SECTION VII
ROADWAY AND SITE IMPROVEMENTS
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## ROADWAY AND SITE IMPROVEMENTS

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</table>
Notes:
1. Concrete for Alley and Alley Apron to be 8' Plain Portland Cement Concrete Mix No. 7
2. No Longitudinal Construction Joints will be permitted.
Note: This Standard Detail Applies for Double Driveways to Semi-detached Houses.

DRIVEWAY ENTRANCE

Sidewalk Elevation

Expansion Joint

Curb Below Gutter Line

FRONT VIEW

R/W Line

NOTE: For Details Of Section 'A-A' See Standard 1/3

PLAN VIEW

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS

STANDARD ROADWAY & SITE IMPROVEMENT DETAILS TYPICAL DOUBLE DRIVEWAY ENTRANCE-URBAN (SPACE BETWEEN SIDEWALK AND CURB)

REVISED 1
NOTES:
1. FOR THE MINIMUM PAVING FOR DRIVEWAYS IN THE COUNTY RIGHT OF WAY, SEE LOCAL ROAD PAVING SECTIONS, DETAIL P/8.
2. A MINIMUM OF 20 LIN. FT. OF METAL PIPE (16 GAUGE MINIMUM) TO BE INSTALLED.
3. DITCH LINING AND VELOCITY DISSIPATORS TO BE PROVIDED AS REQUIRED.

SLOPE VARIATION:
* SLOPE VARIES IN DITCH TRANSITION SECTION FROM MAX 1.5:1 AT FACE OF PIPE TO 2:1 AT BEGINNING OF TRANSITION.
** SLOPE VARIES IN DITCH TRANSITION SECTION FROM MAX OF 3.5:1 AT FACE OF PIPE TO 4:1 AT BEGINNING OF TRANSITION.

SHOULDER WIDTH VARIES (SEE PLANS OR APPLICABLE PAVING DETAIL)

EDGE OF SHOULDER
PIPE TO BE CENTERED ON DITCH MIN. 15" OR EQUIVALENT DIAMETER

ANNE ARUNDEL
COUNTY
DEPARTMENT OF
PUBLIC WORKS

APPROVED

CHIEF ENGINEER

DESIGN ENGINEER

DATE

STANDARD ROADWAY & SITE IMPROVEMENT DETAILS
TYPICAL DRIVEWAY ENTRANCE — RURAL
(WITH DRAINAGE PIPE)
RIGHT OF WAY

WRAP SHOULDER TO PROVIDE TRANSITION TO DRIVEWAY GRADE (BOTH SIDES)

SHOULDER

EDGE OF ROADWAY PAVING

SAME AS SHOULDER WIDTH

PLAN

NOTES:
1. FOR THE MINIMUM PAVING FOR DRIVEWAYS IN THE COUNTY RIGHT OF WAY, SEE LOCAL ROAD PAVING SECTIONS, DETAIL P/8.
2. DITCH LINING AND VELOCITY DISSIPATORS TO BE PROVIDED AS REQUIRED.
3. ALLOWING SURFACE DRAINAGE TO CROSS A PAVED DRIVEWAY ON THE SURFACE IS SUBJECT TO THE APPROVAL OF THE DEPARTMENT OF PUBLIC WORKS.
4. MAXIMUM ALGEBRAIC GRADE DIFFERENCE IS 14%
NOTE: FINAL PLANS SHALL INDICATE STRUCTURES, TRAFFIC PATTERN, TOPO (EX & PROP) DIMENSIONS, STORM DRAIN (EX. & PROP.) AND ETC.

Minimum Widening as required by Trafficway Section.

Note: At Channelized Intersection these Dimensions may be increased.

Note: 20' Minimum at Existing or Proposed Signalized Intersections.

EDGE OF EXISTING TRAFFICWAY PAVEMENT

STANDARD ROADWAY & SITE IMPROVEMENT DETAILS
CHANNELIZATION OF COMMERCIAL ENTRANCES AT ROAD INTERSECTIONS - (RURAL DUAL)
NOTE FINAL PLANS SHALL INDICATE STRUCTURES
TRAFFIC PATTERN, TOPO (EX & PROP) DIMENSIONS
STORM DRAIN (EX & PROP) AND ETC.

PROPERTY LINE
(VARIABLE)

PROPERTY LINE
(VARIABLE)

Minimum Widening
as required by
Traffic Section.

Note 20' Minimum at Existing or
Proposed Signalized Intersections.

