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<th>S.L.</th>
<th>Description</th>
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</thead>
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<tr>
<td>A-3 SAND</td>
<td></td>
<td></td>
<td>SAND 53% MIN. P.I.-N.P. L.L.-MUST BE N.P.</td>
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<td>A-2 SAND/FINES</td>
<td>22</td>
<td>18</td>
<td>SAND 53% MIN. P.I.-7 MAX. L.L.-34 MAX. (MUST HAVE L.L.)</td>
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<td>24</td>
<td>21</td>
<td>SAND 53% MIN. P.I.-7 MAX. L.L.-34 MAX. (MAY BE N.P.)</td>
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<td>A-4-2 SANDY SILT</td>
<td>25</td>
<td>27</td>
<td>SAND 48% MIN. P.I.-7 MAX. L.L.-40 MAX. (MAY BE N.P.)</td>
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<tr>
<td>A-2-7 CLAYEY SAND</td>
<td>31</td>
<td>18</td>
<td>SAND 48% MIN. CLAY-25% MAX. P.I.-8-14 L.L.-40 MAX.</td>
</tr>
<tr>
<td>A-7-2 SANDY CLAY</td>
<td>39</td>
<td>17</td>
<td>SAND 48% MIN. CLAY-17% 35% L.L.-30 MIN.</td>
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<tr>
<td>A-4 SILT</td>
<td>30</td>
<td>19</td>
<td>SAND 47% MAX. P.I.-9 MAX. L.L.-40 MAX.</td>
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<td>A-4-7 CLAYEY SILT</td>
<td>33</td>
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<td>SAND 47% MAX. CLAY-25% MAX. P.I.-3 MAX.</td>
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<td>A-7-4 SILTY CLAY</td>
<td>39</td>
<td>16</td>
<td>SAND 47% MAX. CLAY-25% MAX. P.I.-15 MAX.</td>
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<td>A-7 CLAY</td>
<td>40</td>
<td>15</td>
<td>SAND 47% MAX. CLAY-30% 35% P.I.-15 MIN.</td>
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<tr>
<td>A-6 COLOIDAL CLAY</td>
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<tr>
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<td>26</td>
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<tr>
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<td>52</td>
<td>38</td>
<td>ORGANIC CONTENT-4% MIN. P.I.-LOW L.L.-HIGH S.L.-26 MIN. WHEN OBTAINABLE</td>
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**SOILS & SOIL-AGGREGATE MIXTURE DESIGNATIONS**
<table>
<thead>
<tr>
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<th>SILT-CLAY MATERIALS</th>
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<td>GROUP CLASSIFICATION</td>
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</tr>
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<td>A-4-2</td>
<td>A-2-7</td>
</tr>
<tr>
<td>A-7-2</td>
<td>A-4</td>
<td>A-4-7</td>
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<tr>
<td>A-7-4</td>
<td>A-7</td>
<td>A-6</td>
</tr>
<tr>
<td>A-5</td>
<td>A-8</td>
<td></td>
</tr>
</tbody>
</table>

| GENERAL DESCRIPTION    | SAND                | SANDY-SILT          |
|                       | SILTY-SAND          | CLAYEY-SAND         |
|                       | SILTY-CLAY          |-clay               |

| STABILITY              | WHEN N.P.            | WHEN PLASTIC.       |
|                       | HIGH                 | GOOD WHEN CONFINED  |
|                       |                     | GOOD WHEN DRY       |
|                       |                     | GOOD WHEN DRY       |
|                       |                     | GOOD WHEN DRY       |
|                       |                     | GOOD WHEN DRY       |
|                       |                     | GOOD WHEN DRY       |
|                       |                     | GOOD WHEN DRY       |
|                       |                     | GOOD WHEN DRY       |
|                       |                     | GOOD WHEN DRY       |
|                       |                     | GOOD WHEN DRY       |

| USE AS A BASE          | FAIR                | FAIR                |
|                       | EXCELLENT           | FAIR                |
|                       | FAIR                | FAIR                |
|                       | FAIR                | FAIR                |
|                       | FAIR                | FAIR                |
|                       | FAIR                | FAIR                |
|                       | FAIR                | FAIR                |
|                       | FAIR                | FAIR                |
|                       | FAIR                | FAIR                |

| USE AS A SUB-BASE      | EXCELLENT           | EXCELLENT           |
|                       | EXCELLENT           | EXCELLENT           |
|                       | EXCELLENT           | EXCELLENT           |
|                       | EXCELLENT           | EXCELLENT           |
|                       | EXCELLENT           | EXCELLENT           |
|                       | EXCELLENT           | EXCELLENT           |
|                       | EXCELLENT           | EXCELLENT           |
|                       | EXCELLENT           | EXCELLENT           |

| FILLS UNDER 50'        | GOOD TO FAIR        | GOOD TO FAIR        |
|                       | GOOD TO FAIR        | GOOD TO FAIR        |
|                       | GOOD TO FAIR        | GOOD TO FAIR        |
|                       | GOOD TO FAIR        | GOOD TO FAIR        |
|                       | GOOD TO FAIR        | GOOD TO FAIR        |
|                       | GOOD TO FAIR        | GOOD TO FAIR        |
|                       | GOOD TO FAIR        | GOOD TO FAIR        |
|                       | GOOD TO FAIR        | GOOD TO FAIR        |

| FILLS OVER 50'         | FAIR                | FAIR                |
|                       | POUR                | POUR                |
|                       | FAIR                | POUR                |
|                       | FAIR                | POUR                |
|                       | FAIR                | POUR                |
|                       | FAIR                | POUR                |
|                       | FAIR                | POUR                |
|                       | FAIR                | POUR                |
|                       | FAIR                | POUR                |

| FROST ACTION           | NONE TO LOW         | MEDIUM              |
|                       | MEDIUM              | HIGH                |
|                       | MEDIUM              | HIGH                |
|                       | MEDIUM TO HIGH      | MEDIUM              |
|                       | MEDIUM              | MEDIUM              |
|                       | MEDIUM              | MEDIUM              |
|                       | MEDIUM              | MEDIUM              |
|                       | MEDIUM              | MEDIUM              |

| RANGE OF MAX. DRY DENSITY (AASHO T-1800 (POF)) | 115-135 | 115-135 | 105-130 | 110-130 | 110-135 | 115-135 | 115-135 | 110-135 | 110-135 | 105-130 | 100-120 | 90-115 | 100-135 |
| REQUIRED COMPACTION (AASHO T-1800 (C)) | 92-95 | 92-95 | 92-95 | 92-95 | 92-95 | 92-95 | 92-95 | 92-95 | 92-95 | 92-95 | 92-95 | 92-95 | 92-95 |
| COMPACTION METHODS | ROLLING WITH SMOOTH FACE TAMPER RUBBER TIRED ROLLER OR VIBRATORY COMPACTOR | TAMPING OR RUBBER-TIRED ROLLER | TAMPING OR RUBBER-TIRED ROLLER | TAMPING OR RUBBER-TIRED ROLLER | TAMPING OR RUBBER-TIRED ROLLER | TAMPING OR RUBBER-TIRED ROLLER | TAMPING OR RUBBER-TIRED ROLLER | TAMPING OR RUBBER-TIRED ROLLER | TAMPING OR RUBBER-TIRED ROLLER |
| COMPACTION ABILITIES | GOOD WITH CLOSE CONTROL | GOOD TO FAIR | GOOD TO FAIR | GOOD TO FAIR | GOOD TO FAIR | GOOD TO FAIR | GOOD TO FAIR | GOOD TO FAIR | GOOD TO FAIR | GOOD TO FAIR |
| PUMPING ACTION       | SLIGHT TO NONE      | FAIR TO FAIR       |
| BEARING VALUE        | EXCELLENT TO FAIR   | GOOD TO FAIR       |
| DRAINAGE             | GOOD                | DRAINS FREELY       |

**NOTES:***

A-2 TO A-3 SOILS: WHEN USED AS A BASE PLASTICITY INDEX AND LIQUID LIMIT SHOULD NOT EXCEED 6 AND 25 RESPECTIVELY BEST FOR SOIL - CEMENT STABILIZATION GENERALLY 6 TO 12% CEMENT BY WEIGHT WILL BE SUFFICIENT.

NON - PLASTIC A-2 TO A-3 SOILS: MAY REQUIRE VIBRATION FOR COMPACTION.

A-4 TO A-7 SOILS: FILLS SHOULD BE PLACED IN DRY SEASON.

A-4 SILTS: SUSCEPTIBLE TO SETTLEMENT AND EROSION.

A-5 SOILS: WHEN MICA IS PRESENT VERY DIFFICULT TO COMPACT BECAUSE OF EXPANSION AND REBOUND.

A-6 SOILS (CLAY): WILL PUMP IN POROUS BASES FORMING CRACKS FILLS WILL SETTLE OVER LONG PERIODS OF TIME. HIGH BANKS IN CUTS AND FILLS VERY LIABLE TO SLIDE.
TYPE | TREATMENT & USE
--- | ---
A-2 SOILS | WELL GRADED TO POORLY GRADED SAND AND GRAVELS. GOOD BASE FOR MODERATE FLEXIBLE OR THIN RIGID PAVEMENT. GOOD FILL. FROST HEAVE, BREAK-UP IF PLASTIC SOFTENS WHEN WET. IF PLASTIC USE BASE COURSE WHEN SUB-GRADE P.I. IS GREATER THAN 6. SUB-DRAINAGE EFFECTIVE. STABILIZE WITH BITUMEN, CHLORIDES, CEMENT OR ADMIXTURE SOIL.
A-3 SOILS | CLEAN SANDS AND GRAVELS. IDEAL BASE FOR MODERATE FLEXIBLE OR THIN RIGID PAVEMENT. GOOD FILL. NO FROST HEAVE OR BREAK-UP. SUB-DRAINAGE ONLY THROUGH IMPERVIOUS SHOULDERS. STABILIZE WITH SOIL BINDER OR CHEMICAL ADMIXTURES.
A-4 SOILS | SILTY SOILS NOT GOOD FOR SURFACE, POOR BASE. ABSORBS WATER. UNSTABLE WHEN WET. BAD FROST HEAVE AND BREAK-UP. USE SUB-DRAINAGE AND/OR BASE AND SUB-BASE WITH FLEXIBLE PAVEMENT. USE BITUMINOUS SUB-GRADE PRIME USE THICK CONCRETE PAVEMENT (7' TO 10') WITH STEEL REINFORCEMENT AND CRACK CONTROL.
A-5 SOILS | ELASTIC SILTS USE SUB-DRAINAGE AND/OR GRANULAR BASE AND SUB-BASE WITH BITUMINOUS SUB-GRADE PRIME USE THICK CONCRETE PAVEMENT, REINFORCED WITH CRACK CONTROL.
A-6 SOILS | CLAYS IMPERMEABLE AND STABLE WHEN DRY AND UNDISTURBED (HARD CLAY). PLASTIC AND ABSORBENT IF DISTURBED. BAD PUMPING INTO POROUS BASE MACADAM OR PAVEMENT JOINTS SHRINKS OR CRACKS WHEN DRY. USE GRANULAR BASE AND SUBBASE USE SUB-DRAINAGE ONLY WHEN MADE PERVIOUS BY CRACKS, ROOT HOLES AND LAMINATIONS. FROST HEAVE SLIGHT WHEN IMPERMEABLE. BAD WHEN PERVIOUS USE SUB-GRADE PRIME USE THICK, STRONG DENSE FLEXIBLE PAVEMENT OR REINFORCED CRACK CONTROLLED CONCRETE.
A-7 SOILS | EXPANSIVE, PLASTIC CLAYS. EXCESSIVE VOLUME CHANGE BAD FROST HEAVE AND BREAK-UP. SUB-DRAINAGE NOT EFFECTIVE. USE THICK, DENSE, FLEXIBLE PAVEMENT WITH BASE AND SUB-BASE OVER SUB-GRADE PRIME OR REINFORCED CRACK CONTROLLED CONCRETE PLACED ON IMPERVIOUS PAPER.
A-8 SOILS | MUCK AND PEAT UNFIT FOR CONSTRUCTION PURPOSES. EXCAVATE TO SOLID STRATUM AND REPLACE WITH SELECTED FILL. DISPLACEMENT BY SUPERIMPOSED FILL IS DOUBTFUL. DISPLACEMENT BY EXPLOSIVE UNDER SUPERIMPOSED FILL IS SOMETIMES EFFECTIVE.

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

SOIL & SOIL-AGGREGATE MIXES
TREATMENT & USE

DIRECTOR OF PUBLIC WORKS
DATE

DEP. DIRECTOR, PUBLIC WORKS
DATE

ISSUED

REVISED

PLATE G-3
SECTION II

BARRICADES

Plate

Barricade
Typical County Road Closure

P-1
W16-1 MODIFIED 18" X 18" SOLID RED REFLECTIVE

CENTERLINE WHITE ON GREEN

FUTURE ROAD 6"

1' - 5 1/2" SPAN

30" SPAN

BO/T & NUT

END SECTION

W BEAM SECTION

RAIL SPlice

POST

GROUND/PAVEMENT SURFACE

SEE S.H.A. STANDARDS FOR HIGHWAYS & INCIDENTAL STRUCTURES FOR DETAILS OF CONNECTIONS, FIXTURES & ASSEMBLY

LENGTH OF BARRICADE NOTED ON PLANS CENTER TO CENTER OF END POSTS ALL SPANS TO BE EQUAL IN LENGTH NUMBER OF POSTS NOTED ON PLANS

BARRICADED ROADWAY FOR ODD NUMBER POST BARRICADE (FOR EVEN NUMBER POST BARRICADE CENTERLINE ROAD = CENTER SPAN)

MINIMUM NUMBER OF SPANS = 4
MINIMUM NUMBER OF POSTS = 5
MAXIMUM SPAN: 6' - 3"

* WHEN THE GRADE BEYOND THE END OF PAVEMENT IS 4:1 1' FLATTER FOR AT LEAST 100' THE GUARDRAIL SHALL BE REMOVED AND ONLY THE SIGNS INSTALLED.

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

BARRICADE TYPICAL COUNTY ROAD CLOSURE

ISSUED 5-2-00
REvised 4-12-00
PLATE P-1

DIRECTOR OF PUBLIC WORKS

DEP. DIRECTOR, PUBLIC WORKS
SECTION III

ROADS AND STREETS

Plate

Residential and Townhouse Roads Paving Section .............................................R-1 and R-2

Business, Commercial, and Industrial Roads Paving Section (Non-Residential) ........R-3

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Modified Method of Cutting and Repairing Openings in Existing Roadways ..........R-5

Method of Cutting and Repairing a Road ..............................................................R-6

Method of Cutting and Repairing a Gravel Road .................................................R-7

Trenches Cradle and Encasement .................................................................R-8

Capping Existing Dug Wells .................................................................R-9
2" HOT MIX ASPHALT BAND, 12.5MM (COMPACTED)

| TACK COAT |

11" SUBGRADE

7" GRADED AGGREGATE BASE COURSE,
PLACED IN TWO (2) 3 1/2" LAYERS

ALTERNATE A

11/2" HOT MIX ASPHALT, BAND 9.5MM OR 12.5MM (COMPACTED)

| TACK COAT |

11" SUBGRADE

7" GRADED AGGREGATE BASE COURSE,
PLACED IN TWO (2) 3 1/2" LAYERS

ALTERNATE B

FOR NOTES SEE PLATE R-1A
1" HOT MIX ASPHALT BAND, 9.5MM (COMPACTED)
3" HOT MIX ASPHALT BAND, 12.5MM (COMPACTED)
TACK COAT

11"

SUBGRADE

7" GRADED AGGREGATE BASE COURSE,
PLACED IN TWO (2) 3 1/2" LAYERS

ALTERNATE C

NOTES:

1. SUPERPAVE PERFORMANCE GRADE ASPHALT CEMENTS
   SHALL BE PERFORMANCE GRADES PG 64-22 AND DESIGNED
   AS LEVEL 1 MIXES @ 50 GYRATIONS N-DESIGN.

2. THE DIRECTOR MAY REQUIRE WETTING OF THE
   BASE COURSE BEFORE LAYING THE FIRST LIFT.

3. HARFORD COUNTY RESERVES THE RIGHT TO
   ENTER THE PROPERTY FOR THE PURPOSE OF
   TAKING "CORE BORINGS."

1/7/03
DIRECTOR OF PUBLIC WORKS

1/7/03
DEP. DIRECTOR, PUBLIC WORKS
3" HOT MIX ASPHALT BAND, 12.5MM (COMPACTED)
3" HOT MIX ASPHALT BAND, 19.0MM (COMPACTED)

TACK COAT

16'

10" GRADED AGGREGATE BASE COURSE, PLACED IN TWO (2) FIVE INCH (5") LAYERS

SUPERPAVE PERFORMANCE GRADE ASPHALT CEMENTS SHALL BE PERFORMANCE GRADE PG 70-22.

NOTES:
1. THE DIRECTOR MAY REQUIRE WETTING OF THE BASE COURSE BEFORE LAYING THE FIRST LIFT.
2. HARFORD COUNTY RESERVES THE RIGHT TO ENTER THE PROPERTY FOR THE PURPOSE OF TAKING "CORE BORINGS."

