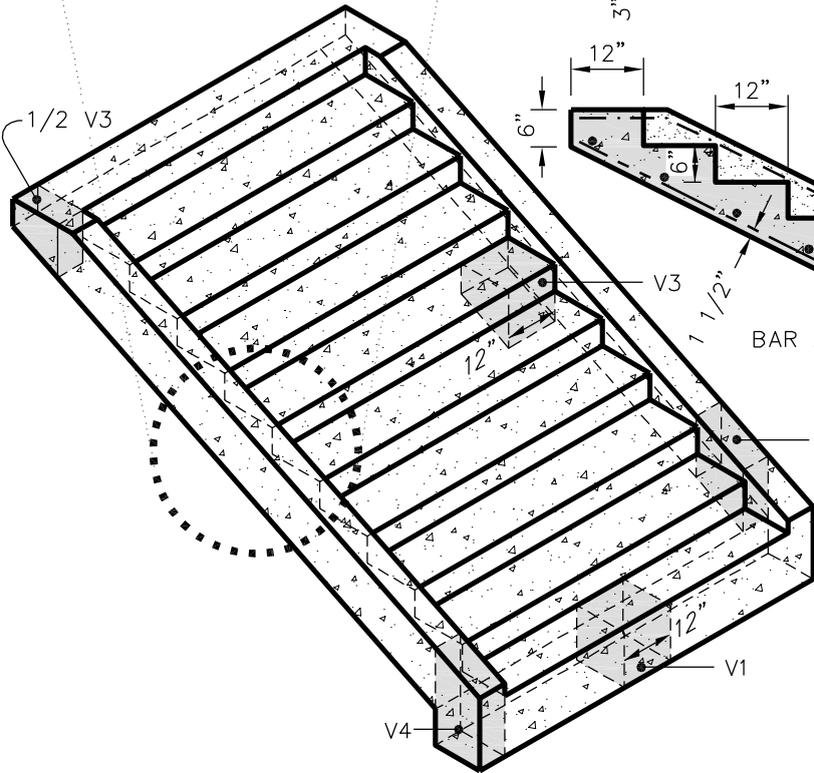


BARS A TO BE EQUALLY SPACED FOR # OF BARS SEE TABLE BELOW



(1) BAR B TO BE PLACED UNDER EACH STEP AND (2) UNDER LANDING AS SHOWN.

PLAN



SECTION A-A

LEGEND

- BAR A
- BAR B
- BAR C

NUMBER OF BARS "A"									
NUMBER OF RISERS (N)	1-5	6	7	8	9	10	11	12	13-25
W=3'	NO STEEL	4	5	5	6	6	7	7	8
W=4'		5	6	7	7	8	8	9	10
W=5'		6	7	8	9	9	10	11	12