EDGE OF EXISTING TRAFFICWAY PAVEMENT

Paved

CR

5'

35' Max
at 60'

20' Min

15' Min

Setback 30 Min

Ultimate R/W Line

Maintenance
By Permittee
And/Or Owner

Maintenance
By County

2'

25'

STANDARD ROADWAY & SITE IMPROVEMENT DETAILS
CHANNELIZATION OF COMMERCIAL ENTRANCES
MID BLOCK - (RURAL DUAL)
Note 1. Mark in 4’ Squares, Use Pre-moulded Expansion Joints at Intervals Not Greater Than 16’, See Detail 1/16

Note 2. All Unpaved Areas Within R/W to be Seeded And Mulched With 4” of Top Soil, or Sodded to Obtain A Thick Stand of Grass.
Note 1. Mark Sidewalk in 4" Squares, with Weakened Plane Traverse Joints. See Detail 1/16

Note 2. Use Pre-moulded Expansion Joints at Intervals Not Greater Than 16'. See Detail 1/16

Note 3. All Unpaved Areas Within R/W to be Seeded And Mulched with 4" of Top Soil or Sodded to Obtain a Thick Stand of Grass
1. Sidewalk ramps should be located as indicated on drawings. However, existing light poles, fire hydrants, drop inlets, etc. may affect placement.

2. No slope shall exceed 12:1 on the ramp or sidewalk.

3. In no case shall the width of ramps be less than 3'-4" widths may exceed 3'-4" if necessary.

4. A ½ expansion joint will be required where the concrete ramp joins any road pavement or structure.

5. The pedestrian crosswalk lines shall be established by bisecting the intersection radius.

6. Ramps shall be located so that the beginning will be two feet from the inside pedestrian crosswalk line. (Generally)

7. All pavement markings shall be in accordance with the latest edition of the Manual of Uniform Control Devices published by the Federal Highway Administration.

8. Sidewalk ramps to be included in cost bid for concrete sidewalk and curb or curb & gutter.

9. This standard may be modified to suit a particular location. Sidewalk ramps to be shown on plans (by symbol B) and referenced with the center of the ramp aligned to a station on the construction centerline.

Type 1

4' sidewalk

Type 2

Combination Grass Plot 8' sidewalk. 8' = 6'

Type 3

6' or > sidewalk

Surface texture of ramps shall be coarse brooming or non-skid type surface.

Plan

Elevation

Section A-A

Standard Roadway & Site Improvement Details

Anne Arundel County Department of Public Works

Published: 01/01 Revised:
SECTION A-A
(SHOWN - 3'-0" WIDTH SIDEWALK 8'-0" CURB HEIGHT)

NORMAL CONDITION
12:1 SLOPE MAX.
= 3'-0"

"Y" 3'-0" MIN.
Landing Area
48:1 SLOPE
NORM.

"W" 5'-0"

"X" 4'-0"

"Z" 3'-0"

"N" 5'-0"

PEDESTRIAN CROSSWALK
STOP BAR

NON-SKID TYPE SURFACES

CURB HEIGHT

SIDEWALK WIDTH

"W" "X" "Y" "Z"

5'

6'

7'

8'

9'

4' 1'

5' 1'

6' 1'

7' 1'

8' 1'

9' 1'

10' 1'

11' 1'

12' 1'

13' 0'

14' 0'

15' 0'

16' 0'

17' 0'

18' 0'

19' 0'

20' 0'

21' 0'

22' 0'

23' 0'

24' 0'

ALL ABOVE DIMENSIONS BASED ON CURB LIP OF 1/2'-0"

* THIS DIMENSION VARIES FROM A MINIMUM OF 3" FOR 5' SIDEWALK TO FULL CURB HEIGHT WITHOUT REQUIRING A 24:1 SIDEWALK SLOPE FOR SIDEWALKS OF 11' OR MORE IN WIDTH.

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS

STANDARD ROADWAY & SITE IMPROVEMENT DETAILS

APPROVED CHIEF ENGINEER DESIGN ENGINEER

Published: 01/01 Revised:
This dimension varies from a minimum of 3" for a 5' sidewalk to full curb height without requiring a 24:1 sidewalk slope for sidewalks of 11' or more in width.
GUTTER PAN AT THE MEDIAN EDGE OF INTERMEDIATE ARTERIALS OR THE HIGH SIDE OF SUPERELEVATED SECTIONS SHALL BE SLOPED AT THE SAME RATE AND IN THE SAME DIRECTION AS THE PAVEMENT. MATCH PAVEMENT CROSS SLOPE WHEN CURB IS LOCATED ON THE LOW SIDE OF SUPERELEVATED SECTION AND THE RATE OF SUPERELEVATION IS GREATER THAN 3% FOR MODIFIED CURB AND GUTTER.
**Reverse Slope Curb and Gutter**

**NOTE:** Slope at same rate as linear slope across paving.

**Type "A"**

**Type "B"**

**NOTE:** Type "A" and Type "B" Median Curbs to be used only upon approval of the Department of Public Works.

Published: 01/01 Revised:
TYPICAL TRANSITION STANDARD CURB AND GUTTER TO MOUNTABLE CURB AND GUTTER

MOUNTABLE CURB AND GUTTER
Pavement Width Indicated on Typical Street Sections to be Measured To This Point.

