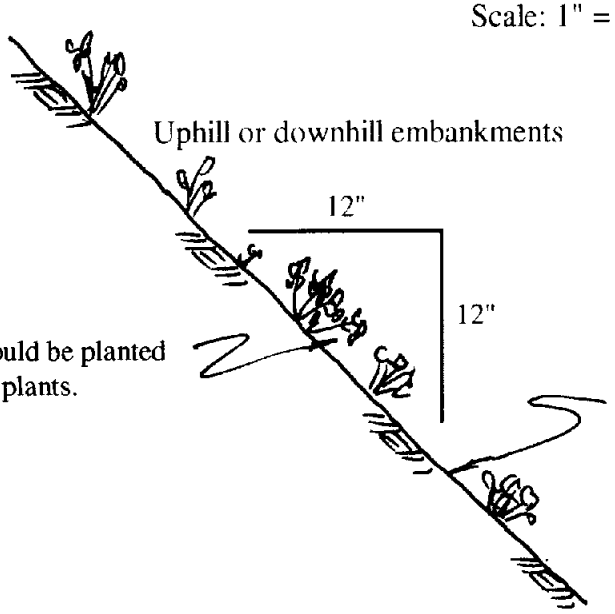
TYPICAL ROADWAY EMBANKMENT IMPROVEMENT STANDARDS

Scale: 1" = 1' - 0"



Maximum graded slope shall not exceed 12/12 (horizontal to vertical) ratio unless the soil is stable rock or hardpan that will not erode or slide into the roadway right of way. Slopes exceeding this ratio shall be stabilized/retained by rip/rap, timbers, mortarless blocks, or other approved retaining wall materials.

SLOPE IMPROVEMENT GUIDELINES:

1. Stable slopes of rock or hardpan, certified by a qualified soils engineer may remain in their natural condition. **However, in the event such slopes become unstable and slide into the District right of way, it shall be the property owner's responsibility to correct the situation to meet District standards.**

2. The height of the slope improvements shall be from the elevation at the properly graded right of way line to the point of natural stabilized ground level existing prior to the roadway improvement grading.

3. Unstable slopes exceeding the 12/12 ratio, but less than a 6/12 ratio may be stabilized with large rip/rap varying from 18"± boulders minimum at the bottom to 12"± boulders at the top.