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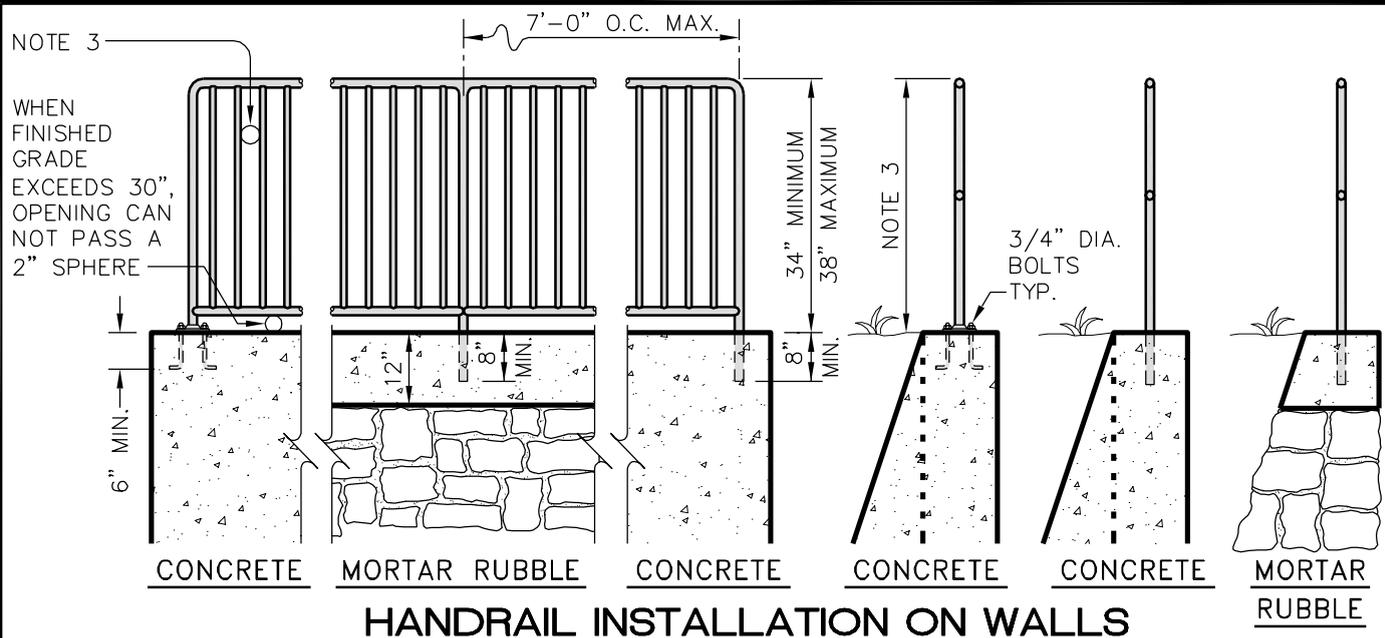
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STANDARD CONCRETE STEPS FOR 2:1 SLOPES