STANDARD BITUMINOUS CURB
DRIVE ANCHOR
SQUARE OR ROUND TERMINAL POST
CONSTRUCTION.
ALTERNATE TO CONCRETE FOOTING
SEE DETAIL 1/32, 1/34, 1/35

NOTES
1. ALL ROUND LINEMAN POSTS TO BE CAPPED WITH LOOP CAPS TENSION WIRE TO RUN THROUGH LOOP CAPS TO BE FASTENED TO ALL TERMINAL POSTS WITH TENSION BANDS.
2. FASTEN FABRIC TO TENSION WIRE WITH HOG RINGS 218" C/C HOG RINGS TO BE 12" QUACK GALVANIZED STEEL WIRE.
3. MATERIALS TO MEET REQUIREMENTS OF AASHTO M 181.
4. COLOR OF VINYL SHALL BE WARM GRAY OR BLACK BLACK SEE SPECIAL PROVISIONS.
ALTERNATE TRUSS BRACE ATTACHMENT FOR SQUARE CONSTRUCTION

STRETCHER BAR
\( \frac{3}{8} \) GALVANIZED STEEL
OR \( \frac{3}{8} \) ALUMINUM ALLOY 6063-T6

STRETCHER ROD CLIP
\( \frac{3}{16} \) GALVANIZED WIRE OR
\( \frac{3}{16} \) ALUMINUM WIRE ALLOY 2024

ALTERNATE STRETCHER ROD ATTACHMENT

ALTERNATE ATTACHMENT FOR BARB WIRE OR TENSION WIRE

ALTERNATE BRACE RAIL ATTACHMENT FOR SQUARE CONSTRUCTION

GALVANIZED MALLEABLE IRON OR CAST ALUMINUM

TRUSS ROD
\( \frac{3}{8} \) GALVANIZED STEEL ROD OR
\( \frac{3}{8} \) ALUMINUM ROD ALLOY 6061-T6

TURN BUCKLE
PREFORMED GALVANIZED STEEL OR
PREFORMED ALUMINUM ALLOY 6063-T42

BRACKET
\( \frac{3}{8} \) PREFORMED GALVANIZED STEEL OR
\( \frac{3}{8} \) PREFORMED ALUMINUM ALLOY 6063-T42
NOTE: WHEN EPOXY COATING IS DESIRED, IT IS TO BE MARKED ON THE PLANS AND SHALL BE INCLUDED IN THE S10.
PRICE FOR THE ITEM "STANDARD CONCRETE BARRIER." STANDAD CONCRETE BARRIER TO BE FIELD CONSTRUCTED.

CONCRETE PAVEMENT SURFACE

MIX NO. 2 CONCRETE

EXISTING PAVEMENT SURFACE

ROUGHEN EXISTING PAVEMENT

NEW CONSTRUCTION

EXISTING INSTALLATION

DRILL HOLE IN EXISTING PAVEMENT FOR FULL DEPTH OF PAVEMENT. GROUT DOWEL INTO EXISTING PAVEMENT.

TERMINUS TRANSITION

PLAN

80'-0"

TERMINUS TRANSITION

ELEVATION

ISOMETRIC

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

CHIEF ENGINEER
DESIGN ENGINEER

STANDARD ROADWAY & SITE IMPROVEMENT DETAILS
STANDARD CONCRETE BARRIER SINGLE FACE

REVISED

Published: 01/01  Revised:
NOTE: WHEN EPOXY COATING IS DESIRED, IT IS TO BE NOTED ON THE PLANS AND SHALL BE INCLUDED IN THE BID.
PRICE FOR THE ITEM "STANDARD CONCRETE BARRIER" STANDARD CONCRETE BARRIER TO BE FIELD CONSTRUCTED.