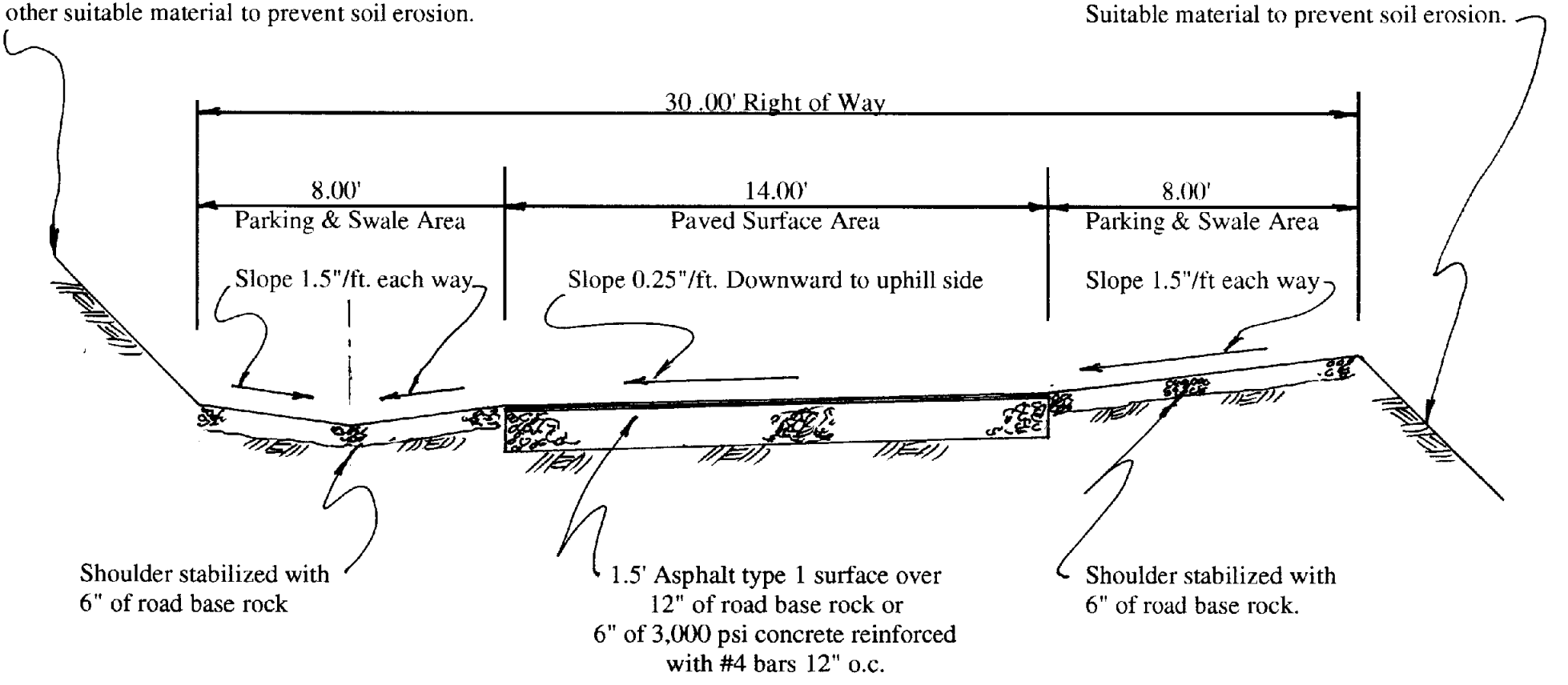
4. Unstable slopes exceeding the 6/12 ratio, but less than a 2/12 ratio may be stabilized with mortarless blocks to a height not exceeding 6 feet. Heights greater than six feet may be stabilized with mortarless block using a horizontal step of not less than 4 feet in width prior to beginning another vertical continuation.

5. Unstable slopes exceeding the 2/12 ration may be stabilized with a timber, reinforced concrete or concrete block retaining walls using vertical support columns extending into the natural ground 1.5 feet for every 1.0 feet of above ground height. Such walls shall be backfilled with 3/4" gravel to provide drainage, and 1" diameter drainage holes shall be placed on 3 feet centers in walls other than timber construction. Timber walls shall have ½" spacers to separate the horizontal timbers and provide drainage. Timber walls shall be constructed of pressure treated wood timbers. **Walls under this category shall not exceed 6' - 0" in height above grade, unless designed by a registered engineer.**

TYPICAL ROADWAY CROSS SECTION

Uphill slope will be stabilized and graded or protected by rip/rap, or an approved wall of wood, mortarless block, timber or other suitable material to prevent soil erosion.