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

BUSINESS, COMMERCIAL AND INDUSTRIAL ROADS
PAVING SECTION (NON-RESIDENTIAL)

ISSUED 5/2/00
REVISED 5/31/07
PLATE R-3
ALL EDGES SHALL BE SEALED WITH A RUBERIZED ASPHALT SEALER.

IF LESS THAN 3'-0" REMOVE EXISTING PAVING AND REPave TRENCH AND THIS AREA AS ONE.

3'-0" MIN. TO C. OR PAVING JOINT.

9.5 MM HOT MIX ASPHALT TO ADJACENT PAVING (3' MIN.)

6" MIN. OF 12.5 MM HOT MIX ASPHALT PLACED IN TWO LIFTS NOT TO EXCEED 3° COMPACTED

EXISTING MACADAM OR CONCRETE BASE

COMPACTED CRUSHED STONE CR-6 TO LIMIT SHOWN ON UTILITY BEDDING DETAIL

METHOD OF CUTTING AND REPAIRING OPENINGS IN EXISTING ROADWAYS

HARFORD COUNTY, MD DEPARTMENT OF PUBLIC WORKS

DIRECTOR OF PUBLIC WORKS DATE 1/7/03

DEP. DIRECTOR, PUBLIC WORKS DATE 1/7/03

ISSUED 1/7/03

REVISED 2/15/03

REVISED 5/31/07

PLATE R-4
ALL EDGES SHALL BE SEALED WITH A RUBBERIZED ASPHALT SEALER.

VARIATES - TO C/L OR PAVING JOINT OR EDGE OF PAVING

5'-0' MIN.

9.5 MM HOT MIX ASPHALT TO ADJACENT PAVING (1'-1/2" MIN.)

ASPHALT TACK COAT REQUIRED

EXISTING MACADAM OR CONCRETE BASE

COMPACTED CRUSHED STONE CR-6 FULL DEPTH OF TRENCH

MODIFIED

METHOD OF CUTTING AND REPAIRING OPENINGS IN EXISTING ROADWAYS

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

ISSUED 5/18/06
REVISED 9/30/08
PLATE R-5
NOTES:

FLOWABLE FLY ASH FILL FULL DEPTH (EXCLUDING 1' BEDDING) EXCEPT FOR LAST 4" OF HOT MIX ASPHALT SURFACE SHALL MEET AASHTO REQUIREMENTS.

TWO (2) TEST CYLINDERS TO BE PROVIDED TO HARFORD COUNTY MATERIALS AND TESTING SECTION AT 2220 ADY ROAD, FOREST HILL, MD 21050. PHONE NUMBER: 638-3562.

TRENCH TO BE COVERED WITH STEEL PLATES DURING THE CURING PERIOD OF 24 HOURS. PLATES SHALL BE PINNED AND RAMMED.

MAINTAIN ONE FOOT (1') VERTICALLY AND FIVE FEET (5') HORIZONTALLY FROM WATER AND SEWER LINES.
CR-6 OR 467 TO LIMITS SHOWN ON UTILITY BEDDING DETAIL 21" MIN.

NOTES:

SUB-GRANE BASE AND STONE BASE TO BE COMPACTED TO 95% OF MAXIMUM DENSITY PLACED IN LAYERS - NOT TO EXCEED 6" LIFTS.

BACKFILL SHALL MEET THE REQUIREMENTS OF SECTION 602.03.04 OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS.
<table>
<thead>
<tr>
<th>Pipe Diameter (D)</th>
<th>Low Cradle</th>
<th>High Cradle</th>
<th>Encasement</th>
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<tbody>
<tr>
<td>12&quot;</td>
<td>1.62</td>
<td>2.65</td>
<td>4.03</td>
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<td>15&quot;</td>
<td>1.91</td>
<td>3.18</td>
<td>4.83</td>
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<td>18&quot;</td>
<td>2.22</td>
<td>3.73</td>
<td>5.66</td>
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<td>21&quot;</td>
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<td>6.59</td>
<td>12.35</td>
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<td>7.67</td>
<td>14.26</td>
<td>21.38</td>
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<tr>
<td>54&quot;</td>
<td>8.75</td>
<td>16.26</td>
<td>24.46</td>
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<tr>
<td>60&quot;</td>
<td>9.97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>66&quot;</td>
<td>11.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>72&quot;</td>
<td>12.55</td>
<td></td>
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</table>

W = Cradle Payment Width (Trench Width)
W = O.D. + 2E
E = 9" For 6" To 24" Pipes
E = 12" For 27" To 36" Pipes
E = 15" For 42" To 72" Pipes

NOTE: Quantities are for estimating only.

TRENCHES
CRADLE AND ENCASEMENT
ALL WELLS SHALL BE CAPPED WITH AN 8" REINFORCED CONCRETE SLAB WHERE THE WALLS OR THE WELL RINGS ARE SOUND, THE CAP SHALL BE SQUARE IN SHAPE AND OF A DIMENSION EQUAL TO THE MAXIMUM well DIAmETER PLUS 2" WHERE THERE ARE NO WELL RINGS OR WHERE THE WALLS OR RINGS ARE UNSOUND, THE CAP SHALL BE SQUARE IN SHAPE AND OF A DIMENSION EQUAL TO THE MAXIMUM WELL DIAMETER PLUS 6" THIS WILL ALLOW THE CAP TO REST UPON A MINIMUM OF 3' OF THE EXISTING GROUND BEYOND THE WELL OPENING.

FILL CAN BE EITHER CLEAN SAND (TAMPING NOT NECESSARY), CONCRETE CEMENT, GROUT, NEAT CEMENT, OR SODIUM BASED BENTONIC CLAY.
SECTION IV

SHOULders

Plate

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7" COMBINATION CURB AND GUTTER

MIX 3 CONCRETE 3500 PSI

4" BASE COURSE

1'-8"

1'-3 1/2"

7" R

3/4" TO 1'

8-5/16'

8'

7-3/16'

1'-0'

1' R

1'-3 1/2"

7" R

3/4" TO 1'

8-5/16'

8'

7-3/16'

1'-0'

1' R

A BITUMINOUS SEAL SHALL BE PLACED AT ALL CURB JOINTS ALONG THE GUTTER PAN.

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

7-1.DGN 02/13/2009 10:30:53 AM
CONCRETE MOUNTABLE CURB AND GUTTER

A BITUMINOUS SEAL SHALL BE PLACED AT ALL CURB JOINTS ALONG THE GUTTER PAN.

MOUNTABLE CURB & GUTTER
* 4"x4"x4" concrete key way spaced 4' on center will be required to anchor curb to pavement section. Expansion joint material, to be placed every 50' and at P.C.'s and P.T.'s of all curves.
MATCH ROADWAY PAVEMENT SLOPE

8"

1"

1' 8"

1"

NOTE:
THIS CURB SHALL ONLY BE USED
AROUND THE TRUCK APRONS
ON ROUNDABOUTS AND THE MEDIAN/NOSE
OF THE MEDIAN ON ISLANDS.
SECTION A-A

TYPE A-1
PLACED WITH BITUMINOUS CONCRETE PAVEMENT

SECTION A-A

TYPE A-2
PLACED IN COMBINATION WITH PAVEMENT RESURFACING

SECTION A-A

TYPE A-3
PLACED ON EXISTING PAVEMENT

GUTTER PAN SHOWN ON TYPE A-1 ONLY

A
END NORMAL SECTION BEGIN NOSE DOWN

ISOMETRIC - NOSE DOWN
(SHOWN WITHOUT GUTTER PAN)

ELEVATION

NOSE DOWN AT APPROACH END OF MEDIAN

NOTES:

JOINT SPACING WILL BE A MAXIMUM OF 10'-0" APART SEE SPECIFICATIONS FOR LOCATION AND DESCRIPTION OF TREATMENT FOR THE TYPES OF JOINTS USED IN THE CASE OF PAVED PAVEMENT JOINTS SHALL MATCH PAVEMENT JOINTS. ALLOW 4" HOLE IN MEDIAN FOR SIGNS SPACED AS SHOWN ON PLANS OR AS DIRECTED BY THE ENGINEER.

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

STANDARD MONOLITHIC CONCRETE MEDIAN

ISSUED: 5/2/00
REVISED: 
REVISED: 
PLATE: S-6
NOTES

1. TO BE USED ON WIDE SIDEWALKS OR SIDEWALKS WITH SIGNIFICANT SEPARATION FROM THE ROADWAY WHERE THE GEOMETRY SPECIFIED IN THE DETAILS ABOVE CAN BE SATISFIED. MAY BE MODIFIED TO SUIT A PARTICULAR LOCATION.

2. WHERE 60° SIDEWALK CAN NOT BE PROVIDED, A DESIGN WAIVER MUST BE REQUESTED.

3. NO TRAVERSABLE SLOPE ON THE RAMP OR SIDEWALK SHALL EXCEED 12:1 IN THE DIRECTION OF PEDESTRIAN TRAVEL, OR 48:1 PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL.

4. SIDEWALK RAMP TO BE SHOWN ON PLANS SYMBOLICALLY AND REFERENCED WITH THE CENTER OF THE RAMP ALIGNED TO A STATION ON THE CONSTRUCTION CENTERLINE. SEPARATE DETAILS SHALL BE SHOWN WHERE PROPOSED RAMP VARIES FROM STANDARD CASES.

SECTION A-A

[Diagram and text related to sidewalk ramp design and specifications]
NOTES

1. TO BE USED WHERE SIDEWALK IS ADJACENT TO THE CURB. THIS STANDARD MAY BE MODIFIED TO SUIT A PARTICULAR LOCATION.
2. WHERE 60° SIDEWALK CAN NOT BE PROVIDED, A DESIGN WAIVER MUST BE REQUESTED.
3. NO TRAVERSABLE SLOPE ON THE RAMP OR SIDEWALK SHALL EXCEED 12:1 IN THE DIRECTION OF PEDESTRIAN TRAVEL, OR 48:1 PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL.
4. SIDEWALK RAMPS TO BE SHOWN ON PLANS SYMBOLICALLY AND REFERENCED WITH THE CENTER OF THE RAMP ALIGNED TO A STATION ON THE CONSTRUCTION CENTERLINE. SEPARATE DETAILS SHALL BE SHOWN WHERE PROPOSED RAMP VARIES FROM STANDARD CASES.
NOTES

1. TO BE USED WHERE AT LEAST 7'-0" EXIST BETWEEN THE BACK OF CURB AND THE BACK OF SIDEWALK. THIS STANDARD MAY BE MODIFIED TO SUIT A PARTICULAR LOCATION.

2. WHERE 60° SIDEWALK CAN NOT BE PROVIDED, A DESIGN WAIVER MUST BE REQUESTED.

3. NO TRAVERSABLE SLOPE ON THE RAMP OR SIDEWALK SHALL EXCEED 12:1 IN THE DIRECTION OF PEDESTRIAN TRAVEL, OR 48:1 PERPENDICULAR TO THE DIRECTION OF PEDESTRIAN TRAVEL.

4. SIDEWALK RAMP'S TO BE SHOWN ON PLANS SYMBOLICALLY AND REFERENCED WITH THE CENTER OF THE RAMP ALIGNED TO A STATION ON THE CONSTRUCTION CENTERLINE. SEPARATE DETAILS SHALL BE SHOWN WHERE PROPOSED RAMP VARIES FROM STANDARD CASES.

5. FOR BUFFER WIDTHS LESS THAN 24", WIDEN SIDEWALK TO BACK OF CURB AS SHOWN FOR THE SPECIAL CASE. THEN BUILD PARALLEL RAMP USING PLATE S-6.

Quinet F. Cooper
Director of Public Works

H. Wryley Mayo, Jr.
DEP. DIRECTOR, PUBLIC WORKS

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

SIDEWALK RAMPS PARALLEL

PLATE S-9

USER\DETAILS\SPEC\ROADCODE\STANDARD DETAILS\SHOULDER\S-9.DGN
MAT DETAILS
SEE PLACEMENT GUIDELINES BELOW

DOME SPACING

DOME SECTION

PLACEMENT GUIDELINES

WHERE ISLANDS OR MEDIAN ARE LESS THAN 6 FEET WIDE, THE DETECTABLE WARNING SHOULD EXTEND ACROSS THE FULL LENGTH OF THE CUT THROUGH THE ISLAND OR MEDIAN

NOTES

1. DETECTABLE WARNING SURFACES SHALL CONSIST OF RAISED TRUNCATED DOMES WITH NOMINAL DIMENSIONS AS SHOWN AND SHALL BE CAST IN PLACE INTO THE RAMP. SURFACE APPLIED DETECTABLE WARNING SURFACES SHALL NOT BE PERMITTED ON NEW OR RECONSTRUCTED CURB RAMPS.

2. DETECTABLE WARNING SURFACES SHALL BE A "BRICK" OR "RUST" RED COLOR.

3. THE DETECTABLE WARNING SURFACES SHALL BE LOCATED SO THAT THE EDGE NEAREST THE CURB LINE IS 6 TO 8 INCHES FROM THE FACE OF CURB.

4. FOR SKEWED APPLICATIONS DETECTABLE WARNING SHALL BE PLACED SUCH THAT THE DOMES CLOSEST TO THE BACK OF CURB ARE NO LESS THAN 0.5" AND NO MORE THAN 3.0" FROM THE BACK OF CURB. TRUNCATED DOME SURFACES SHALL BE FABRICATED TO PROVIDE FULL DOMES ONLY.

5. DETECTABLE WARNING SURFACES ARE REQUIRED AT STREET CROSSING & SIGNALIZED INTERSECTIONS.

Robert B. Grosh
Director of Public Works 10/09/08

J. W. Waller Myers
DEP. DIRECTOR, PUBLIC WORKS 9/29/08

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

DETECTABLE WARNING SURFACE

PLATE S-10
1. SIDEWALK TO BE SCRIBED IN 5' SQUARES.
2. EXPANSION JOINTS ACROSS THE SIDEWALK NOT MORE THAN 16' APART.
3. 1/2" PREFORMED BITUMINOUS EXPANSION JOINT MATERIAL IN EXPANSION JOINTS TO BE 1/4" BELOW SURFACE OF SIDEWALK.
4. CONCRETE TO BE MIX 3 (3500 P.S.I.)
5. WHEN SIDEWALK ABUTS CURB, WALK SHALL BE 1/4" ABOVE CURB WITH 1/2" PREFORMED BITUMINOUS EXPANSION JOINT BETWEEN THEM AND RESTING ON A COMPACTED CRUSHED STONE BASE. SEE DETAIL 'A' THIS SHEET.
6. OFF SITE DRAIN TO BE 3" DIAMETER PLASTIC OR FIBER PIPE TO 1' BEHIND WALKS WHERE THEY ARE ADJACENT TO CURB.
NOTES

1. TO BE USED WHERE A STREET-LEVEL PEDESTRIAN CROSSING IS REQUIRED THROUGH RAISED MEDIANS OR RAISED ISLANDS AND THERE IS INSUFFICIENT WIDTH TO PROVIDE A RAMPED MEDIAN OR ISLAND OPENING.

2. WHERE PHYSICAL CONSTRAINTS PRECLUDE USE OF 6 FT. MEDIAN, A 4 FT. MEDIAN WIDTH IS ACCEPTABLE.

3. CUT-THROUGH MEDIANS AND ISLAND OPENINGS TO BE SHOWN ON PLANS SYMBOLICALLY AND REFERENCED WITH THE CENTER OF THE OPENING ALIGNED TO A STATION ON THE CONSTRUCTION CENTERLINE. SEPARATE DETAILS SHALL BE SHOWN WHERE PROPOSED OPENING VARIES FROM STANDARD METHODS.

Director of Public Works 10/09/08

DEP. DIRECTOR, PUBLIC WORKS 9/20/08
NOTES

1. TO BE USED WHERE A PEDESTRIAN ACCESS ROUTE CROSSES RAISED MEDIAN OR RAISED ISLANDS AND THERE IS SUFFICIENT WIDTH TO SATISFY THE GEOMETRY OUTLINED IN THIS STANDARD.

2. RAMPED MEDIAN AND ISLAND OPENINGS TO BE SHOWN ON PLANS SYMBOLICALLY AND REFERENCED WITH THE CENTER OF THE OPENING ALIGNED TO A STATION ON THE CONSTRUCTION CENTERLINE. SEPARATE DETAILS SHALL BE SHOWN WHERE PROPOSED OPENING VARIES FROM STANDARD METHODS.

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

RAMPED MEDIAN AND ISLAND OPENINGS

ISSUED
REVISED
REVISED
PLATE S-13
DRIVEWAY ENTRANCE

7" CONCRETE CURB 
& GUTTER

1'-0"

1'-6"

1'-6"

1'

EDGE OF TRAFFIC WAY PAVING

5' SIDEWALK

2

VARIABLE WIDTH

10'-24' MAX.