NEW CONSTRUCTION

EXISTING INSTALLATION

TERMINUS TRANSITION

PLAN

ELEVATION

ISOMETRIC

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

STANDARD ROADWAY & SITE IMPROVEMENT DETAILS
STANDARD CONCRETE BARRIER
DOUBLE FACE

Published: 01/01 Revised:
GENERAL NOTES
1. ALL CONCRETE FOR BARRIER TO BE MIX NO. 6 (4000 PSI).
2. EXPOSED FACE AND TOP OF PRECAST BARRIER TO BE COATED WITH TWO COATS OF WHITE EPOXY PAINT.
3. 25"x7"x5/16" GALVANIZED STEEL PLATE TO BE FURNISHED AS CONNECTOR, AND INCIDENTAL TO THE CONCRETE BARRIER.
GENERAL NOTES
1. ALL CONCRETE FOR BARRIER TO BE MIX NO. 6 (W500PSI).
2. EXPOSED FACE AND TOP OF PRECAST BARRIER TO BE COVERED WITH TWO COATS OF WHITE EPOXY PAINT.
3. 27" x 5/16" GALVANIZED STEEL PLATE TO BE FURNISHED AS CONNECTOR, AND INCIDENTAL TO THE CONCRETE BARRIER.
NOTE
1. PRECAST CONCRETE WHEEL STOPS SHALL BE LOCATED AS SHOWN ON THE PLANS, THEN SECURED IN PLACE WITH TWO (2) NO. 7 REINFORCEMENT BARS PER WHEEL STOP.
2. CONCRETE TO BE MIX NO. 2.
RAILS TO BE UNTREATED TIMBER.

POSTS TO BE TREATED TIMBER, WHERE PAINT IS CALLED FOR, TWO COATS TO BE APPLIED.

ALL LUMBER TO BE SOUTHERN YELLOW PINE OF 1400* STRESS GRADE OR BETTER.

TO BE PAINTED IN A COLOR SCHEME AND STRIPING DETAILS IN ACCORDANCE WITH THE LATEST "MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES."

* TO BE USED WHERE NOTED ON PLANS *

THE COST OF ALL EXCAVATION AND BACKFILL TO BE INCLUDED IN LUMP SUM PRICE BID FOR TIMBER BARRICADE.

THE LUMP SUM PRICE BID SHALL INCLUDE THE FURNISHING OF ALL MATERIALS, PRESERVATIVE TREATMENTS, TIMBER CONNECTORS AND HARDWARE, PAINTING, GALVANIZING AND CONCRETE AS WELL AS ALL LABOR, TOOLS AND EQUIPMENT AND ALL WORK INCIDENTAL THERE TO.

ANNE ARUNDEL COUNTY
DEPARTMENT OF PUBLIC WORKS

CHIEF ENGINEER
DESIGN ENGINEER
DATE

STANDARD ROADWAY & SITE IMPROVEMENT DETAILS
STANDARD TIMBER BARRICADE

REVISED

Published: 01/01 Revised:
PORTABLE BARRICADE

Standard 10' Length of Dressed 1" X 8"

Dressed 1" X 3" Cleats

3" Black and Yellow Striping
(1 Prime Coat, and 2 Coats Exterior Lead and Oil, Reflective Paint)

To Be Used With Appropriate Signs and Lights.

PORTABLE BARRICADE

1'-5½'
Approx

Span

C Barricaded Roadway Span

Top of Ground or Pavement

Minimum Number of Spans = 2
Minimum Number of Posts = 3
Maximum Span: 12'-6"
All Posts: 6" W X 8.5 Lbs.
5'-9" Long, See Detail 1/54

End Post

Intermediate Post

Same Detail, Each End
See Detail 1/51

Paint Rail and Post with 2 Coats of White Paint.

BEAM TYPE BARRICADE (12 GAGE)
APPRAOCH END TO BE FLARED AT NORMAL ELEVATION FROM SHOULDER TO DITCH LINE AND EXTENDED AT LEVEL ELEVATION INTO CUT BACKSLOPE. ANCHORED WITH POST AND CONCRETE BLOCK TO END GUARD RAIL. THE CONTRACTOR SHALL ADJUST THE PLACEMENT OF POSTS, WHERE NECESSARY, TO AVOID POSTS BEING INSTALLED IN THE CENTER OF THE DITCH.

THE COST OF THE CONCRETE BLOCK TO BE INCIDENTAL TO THE ITEM - GUARD RAIL W BEAM.
GUARD RAIL W BEAM TREATMENT FOR BRIDGE APPROACHES
(CUT ADJACENT TO BRIDGE APPROACH)

FOR GUARD RAIL ATTACHMENT TO STRUCTURE, SEE DETAIL 1/82

<table>
<thead>
<tr>
<th>W=12 FT.</th>
<th>W=14 FT.</th>
<th>W=15 FT.</th>
<th>W=17 FT.</th>
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<td>A=6° 53' 48&quot;</td>
<td>A=7° 17' 05&quot;</td>
<td>A=6° 53' 43&quot;</td>
<td>A=7° 11' 03&quot;</td>
<td>A=7° 07' 30&quot;</td>
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<td>D=28° 38' 32&quot;</td>
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<td>L=12.05'</td>
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<td>LENGTH OF GUARD RAIL = 182.30' (MIN.)</td>
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<tr>
<td>X</td>
<td>Y</td>
<td>X</td>
<td>Y</td>
<td>X</td>
</tr>
<tr>
<td>159.95'</td>
<td>17.88'</td>
<td>172.23'</td>
<td>20.39'</td>
<td>184.77'</td>
</tr>
<tr>
<td>13.96'</td>
<td>17.88'</td>
<td>20.39'</td>
<td>184.77'</td>
<td>209.49'</td>
</tr>
</tbody>
</table>
| ALL DIMENSIONS ARE TO THE FACE OF THE GUARD RAIL
# Guard Rail W Beam Treatment for Bridge Approaches