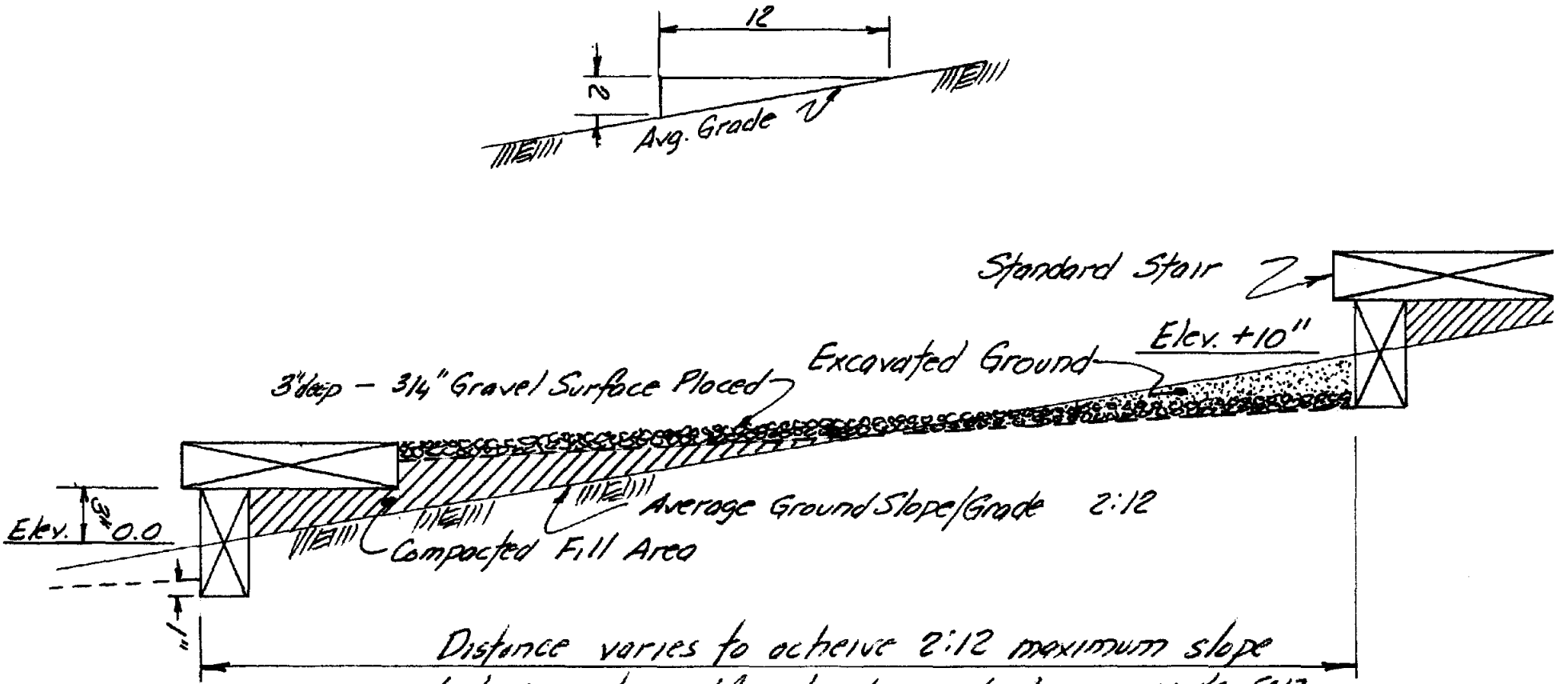
Downhill slope will be stabilized and graded or protected by rip/rap or an approved retaining wall of timber, mortarless block , timber or other Suitable material to prevent soil erosion.



Muir Beach Community Services District

Roads and Easements Standards

Scale: 1/4" = 1' - 0"