1/2" PREFORMED EXPANSION JOINT MATERIAL

RIGHT OF WAY LINE

NOTES:

1. THE ACCESS (DRIVEWAY) MUST BE PAVED WITH PORTLAND CEMENT (7") (MIX • 3)
   OR HOT MIX ASPHALT (3") COMPACTED MINIMUM, WITH (6") GRADED AND COMPACTED
   AGGREGATE BASE, FROM EDGE OF THE COUNTY ROAD A MINIMUM OF TWELVE (12) FEET,
   OR TO THE RIGHT-OF-WAY LINE, WHICHERSOEVER IS GREATER.
2. HOT MIX ASPHALT (3") MAY ONLY BE USED WHERE SIDEWALKS ARE NOT PRESENT.
   THREE (3) INCH MINIMUM THICKNESS IS THE COMPACTED AND COMPLETED THICKNESS
   THROUHOUT.
3. PORTLAND CEMENT (7") MUST BE Poured USING SEVEN (7) HIGH FORMS, MINIMUM.
4. ALL ACCESSES (DRIVEWAYS) MUST MAINTAIN A FIVE (5) FOOT MINIMUM CLEARANCE FROM
   ALL ABOVE GROUND UTILITIES, (E.G., CABLE, TELEPHONE, AND ELECTRIC BOXES, HYDRANTS, POLES,
   STORM DRAINS, ETC.)
5. ACCESS WILL RISE FROM 1/2" TO 1" PER FOOT SLOPE FROM THE 1 1/2" LIP TO THE RIGHT-OF-WAY
   LINE OR 12', WHICHERSOEVER IS GREATER. THE ACCESS MAY THEN SLOPE TO MEET EXISTING
   GRADES, BUT MAY NOT EXCEED 15% GRADE WITHOUT SPECIFIC APPROVAL OF THE DIRECTOR.
6. JOINTS MUST BE SAW CUT WHEN THREE (3) FEET OR GREATER FROM AN EXISTING JOINT.
   WHEN WITHIN THREE (3) FEET, CURB MUST BE REMOVED TO THE JOINT.
7. COUNTY ROAD EDGE TIE IN MUST BE SAW CUT TO DEPTH OF APPROVED CONSTRUCTION
   MATERIAL, SEALER MUST BE APPLIED TO THE JOINT DURING CONSTRUCTION UPON COMPLETION.
8. SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2% WHEN CROSSING DRIVEWAY. IF NECESSARY,
   THE SIDEWALK MAY BE "BENCHED" THRU THE DRIVEWAY TO MAINTAIN THE CROSS SLOPE.
   A 5' WIDE "BENCH" IS PREFERRED, BUT MAY BE REDUCED TO 3' IF DRIVEWAY GRADE EXCEEDS 10%.
9. EXISTING SIDEWALK MUST BE REMOVED AND CONSTRUCTED TO MEET THESE SPECIFICATIONS.

Director of Public Works 10/09/08
DEP. DIRECTOR, PUBLIC WORKS 9/29/08

TYPICAL DRIVEWAY ENTRANCE
FOR 7" CONCRETE CURB AND GUTTER WITH SIDEWALK

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS
DRIVEWAY ENTRANCE

MOUNTABLE CURB & GUTTER

1'-6"

1'-0"

5' SIDEWALK

VARIABLE WIDTH
10' - 24' MAX.

12" MIN

EDGE OF TRAFFIC WAY PAVING

1/2" PREFORMED EXPANSION JOINT MATERIAL

RIGHT OF WAY LINE

1/2" PREFORMED EXPANSION JOINT MATERIAL

NOTES:

1. THE ACCESS (DRIVEWAY) MUST BE PAVED WITH PORTLAND CEMENT (7") (MIX #3) OR HOT MIX ASPHALT (3") MINIMUM, WITH (6") GRADED AND COMPACTED AGGREGATE BASE, FROM THE EDGE OF THE COUNTY ROAD A MINIMUM OF TWELVE (12) FEET, OR TO THE RIGHT-OF-WAY LINE, WHICHEVER IS GREATER.

2. HOT MIX ASPHALT (3") MAY ONLY BE USED WHERE SIDEWALKS ARE NOT PRESENT.

3. PORTLAND CEMENT (7") MUST BE Poured USING SEVEN (7) INCH HIGH FORMS, MINIMUM.

4. ALL ACCESSES (DRIVEWAYS) MUST MAINTAIN A FIVE (5) FOOT MINIMUM CLEARANCE FROM ALL ABOVE GROUND UTILITIES, (E.G. CABLE, TELEPHONE, AND ELECTRIC BOXES, HYDRANTS, POLES, STORM DRAINS, ETC.)

5. ACCESS WILL RISE FROM 1/2" TO 1" PER FOOT SLOPE FROM THE CURB BACK TO THE RIGHT-OF-WAY LINE OR 12', WHICHEVER IS GREATER.

6. MOUNTABLE CURB AND GUTTER MAY NOT BE REMOVED OR MODIFIED FOR ACCESS CONSTRUCTION WITHOUT SPECIFIC APPROVAL OF DIRECTOR.

7. SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2% WHEN CROSSING DRIVEWAY. IF NECESSARY, THE SIDEWALK MAY BE "BENCHED" THRU THE DRIVEWAY TO MAINTAIN THE CROSS SLOPE.

8. EXISTING SIDEWALK MUST BE REMOVED AND CONSTRUCTED TO MEET THESE REQUIREMENTS.
NOTES:

1. THE ACCESS (DRIVEWAY) MUST BE PAVED WITH PORTLAND CEMENT (7") (MIX #3) OR HOT MIX ASPHALT (3") MINIMUM, WITH (6") GRADED AND COMPACTED AGGREGATE BASE, FROM THE EDGE OF THE COUNTY ROAD A MINIMUM OF TWELVE (12) FEET, OR TO THE RIGHT-OF-WAY LINE, WHICHEVER IS GREATER.

2. HOT MIX ASPHALT (3") MAY ONLY BE USED WHERE SIDEWALKS ARE NOT PRESENT. THREE (3) INCH MINIMUM THICKNESS IS THE COMPACTED AND COMPLETED THICKNESS THROUGHOUT.

3. PORTLAND CEMENT (7") MUST BE POURED USING SEVEN (7) INCH HIGH FORMS, MINIMUM.

4. ALL ACCESSES (DRIVEWAYS) MUST MAINTAIN A FIVE (5) FOOT MINIMUM CLEARANCE FROM ALL ABOVE GROUND UTILITIES, (E.G., CABLE, TELEPHONE, AND ELECTRIC BOXES, HYDRANTS, POLES, STORM DRAINS, ETC.)

5. ACCESS WILL RISE FROM 1/2" TO 1" PER FOOT SLOPE FROM THE CURB BACK TO THE RIGHT-OF-WAY LINE OR 12", WHICHEVER IS GREATER. THE ACCESS MAY THEN SLOPE TO MEET EXISTING GRADES, BUT MAY NOT EXCEED 15% GRADE WITHOUT SPECIFIC APPROVAL OF THE DIRECTOR.

6. EXTRUDED CURB MUST BE SAW CUT AND REMOVED FOR ACCESS CONSTRUCTION. HOT MIX ASPHALT MUST BE FORMED BACK INTO EXTRUDED CURB ON BOTH SIDES OF ACCESS.

7. COUNTY ROAD EDGE TIE IN MUST BE SAW CUT TO DEPTH OF APPROVED CONSTRUCTION MATERIAL SEALER MUST BE APPLIED TO THE JOINT DURING CONSTRUCTION UNTIL COMPLETION.

8. SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2% WHEN CROSSING DRIVEWAY. IF NECESSARY, THE SIDEWALK MAY BE "BENCH"ED THRU THE DRIVEWAY TO MAINTAIN THE CROSS SLOPE. A 5" WIDE "BENCHED" IS PREFERRED, BUT MAY BE REDUCED TO 3" IF DRIVEWAY GRADE EXCEEDS 10%.

9. EXISTING SIDEWALK MUST BE REMOVED AND CONSTRUCTED TO MEET THESE SPECIFICATIONS.
NOTES:

1. THE ACCESS (DRIVEWAY) MUST BE PAVED WITH PORTLAND CEMENT(7°) (MIX#3) OR HOT MIX ASPHALT (3°) MINIMUM, WITH (6°) GRADED AND COMPACTED AGGREGATE BASE, FROM THE EDGE OF THE COUNTY ROAD A MINIMUM OF TWENTY (20) FEET, OR TO THE RIGHT-OF-WAY LINE, WHICHER IS GREATER.

2. HOT MIX ASPHALT (3°) MAY ONLY BE USED WHERE SIDEWALKS ARE NOT PRESENT THREE (3) INCH MINIMUM THICKNESS IS THE COMPACTED AND COMPLETED THICKNESS THROUGHOUT.

3. PORTLAND CEMENT (7°) MUST BE POURLED USING SEVEN (7) INCH HIGH FORMS, MINIMUM.

4. ALL ACCESSES (DRIVEWAYS) MUST MAINTAIN A FIVE (5) FOOT MINIMUM CLEARANCE FROM ALL ABOVE GROUND UTILITIES, (E.g. CABLE, TELEPHONE, AND ELECTRIC BOXES, HYDRANTS, POLES, STORM DRAINS, ETC.)

5. ACCESS WILL FALL FROM 1/2° TO 1° PER FOOT SLOPE FROM THE EDGE OF COUNTY ROAD FOR A MINIMUM OF TWO (2) FEET, AND THEN RISE FROM 1/2° TO 1° PER FOOT SLOPE TO RIGHT-OF-WAY LINE OR 12', WHICHER IS GREATER. THE ACCESS MAY THEN SLOPE TO MEET EXISTING GRADES, BUT MAY NOT EXCEED 15° GRADE WITHOUT SPECIFIC APPROVAL OF THE DIRECTOR.

6. APPROVED CONCRETE OR CORRUGATED METAL PIPE SHALL BE USED FOR ACCESS CONSTRUCTION FLUME TYPE END SECTIONS DESIGNED AND APPROVED FOR EACH TYPE AND SIZE OF PIPE, SHALL BE INSTALLED ON EACH END AND STABILIZATION COMPLETED.

7. DRIVEWAY PIPES MAY NOT BE CONNECTED TO ANY OTHER DRIVEWAY PIPE OR STORM DRAIN WITHOUT PRIOR APPROVAL OF THE DIRECTOR.

8. COUNTY ROAD EDGE TIE IN MUST BE SAW CUT TO DEPTH OF APPROVED CONSTRUCTION MATERIAL SEALER MUST BE APPLIED TO THE JOINT DURING CONSTRUCTION AND UPON COMPLETION.
NOTES:

1. THE ACCESS (DRIVEWAY) MUST BE PAVED WITH PORTLAND CEMENT (7") (MIX#3) OR HOT MIX ASPHALT (3") MINIMUM, WITH (6") GRADED AND COMPACTED AGGREGATE BASE, FROM THE EDGE OF THE COUNTY ROAD A MINIMUM OF TWELVE (12) FEET, OR TO THE RIGHT-OF-WAY LINE, WHICHEVER IS GREATER.

2. HOT MIX ASPHALT (3") MAY ONLY BE USED WHERE SIDEWALKS ARE NOT PRESENT. THREE (3) INCH MINIMUM THICKNESS IS THE COMPACTED AND COMPLETED THICKNESS THROUGHOUT.

3. PORTLAND CEMENT (7") MUST BE POURED USING SEVEN (7) INCH HIGH FORMS, MINIMUM.

4. ALL ACCESSES (DRIVEWAYS) MUST MAINTAIN A FIVE (5) FOOT MINIMUM CLEARANCE FROM ALL ABOVE GROUND UTILITIES, (e.g. CABLE, TELEPHONE, AND ELECTRIC BOXES, HYDRANTS, POLES, STORM DRAINS, ETC.)

5. ACCESS WILL FALL FROM 1/2" TO 1" PER FOOT SLOPE FROM THE EDGE OF COUNTY ROAD FOR A MINIMUM OF TWO (2) FEET, AND THEN RISE FROM 1/2" TO 1" PER FOOT SLOPE TO RIGHT-OF-WAY LINE OR 12", WHICHEVER IS GREATER TO CREATE A DRAINAGE SWALE. THE ACCESS MAY THEN SLOPE TO MEET EXISTING GRADES, BUT MAY NOT EXCEED 15% GRADE WITHOUT SPECIFIC APPROVAL OF THE DIRECTOR.

6. DRAINAGE SWALE LOCATION AND/OR DEPTH MAY BE GREATER AND/OR DEEPER AS DETERMINED BY ROAD DESIGN OR THE INSPECTOR PRIOR TO PAVING.

7. COUNTY ROAD EDGE TIE IN MUST BE SAW CUT TO DEPTH OF APPROVED CONSTRUCTION MATERIAL SEALER MUST BE APPLIED TO THE ROADWAY JOINT DURING CONSTRUCTION AND UPON COMPLETION.
DRIVEWAY ENTRANCE

EDGE OF TRAFFIC WAY PAVING

34' MAX.

5'-TYP

24' MAX.

20'-MIN.

MIN.

W/ O PIPE

MIN.

W/ O PIPE

END SECTION

FLOW MINIMUM

5'-TYP

VARIETY

2

4'-MIN WIDTH VARIES 4'-MIN

APPROVED S.D. PIPE- AS REQUIRED

RIGHT OF WAY LINE

PLAN

NOTES:

1. THE ACCESS (DRIVEWAY) MUST BE PAVED WITH PORTLAND CEMENT (7") (MIX #3) OR HOT MIX ASPHALT (3") MINIMUM, WITH 6" GRADED AND COMPACTED AGGREGATE BASE, FROM THE EDGE OF THE COUNTY ROAD A MINIMUM OF TWELVE (12) FEET, OR TO THE RIGHT OF WAY LINE, WHICHEVER IS GREATER

2. HOT MIX ASPHALT (3") MAY ONLY BE USED WHERE SIDEWALKS ARE NOT PRESENT THREE (3) INCH MINIMUM ASPHALT THICKNESS IS THE COMPACTED AND COMPLETED THICKNESS THROUGHOUT

3. PORTLAND CEMENT (7") MUST BE POURED USING SEVEN (7) INCH HIGH FORMS, MINIMUM, AND EXPANSION JOINT AS NOTED

4. ALL ACCESSES (DRIVEWAYS) MUST MAINTAIN A FIVE (5) FOOT MINIMUM CLEARANCE FROM ALL ABOVE GROUND UTILITIES, (e.g., CABLE, TELEPHONE, AND ELECTRIC BOXES, HYDRANTS, POLES, STORM DRAINS, ETC.)

5. ACCESS WILL FALL FROM 3/4" TO 1" PER FOOT SLOPE FROM THE EDGE OF COUNTY ROAD FOR A MINIMUM OF TWO (2) FEET, AND THEN RISE FROM 3/4" TO 1" PER FOOT SLOPE TO RIGHT OF WAY LINE OR 12", WHICHEVER IS GREATER THE ACCESS MAY THEN SLOPE TO MEET EXISTING GRADES, BUT MAY NOT EXCEED 15% GRADE WITHOUT SPECIFIC APPROVAL OF THE DIRECTOR

6. APPROVED CONCRETE OR CORRUGATED METAL PIPE SHALL BE USED FOR ACCESS CONSTRUCTION, FLUME TYPE END SECTIONS DESIGNED AND APPROVED FOR EACH TYPE AND SIZE OF PIPE, SHALL BE INSTALLED ON EACH END AND STABILIZATION COMPLETED

7. DRIVEWAY PIPES MAY NOT BE CONNECTED TO ANY OTHER DRIVEWAY PIPE OR STORM DRAIN WITHOUT PRIOR APPROVAL OF THE DIRECTOR

8. COUNTY ROAD EDGE TIE IN MUST BE SAW CUT TO DEPTH OF APPROVED CONSTRUCTION MATERIAL SEALER MUST BE APPLIED TO THE ROADWAY JOINT DURING CONSTRUCTION AND UPON COMPLETION.

TYPICAL DRIVEWAY ENTRANCE
FOR
COMMON DRIVE (2-5 HOMES)
OPEN SECTION ROAD

HARFORD COUNTY, MD
DEPARTMENT OF
PUBLIC WORKS

TYPICAL DRIVEWAY ENTRANCE
FOR
COMMON DRIVE (2-5 HOMES)
OPEN SECTION ROAD

PLATE S-19
NOTES:
1. THE ACCESS (DRIVEWAY) MUST BE PAVED WITH PORTLAND CEMENT (9") (MIX #3) OR HOT MIX ASPHALT (6") MINIMUM, WITH 10" MINIMUM GRADED AND COMPACTED AGGREGATE BASE, FROM THE EDGE OF THE COUNTY ROAD A MINIMUM OF TWENTY FIVE (25) FEET, OR TO THE RIGHT-OF-WAY LINE, WHICHEVER IS GREATER.
2. PORTLAND CEMENT (9") MUST BE POURED USING NINE (9) INCH HIGH FORMS, MINIMUM.
3. ALL ACCESSES (DRIVEWAYS) MUST MAINTAIN A FIVE (5) FOOT MINIMUM CLEARANCE FROM ALL ABOVE GROUND UTILITIES, (e.g. CABLE, TELEPHONE, AND ELECTRIC BOXES, HYDRANTS, POLES, STORM DRAINS, ETC.)
4. ACCESS WILL RISE FROM 1/2" TO 1" PER FOOT SLOPE FROM THE EDGE OF TRAFFIC WAY PAVING TO THE RIGHT-OF-WAY LINE OR 12", WHICHEVER IS GREATER.
   THE ACCESS MAY THEN SLOPE TO MEET EXISTING GRADES, BUT MAY NOT EXCEED 15% GRADE WITHOUT SPECIFIC APPROVAL OF DIRECTOR.
5. JOINT MUST BE SAW CUT WHEN THREE (3) FEET OR GREATER FROM AN EXISTING JOINT WHEN WITHIN THREE (3) FEET, CURB MUST BE REMOVED TO THE JOINT EXCEPT FOR EXTRUDED CURB WHICH MUST BE SAWED CUT AND REMOVED.
6. EXISTING COUNTY ROAD EDGE TIE IN MUST BE SAW CUT TO DEPTH OF APPROVED CONSTRUCTION MATERIAL.
   SEALER MUST BE APPLIED TO THE JOINT DURING CONSTRUCTION AND UPON COMPLETION.
7. SIDEWALK CROSS SLOPE SHALL NOT EXCEED 2% WHEN CROSSING DRIVEWAY. IF NECESSARY, THE SIDEWALK MAY BE "BENCH"ED THROUGH THE DRIVEWAY TO MAINTAIN THE CROSS SLOPE.
8. EXISTING SIDEWALK MUST BE REMOVED AND CONSTRUCTED TO MEET THESE SPECIFICATIONS.
Dimension Guidelines

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<td>IND</td>
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NOTES:

1. THE ACCESS (DRIVEWAY) MUST BE PAVED WITH PORTLAND CEMENT (9") (MIX #3) OR HOT MIX ASPHALT (6") MINIMUM, WITH 10" (MIN) GRADED AND COMPACTED AGGREGATE BASE, FROM THE EDGE OF THE COUNTY ROAD A MINIMUM OF TWELVE (12) FEET, OR TO THE RIGHT-OF-WAY LINE, WHICHEVER IS GREATER.