(Embarkment Greater Than 15 Feet)

**Diagram Description**

- **Begin Curve No. 1**
- **Tangent**
- **Begin Curve No. 2**
- **Edge of Shoulder**
- **Edge of Roadway**

**Table: Guard Rail Details**

<table>
<thead>
<tr>
<th>Width (ft)</th>
<th>Curve No. 1</th>
<th>Curve No. 2</th>
<th>Curve No. 1</th>
<th>Curve No. 2</th>
<th>Curve No. 1</th>
<th>Curve No. 2</th>
<th>Curve No. 1</th>
<th>Curve No. 2</th>
<th>Curve No. 1</th>
<th>Curve No. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>W = 12 ft</td>
<td>Δ = 6°53'48&quot;</td>
<td>Δ = 6°53'48&quot;</td>
<td>Δ = 7°17'03&quot;</td>
<td>Δ = 7°17'03&quot;</td>
<td>Δ = 6°53'43&quot;</td>
<td>Δ = 7°17'03&quot;</td>
<td>Δ = 6°53'43&quot;</td>
<td>Δ = 7°17'03&quot;</td>
<td>Δ = 7°17'03&quot;</td>
<td>Δ = 6°53'43&quot;</td>
</tr>
<tr>
<td></td>
<td>D = 28°38'52&quot;</td>
<td>D = 28°38'52&quot;</td>
<td>D = 14°18'26&quot;</td>
<td>D = 14°18'26&quot;</td>
<td>D = 28°38'52&quot;</td>
<td>D = 28°38'52&quot;</td>
<td>D = 28°38'52&quot;</td>
<td>D = 28°38'52&quot;</td>
<td>D = 28°38'52&quot;</td>
<td>D = 28°38'52&quot;</td>
</tr>
<tr>
<td></td>
<td>R = 200.00'</td>
<td>R = 400.00'</td>
<td>R = 200.00'</td>
<td>R = 400.00'</td>
<td>R = 200.00'</td>
<td>R = 400.00'</td>
<td>R = 200.00'</td>
<td>R = 400.00'</td>
<td>R = 200.00'</td>
<td>R = 400.00'</td>
</tr>
</tbody>
</table>

**Lengths**

- **Length of Guard Rail - 137.50' (Min.)**
- **Length of Guard Rail - 150.00' (Min.)**
- **Length of Guard Rail - 162.50' (Min.)**
- **Length of Guard Rail - 175.00' (Min.)**
- **Length of Guard Rail - 200.00' (Min.)**

**Embarkment Details**

<table>
<thead>
<tr>
<th>Width (ft)</th>
<th>Embarkment X</th>
<th>Embarkment Y</th>
<th>Embarkment X</th>
<th>Embarkment Y</th>
<th>Embarkment X</th>
<th>Embarkment Y</th>
<th>Embarkment X</th>
<th>Embarkment Y</th>
<th>Embarkment X</th>
<th>Embarkment Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>W = 12 ft</td>
<td>133.26'</td>
<td>12.00'</td>
<td>147.71'</td>
<td>14.00'</td>
<td>160.18'</td>
<td>12.00'</td>
<td>172.53'</td>
<td>17.00'</td>
<td>197.35'</td>
<td>200'</td>
</tr>
</tbody>
</table>

All dimensions are to the face of the guard rail.
END TREATMENT FOR TRAILING END OF GUARD RAIL

NORMAL POST SPACING

4'2" 4'2" 4'2" 6'3" 6'3"

1'6.6" 1'6.6" 1'6.6" 12'8" LAP IN DIRECTION OF TRAFFIC

BACK-UP PLATE CENTERED ON BOLT

FINISHED GROUND LINE

NOTE: BACK-UP PLATE (12" LENGTH OF BEAM) TO BE PLACED WHERE NO OVERLAP OF RAIL SPlice OCCURS.

END POSTS - 6WF15.5, 6-9" LONG
INTERMEDIATE POSTS - 6WF8.5, 5-9" LONG
CONCRETE BLOCK FOR END POST 2' X 2' X 2'

STANDARD ROADWAY & SITE IMPROVEMENT DETAILS
GUARD RAIL W/BEAM
POST SPACING & TRAIL-END TREATMENT
VII-51 of 66

NOTES:

ALL GUARD RAIL ITEMS TO BE PAID FOR AS PER LINEAR FEET OF "GUARD RAIL W/ BEAM - BARRIER." EMBANKMENT SHALL BE PAID FOR ON THE PERTINENT EXCAVATION ITEMS OF WORK.