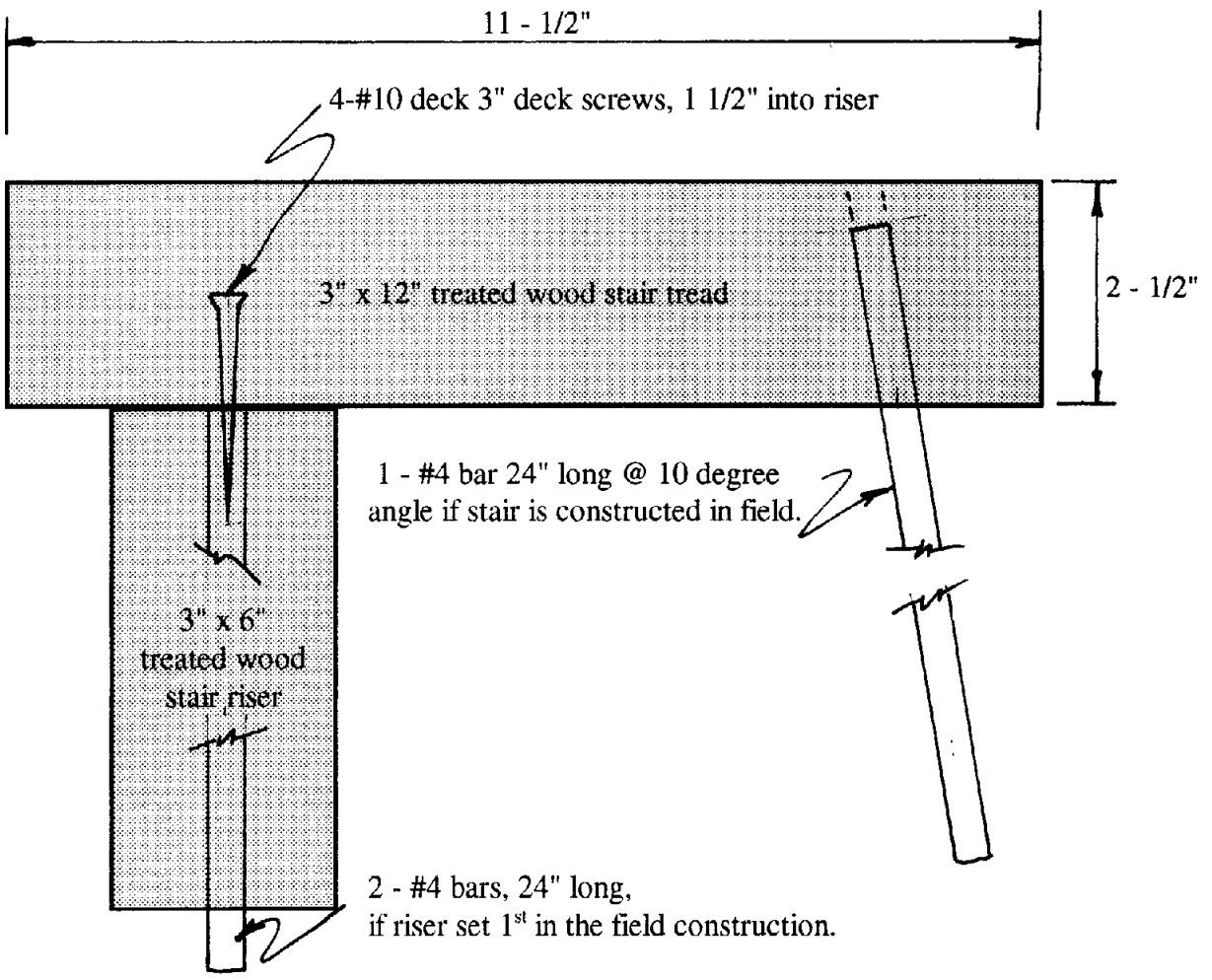


Muir Beach Community Services District

Pedestrian Easement Improvement Standards
for
Average Ground Slope of 2:12 or 16.66%
Scale: 1.5" = 1'-0"

D:\R&E\2-12 slope standard

September 9, 1997



LEGEND

Fill area

Excavation area

Placed 3/4" Gravel

NOTE:

It is generally easier to construct the Stairs in the field, setting the riser in first, then backfilling to the tread level then placing and securing the tread to the anchored riser.