2. PORTLAND CEMENT (9") MUST BE POURED USING NINE (9) INCH HIGH FORMS, MINIMUM.

3. ALL ACCESSES (DRIVEWAYS) MUST MAINTAIN A FIVE (5) FOOT MINIMUM CLEARANCE FROM ALL ABOVE GROUND UTILITIES, (E.G. CABLE, TELEPHONE, AND ELECTRIC BOXES, HYDRANTS, POLES, STORM DRAINS, ETC.)

4. ACCESS WILL FALL FROM 1/2" TO 1" PER FOOT SLOPE FROM THE EDGE OF COUNTY ROAD FOR A MINIMUM OF TWO (2) FEET, AND THEN RISE FROM 1/2" TO 1" PER FOOT SLOPE TO RIGHT-OF-WAY LINE OR 12", WHICHEVER IS GREATER.

5. THE ACCESS MAY THEN SLOPE TO MEET EXISTING GRADES, BUT MAY NOT EXCEED 15% GRADE WITHOUT SPECIFIC APPROVAL OF DIRECTOR.

6. APPROVED CONCRETE OR CORRUGATED METAL PIPE SHALL BE USED FOR ACCESS CONSTRUCTION FLUME TYPE END SECTIONS DESIGNED AND APPROVED FOR EACH TYPE OF PIPE, SHALL BE INSTALLED ON EACH END AND STABILIZATION INSTALLED AND COMPLETED.

6. DRIVEWAY PIPES MAY NOT BE CONNECTED TO ANY OTHER DRIVEWAY PIPE OR STORM DRAIN WITH PRIOR APPROVAL OF THE DIRECTOR.

7. EXISTING COUNTY ROAD EDGE TIE IN MUST BE SAW CUT TO DEPTH OF APPROVED CONSTRUCTION MATERIAL SEALER MUST BE APPLIED TO THE JOINT DURING CONSTRUCTION AND UPON COMPLETION.
NOTES:

1. THE ACCESS (DRIVEWAY) MUST BE PAVED WITH PORTLAND CEMENT (9") (MIX #3) OR HOT MIX ASPHALT (6") MINIMUM, WITH 10" (MIN.) GRADED AND COMPACTED AGGREGATE BASE, FROM THE EDGE OF THE COUNTY ROAD A MINIMUM OF TWELVE (12) FEET, OR TO THE RIGHT-OF-WAY LINE, WHICHEVER IS GREATER.

2. PORTLAND CEMENT (9") MUST BE Poured USING NINE (9) INCH HIGH FORMS, MINIMUM.

3. ALL ACCESSES (DRIVEWAYS) MUST MAINTAIN A FIVE (5) FOOT MINIMUM CLEARANCE FROM ALL ABOVE GROUND UTILITIES, (E.G. CABLE, TELEPHONE, AND ELECTRIC BOXES, HYDRANTS, POLES, STORM DRAINS, ETC.)

4. ACCESS WILL FALL FROM 1/2" TO 1" PER FOOT SLOPE FROM THE EDGE OF COUNTY ROAD FOR A MINIMUM OF TWO (2) FEET, AND THEN RISE FROM 1/2" TO 1" PER FOOT SLOPE TO RIGHT-OF-WAY LINE OR 12", WHICHEVER IS GREATER, TO CREATE A DRAINAGE SWALE. THE ACCESS MAY THEN SLOPE TO MEET EXISTING GRADES, BUT MAY NOT EXCEED 15% GRADE WITHOUT SPECIFIC APPROVAL OF DIRECTOR.

5. DRAINAGE SWALE LOCATION AND/OR DEPTH MAY BE GREATER AND/OR DEEPER AS DETERMINED BY ROAD DESIGN OR THE INSPECTOR, PRIOR TO PAVING.

6. EXISTING COUNTY ROAD EDGE TIE IN MUST BE SAW CUT TO DEPTH OF APPROVED CONSTRUCTION MATERIAL SEALER MUST BE APPLIED TO THE JOINT DURING CONSTRUCTION AND UPON COMPLETION.
FENCING AT GRADE CHANGES

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<td>(S) MAXIMUM</td>
<td>12'-0&quot;</td>
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<tr>
<td>(S) MINIMUM</td>
<td>10'-0&quot;</td>
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NOTE: PULL POSTS SHALL BE INSTALLED AT SHARP BREAKS IN VERTICAL ALIGNMENT AND ON APPROXIMATE 500'-0" CENTERS IN STRAIGHT RUNS OF FENCE OR AS DIRECTED BY THE ENGINEER. ALL TERMINAL POSTS, PULL POSTS & CORNER POSTS SHALL BE BRACED AS SHOWN.

FENCING AT DEPRESIONS OVER 6'-0" DEEP

ATTACH BARBED WIRE TO LINE POSTS WITH NO. 9 GAUGE GALV STEEL CLIPS AS SHOWN IN THE DETAILS FOR "TIE WIRE ATTACHMENT FOR LINE POST".
GENERAL DETAILS

A.ST.M A-116 (16), DESIGN NO. 1047-5-1
NO. 9 GA. GALV WIRE, CLASS III COATING

ANCHOR R RIVETED OR WELDED TO THE
BACK OF POST
MIN. THICKNESS = 3/32".
MIN. WEIGHT = 0.67 LB.
MIN. SURFACE AREA = 19.5^2

LINE POSTS (1.33 LB/FT) U OR T SHAPE
(9.32 LB MIN. INCLUDING ANCHOR PLATE)

PULL POST & CORNER POST
2.375" O.D. (SCH 40) 3.65 LB/FT OR 3.12 LB/FT

BRACE ∆ 2"x2" x 1/4"
3.19 LB/FT FASTEN WITH 5/16" # BOLT

12"-0" MAX AT PULL & CORNER POSTS

MIX 2 CONCRETE 1'-0" DIAMETER

12'-0" MAX

12'-0" MAX

12'-0" OPENING DOUBLE-GATE

PIECE 1" NPS (1.315" O.D.) 1.16 LB/FT

PIECE 3" NPS (3 1/2" OD) 7.58 LB/FT OR 5.71 LB/FT

GRATE FRAMES & POSTS SHALL BE OF A.S.T.M. A-120 HOT DIPPED GALV. PIPE

DOUBLE SWING GATE

3/8" # BOLT W/TURNBUCKLE

PIECE 1" NPS (1.315" O.D.) 1.16 LB/FT

PIECE 2" NPS (2.375" O.D.) 3.65 LB/FT

OR 3.12 LB/FT

2 DBL STRAND NO. 9 GA. WIRES

GROUND LINE

MAX SPACING OF LINE POSTS SHALL BE 12'-0" Nominal Pipe Size (NPS)

SINGLE GATE

NOTES:
POSTS IN ROCK—WHERE SUBSTANTIAL ROCK IS ENCOUNTERED A HOLE ONE (1") INCH LARGER THAN THE POST AND OF
12" MINIMUM DEPTH FOR LINE POSTS AN 18" MINIMUM DEPTH FOR TERMINAL POSTS, SHALL BE MADE AFTER INSERTING THE POSTS,
THE HOLES SHALL BE BACKFILLED WITH A HANDMIXED 1:2 MORTAR CONSISTING OF ONE PART PORTLAND CEMENT AND TWO PARTS
FINE AGGREGATES MIXED TO A PLASTIC CONSISTENCY SHOWING NO SIGNS OF FREE WATER. THE HANDMIXING AND CONSOLIDATION OF
THE MORTAR SHALL BE PREFORMED IN A MANNER APPROVED BY THE ENGINEER.
THE WEIGHT OF STEEL PIPE CALLED FOR ON THIS STANDARD SHALL NOT VARY MORE THAN 5% FROM THE INDICATED WEIGHT,
BUT MAY EXCEED SUCH INDICATED WEIGHT. THE WEIGHT OF STEEL SHAPES CALLED FOR ON THIS STANDARD SHALL NOT VARY MORE
THAN 2.5% FROM THE INDICATED WEIGHT, BUT MAY EXCEED SUCH INDICATED WEIGHT.
TRUSS BRACE ATTACHMENT FOR ROUND CONSTRUCTION

1/8" GALVANIZED STEEL ROD

TRUSS ROD

TURN BUCKLE

PREFORMED GALVANIZED STEEL

BRACE BANDS

1/8" X 1" GALVANIZED STEEL

1/4" X 1 1/2" GALVANIZED CARRIAGE BOLT & NUT

TERMINAL POST

GALVANIZED MALLEABLE IRON

LINE POST

BRACE RAIL ATTACHMENT FOR ROUND CONSTRUCTION

CHAIN LINK BANDS

1/8" X 1" GALVANIZED STEEL

1/4" X 1 1/2" GALVANIZED CARRIAGE BOLT & NUT

STRETCHER BAR

1/4" X 3/4" GALVANIZED STEEL

STRETCHER ROD ATTACHMENT

ATTACHMENT FOR BARB WIRE OR TENSION WIRE
Alternate truss brace attachment for square construction.

Stretcher rod clip:
- .3125" galvanized wire or .3125" aluminum wire alloy 6063-T6

Stretcher bar:
- 3/16" x 3/4" galvanized steel or 1/4" x 3/4" alluminum alloy 6063-T6

Alternate stretcher rod attachment:

Alternate attachment for barb wire or tension wire:

Alternate brace rail attachment for square construction:

Director of Public Works:

Date:

Issued:

Revised:

Plate: S-28
DRIVE ANCHOR BLADE
GALVANIZED STEEL ANGLE
1/2"x1/2"x3.50" LONG OR
1/4"x1/4"x3.50" LONG OR
1"x1/2"x3.50" LONG
DRIVEN PARALLEL OR
PERPENDICULAR TO FENCE
LINE.

TIE WIRE ATTACHMENT
FOR LINE POST

LINE POST TIES ON
15" - 1/2" C/C #9 GAUGE
GALVANIZED STEEL CLIP

LINE POST

GALVANIZED PRESSURE STEEL OR
GALVANIZED MALLEABLE IRON
SLOTTED ATTACHMENT BOLTED AR-IND POST.

LINE POST

3'-3" +/-

DRIVE ANCHOR FOR LINE POST
ALTERNATE TO CONCRETE FOOTING

OUTSIDE

1/4"x3"x3"x3" LG ANGLE CLIP

1/4" x 1/2" BAND.

1/4" CARTRIDGE BOLT & NUT

1/4" CONCRETE EXPANSION ANCHOR
OR APPROVED EQUIVALENT IN 1/4"
DRILLED HOLE WITH 1/4" HEAVY MET.
MEAD BOLT 1/2" LONG, UNC. CLASS 2A &
2B WITH WASHER AND NUT.

SECTION A-A

INSIDE

TERMINAL POST

ALTERNATE POST ATTACHMENT AT BRIDGE END

HARFORD COUNTY, MD
DEPARTMENT OF
PUBLIC WORKS

CHAIN LINK FENCE
DRIVE ANCHOR & POST
ATTACHMENT AT BRIDGE

ISSUED

REVISED

PLATE S-29
2-3/8"x5" GALVANIZED CARRIAGE BOLTS & NUTS
ANCHOR SHOE

H-BEAM
PLAN

LINE POST
ELEVATION

3'-3'+/-

DRIVE ANCHOR BLADES
GALVANIZED STEEL ANGLE
1½"x1½"x36" LONG OR
1½"x1½"x36" LONG OR 1½"x1½"x30" LONG
DRIVEN PARALLEL OR
PERPENDICULAR TO FENCE LINE

5 1/2"

2"

1/2"

3/8" SQUARE HOLE

2"

3'

2'

1/2'

1/2"

LINE POST GUIDE
RECESS NIPPLES
ELEVATION
ANCHOR SHOE DETAILS

NOTE: THIS SHOE ASSEMBLY MAY
BE USED IN PLACE OF THE
ASSEMBLY SHOWN ON
STANDARD PLATE S-22

5/2/00  4/12/00
DIRECTOR OF PUBLIC WORKS  DEP. DIRECTOR, PUBLIC WORKS

HARFORD COUNTY, MD  DEPARTMENT OF
PUBLIC WORKS

CHAIN LINK FENCE
DRIVE ANCHOR SHOE ASSEMBLY

ISSUED  5/2/00
REVISED

PLATE  S-32
2 THREADED HOLES FOR 3/8" DIA X 1/2" LONG TOLERANCE

2 1/2"

TUBING SIZE 10 GAUGE +/- MILL TOLERANCE

BLADE HOLDERS
L" x 2" x 2" x 1/8"

PLAN

ANGLE OF BLADE

WELDED CONNECTIONS (TYPICAL)

ELEVATION

SIDE VIEW

DRIVE ANCHOR ADAPTER FOR LINE POSTS

WELDED CONNECTIONS (TYPICAL)

3" +/- DIA PIPE @ 7.56 LBF/FT

2 THREADED HOLES FOR 3/8" +/- DIA X 1/2" LONG SET SCREWS

PLAN

TUBING SIZE 3/16" MINIMUM

ANGEL OF BLADE

ELEVATION

DRIVE ANCHOR ADAPTER FOR TERMINAL POSTS

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

CHAIN LINK FENCE
DRIVE ANCHOR ADAPTER

DIRECTOR OF PUBLIC WORKS

5/2/00

DATE

CHAIN LINK FENCE
DRIVE ANCHOR ADAPTER

DEP. DIRECTOR, PUBLIC WORKS

4/12/00

DATE

ISSUED 5/2/00
REVISED

PLATE S-33
CHAIN LINK FABRIC TO BE SAME AS FENCE

HINGE

2 ¾" (FOR ROUND POST)

END POST
2 875" O.D. PIPE-5.70 LB/FT
OR 4.64 LB/FT

HINGE

5'-9" ½' 5'-9" ½'

HINGE

8'-14 1/3" HEIGHT
12' OPENING DOUBLE GATES

5'-0" OR 6'-0" HEIGHT
9" OPENING GATE

GATE FRAME
2 90" O.D PIPE-2.72 LB/FT
OR 2.28 LB/FT

HINGE

2 1/4" (FOR ROUND POST)

1 1/2" (FOR SQUARE POST)

GATE FRAME
1 ¼" SQ. FRAME-2.05 LB/FT

ALTERNATE TERM. POST
2 ¾" SQ-5.70 LB/FT IN STEEL

ECCENTRIC

SQUARE POST HINGE

ROUND POST HINGE

HARFORD COUNTY, MD
DEPARTMENT OF
PUBLIC WORKS

CHAIN LINK FENCE
GATE DETAILS

DIRECTOR OF PUBLIC WORKS

DATE

DEP. DIRECTOR, PUBLIC WORKS

DATE

ISSUED

REVISED

PLATE S-34
GENERAL NOTES:
1. ALL CONCRETE FOR BARRIER TO BE MIX NO. 6 (4500 PSI).
2. EXPOSED FACE AND TOP OF PRECAST BARRIER TO BE COVERED WITH TWO COATS OF WHITE EPOXY PAINT IN ACCORDANCE WITH THE PROVISIONS OF THE SUPPLEMENT TO THE SPECIFICATIONS.
3. 27"x7"x5/16" GALVANIZED STEEL PLATE TO BE FURNISHED AS CONNECTOR AND INCIDENTAL TO THE CONCRETE BARRIER.