<table>
<thead>
<tr>
<th>WIDTH OF MEDIAN (FEET)</th>
<th>WIDTH OF MOUNDING (FEET)</th>
<th>EMBANKMENT REQUIRED APPX. (CU YDS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>16</td>
<td>40</td>
</tr>
<tr>
<td>30</td>
<td>22</td>
<td>50</td>
</tr>
<tr>
<td>36 (RECREATION)</td>
<td>28</td>
<td>80</td>
</tr>
</tbody>
</table>

Published: 01/01 Revised:
Road contractor shall furnish and install 4-3/8" concrete expansion anchors or approved equivalent, in 1-5/8" drilled holes with 4-5/8" heavy hex head bolts, 1-5/8" long, galv. UNC class 2A & 2B, and 4 rectangular galv. washers as shown on detail 1/54 modified to fit 5/8" bolt.

Dimensions of barrier to conform to bridge plan.

Terminal end - 10 gauge see detail 1/61

Elevation

General Notes

First 25'-0" of guard rail affixed to bridge on the approach end.
Place first post maximum 1'-9" from bridge and next seven posts spaced 3'-11"/c/c. Place an additional offset bracket at the fourth and fifth posts from the bridge to avoid conflict with inlets.
When affixing guard rail to bridge on the trailing end, use normal post spacing with an additional offset bracket placed at the second post to avoid conflict with inlets.
Cost of additional posts and offset brackets to be included in the bid price per linear foot of guard rail.
In general, two offset brackets shall be used wherever necessary to avoid conflict with drainage inlets.
OFFSET BRACKET 6 WF 8.5
OFFSET BRACKET
STANDARD GUARD RAIL
SEE DETAIL 1/51

POST BOLTS
4 PER POST 5/8" HEX
HEAD BOLT & NUT 1-1/2" LONG

FINISHED
GROUND LINE

FOR ST'D GUARD RAIL POST SPACING,
SEE

NOTE: A LIMIT OF LINEAR FOOT LENGTH OF ST'D. BEAM TYPE
GUARD RAIL MEDIAN BARRIER

STANDARD BARRIER END
SECTION SEE DETAIL 1/51

SEE NOTE: A
ABOVE
BEAM GUARD RAIL MEDIAN BARRIER APPROACH FLARE

PER EACH

6'-3"
6'-3"

RAIL TWISTED ON ANCHORAGE CASTING
AT 30° MOUNTED ON OFFSET BRACKET

FOR "MEDIAN BARRIER END BLOCK" SEE DETAIL 1/56
FOR TREATMENT OF RAIL SEE DETAIL 1/61

ANNE ARUNDEL
COUNTY
DEPARTMENT OF
PUBLIC WORKS

CHIEF ENGINEER

DESIGN ENGINEER

APPROVED

DATE

STANDARD ROADWAY &
SITE IMPROVEMENT DETAILS
GUARD RAIL W/ BEAM
MEDIAN BARRIER & APPROACH FLARES

REVISED

1

53

Published: 01/01  Revised:
GENERAL NOTES:
1. ALL DIMENSIONS ARE SUBJECT TO MG TOLERANCES.
2. POSTS TO BE 5'-9" LONG, SPACED AT 6'-3" C/C.
3. BACK-UP PLATE (1/2" LENGTH OF BEAM) CENTERED ON OFFSET BRACKET BOLT TO BE PLACED WHERE NO OVERLAP OF RAIL SPLICE OCCURS.
4. MATERIAL = ASTM A-570 WITH MECHANICAL PROPERTIES EQUAL TO A-36.
5. GALVANIZING = AASHO MILL ASTM A-123.

OPEN SIDE OF C SHAPE POST
B OFFSET BRACKETS TO BE PLACED AWAY FROM DIRECTION OF TRAFFIC

SIDE ELEVATION

5'-C' SHAPE OFFSET BRACKET
5'-C' SHAPE POST

STANDARD ROADWAY & SITE IMPROVEMENT DETAILS
GUARD RAIL W/BEAM
ALTERNATE 'C' SHAPE STRONG POST

Published: 01/01 Revised:
SECTION A-A

Install 6 7/8" φ Bolts and Nuts 10" Long, 2" Projection, and 6 Rectangular Galvanized Washers as shown on Detail 1/54 Modified to fit 7/8" φ Bolts