Muir Beach Community Services District

Pedestrian Easement Improvement Standards

for

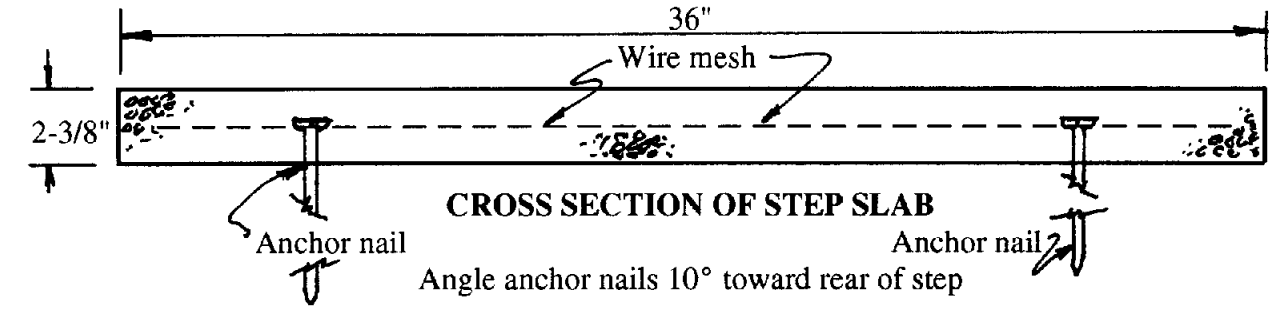
STANDARD PEDESTRIAN EASEMENT TREATED WOOD STAIR

No Scale

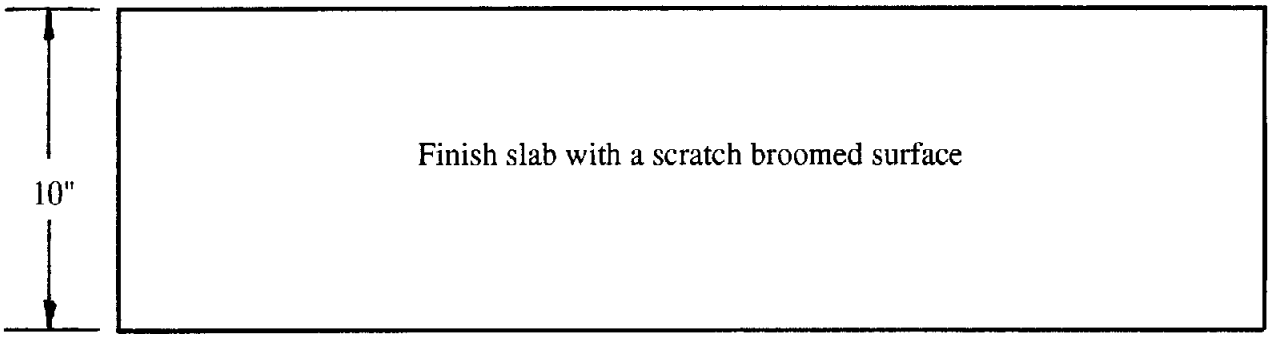
D:\R&E\Standard Stair

September 9, 1997

MUIR BEACH COMMUNITY SERVICES DISTRICT SPECIFICATIONS FOR CONCRETE STAIRS FOR EASEMENT IMPROVEMENTS.



CROSS SECTION OF STEP SLAB



PLAN OF STEP SLAB

GENERAL SPECIFICATIONS:

I. The dimensions of each slab shall be approximately 3 feet wide, by 10 inches deep and 2 3/8 inches thick.

II The volume of each slab is 0.5± cubic feet and equal to approximately 67 pounds.

III. Each step shall be formed on firm ground using the following procedures:

A. A single 60 pound bag of pre mix concrete will be used with the following added materials:

1. ½ gallon of Portland cement.
2. 1 quart of sand
3. 1 quart of 3/4 gravel

B. The water to cement ratio is the most important factor in the final strength of the concrete; therefore the water added should be very carefully measured. **No more than 1 gallon of water** (preferably 0.75 gallons) **should be used per bag of mix** including the added materials above.

C. The color powder should be mixed with the cement. A desired color of medium brown should be determined by trial and error to determine the amount of color mix required.

IV Prior to pouring the mix into the forms, the forms should be thoroughly oiled and the soil inside the forms should be saturated with 2 gallons of water (to provide a satisfactory curing base).

IV Place the concrete mix as follows:

A. When the soil moisture water has percolated into the soil, approximately half the mix should be placed in the forms and then tamped to remove all voids.