REINFORCING STEEL DETAILS

END VIEW

ELEVATION
PRECAST CONCRETE BARRIER

PLAN

SLOT AND BARRIER

LIFT ANCHORS 2 TON CAPACITY

KEYWAY

4" X 4" - 4" X 4" WELDED WIRE FABRIC TO BE PLACED ALONG \( \xi \) OF BARRIER

CONNECTION DETAIL

1/8

12

12

1/8

12

CONNECTOR

DIRECTOR OF PUBLIC WORKS
5/2/00

DEP. DIRECTOR, PUBLIC WORKS
4/12/00

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

PRECAST CONCRETE BARRIER
DOUBLE FACE

PLATE S - 35
NOTES:
1. TYPICAL BOTH SIDES OF INLET
2. FOR CONSTRUCTION DETAILS, SEE PLATE S-1 AND S-2.
NOTES:
1. TYPICAL BOTH SIDES OF INLET
2. FOR CONSTRUCTION DETAILS, SEE PLATE S-3.
NOTE:

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.
SECTION V

DRAINAGE

Plate

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BOTTOM SLAB REINFORCING

CHAMFER FRONT & BACK OF WALL 3/4"

#4 - 18" O/C TOP & BOTTOM STAGGERED

#4 - 12" O/C TOP

PLAN

FINISHED 0.1 MAX GRADE SLOPE

FRONT ELEVATION

SECTION A-A

SECTION B-B

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NOTE:

HEADWALL TO BE PARALLEL TO % OF ROADSIDE UNLESS OTHERWISE NOTED IN THE CONTRACT DRAWINGS

CONCRETE VOLUME BASED ON 2:1 SIDE SLOPES TO BE USED FOR ESTIMATING ONLY

CONCRETE MIX #3

PRECASTING THIS ENDFLANGE: SEE NOTE 4 DETAIL D-3

Based on 2:1 channel side slopes

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

TYPE "A" HEADWALL
CIRCULAR PIPE

PLATE D-1
HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

TYPE "A" HEADWALL METAL PIPE ARCH

NOTES
1. CHAMFER EXPOSED EDGES 3/4"X3/4"
2. CONCRETE QUANTITIES TO BE USED FOR ESTIMATING ONLY
3. HEADWALL TO BE PARALLEL TO E OF ROADWAY UNLESS OTHERWISE NOTED ON CONTRACT DRAWINGS
4. PRECASTING THIS ENDSWALL. SEE NOTE 4, DETAIL D-3
NOTES:
1. CHAMFER EXPOSED EDGES 3/4"X3/4"
2. CONCRETE QUANTITIES TO BE USED FOR ESTIMATING ONLY.
3. HEADWALL TO BE PARALLEL TO LEFT OF ROADWAY UNLESS OTHERWISE NOTED IN THE CONTRACT DRAWINGS.
4. PRECAST WALL WITH DIMENSIONS AND REINFORCEMENT EQUIVALENT TO CAST IN PLACE WALL SHOWN WILL BE CONSIDERED PROVIDE SHOP DRAWINGS SHOWING REINFORCEMENT AND MEANS OF WALL-TO-TOE CONNECTION PLACE ON UNDISTURBED EARTH OR PURC CONCRETE FOOTING TO SAME PRECAST WALLS THAT ARE CUT OR BROKEN FOR ANY REASON WILL BE REJECTED PRECAST CONCRETE, 4500 psi MIN.

△ SEE NOTE 2

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

TYPE "A" HEADWALL
ELLIPITCAL CONCRETE PIPE

PLATE D-3
ELEVATION (SURFACE REMOVED)

SECTION A-A

S = Distance from inside surface of pipe to vertical bars in front and rear face:
- 4" for 12" - 18" dia pipes
- 6" for 24" - 36" dia pipes
- 8" for 42" - 60" dia pipes

NOTE: KEY TO BE 4" W x 2" D, CENTERED IN ENDWALL

PLAN (SURFACE REMOVED)

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REINFORCING BARS

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USES:
- A = ALL ENDWALLS
- B = 12" - 18" DIA PIPES
- C = 24" - 60" DIA PIPES
- D = 36" - 60" DIA PIPES

END SUPPORT WALL ROUND PIPE

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

PLATE D-4
#4 Dowels @ 6" spacing - 2'-0" long.

4 - #4 Straight bars vertical in front face for 28"x20" and 35"x24" pipe end walls.

#4 Straight bars horizontal @ 1'-7" max. c.c. both faces. Bottom bars to be full length - all end walls.

#4 Straight horizontal @ 1'-0" c.c. all end walls.

2 - #4 Bent bars horizontal for 47"x33" to 71"x47" pipe and walls.

Mix #3 Concrete

SECTION A - A

END SUPPORT WALL
ARCH PIPE
#4 STRAIGHT BARS VERTICAL @ 1'-6" MIN TO 2'-0" MAX IN FRONT FACE

ELEVATION

#4 LONG BENT BARS HORIZONTAL
#4 SHORT BENT BARS HORIZONTAL
ALT 1 WITH 1 @ 6" C/C

PLAN

B-66
B-72
B-78
B-84

ISOMETRIC VIEW

#4 BARS HORIZONTAL @ 1'-7" MAX C/C BOTH FACES BOTTOM BARS BENT ALONG ENDWALL OTHERS STRAIGHT

SECTION A-A

1'-4", 2'-0" OR 4'-1" SLOPE
3/4" HOOK BOLTS @ 1'-6"
C/C AROUND PIPE ARCH
WHEN METAL PIPE IS USED

SECTION B-B

1'-0" BENT BAR HORIZONTAL
2'-0" BENT BARS HORIZONTAL
2'-0" BENT BARS BOTH WINGWALLS
ALL END WALLS

GENERAL NOTES:
CONCRETE MIX NO 3
REINFORCING: DEFORMED STEEL BARS #4 & #6
CHAMFER: ALL EXPOSED EDGES 1" x 1" OR AS DIRECTED

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<td>VOL CONC C Y</td>
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<td>STEEL LBS</td>
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STANDARD HEADWALLS
B-66, B-72, B-78, B-84.

HARFORD COUNTY, MD
DEPARTMENT OF
PUBLIC WORKS

ISSUED 05.02.00
REVISIONS
PLATE D-7
NOTE: OTHER BARS NOT SHOWN IN FRONT ELEVATION

2 x 2 = 4-#6 BARS BENT TO FOLLOW SLOPE OF WALL

"4 BARS EACH FACE 2" CLEAR OF PIPE ARCH

FRONT ELEVATION

LONGITUDINAL BARS IN FOOTING UNDER PIPE TO BE "4 BARS SPACED AS SHOWN.

SECTION A-A

4-#5 HORIZONTAL BARS, ABOVE TOP OF PIPE ARCH TO EXTEND 2'-6" BEYOND TURN IN WING.

3/4" HOOK BOLTS @ 1'-6" C/C AROUND PIPE ARCH

"4 BARS @ 1'-8" C/C

CONSTRUCTION JOINT

SECTION B-B

"4 BARS @ 1'-6" C/C

"4 BEND BARS @ 1'-0" C/C BOTH WINGWALLS-ALL ENDWALLS

CONSTRUCTION JOINT WITH 2" X 4" KET.

SECTION C-C

"4 BARS @ 1'-6" C/C (MAX)

CHAMFER ALL EXPOSED EDGES 1" X 1" OR AS DIRECTED HEADWALL SIZE FOR INTERMEDIATE SIZE PIPE ARCHES USE NEXT LARGER SIZE HEADWALL

CONCRETE; MIX NO. 3

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HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

DIRECTOR OF PUBLIC WORKS
05.02.00

DATE

DEP. DIRECTOR, PUBLIC WORKS
04.12.00

ISSUED 05.02.00

REVISED

REvised

PLATE D-8

TYPE "A" HEADWALL
PIPE ARCH
73' x 55'; 84' x 61'
NOTE: OTHER BARS NOT SHOWN IN FRONT ELEVATION

2 = 2 x 4-1/2 bars bent to follow slope of wall.

FRONT ELEVATION

2 x 4-1/2 bars each face 2' clear of pipe arch.

CONSTRUCTION JOINT

LONGITUDINAL BARS IN FOOTING UNDER PIPE TO BE 4 x bars spaced as shown.

SECTION A-A

3/8" hook bolts @ 1'-6" c/c around pipe arch

2 = 4 x bars parallel to slope of top of wingwall.

SECTION B-B

SLOPE AS STEEP AS GROUND WILL STAND.

SECTION C-C

CONCRETE MIX NO.3

Chamfer: All exposed edges 1" x 1" or as directed.

HEADWALL SIZES FOR INTERMEDIATE SIZE PIPE ARCHES USE NEXT LARGER SIZE HEADWALL.

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HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

TYPE "A" HEADWALL PIPE ARCH
95' x 67'; 106' x 73'; 117' x 79'; 131' x 85'

PLATE D-9
NOTE: PLACE 3/4" Ø HOOK BOLTS AT 1'-6" C/C AROUND PERIPHERY OF EACH STRUCTURAL PLATE PIPE, PIPE ARCH, OR CMP ø 48" DIAMETER, AT EACH HEADWALL, JUNCTION BOX, &/OR SLOPE PROTECTION AS CASE MAY BE SET BOLTS IN PIPE (OR PIPE ARCH) AT MID POINT OF WALL OR SLOPE PROTECTION.

COST OF ALL BOLTS COMPLETE IN PLACE TO BE INCLUDED IN CONTRACT PRICE BID ON PERTINENT PIPE ITEM.

BOLTS & NUTS SHALL BE GALVANIZED AFTER THREADING

THE GALVANIZING ON THE THREADED PORTION SHALL NOT PREVENT TURNING THE NUT BY HAND.
#4 STRAIGHT BARS HORIZONTAL @ 1'-0" C/C BOTH SIDES OF OPENING FOR 49"x33" TO 71"x47" PIPE ENDWALLS INCLUSIVE

#4 BENT BARS @ 1'-0" C/C ALL ENDWALLS

#4 STRAIGHT BARS HORIZONTAL @ 1'-0" C/C BOTH SIDES OF OPENING FOR 49"x33" TO 71"x47" PIPE ENDWALLS INCLUSIVE

1 - #4 STRAIGHT BAR HORIZONTAL - ALL ENDWALLS

2 - #4 STRAIGHT BARS HORIZONTAL FOR 49"x33" TO 71"x47" PIPE ENDWALLS INCLUSIVE

"S" DISTANCES FROM INSIDE SURFACE OF PIPE TO VERTICAL BARS IN FRONT AND REAR FACE
4" FOR 14"x9" TO 21"x15" INCLUSIVE
6" FOR 28"x20" TO 42"x29" INCLUSIVE
8" FOR 49"x33" TO 71"x47" INCLUSIVE

GENERAL NOTES:
REINFORCING: DEFORMED STEEL BARS: #4 # BARS CHAMFER ALL EXPOSED EDGES 1" x 1" OR AS DIRECTED
CONCRETE: MIX. NO. 2

DISPOSITION OF BARS-DETAILS

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QUANTITIES IN TABLE TO BE USED FOR EST ONLY

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

STANDARD TYPE 'C' ENDWALL
ARCH PIPE

ISSUED 05.02.00
REVISED
REVISED
PLATE D-12
### GENERAL NOTES:
- REINFORCING: DEFORMED STEEL BARS; #4 Ø BARS
- CHAMFER: ALL EXPOSED EDGES 1" x 1" OR AS DIRECTED

### PLAN

### DISPOSITION OF BARS DETAIL

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**HARFORD COUNTY, MD**
DEPARTMENT OF PUBLIC WORKS

**STANDARD TYPE H ENDWALL ROUND PIPE**

**DIRECTOR OF PUBLIC WORKS**

**DEP. DIRECTOR, PUBLIC WORKS**

**ISSUED**

**REVISED**

**PLATE**

---
NOTE: CONTRACTOR HAS OPTION OF FURNISHING END SECTIONS CONFORMING TO DETAILS ON THIS SHEET OR END SECTIONS CONFORMING TO DETAILS ON D-17

NOTES:
1 END SECTIONS MUST BE REINFORCED TO CONFORM WITH CLASS IV PIPE
2 CONCRETE FOOTER SHALL BE USED WHEN SPECIFIED ON THE PLANS. COST OF CONCRETE FOOTER TO BE PAID PER CUBIC YARD OF MIX 2 CONCRETE FOR MISCELLANEOUS STRUCTURES. REINFORCEMENT TO BE #3 BARS.

* INVERT ELEVATION TO BE AT THE PIPE END OF THE END SECTION ELEVATIONS TO BE NOTED ON CONSTRUCTION PLANS

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HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

CONCRETE END SECTION
ROUND CONCRETE PIPE

DIRECTOR OF PUBLIC WORKS
5-2-00

DEP. DIRECTOR, PUBLIC WORKS
4/12/00

ISSUED 5-2-00
REVISED
PLATE D-16
NOTES:
1. END SECTIONS MUST BE REINFORCED TO CONFORM WITH CLASS IV PIPE.

2. CONCRETE FOOTER SHALL BE USED WHEN SPECIFIED ON THE PLANS COST OF CONCRETE FOOTER TO BE PAID PER CUBIC YARD OF MIX 2 CONCRETE FOR MISCELLANEOUS STRUCTURES REINFORCEMENT TO BE #3 BARS.

**INVERT ELEVATION TO BE AT THE PIPE END OF THE END SECTION ELEVATIONS TO BE NOTED ON CONSTRUCTION PLANS.**

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</tr>
</tbody>
</table>

**NOTE:** CONTRACTOR HAS OPTION OF FURNISHING END SECTIONS CONFORMING TO DETAILS ON THIS SHEET OR END SECTIONS CONFORMING TO DETAILS ON D-16

---

**HARFORD COUNTY, MD DEPARTMENT OF PUBLIC WORKS**

**CONCRETE END SECTION ROUND CONCRETE PIPE**

**ISSUED 5-2-00**

**REVISED**

**REVISED**

**PLATE D-17**

---

**DIRECTOR OF PUBLIC WORKS**

**DEP. DIRECTOR, PUBLIC WORKS**

**5-2-00**

**4/12/00**
NOTES:
1. ALL 3 PIECE BODIES TO HAVE 12 GA SIDES AND 10 GA CENTER PANELS. WIDTH OF CENTER PANELS TO BE GREATER THAN 20% OF THE PIPE PERIPHERY. MULTIPLE PANEL BODIES TO HAVE LAP SEAMS WHICH ARE TO BE TIGHTLY JOINED BY 3/8" SLOTTED GALVANIZED RIVETS OR BOLTS.
2. FOR 60' THRU 84' SIZES REINFORCED EDGES TO BE SUPPLEMENTED WITH GALVANIZED STIFFENER ANGLES. THE ANGLES WILL BE 2"x2"x1/4" 60' THRU 72' DIAMETER AND 2 1/2"x2 1/2"x1/4" FOR 72' AND 84' DIAMETER. THE ANGLES TO BE ATTACHED BY 3/16" SLOTTED GALVANIZED NUTS AND BOLTS.
3. TOE PLATE SHALL BE USED WHEN SPECIFIED ON THE PLANS.
4. TYPE 3 CONNECTION INCLUDES ONE FOOT OF PIPE LENGTH FOR 42' THRU 84' DIAMETER AS A CONNECTOR SECTION. THE CONNECTOR SECTION WILL BE ATTACHED TO THE END SECTION BY GALVANIZED RIVETS OR BOLTS.

TABLE OF DIMENSIONS

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<td>12&quot;</td>
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</tbody>
</table>
NOTES:

1. ALL 3 PIECE BODIES TO HAVE 12 GA. SIDES AND 10 GA. CENTER PANELS.
   WIDTH OF CENTER PANELS TO BE GREATER THAN 20% OF THE PIPE PERIPHERY.
   MULTIPLE PANEL BODIES TO HAVE LAP SEAMS WHICH ARE TO BE TIGHTLY JOINED
   BY 3/8" GALVANIZED RIVETS OR BOLTS.

2. FOR THE 77"X52" AND 83"X57" SIZES, REINFORCED EDGE TO BE SUPPLEMENTED BY
   2"X2" X 1/4" GALVANIZED ANGLES. THE ANGLES TO BE ATTACHED BY 3/8" GALVANIZED
   NUTS AND BOLTS.

3. ANGLE REINFORCEMENT WILL BE PLACED UNDER THE CENTER PANEL SEAMS ON THE
   77"X52" AND 83"X57" SIZES.

4. TOE PLATE SHALL BE USED WHEN SPECIFIED ON THE PLANS.

5. ALL RODS, BOLTS, NUTS, ETC. TO BE HOT DIP GALVANIZED.

6. SPECIFICATIONS. ASSHTO DESIGNATION M36-57.
CONNECTIONS FOR ROUND PIPE

**TYPE 1**
For only 12" thru 24" only

**TYPE 2**
For 30" and 36" only

**TYPE 3**
For 42" thru 84" only

CONNECTIONS FOR ARCH PIPE

**TYPE 2**
For 17"x13" thru 57"x38" only

**TYPE 3**
For 64"x43" thru 83"x57" only

NOTES:
A. **TYPE 3 CONNECTION INCLUDES ONE FOOT OF THE PIPE**
Length for 64"x43" thru 83"x57" arch sizes and 42" thru 84"
Round sizes as a connector section. The connector section
will be attached to the end section by galvanized rivets
or bolts.

B. WHERE END SECTION IS TO BE APPLIED TO A STRUCTURAL PLATE
pipe or structural plate arch pipe the end section shall
be ordered without the one foot of pipe length. Instead,
drill holes and field bold the end section directly to the
structural plate pipe or structural plate arch pipe.
INVERT MAY BE PLAIN CONCRETE, OR 4" BRICK LAID ON EDGE.
INVERT TO SLOPE DOWN TOWARDS OUTLET, AT THE RATE OF 2" PER FOOT, OR AS DIRECTED.