Concrete for End Block to be Mix No. 3 Concrete.
METHOD OF ANCHORAGE

MATERIAL REQUIREMENTS

1. THE METAL CASTING SHALL CONFORM TO THE
   A.S.T.M. DESIGNATION A-47, GRADE 32510

2. THE ZINC COATING SHALL CONFORM TO THE
   A.S.T.M. DESIGNATION A-153, CLASS A.

3. ALL PARTS TO BE GALVANIZED

PITCH WASHER

CASTING
ALL STEEL TO BE A.S.T.M. DESIGNATION A-36
HOT DIPPED GALVANIZED AFTER FABRICATION
TO A.S.T.M. DESIGNATION A-123

H = HEIGHT OF TOP OF GUARD POST ABOVE FINISHED GRADE
θ = ANGLE OF PITCH OF RAIL

<table>
<thead>
<tr>
<th>POST</th>
<th>H</th>
<th>θ</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2’-3”</td>
<td>0°</td>
</tr>
<tr>
<td>B</td>
<td>2’-5”</td>
<td>0°</td>
</tr>
<tr>
<td>C</td>
<td>2’-3”</td>
<td>0°</td>
</tr>
<tr>
<td>D</td>
<td>2’-3”</td>
<td>0°</td>
</tr>
<tr>
<td>E</td>
<td>2’-3”</td>
<td>0°</td>
</tr>
<tr>
<td>F</td>
<td>2’-3”</td>
<td>0°</td>
</tr>
<tr>
<td>G</td>
<td>1-1/2’</td>
<td>15°</td>
</tr>
<tr>
<td>H</td>
<td>0’-0”</td>
<td>30°</td>
</tr>
<tr>
<td>I</td>
<td>0’-7”</td>
<td>45°</td>
</tr>
<tr>
<td>J</td>
<td>0’-4/1”</td>
<td>60°</td>
</tr>
<tr>
<td>K</td>
<td>0’-1/2”</td>
<td>75°</td>
</tr>
<tr>
<td>L</td>
<td>0’-0”</td>
<td>90°</td>
</tr>
</tbody>
</table>

METHOD OF ANCHORAGE
NOTE: USE OF ANCHORAGE BRACKET IN PLACE OF OFFSET BRACKET BEGINS AT POST 9 WITH AN ANGLE OF 15°
I X BEAM POST CUT ON INDICATED ANGLE & 13" X 6" X 1/2 STEEL PLATE WELDED ON

HOLE FOR ST'D "OFFSET BRACKET" BOLT & NUT

STEEL PLATE DETAIL

NOTE: ALL STEEL IS TO BE ASTM DESIGNATION A-58 HOT DIPPED GALVANIZED AFTER FABRICATION TO ASTM DESIGNATION A-123.

H = HEIGHT OF TOP OF GUARD POST ABOVE FINISHED GRADE
B = ANGLE OF PITCH OF RAIL

<table>
<thead>
<tr>
<th>POST</th>
<th>H</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2'-3&quot;</td>
<td>0°</td>
</tr>
<tr>
<td>B</td>
<td>2'-3&quot;</td>
<td>0°</td>
</tr>
<tr>
<td>C</td>
<td>2'-3&quot;</td>
<td>0°</td>
</tr>
<tr>
<td>D</td>
<td>2'-3&quot;</td>
<td>0°</td>
</tr>
<tr>
<td>E</td>
<td>2'-3&quot;</td>
<td>0°</td>
</tr>
<tr>
<td>F</td>
<td>2'-3&quot;</td>
<td>0°</td>
</tr>
<tr>
<td>G</td>
<td>2'-0 1/2&quot;</td>
<td>15°</td>
</tr>
<tr>
<td>H</td>
<td>1'-8&quot;</td>
<td>30°</td>
</tr>
<tr>
<td>I</td>
<td>1'-2 1/2&quot;</td>
<td>45°</td>
</tr>
<tr>
<td>J</td>
<td>0'-9 1/2&quot;</td>
<td>60°</td>
</tr>
<tr>
<td>K</td>
<td>0'-4 1/2&quot;</td>
<td>75°</td>
</tr>
<tr>
<td>L</td>
<td>0'-0&quot;</td>
<td>90°</td>
</tr>
</tbody>
</table>

TYPICAL METHOD OF ANCHORAGE (POSTS H, J, & K)

NOTE: USE OF ANCHORAGE PLATE IN PLACE OF OFFSET BRACKET BEGINS AT POST B WITH AN ANGLE OF 15°
NOTE: USE OF GUARD RAIL W. BEAM ANCHORAGE IN PLACE OF OFFSET BRACKET BEGINS AT POST G. THE CONTRACTOR HAS THE OPTION FOR THE METHOD OF GUARD RAIL W. BEAM ANCHORAGE. FOR DETAILS OF OPTIONS SEE DETAIL 1/57 ANCHORAGE CASTING DETAIL 1/58 ANCHORAGE BRACKET DETAIL 1/59 ANCHORAGE PLATE

COST OF ANCHORAGE SELECTED SHALL BE INCLUDED IN THE PAYMENT FOR END FLARE AS INDICATED ABOVE.