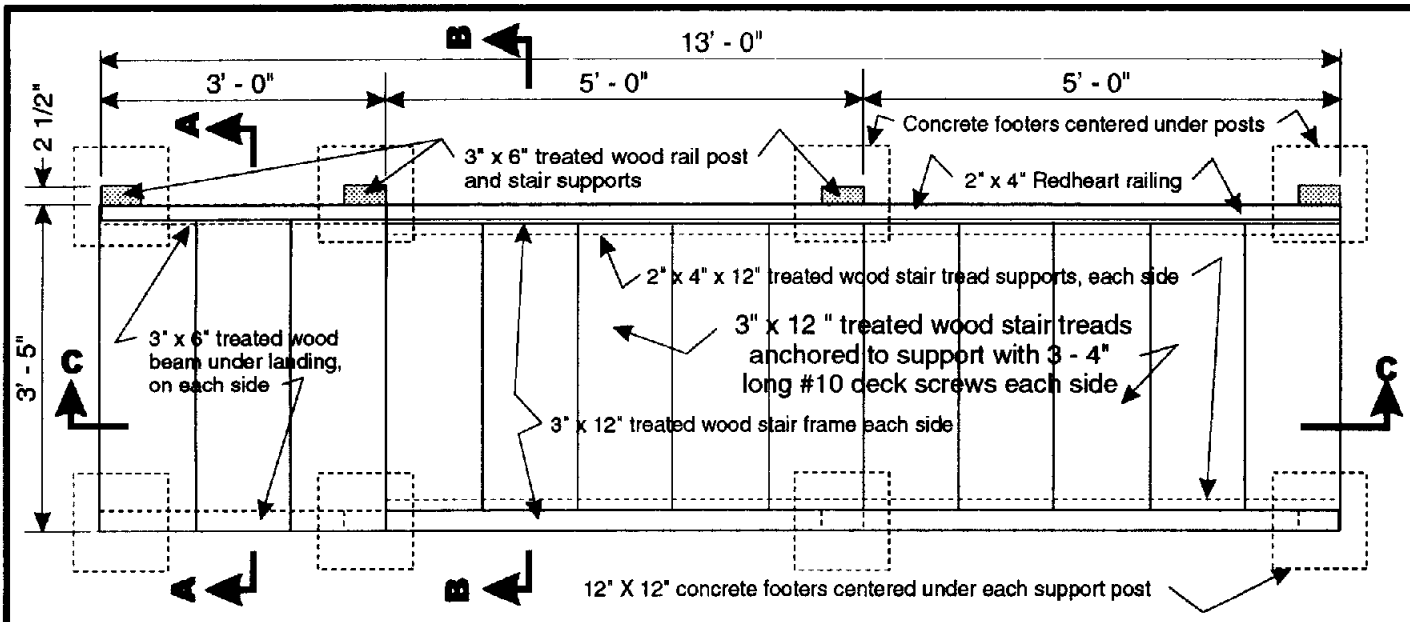
B. Place the wire mesh on top of the mix in place and drive the anchor nails through the mesh into the soil until the nail head just touches the wire mesh. The anchor nails should be placed approximate 6 inches from each end and slightly toward the rear of the step, then driven at an slight angle (10 degrees) toward the center of the step.

C. Pour the remaining mix on top of the mesh and tamp to remove voids. Trowel the surface to level with the forms and to produce a smooth surface.

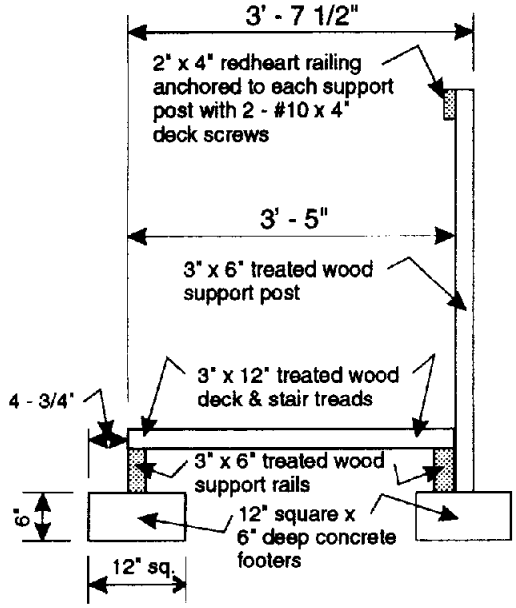
D. When the surface is sufficiently dried to hold form, scratch the surface with a course broom oar brush to provide a non-slip surface.