GENERAL NOTES:
INLET MAY BE CONSTRUCTED OF BRICK OR REINFORCED CONCRETE SEE HARFORD COUNTY SPECIFICATIONS FOR INLETS.
TOP 4" OF WALLS MAY BE BRICK MASONRY. ADDITIONAL BRICK MAY BE USED TO BRING THE GRATE TO GRADE, IF REQUIRED.
REINFORCEMENT REQUIRED ON OUTSIDE, AS WELL AS ON INSIDE OF WALLS BELOW 7'-0" WHEN 'A' IS GREATER THAN 7'-0" SPACING.
SAME AS FOR INSIDE OF WALL.
PLACE 1/2 EXPANSION MATERIAL OF SAME TYPE APPROVED FOR PAVEMENT BETWEEN THE FRAME AND ABDUTTING RIGID PAVEMENT, AND BETWEEN ENDS OF INLET CURB AND NORMAL CURB SIZE.
TYPE AND DIRECTION OF INLET CONNECTION WILL VARY TO SUIT CONDITONS.
WHEN INLET IS USED ADJACENT TO CURB, SLOPE CURB FACE TO MEET INSIDE EDGE OF FRAME AS SHOWN IN SECTION 'B-B' ADJACENT TO CURB.
"BRICK FOR MASONRY" TO COMPLY WITH THE HARFORD CO. SPECIFICATIONS.
INLETS TO BE BENCHED WHEN PIPES PASS THROUGH.
PREFAB INLETS MUST COMPLY WITH STRUCTURAL REQUIREMENTS OF PLATE D-27.
PROVIDE 1" DIAMETER WEEP HOLE 6" ABOVE HIGHEST CROWN OF PIPE OR AS DIRECTED FOR BRICK MASONRY STRUCTURE ONLY.

HARFORD COUNTY, MD
DEPARTMENT OF
PUBLIC WORKS

TYPE 'S' INLET

DATE 5-2-00

DIRECTOR OF PUBLIC WORKS

DEP. DIRECTOR, PUBLIC WORKS

4/12/00

PLATE D-21
General Notes:

Inlet may be constructed of brick or reinforced concrete. See latest Harford County specifications for inlets. Top 4" of walls may be brick masonry. Additional brick may be used to bring the grate to grade, if required. Reinforcement is required on outside as well as inside of walls below 7" when A is greater than 7'. Spacing is the same as for inside of wall.

Place 1/2" expansion joint material of same type approved for pavement between the frame and adjoining rigid pavement and between ends of inlet curb and normal curb.

Size, type, and direction of inlet connection will vary to suit conditions.

When inlet is used adjacent to curb, slope curb face to meet inside edge of frame, as shown in section B-B. "Brick for Masonry" to comply with latest Harford Co specs.

Inlet to be bench when pipes pass through invert. Invert may be plain concrete or 4" brick laid on edge. Invert should slope down towards outlet at the rate of 2" per foot, or as directed.

Precast inlets must comply with structural requirements of Plate D-27.
DOUBLE TYPE "S" INLET

SECTION "A-A"

- 6" Knockouts for underdrain w/caps to be placed as directed.

NOTES:
1. Invert shall be Brick of 3000 psi Concrete
2. Walls shall be Brick (Br.), 3000 psi Concrete (PC), or Reinforced Concrete (RC). See table for dimensions.
3. *Reinforcing #4 at 10" o/c E.W. in 6" walls. Reinforcing continuous at corners. All laps 1-4".
4. Top 4" of walls shall be brick masonry. Additional brick shall be used to bring the grate to existing grade if required.
5. Where brick is used, invert shall be brick laid on edge.
6. Bench (as per Type A manhole) shall be built into inlet where drains run through inlet.
7. Precast inlets shall meet the structural requirements of Plate D-29.

WHERE A IS 3'-6" OR GREATER STANDARD MANHOLE STEPS D-51

SECTION "B-B"
Provide 1" diameter Weep hole 5" above highest crown of pipe or as directed for brick masonry structure only.

<table>
<thead>
<tr>
<th></th>
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<th>B</th>
<th>Walls</th>
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<tr>
<td>&lt; 6&quot;</td>
<td>8&quot;</td>
<td>Br or PC</td>
<td></td>
</tr>
<tr>
<td>6&quot; to 10&quot;</td>
<td>12&quot;</td>
<td>Br or PC</td>
<td></td>
</tr>
<tr>
<td>6&quot; to 15&quot;</td>
<td>8&quot;</td>
<td>RC</td>
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DEPARTMENT OF PUBLIC WORKS

HARFORD COUNTY, MD

DIRECTOR OF PUBLIC WORKS

DEP. DIRECTOR, PUBLIC WORKS

ISSUED 5-2-00

REVISED

PLATE D-23
6' Knockouts for underdrain w/caps to be placed on all walls of inlet where no pipe is present invert of knockout - highest pipe crown

CHORD AND CENTERLINE

6' Knockouts w/caps for underdrain to be placed as directed.

Tilt-Bar Grate & e frame (side D-30, D-30A with cut flange)

PLAN

NOTES:

1. Invert shall be brick of 3000 p.s.i. concrete.
2. Walls shall be Brick (Br.), 3000 p.s.i. concrete (P.C.), or Reinforced Concrete (R.C.). See Table for dimensions.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>Walls</th>
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</thead>
<tbody>
<tr>
<td>&lt;5</td>
<td>8</td>
<td>Br. or P.C.</td>
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<tr>
<td>5' to 9'</td>
<td>12'</td>
<td>Br or P.C.</td>
</tr>
<tr>
<td>5' to 14'</td>
<td>8'</td>
<td>R.C.*</td>
</tr>
</tbody>
</table>

3. Reinforcing - #4 at 10" o.c. E.W. in #6 of walls. Reinforcing continuous at corners. All laps 1"-4".
4. Top 4' of walls shall be brick masonry. Additional brick shall be used to bring the grate to existing grade if required.
5. Where brick is used, invert shall be brick laid on edge.
6. Inlet to be boxed out when pipes pass thru.
7. Where A is 3'-6" or greater, standard manhole steps to be installed as shown.
8. For headpiece detail see D-22
9. Precast inlets shall meet the structural requirements of Plate D-29

SECTION A-A

Provide 1" diameter Weep hole 6" above highest crown of pipe or as directed for brick masonry structure only.

SECTION B-B

ELEVATION-HEADPIECE

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

DOUBLE TYPE 'S' COMB. INLET

5/2/00
DIRECTOR OF PUBLIC WORKS

4/12/00
DEP. DIRECTOR, PUBLIC WORKS

5/2/00
ISSUED

5/2/00
REVIEWED

PLATE D-24

USER DETAILS SPEC ROADCODE STANDARD DETAILS DRAINAGE D-24 DGN
NOTES:
1. See detail D-22 perspective view, headpiece details and inlet cross section.
2. Slab and invert - brick or 3000 p.s.i. concrete.
3. Walls shall be brick (Br.), 3000 p.s.i. concrete (PC), or reinforced concrete (R.C.) See table for dimensions.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>Walls</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5'</td>
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<td>Br or PC</td>
</tr>
<tr>
<td>5'-9'</td>
<td>12'</td>
<td>Br or PC</td>
</tr>
<tr>
<td>5'-14'</td>
<td>8'</td>
<td>R.C.</td>
</tr>
</tbody>
</table>

4. Reinforcing = #4 at 10" o/c E W in of walls. Reinforcing continues at corners. All laps 1'-4".
5. Top 4" of walls shall be brick masonry. Additional brick shall be used to bring the grate to existing grade if required.
6. Where brick is used, invert shall be brick laid on edge.
7. Where A is 3'-6" or larger, standard manhole steps shall be installed as shown.

Provide 1" diameter Weep hole 6" above highest crown of pipe or as directed for brick masonry structure only.

6" knockouts for underdrain w/caps to be placed on all walls of inlet where no pipe is present invert of knockout = highest pipe crown.
GENERAL NOTES

1. CONCRETE TO BE MIX NO. 6 (4500PSI)
2. REINFORCING: 2 LAYERS OF 4X4 M4 X W4 0.85-1.5 FT WELDED WIRE FABRIC
3. THREADED PLASTIC INSERTS TO BE PROVIDED FOR HANDLING
4. GRADE AND SLOPE ADJUSTMENTS COMPLETED IN FIELD USING CONCRETE MIX NO. 6 OR BRICK AND MORTAR
5. PIPE OPENINGS TO BE PROVIDED AS REQUIRED, FOR SIZE, LOCATION AND INVERT ELEVATIONS REFER TO CONSTRUCTION PLANS
6. PLACEMENT OF SUBGRADE DRAINAGE WILL BE AS DIRECTED BY THE ENGINEER OR AS NOTED ON THE CONSTRUCTION PLANS
7. LADDER RUNGS SHALL BE IN ACCORDANCE WITH STANDARD AS SHOWN, OR AS DIRECTED BY THE ENGINEER
8. MINIMUM DEPTH PAYMENT PER EACH INLET INCLUDES DEPTHS UP TO 3'-6" VERTICAL DEPTH PAYMENT PER LINEAR FOOT INCLUDES DEPTHS IN EXCESS OF 3'-6"
9. A 6" PERFORATED CIRCULAR PIPE, FOR EROSION AND SEDIMENT CONTROL, SHALL BE PLACED IN THE INLET WALL AT ALL INLET SEDIMENT TRAPS AS SHOWN ON THE PLANS.

Provide 1" diameter Weep hole 6" above highest crown of pipe on all four sides for brick masonry structure only.
GENERAL NOTES

1. CONCRETE TO BE MIX NO 6 (4500 PSI).
2. REINFORCING-2 LAYERS OF 4X4-W4 0.0X4 0 86#/CFT WELDED WIRE FABRIC.
3. THREADED PLASTIC INSERTS TO BE PROVIDED FOR HANDLING.
4. GRADE AND SLOPE ADJUSTMENTS COMPLETED IN FIELD USING CONCRETE MIX NO 6 OR BRICK AND MORTAR.
5. PIPE OPENINGS TO BE PROVIDED AS REQUIRED, FOR SIZE, LOCATION AND INVERT ELEVATIONS REFER TO CONSTRUCTION PLANS.
6. PLACEMENT OF SUBGRADE DRAINAGE WILL BE AS DIRECTED BY THE ENGINEER OR AS NOTED ON THE CONSTRUCTION PLANS.
7. LADDER RUNGS SHALL BE IN ACCORDANCE WITH STANDARD D-51 AS SHOWN, OR AS DIRECTED BY THE ENGINEER.
8. MINIMUM DEPTH PAYMENT PER "EACH" INLET INCLUDES DEPTHS UP TO 3'-6" VERTICAL DEPTH PAYMENT PER LINEAR FOOT INCLUDES DEPTHS IN EXCESS OF 3'-6".
9. A 6" PERFORATED CIRCULAR PIPE, FOR EROSION AND SEDIMENT CONTROL, SHALL BE PLACED IN THE INLET WALL AT ALL INLET SEDIMENT TRAPS AS SHOWN ON THE PLANS.

SECTION B-B

PRE CAST INLET HEAD
1 LAYER OF 4 X 4-W 40 X W 40 86#/CFT WELDED WIRE FABRIC.

THIS PORTION OF INLET SHALL BE PROVIDED IN THE FIELD AND SHALL BE CONSTRUCTED OF BRICK, MAUSOLEUM OR REINFORCED CONCRETE MIX NO 6 Brick for Masonry. To comply with latest specifications.

DIRECTOR OF PUBLIC WORKS  05.02.00
DEP. DIRECTOR, PUBLIC WORKS  04.12.00
3'-5\(\frac{1}{4}\) O.A.

2'-10\(\frac{3}{4}\) (Top of Frame)

\(\frac{3}{16}\)

2'-8\(\frac{1}{2}\) (Top of Grate)

\(\frac{3}{4}\)

2'-6"

\(\frac{3}{4}\)

3'-1\(\frac{1}{4}\) (Top of Grate)

2'-7\(\frac{1}{8}\) (Top of Grate)

FRAME MATERIAL: GALVANIZED STEEL

SEE STD. D-30A

SECTION B-B

SECTION C-C

NOTE 'A' FRAME TO BE CASTING WITH FLANGE CUT, AS SHOWN, WHEN INLET IS TO BE USED ADJACENT TO CURB OPENING.

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

FRAME AND GRATE
SINGLE TYPE S INLET & COMBINATION

ISSUED

PLATE D-29
GENERAL NOTES:
1. GRATES TO BE SQUARE, FLAT AND TRUE.
2. STRUCTURAL STEEL SHALL BE ASTM A-36.
3. GRATES TO BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A-123.

FRAME ANCHORAGE DETAIL

HARFORD COUNTY, MD
DEPARTMENT OF
PUBLIC WORKS

HARFORD COUNTY, MD
DEPARTMENT OF
PUBLIC WORKS

TIKT BAR GRATE
STANDARD 'S' SIZE

PLAN

SECTION A-A

LAST BEARING BAG

FRAME

FRAME ANCHORAGE DETAIL

ISSUED 05.02.00
REVISED
REVISED
PLATE D-30
2 1/2" BAR @ 3 1/2" C/C
Mix 3 CONCRETE
METHOD OF ANCHORING
SUPPORT BEAM
IF INLET IS CONSTRUCTED
OF BRICK

1/8" OF INLET
1/4"
1/8"
3/16"
3/8"

AREA "H" DETAIL

SECTION A-A

SECTION C-C

3"x2 1/2"x1/4"L, 4 3/4" LONG
GALVANIZED AFTER WELDING

8 WF 20

3'-3"
4'-6"
1'-3"
8 1/4"

NOTE: CASTING MATERIALS
SHALL BE GALVANIZED
STEEL

HARFORD COUNTY, MD
DEPARTMENT OF
PUBLIC WORKS

FRAME & GRATE
DOUBLE 'S' INLET & COMBO.

ISSUED 05/02/00
REVISED

PLATE D-31
PROVIDE FOUNDRY NAME & FLOW DIRECTION AS SHOWN IN ⅛" +/− [13 mm +/− ] LETTERS

NOTE: ALL DIMENSIONS ARE SHOWN IN ENGLISH AND METRIC
MATERIAL: CAST GRAY IRON ASTM A-48, CLASS 35B
WEIGHT: GRATE APPROX 338#
GRATE SHALL SIT SQUARE UPON FRAME SUPPORTS WITHOUT ROCKING OR SHIFTING UNDER LOAD, GRATE SHALL MEET OR EXCEED AASHTO HS20 LOAD STANDARDS.
FRAME: PER DETAIL D-30 AND D-31

CURVED VANE (S-CV) GRATE FOR TYPE INLET FRAMES
CONCRETE SLAB
ALL REINFORCEMENT TO BE #4 &
DEFORMED BARS @ 6" C/C
2 WAYS 2" COVER EXCEPT AS NOTED

SLAB ELEVATION
5'-6" ANCHOR BOLTS, SPACED @
3'-0" MAX GALVANIZED
AFTER WELDING

SECTION C-C
5'-6" GALVANIZED

3" RUSTPROOF PIPES
1'-0" LONG WITH FLANGE
AT EACH END. FILL PIPES
WITH CONCRETE.

PLAN
(SHOWED WITHOUT CONCRETE SLAB)
FOR STRIPPING DETAILS REFER TO STANDARD D-34

Provide a 1" diameter weep
hole 6" above crown of pipe
or as directed

PLAN A-A
#4 § DEFORMED BARS (12" LENGTHS)

NOTE:
CURB OPENING SHOULD NOT ENCROACH ON CROSSWALK AREAS.
INLETS SHALL BE CONSTRUCTED OF REINFORCED CONCRETE
(MIX NO. 2) SIZE, TYPE & DIRECTION OF INLET CONNECTION
WILL VARY TO SUIT CONDITIONS REINFORCEMENT REQUIRED
ON OUTSIDE, AS WELL AS ON INSIDE OF WALLS. WHEN "A"
IS GREATER THAN 7'-0" SPACING, SAME AS FOR INSIDE OF WALL
PLACE EXPANSION MATERIAL (SAME TYPE APPROVED
FOR PAVEMENT) AS INDICATED METAL LADDER RUNGS SHALL
BE IN ACCORDANCE WITH STD D-51 AND SHALL BE
INSTALLED AS SHOWN OR AS DIRECTED BY THE ENGINEER
ANGLES & ANCHOR BOLTS TO BE GALVANIZED
IN ACCORDANCE WITH ASTM A-123, AFTER WELDING.

SECTION B-B
INVERT TO SLOPE 2" PER FOOT
TOWARD OUTLET OR AS DIRECTED.