SCALE: Not To Scale	DETAIL # 2408.01
REVISION DATE: July, 2010	SHEET #: 1 of 3



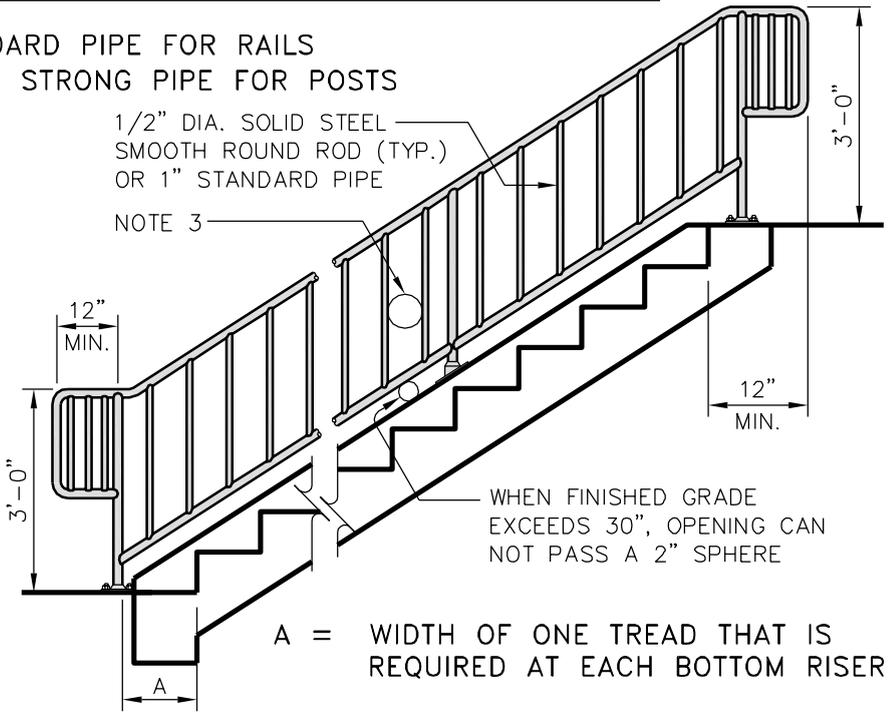
HANDRAIL INSTALLATION ON WALLS

- 1 1/2" STANDARD PIPE FOR RAILS
- 1 1/2" EXTRA STRONG PIPE FOR POSTS

1/2" DIA. SOLID STEEL SMOOTH ROUND ROD (TYP.) OR 1" STANDARD PIPE

NOTE 3

HANDRAIL INSTALLATION ON STEPS



NOTES:

1. This handrail is to be used only as a protection for pedestrians and should not be placed in any location where it might be subject to vehicular impact. For vehicular protection standard guardrail should also be used.
2. Handrail to be in accordance with the latest codes as set forth in the North Carolina Building Code and the N.C. Accessibility Code.
3. When the finished grade exceeds 30", rail height to be minimum 42". Additionally baluster (vertical pickets) spacing shall be spaced such that a 4 inch sphere cannot pass thru any opening up to a height of 34". From a height of 34" to 42" above the walking surface, a sphere of 8 inches in diameter may not pass. When the grade is 30" or less, horizontal rails may be used with rail spacing varying as desired.



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HANDRAIL INSTALLATION ON WALLS AND STEPS

SCALE: Not To Scale	DETAIL # 2408.01
REVISION DATE: July, 2010	SHEET #: 2 of 3

V = Indicates total volume of steps in Cu. yards.
 V1, V2, V3, & V4 = Indicates elementary volumes used in computing V.
 W = Indicates clear width of steps, in feet, between sidewalls.
 N = Indicates number of steps in installation exclusive of landing.
 L1 = Indicates length of bars A, in inches. $L1=13.416N+8''$.
 L2 = Indicates length of bars B, in inches. $L2=12w+9''$
 L3 = Indicates length of bars C, in inches. $L3=13.416N+18''$.

V1 = 1.000 Cu. Ft.
 V2 = 0.583 Cu. Ft.
 V3 = 0.750 Cu. Ft.
 V4 = 0.708 Cu. Ft.

FROM PICTORIAL VIEW IT IS SEEN THAT:

$$V = \frac{V1W + (2) V2 (N-1) + V3 (WN+1) + (2) V4}{27}$$

SUBSTITUTING VALUES OF ELEMENTARY VOLUMES:

$$V = \frac{1.000 W + 1.166 (N-1) + 0.750 (WN+1) + 1.416}{27}$$

NOTES:

1. Provide 3/4" deep tooled score joints at 5'-0" O.C.
2. Expansion joints to be placed at 30' O.C. longitudinally, adjacent to curbs, and when butting existing structures, concrete, or buildings.
3. A landing is to be provided where 12 or more steps are required. Maximum size of landing to be W+1'-0" x 4'-0".
4. This item may be precast or cast-in-place. Concrete to be 3000 psi air entrained if cast-in-place or 4,000 PSI if precast.
5. For other widths the approximate spacing of bars A in inches will be equal to 80/N with a minimum spacing of 6".
6. Reinforcing bars to be used in installations of 6 or more steps.
7. Handrail is to be provided for steps having four or more risers, and will meet the following conditions:
 - A. On steps less than 44" wide having both sides enclosed, at least one handrail, preferably on the right side descending.
 - B. On steps less than 44" wide having one side open, one handrail on each side.
 - C. On steps less than 44" wide having both sides open, one handrail each side.
 - D. On steps more than 44" wide but less than 88" wide, one handrail each side.
 - E. On steps 88" or more wide, one handrail each side, and one intermediate handrail located approximately midway of the width.



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**STANDARD CONCRETE STEPS
 FOR 2:1 SLOPES**

SCALE: Not To Scale	DETAIL # 2 408.01
REVISION DATE: July, 2010	SHEET #: 3 of 3