E. Apply a thorough coating of curing liquid to the entire surface of the step.

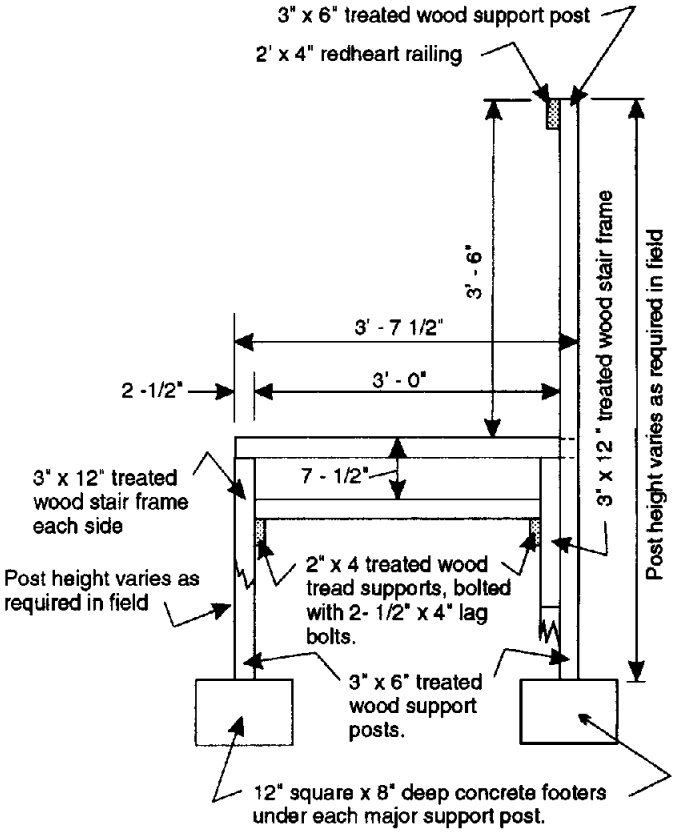
V. The forms should be removed after three (3) days and the steps can be placed into use after seven (7) days.