<table>
<thead>
<tr>
<th>INLETS</th>
<th>&quot;T&quot;</th>
<th>&quot;L&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>C00-5</td>
<td>4'-3½&quot;</td>
<td>5'-8½&quot;</td>
</tr>
<tr>
<td>C00-10</td>
<td>10'-0&quot;</td>
<td>11'-5&quot;</td>
</tr>
<tr>
<td>C00-15</td>
<td>15'-0&quot;</td>
<td>16'-5&quot;</td>
</tr>
<tr>
<td>C00-20</td>
<td>20'-0&quot;</td>
<td>21'-5&quot;</td>
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</tbody>
</table>

* THIS DIMENSION TO BE MAINTAINED
FOR ALL STANDARD C00 INLET

HARFORD COUNTY, MD
DEPARTMENT OF
PUBLIC WORKS

STANDARD C00 INLETS
5', 10', 15' & 20'

DIRECTOR OF PUBLIC WORKS
DEP. DIRECTOR, PUBLIC WORKS

ISSUED
REVISED
PLATE D-33

05.02.00 04.12.00
**GENERAL NOTES**

1. CURB OPENING SHOULD NOT ENCROACH ON CROSSWALK AREAS.
2. CONCRETE TO BE MIX NO. 6 (1000 PSI).
3. THREADED PLASTIC INSERTS TO BE PROVIDED FOR HANDLING.
4. PIPE KNOCKOUTS, 4 1/2 IN VERTICALLY, TO BE PROVIDED AS SHOWN ON PLAN.
5. INLET INSERTS TO BE PROVIDED IN FIELD AS REQUIRED.
6. GRADE AND SLOPE ADJUSTMENT COMPLETED IN FIELD USING PRECAST ADJUSTMENT RING AND MORTAR AND/OR BRICK & MORTAR.
7. PRECAST ADJUSTMENT COLLAR TO BE 3 1/4 9" INCREMENTS.
8. WHERE PIPE INSERTS ARE ABOVE BOTTOM OF BOX PROVIDE CONCRETE OR BRICK CHANNEL TO MEET PIPE INVERT.
9. LADDER RUNGS SHALL BE IN ACCORDANCE WITH STANDARD D-31, AND SHALL BE INSTALLED AS SHOWN OR AS DIRECTED BY THE ENGINEER.
10. PIPE KNOCKOUTS, HORIZONTALLY, ARE CONTINGENT UPON THE SIZE OF THE PIPE CONNECTED, 6" THICKNESS, HOWEVER MUST BE MAINTAINED AROUND THE PERIMETER OF THE WALL.

Provide a 1" DIAMETER WEEP HOLE 6" ABOVE CROWN PIPE OR AS DIRECTED.

**SECTION A-A**

FOR CONFIGURATION OF QUTTER PAN & STRIPING DETAILS REFER TO STANDARD D-34

<table>
<thead>
<tr>
<th>INLET TYPE</th>
<th>&quot;i&quot;</th>
<th>&quot;l&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>COG-5</td>
<td>5&quot;</td>
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<tr>
<td>COG-10</td>
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<tr>
<td>COG-20</td>
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<td>21&quot;</td>
</tr>
</tbody>
</table>

**SECTION B-B**

CONCRETE INLET SLAB

6" KNOCKOUT FOR UNDERGROUND WIRING TO BE PLACED AS DIRECTED.

CONCRETE ADJUSMENT COLLAR

*4 1/2" DEFORMED BARS @ 10" C/C

CONCRETE SLAB

*4 1/2" DEFORMED BARS @ 10" C/C

CONCRETE THROUGH SLAB

*4 1/2" DEFORMED BARS @ 7" C/C

SLAB ELEVATION

5 1/4" ANCHOR BOLTS SPACED @ 3'-6" MAX. GALLAZIZED AFTER WELDING.

SECTION C-C

STEEL SUPPORT POSTS @ 5'-6" C/C 3 D WITH 4"X4" X 1/2" CAP & BASE PLATE

METAL LADDER RUNGS

TROUGH SLAB

NORMAL ROADWAY SLOPE

2 1/2" COVER

SECTION D-D

PRECAST COG INLETS

5', 10', 15' & 20'

HARFORD COUNTY, MD

DEPARTMENT OF PUBLIC WORKS

PRECAST COG INLETS

5', 10', 15' & 20'

PLATE D-35
GENERAL NOTES
1. CURB OPENING SHOULD NOT ENCROACH ON CROSSWALK AREAS.
2. CONCRETE TO BE MIX NO. 6.
3. THREADED PLASTIC INSERTS TO BE PROVIDED FOR HANDLING.
4. PIPE KNOCKOUTS 4½" VERTICALLY, TO BE PROVIDED AS SHOWN ON PLAN.
5. INLET INVERTS TO BE PROVIDED IN FIELD AS REQUIRED.
6. WHERE PIPE INVERTS ARE ABOVE BOTTOM OF BOX PROVIDE CONCRETE OR BRICK CHANNEL TO MEET PIPE INVERT.
7. LADDER RUNGS SHALL BE IN ACCORDANCE WITH STANDARD D-51, AND SHALL BE INSTALL AS SHOWN OR AS DIRECTED BY THE ENGINEER.
8. CHANNELS AND ANCHOR BOLTS TO BE GALVANIZED IN ACCORDANCE WITH ASTM A-123, AFTER WELDING.
9. PIPE KNOCKOUTS, HORIZONTALLY, ARE CONTINGENT UPON THE SIZE OF THE PIPE CONNECTED. A 6" THICKNESS, HOWEVER, MUST BE MAINTAINED AROUND THE PERIMETER OF THE WALL.
SLOTTED HOLE TO RECEIVE 3/4" x 4" MACHINE BOLT (6ALV.) IMBEDDED 3" IN CONCRETE WALL NUT TO BE PLACED ON END OF BOLT AFTER GRATE IS INSTALLED.

END STRAP DETAIL

NOTE: THE CONCRETE VALLEY GUTTER TO BE USED IN CONNECTION WITH THIS INLET WILL BE WARPED FROM THE STANDARD SECTION TO MEET THE SECTION AT THE END OF THE INLET. THIS TRANSITION WILL TAKE PLACE WITHIN A DISTANCE OF TEN FEET FROM THE INLET. PAVING WITHIN TEN FEET OF THE INLET TO BE INCLUDED IN THE UNIT PRICE BID FOR THE INLET.

PIPE OUTLETS AND GUTTER APPROACHES CAN BE REVISED TO MEET EXISTING CONDITIONS.

INLET REINFORCEMENT - 1/2" Ø BARS AT 6" C TO C 2" COVER

GRATINGS ARE SUBJECT TO APPROVAL FOR EACH JOB. ANY TYPE OF SUBSTANTIAL TRANSVERSE BARS MAY BE USED WHICH WILL SUPPORT A MINIMUM UNIFORM LOAD OF 150 LBS./SQ. FT. THE TRANSVERSE BARS SHALL BE HELD RIGID BY SPACER BARS

AREA TO BE MADE UP OF TWO EQUAL WIDTH PANELS ARRANGED FOR BOLTING TOGETHER IN THE FIELD.

ALL MATERIAL TO BE HOT DIPPED GALVANIZED

NOTE: THIS TYPE OF INLET MAY BE USED IN CONJUNCTION WITH BERM DITCHES, BENCHES AND SUMP AREAS OF INNER LOOPS OF INTERCHANGES IT IS NOT TO BE USED IN MEDIAN OR OTHER AREAS TRAVESED BY OUT-OF-CONTROL VEHICLES.
GENERAL NOTES
1 CONCRETE TO BE MIX NO. 2
2 REINFORCEMENT TO BE NO. 4 DEFORMED BARS AT 6 IN.
   C/C 2 IN. COVER
3 GRATE TO BE OF STEEL CONSTRUCTION 7 SHALL BE
   SQUARE, FLAT AND TRUE
4 STRUCTURAL STEEL SHALL BE A.S.T.M. DESIGNATION A-36
5 GRATE TO BE GALV. AFTER FABRICATION IN ACCORDANCE
   WITH A.S.T.M. A-123 EXCEPT FOR ADHERENCE WHICH
   SHALL BE IN ACCORDANCE WITH A.S.T.M. DESIGNATION A-153

SECTION A-A

PLAN

1/4" = 1'-0"
1/8" = 1"

PLATE: 1/2" x 2 1/2" x 3 3/4" 
TYPICAL

1/8" x 1/2" x 3 3/4" 
BAR

3'-0 1/2"
3'-5 1/2"
1'-8 3/4"

1/4" TYPICAL

1/8" PLATE LENGTH

3'-4 1/2"

3'-6" NOTCH

6'

5'

SECTION B-B SINGLE OPENING

SECTION B-B DOUBie OPENING

SECTION C-C

TYPICAL BOTH INLETS
(SHOWN WITHOUT GRATE)

DOUBLE OPENING
(SHOWN WITHOUT GRATE)

NOTE: FOR USE IN NON-TRAFFIC LOCATIONS ONLY

SINGLE OPENING

HARFORD COUNTY, MD
DEPARTMENT OF
PUBLIC WORKS

STANDARD TYPE K INLET
OPEN-END GRATE

DIRECTOR OF PUBLIC WORKS 5-2-00
DEP. DIRECTOR, PUBLIC WORKS 4/12/00

PLATE D-38
GENERAL NOTES
1. Concrete to be mix no. 6 (4500 P.S.I.)
2. Reinforcing—2 layers of 4x4-W40xW40 welded wire fabric.
3. Threaded plastic inserts to be provided for handling.
4. Pipe openings to be provided as required.
   For size, location and invert elevations refer to construction plans.
5. For grate details see Harford County to be as shown or furnish approved equivalent.
6. "Minimum Depth" payment per "each" inlet includes depths up to 3'-6". Vertical depth payment per "Linear Foot" includes depths in excess of 3'-6".
7. A 6" perforated circular pipe, for erosion and sediment control, shall be placed in the inlet wall at all inlet sediment traps as shown on the plans.

SECTION B-B SINGLE OPENING

SECTION B-B DOUBLE OPENING

SECTION C-C
TYPICAL BOTH INLETS
(SHOWN WITHOUT GRATE)

CONCRETE GUTTER TO BE FOUND FOR SEPARATELY

NO 57 AGGREGATE ALL SIDES

1-3/4" COVER

2'-COVER

2'-COVER

1/2" PAVING (PROVIDED IN FIELD)

3'-6" NOTCH

3'-6" MAX.

1-3/4" IN ADJACENT BELTS

3'-6" MIN. 5'-6" OF NO 57 AGGREGATE ON FIRM SUB GRADE

STANDARD TYPE K
INLET GRATE SEE STANDARD D-38

DOUBLE OPENING
(SHOWN WITHOUT GRATE)

NOTE FOR USE IN NON-TRAFFIC LOCATIONS ONLY

SINGLE OPENING
NOTES:
1. Invert shall be brick or plain Mix 3 Concrete.
2. Top 4' of walls shall be brick masonry.

Openings to be placed in any or all sides as required.

Provide a 1" diameter weep hole 6' above crown of pipe or as directed.

W = 2'-0" or as indicated on constr. dwg.

Openings as indicated on constr. dwg.

Sod & peg

5' Reinf.
Mix #2 conc. with 6"x6" - W2.1 x W2.1

*4 bar 1'-9" o.c.
each 2'-8" long

PLAN

SECTION "A-A"

OPTIONAL CONCRETE COLLAR

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

TYPE Y-1 INLET

PLATE D-40
NOTE: EXPANSION ANCHORS MAY BE USED INSTEAD OF BOLTS.

NOTES:
1. GRATING SHALL BE STEEL "IRVING X - BAR TYPE A A" OR APPROVED EQUIVALENT.
2. ALL MATERIAL TO BE HOT DIPPED GALVANIZED.
3. ALL REINFORCEMENT TO BE NO. 4 DEFORMED BARS @ 6" C/C.
4. ALL CONCRETE TO BE CONCRETE MIX NO. 2.

2-2" x 4-0" x 7-0" L (CENTERED ON GRATE) TRIM VERTICAL LEG OF ANGLE TO ½" IN HEIGHT WELD SECURELY TO GRATING AT EVERY 4TH BAR (WELDED AREAS TO BE TOUCHED UP WITH ZINC RICH PAINT AFTER WELDING.)

PLAN

SLOPE GROUND TOWARD INLET

6- ½" ø HEX HEAD BOLTS 2" LONG

SECTION B-B

Provide a 1" diameter weep hole 6" above crown of pipe or as directed.

PIPE TYPE, SIZE, SLOPE & INVERT ELEVATION AS SHOWN ON PLANS

SECTION A-A

2'-0" MIN DEPTH

3'-0"

2'-4"

2'

3'-4"

2'-6"

A

A

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

STANDARD Y - 4 INLET

D-41

DIRECTOR OF PUBLIC WORKS  5-2-00
J. JURGENSEN, P.E.
DEP. DIRECTOR, PUBLIC WORKS  4/12/00

5-2-00

ISSUED

REVISED

REVISED
NOTES:
1. MANHOLE MUST BE BRICK OR PLAIN MIX 3 CONCRETE, Poured IN PLACE.
2. WHERE A COVER IS LESS THAN 4'-0", USE TYPE B MANHOLE WHEN PIPES ARE 36" DIAMETER AND SMALLER.
3. FOR PIPE DIAMETERS 42" OR LARGER, USE A TYPE C MANHOLE.
4. FOR PIPE 30" H.D. AND LARGER, WITH CURVE CENTERLINE LENGTH GREATER THAN 4'.
5. THICKNESS OF WALLS TO BE INCREASED TO 12", 12'-0" BELOW UNDERSIDE OF FRAME.
6. FOR PRECAST ALTERNATE, SEE PLATE D-43.
7. PROVIDE STANDARD MANHOLE STEPS. SEE STANDARD D-51.
8. PROVIDE A 1" DIAMETER WEEP HOLE. 6" ABOVE THE CROWN OF PIPE OR AS DIRECTED.
NOTES:
1. EXCEPT AS NOTED, MANHOLE TAPERS, RISERS AND BASES SHALL BE FURNISHED IN STRICT ACCORDANCE WITH ASTM DESIGNATION C-478 (LATEST) FOR "PRECAST" REINFORCED CONCRETE MANHOLE SECTIONS.
2. MANHOLE BASES SHALL BE OF MIX NO. 5 CONCRETE OR Poured IN-PLACE MIX NO. 3 CONCRETE OR 8" MIN. BRICK.
3. PROVIDE A 1" DIAMETER WEEP HOLE 6" ABOVE CROWN OF PIPE OR AS DIRECTED.

MINIMUM CIRCUMFERENTIAL REINFORCING (48" DIA. TAPER) $A_s = 0.12$ SQ. IN./FT.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>MIN. MH BASE LENGTH</th>
<th>MIN. H FOR A</th>
<th>MIN. H FOR B</th>
</tr>
</thead>
<tbody>
<tr>
<td>15&quot; DIAMETER</td>
<td>3'</td>
<td>6.5'</td>
<td></td>
</tr>
<tr>
<td>18&quot; TO 24&quot; DIA.</td>
<td>4'</td>
<td>7.5'</td>
<td></td>
</tr>
<tr>
<td>27&quot; TO 36&quot; DIA.</td>
<td>5'</td>
<td>8.5'</td>
<td></td>
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</tbody>
</table>

* PROVIDE STEPS IF ADDITIONAL SECTIONS ARE USED.

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

PRECAST A & B MANHOLE
(FOR PIPES 15" TO 36" HORIZONTAL DIAMETER)

ISSUED 5-2-00
REVISED
REVISED
PLATE D-43
4" Brick masonry. Additional brick shall be used to bring MH Cover to existing grade.

Storm Drain Heavy Traffic Manhole Frame & Cover

Install Frame w/4 Dowels 90° apart then mortar

NOTES:
1. Walls, bottom slab and invert shall be brick or plain Mix 3 concrete poured in place.
2. Where cover is greater than 4'-0" use Type A manhole.
3. For pipe sizes 42" and larger, use Type C manhole.

Provide a 1" diameter weep hole 6" above crown of pipe or as directed.

Type B Shallow Manhole
(for cover less than 4'
(for pipes 15" to 36" horiz. diam.)

Harford County, MD
Department of Public Works

Issued 5-2-00
Revised

5-2-00
4-12-00

DEP. DIRECTOR, PUBLIC WORKS
DIRECTOR OF PUBLIC WORKS

PLATE D-44
SLAB REINFORCING FOR
TYPE B PRECAST MANHOLE

4" Brick masonry. Additional brick shall be used to bring MH Cover to existing grade if required.

Alternate 10" Square Slab may be used.

Mix 3 Concrete

NOTES:
1. Walls, bottom slab, and invert must be brick or plain Mix #3 concrete poured in place.
2. For covers greater than 4'-0", use Type A Manhole.
3. For pipe sizes 42" and larger, use Type C Manhole.

Provide a 1" diameter weep hole 6" above crown of pipe or as directed.

SECTION

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

ALTERNATE TYPE B SHALLOW MANHOLE
(For cover less than 4')
(For Pipes 15" to 36" Horiz. Dia.)

PLATE D-45
Storm Drain Heavy Traffic Manhole Frame & Cover

**TOP SLAB**

1. Walls, bottom slab and invert shall be brick or plain Mix 3 concrete poured in place.
2. For pipes 36" and smaller, use Type A or Type B Manhole. Use Type B where A (cover) is less than 3'-6".
3. Where A is less than 3'-6", use Alternate Manhole Stack.

**ALTERNATE MANHOLE STACK**

(See Note 3)

Provide a 1' diameter weep hole 6' above crown of pipe or as directed.