SECTION A-A

TERMINAL END [HO GA]
ELEVATION

FOR STANDARD STAIRWAYS
SEE DETAIL 1/62

SECTION A-A
C BARS

SECTION A-A
HALF OVAL BAR
OPTIONAL RAIL TYPES

SECTION A-A
FLAT BAR

GENERAL NOTES
1. RAILINGS ARE REQUIRED FOR STAIRS WITH MORE THAN THREE RISES.
2. STEEL SHALL CONFORM TO ASTM DESIGNATION A-36.
3. WELDMENTS SHALL BE THOROUGHLY CLEANED AFTER FABRICATION.
4. ENTIRE RAILING SHALL BE GALVANIZED OR PAINTED AS FOLLOWS:
   STEPS 1. PRIMER PRETREATMENT CONFORMING TO FEDERAL SPECIFICATION WEL-P-1529 B
             FORMULA H7 FOR METALS.
   STEPS 2. ONE COAT OF RED LEAD LINSEED OIL SHOP COAT.
   STEPS 3. ONE COAT OF RED LEAD IRON OXIDE - FIRST FIELD COAT.
   STEPS 4. ONE COAT OF GRAY ALKYD - SECOND FIELD COAT.
   STEPS A FINISH COAT OF BLACK EQUIPMENT ENAMEL.
   ALL BURRS TO BE GROUND OFF TO PROVIDE A SMOOTH FINISH.
VII-65 of 66

Published: 01/01 Revised:

NOTES:
1. ALL JOINTS & FITTINGS FOR SUCTION PIPE SHALL BE AIRTIGHT.
2. TANK & SUCTION PIPE WITH FITTINGS SHALL BE AIRTIGHT AT A PRESSURE
OF 1/2 P.S.I. FOR 20 MIN. BEFORE TANK IS COVERED.
3. REINFORCING SHALL BE 4-8 BARS 8" C.C. OR 5-9 BARS 12" C.C.
4. THE CONCRETE SLAB WILL NOT BE REQUIRED WHERE IT HAS BEEN
DEMONSTRATED THAT FLOATATION WILL NOT OCCUR.
5. SELECT BACKFILL MAY BE REQUIRED IN ACCORDANCE WITH THE LATEST
STANDARD SPECIFICATIONS.
6. THE FOLLOWING ITEMS SHALL BE PAINTED WITH TWO (2) COATS OF
INDUSTRIAL ENAMEL 554 SERIES 27 LEAD FREE SAFETY YELLOW-
(MANUFACTURED BY SHERWIN WILLIAMS) OR APPROVED EQUAL.
(A) SUCTION CONNECTION (B) VENT PIPE (C) FILL PIPE (TWO).
7. PAINTING SHALL BE IN ACCORDANCE WITH STANDARD SPECIFICATIONS.

* IN CALCULATING THIS INFORMATION, THE FOLLOWING ASSUMPTIONS WERE MADE.
(1) THE GROUNDWATER TABLE IS AT SURFACE.
(2) THE TANK EXCAVATION HAS NOT BEEN
BACKFILLED.
(3) THE TANK IS EMPTY.
(4) THE YIELD STRESS OF ALL STEEL IS Fy = 36 KSI
(5) THE ALLOWABLE STRESS ON STEEL IN TENSION IS
Ft = 0.6 X 36 KSI
(6) ALL STRAPS ARE TIGHTENED TO PRODUCE
UNIFORM LOADING UPON EACH STRAP.
(7) ALL STRAPS ARE VERTICAL AT THE POINT
OF ANCHORAGE.
(8) A FACTOR OF SAFETY OF 2.15 IS USED FOR THE
ANCHORAGE STRAP DESIGN.
(9) WEIGHT OF WATER 6.33 POUNDS PER GALLON.
(10) WEIGHT OF SUBMERGED CONCRETE IS 80
POUNDS PER CUBIC FOOT.

NOTE: UNDERGROUND TANK TIE-DOWN SYSTEMS SHOULD BE DESIGNED BY A LICENSED STRUCTURAL
ENGINEER, DUE TO THE COMPLEXITY OF SOIL CONDITIONS, MATERIAL LISTED IS ONLY
INTENDED AS A GUIDE.

ANNE ARUNDEL
COUNTY
DEPARTMENT OF
PUBLIC WORKS

Revised: 07/95

CHIEF ENGINEER

DATE

STANDARD ROADWAY & SITE IMPROVEMENT DETAILS
UNDERGROUND STORAGE TANK
FOR FIRE SUPPRESSION

REvised: 9/94

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