PLAN VIEW



SECTION A - A

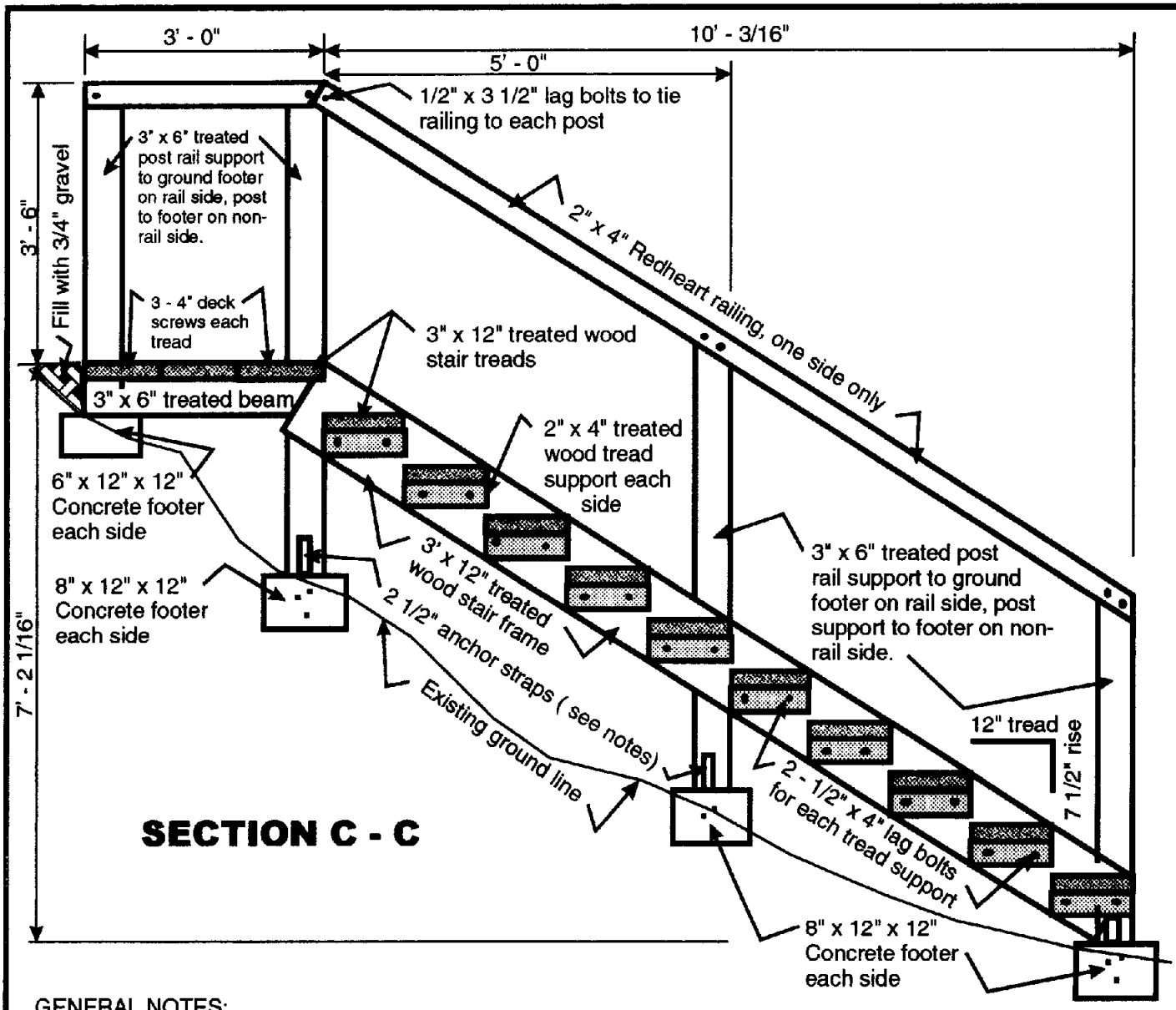


SECTION B - B

TYPICAL STAIR DETAILS FOR PEDESTRIAN EASEMENTS

Muir Beach Community Services District

Roads and Easements Standards



SECTION C - C

GENERAL NOTES:

1. When the natural ground vertical slope is steeper than 5" horizontal to 12" vertical, the above stair standard shall be used in lieu of individual steps.

2. In the event a single filght of stairs is not adequate to reach a ground slope permitting individual steps, additional stair flights shall be consttucted as required.

CONSTRUCTION HARDWARE NOTES:

1. Each support post shal be anchoreed to the concrete footer by a 1/4" steel saddle anchor embedded in the footer and bolted to the post with a 1/2" x 4" lag bolt.

2. The beam supporting the upper landing shal set on the concrete pad without an anchor.

3. The stair frame sides (3" x 12") shall be bolted to the post rail support with 2 -1/2" x 5" lag bolts at each post on the railing side.

4. The stair frame sides (3" x 12") shall rest of the support post on the non railing side and be anchored to the post with a 2 1/2" wide x 6" long x 1/4" thick galvanized strap with 2 - 1/2" x 2 1/2" lag bolts

TYPICAL STAIR DETAILS FOR PEDESTRIAN EASEMENTS

TYPICAL DRIVEWAY CULVERT AND DRAINAGE CULVERT STANDARDS

GENERAL GUIDELINES

I. In the event that driveway access to the private property residence cannot conform to the cross section of the District's standard road design, preserving the open drainage swale for the uphill and/or downhill sides of the roadway, a drainage culvert may be installed in lieu of the drainage swale. The minimum size for a driveway culvert shall be a 12 inch by 15 inch elliptical corrugated metal culvert or a 12 inch round smooth plastic drainage culvert. All culverts shall be installed in accord with the following standards:

A. The culvert shall extend at least 4 inches beyond the edge of the driveway pavement.

B. The intake side of the culvert will be protected from debris by an intake screen with standard 1 inch openings or by 3/8 ths inch non corrosive bars 1 and 1/4 in on center.

C. The inside bottom edge of the culvert opening shall be level with the influent and effluent levels of the existing drainage swale, and shall not interrupt the drainage flow.

D. The existing drainage swale at the influent and effluent areas of the culvert shall be protected with stone rip rap, concrete, or asphalt concrete for a minimum of 3 feet as measured from the ends of the drainage culvert.

II. In the event that the installation of a culvert, in accord with the above standards, is not possible due to topographic conditions or exiting underground utilities, the following alternatives may be used:

A. The District's standard drainage swale may be crossed by the use of a reinforced concrete or 3/4 inch steel slab (hereinafter referred to as a bridge slab) as long as it preserves the full drainage flow of swale.

B. The drainage swale area beneath the bridge slab shale be shaped, formed and surfaced with a minimum of two inches of concrete reinforced with #10/10 wire mesh, or 3 inches of asphalt concrete.

C. The influent effluent sides of the bridge slab and drainage swale shall be protected from debris in a manner similar to the protection outlined in I - B and D above.

III. For all drainage facilities other than driveways, the minimum culvert size shall be as specified in I - A through D above, providing the District's engineering evaluation does not require a larger culvert size or other increased drainage flow requirements.