**SECTION**

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<table>
<thead>
<tr>
<th>DIRECTOR OF PUBLIC WORKS</th>
<th>5-2-00</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEP. DIRECTOR, PUBLIC WORKS</td>
<td>4/12/00</td>
</tr>
</tbody>
</table>
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HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

TYPE C MANHOLE -CI
42" & LARGER PIPES
(DEFLECTION & LENGTH < 4')

PLATE D-46
NOTES:
1. EXCEPT AS NOTED, MANHOLE TAPERS, RISERS AND BASES SHALL BE FURNISHED IN STRICT ACCORDANCE WITH ASTM DESIGNATION C-478 (LATEST) FOR PRECAST REINFORCED CONCRETE MANHOLE SECTIONS.
2. MANHOLE BASES SHALL BE OF MIX NO. 5 CONCRETE OR POURED IN PLACE MIX NO. 3 CONCRETE OR 8" MIN. BRICK.

3' TYP.

-6 x 6' O/C E.W.

SLAB REINFORCING FOR SHALLOW STACK MANHOLE

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>MIN. MH BASE LENGTH</th>
<th>MIN. H FOR A-2</th>
<th>MAX. H FOR A-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>42&quot;</td>
<td>6'</td>
<td>12'</td>
<td></td>
</tr>
<tr>
<td>48&quot;</td>
<td>7'</td>
<td>13'</td>
<td></td>
</tr>
</tbody>
</table>

RISERS IN 1', 2', 3' OR 4' LENGTHS - MIX NO. 5 CONCRETE

MIN. CIRC. REINF., PER ASTM C-478

MIN. CIRC. REINF. (60° DIA. TAPER) Ao = 0.26 SQ. IN./FT.

MIN. CIRC. REINF. PER A.S.T.M. C76-66T, TABLE III WALL B

MINIMUM SLAB REINFORCING Ao = 0.39 SQ. IN./FT. E.W.

BRICK ON EDGE OR MIX NO. 2 CONCRETE

NOTE: PROVIDE STEPS IF ADDITIONAL SECTIONS ARE USED.

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

PRECAST ALTERNATE TYPE C MANHOLES
(FOR PIPE 42" AND 48" HORIZ. DIAM.)

PLATE D-47

Director of Public Works
5-2-00

Deputy Director, Public Works
4/12/00
NOTE: MATERIAL SHALL BE GREY IRON CASTINGS MUST BE MACHINED ON BEARING SURFACES

FRAME AND GRATE
WEIGHT 185 LBS.
MATERIAL - CAST IRON
APPROX. WEIGHT 170 LBS.

PLAN

SECTION A-A

SECTION B-B

DETAIL OF CORRUGATIONS

HARFORD COUNTY, MD
DEPARTMENT OF
PUBLIC WORKS

STANDARD MANHOLE
TYPE A COVER

DEP. DIRECTOR, PUBLIC WORKS 4/12/00

DIRECTOR OF PUBLIC WORKS 5-2-00

ISSUED 5-2-00
REvised
PLATE D-50
SECTION A-A
ALUMINUM ALLOY (SOLID BAR)

SECTION B-B
ALUMINUM ALLOY (SOLID BAR)

SECTION C-C

SECTION D-D
CAST IRON

SECTION 2-B
STEEL

NOTE: METAL LADDER RUNGS ARE TO BE USED IN INLETS, MANHOLES AND JUNCTION BOXES OVER THREE FEET IN DEPTH OR AS DIRECTED BY THE ENGINEER USE EITHER WITH BRICK OR CONCRETE CONSTRUCTION (WHERE BRICK CONSTRUCTION IS EMPLOYED, THE MORTAR JOINTS SHALL BE ADJUSTED TO ACCOMMODATE LADDER RUNGS.) METAL LADDER RUNGS MAY BE COMPRISED OF ONE OF THE FOLLOWING:

1. ALUMINUM ALLOY SHALL CONFORM TO A.S.T.M. DESIGNATION B 221 ALLOY 6061-T6, THAT PORTION EMBEDDED IN THE STRUCTURE SHALL BE COATED WITH ZING CHROMATE OR APPROVED EQUIVALENT COATING.

2. CAST IRON - SHALL CONFORM TO A.S.T.M. A-48 CLASS 30 B.


TYPICAL LADDER RUNG LOCATIONS
### Plan

- **#6 @ 12" O/C U & 8" WALL**
- **#5 @ 12" O/C**
- **RECESS IF POURABLE SEPARATELY**

### Section E-E

- **2" CLEAR**

### Section R-R

- **8"**

### Notes:

1. **Material:** Walls and bottom shall be brick or plain concrete. (See Section E - E) Where 12" thickness is required, 9" Reinforced Concrete may be substituted. (See Section R - R)
2. **Loads:** Super load = A A S H T O H-20 Full Load = 0 to 15 ft. Earth.
3. **Manhole Details:** Steps, frame, cover, walls, max. batter shall be as shown on contract drawings for type A manhole.
4. **Bend Data:** Centerline radius, B, C, and reinforcement shall be governed by R-1 or R-2 whichever is smaller.
5. **Manhole opening d shall be based on downstream pipe size D-2**
6. **Frame and Crate for manhole on 54" and larger bends shall be 2'-6" with lettering and holes as shown for 2'-0" frame**
7. **Manhole stack shall conform to that of Type C manhole: minimum length of curve is 4'-0" for type C manhole stack.**

<table>
<thead>
<tr>
<th>Pipe Dia</th>
<th>C Radius</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Bars F</th>
<th>Bars F</th>
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<td>30&quot;</td>
<td>5'-0&quot;</td>
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<td>8&quot;</td>
<td>#5 @ 6'-0&quot;/c</td>
<td>3'-5&quot;</td>
<td>2'-6&quot;</td>
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<td>33&quot;</td>
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<td>4'-1&quot;</td>
<td>6&quot;</td>
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<td>#5 @ 6'-0&quot;/c</td>
<td>3'-3&quot;</td>
<td>2'-5&quot;</td>
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<td>4'-4&quot;</td>
<td>8&quot;</td>
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<td>#5 @ 6'-0&quot;/c</td>
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<td>3'-0&quot;</td>
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<td>7'-0&quot;</td>
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<td>3'-0&quot;</td>
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<td>12&quot;</td>
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<td>72&quot;</td>
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<td>12&quot;</td>
<td>12&quot;</td>
<td>#6 @ 8'-0&quot;/c</td>
<td>7'-5&quot;</td>
<td>3'-0&quot;</td>
</tr>
</tbody>
</table>

(X) SEE NOTE #1

[Signature]

**5-2-00**

**DIRECTOR OF PUBLIC WORKS DATE**

[Signature]

**4/12/00**

**DEP. DIRECTOR, PUBLIC WORKS DATE**

---

**HARFORD COUNTY, MD**

**DEPARTMENT OF PUBLIC WORKS**

**BEND STRUCTURE CIRCULAR PIPE**

**ISSUED 05-02-00**

**REVISED**

**REVISED**

**PLATE D-52**
Vary Radii so as to form smooth taper when D1 differs from D2.

**NOTES:**

1. Walls and bottom shall be brick or concrete. Where 12" brick thickness is required, B" Reinforced Concrete may be substituted.
2. Loads super load = A.A.S.H.T.O H-20; Fill Load = 0 to 15 ft. Earth.
3. Bend Data, $\gamma R_d$, B, C and Reinforcing shall be based upon D1 or D2, whichever is smaller.

<table>
<thead>
<tr>
<th>Pipe Dimen.</th>
<th>$\gamma R_d$</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>Bars E Spacing</th>
<th>Bars F Spacing</th>
<th>d</th>
</tr>
</thead>
<tbody>
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<td>38&quot; x 24&quot;</td>
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<td>10°</td>
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<td>3'-0&quot;</td>
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<td>10°</td>
<td>#5 @ 6&quot;</td>
<td>#5 @ 8&quot;</td>
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<tr>
<td>45&quot; x 29&quot;</td>
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<tr>
<td>53&quot; x 34&quot;</td>
<td>9'-0&quot;</td>
<td>5'-9&quot;</td>
<td>8&quot;</td>
<td>10°</td>
<td>#5 @ 6&quot;</td>
<td>#5 @ 8&quot;</td>
<td>3'-0&quot;</td>
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<tr>
<td>60&quot; x 38&quot;</td>
<td>10'-0&quot;</td>
<td>6'-4&quot;</td>
<td>8&quot;</td>
<td>12°</td>
<td>#6 @ 8&quot;</td>
<td>#6 @ 10&quot;</td>
<td>3'-0&quot;</td>
</tr>
<tr>
<td>68&quot; x 43&quot;</td>
<td>11'-0&quot;</td>
<td>7'-8&quot;</td>
<td>12&quot;</td>
<td>12°</td>
<td>#6 @ 8&quot;</td>
<td>#6 @ 10&quot;</td>
<td>3'-0&quot;</td>
</tr>
<tr>
<td>76&quot; x 48&quot;</td>
<td>12'-0&quot;</td>
<td>8'-4&quot;</td>
<td>12&quot;</td>
<td>12°</td>
<td>#6 @ 8&quot;</td>
<td>#6 @ 10&quot;</td>
<td>3'-0&quot;</td>
</tr>
<tr>
<td>83&quot; x 53&quot;</td>
<td>13'-0&quot;</td>
<td>8'-11&quot;</td>
<td>12&quot;</td>
<td>12°</td>
<td>#6 @ 8&quot;</td>
<td>#6 @ 10&quot;</td>
<td>3'-0&quot;</td>
</tr>
<tr>
<td>91&quot; x 58&quot;</td>
<td>14'-0&quot;</td>
<td>9'-7&quot;</td>
<td>12&quot;</td>
<td>12°</td>
<td>#6 @ 8&quot;</td>
<td>#6 @ 10&quot;</td>
<td>3'-0&quot;</td>
</tr>
</tbody>
</table>

**SECTION A-A (Brick)**

**SECTION R-R (Concrete)**
NOTES:

MANHOLE LOCATION, SIZE AND DETAILS, CONCRETE AND REINFORCING STEEL REQUIREMENTS, CENTER LINE RADIUS AND OTHER DETAILS SHALL BE IN ACCORDANCE WITH BEND STRUCTURE DETAIL D-52 & D-53
NOTES:
1. Walls and bottom shall be Brick or Mix 3 Concrete
2. Manhole stack and additional slab reinforcing shall conform to that of Type C Manhole.
3. Walls and bottom shall conform to the Standard Bend Structure Detail.

MINIMUM DIMENSIONS

<table>
<thead>
<tr>
<th>D</th>
<th>A</th>
<th>B</th>
</tr>
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<tbody>
<tr>
<td>15'-18'</td>
<td>3'-9'</td>
<td>2'-9'</td>
</tr>
<tr>
<td>21'-30'</td>
<td>4'-4'</td>
<td>3'-7'</td>
</tr>
<tr>
<td>33'-36'</td>
<td>4'-7'</td>
<td>3'-11'</td>
</tr>
</tbody>
</table>

PLAN OF ROOF SLAB REINFORCING

Mix 3 Concrete

2" Clear

#5 @ 6" O/c E.W.

PLAN

#5 @ 6" O/c E.W.

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

JUNCTION CHAMBER
SINGLE & DOUBLE

ISSUED 05-02-00
REvised

PLATE D-55
#6 φ BARS 4" C/C
#4 φ BARS 6" C/C

CONCRETE - SEE LATEST S.H.A. SPECIFICATIONS
REINFORCEMENT-DEFORMED BARS

NOTE: NO PROVISION IS TO BE MADE IN SLAB FOR INTAKE PIPE WHEN NOT NEEDED.

#4 φ BARS 6" C/C

SLOTS TO BE CUT IN PIPE TO CONFORM WITH PROJECTED STEEL.

INTAKE PIPE STEEL TO PROJECT 2" THRU OPENING FOR PIPE AS SHOWN. PROJECTED STEEL TO BE PAINTED

CONCRETE COLLAR

SECTION ALONG ⌀ OF PIPE

NOTE: PRECASTING IS OPTIONAL.

ISOMETRIC VIEW

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

STANDARD JUNCTION BOX

ISSUED 05-02-00
REVISED
REVISED
PLATE D-56
GENERAL NOTES

REINFORCEMENT—DEFORMED BARS
MANHOLE CASTINGS—INSIDE DIA 2'-0'
MANHOLE CASTINGS—MAX. DEPTH 0'-7"
PLAN

SECTION A-A

CONCRETE:
SEE SPECIFICATIONS

#4 @ 6'C/C

2" CLEAR

WATER LEVEL

6" VITRIFIED TILE OUTLETS

TO BE DETERMINED BY
THE ENGINEER

STANDARD SPRING BOX
SPRING OR WELL PROTECTION

HARFORD COUNTY, MD
DEPARTMENT OF
PUBLIC WORKS

ISSUED 05-02-00
REVISED
REvised
PLATE D-58
CIRCULAR PLAN VIEW NOT SHOWN TO BE USED WHERE NOTED ON PLANS OR WHERE DIRECTED BY ENGINEER.
**All concrete denoted will be Mix No. 3**

**Sub-Base Drainage Ditch Section**

- Place tar paper on top of joints for bell and spigot type pipe.
- Perforated "pipe under-drain" see spec. for type.

**Sub-Surface Drainage Ditch Section**

- Earth backfill placed according to specs. for "tamped fill".
- Underdrain outlet.
- This length shall be circular corrugated metal pipe of specified outlet size in all cases, to be measured and paid for at contract unit price for underdrain outlet.

**Outlet Ditch Section**

- Plain underdrain "pipe outlet".
- For joints, refer to specifications.

**5" Concrete Gutter for Underdrain Outlet**

- NOTE: Underdrain to be laid on a minimum of 0.5% grade unless otherwise directed.
- NOTE 'A': Where an underdrain outlets into an inlet, or where any other unusual conditions prevail, these dimensions may be varied as directed.

**Elevation-Underdrain Outlet**

- Gabion stone or concrete.
- Measured along slope.
- Toe wall.

**Harford County, MD**

**Department of Public Works**

**Standard Underdrains**

**Plate D-60**
PLACEMENT AT COMBINATION INLETS

6" UNDERDRAIN
20 L.F. MIN.

FLOW LINE

PLACEMENT AT COS OR COG INLETS

6" UNDERDRAIN
20 L.F. MIN.

FLOW LINE

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

STANDARD PLACEMENT UNDERDRAIN AT INLETS

DIRECTOR OF PUBLIC WORKS
5-2-00
DATE

DEP. DIRECTOR, PUBLIC WORKS
4/12/00
DATE

PLATE D-61
MIX NO. 2 CONCRETE
3000 P.S.I.

NOTE: FOR DRAINS OVER 24" D., USE
BRICK BEND OR MANHOLE.
EXISTING GROUND LINE

1'-0" MIN. FOR TANGENT CHANNEL
1'-6" MIN. FOR CURVED SECTION

PEGGED SODDING
SLOPE 2:1 MAX.
APPROX. 3'-0"

GABION SLOPE PROTECTION
(CLASS AS NOTED ON
CONSTRUCTION DRAWINGS)

3'-0" APPRX.

GABION TOE WALLS

3'-0" UNLINED
APPROX.

'W'

FILTER CLOTH ON
SLOPES UNDER GABION
SEE SPECIFICATIONS

NOTE:
'W' DENOTES CHANNEL WIDTHS, AND
NEED NOT BE IN 3'-0" MULTIPLES

UNPAVED CHANNEL
OR SLOPES

GABIONS

END TOEWALL DETAIL

1'-0" MIN.

'W'

UNLINED INVERT

LINED INVERT

HARFORD COUNTY, MD
DEPARTMENT OF
PUBLIC WORKS

GABION CHANNEL LINING

PLATE D-63
LENGTH OF INLET OR INLETS

CURB OPENING
NORMAL CURB FACE
FLOW LINE

INTERCEPT (ON GRADE)

LENGTH OF INLET OR INLETS

AREA OF CURB
FLOW

FLOW LINE

IN SUMP
CURB OPENING
FLOW LINE

NORMAL CROSS SLOPE
FACE OF CURB

4'-0"

2 1/2"

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

METHOD FOR DEPRESSING PAVEMENT AT INLETS
FOR USE AT EXISTING INLETS ONLY

PLATE D-64
6" PERFORATED DRAIN WRAPPED IN FILTER CLOTH IN 1'-6" WIDE DRAINAGE TRENCH

PROPERTY LINE

6" PERFORATED DRAIN WRAPPED IN FILTER CLOTH

4' WIDE SIDEWALK

1'-6"

4 1/2"

NO. 57 STONE

POSSIBLE MANHOLE

SUPPORT BEAM

SECTION A - A

HARFORD COUNTY, MD
DEPARTMENT OF PUBLIC WORKS

SIDEWALK PEDESTRIAN RAMP UNDERDRAIN

5-2-00
DIRECTOR OF PUBLIC WORKS
5-2-00
DEP. DIRECTOR, PUBLIC WORKS
4/12/00

PLATE 0-65
SECTION VI

STRUCTURES

Plate

Standard "Year Built" Numerals .................................................................................... ST-1
Standard "Year Built" Numerals .................................................................................... ST-2
Standard "Year Built" Numerals .................................................................................... ST-3
Standard "Year Built" Numerals .................................................................................... ST-4
SECTION A-A

TO BE PLACED ON ALL STRUCTURES - AS DIRECTED BY THE ENGINEER