UNIFORM STANDARD DETAILS for PUBLIC WORKS CONSTRUCTION SPONSORED and DISTRIBUTED by the MARICOPA ASSOCIATION of GOVERNMENTS 2012 EDITION ARIZONA (Includes 2014 revisions)
100 SERIES: GENERAL INFORMATION

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1. THESE DETAILS HAVE BEEN PREPARED IN AN EFFORT TO STANDARDIZE THE CONSTRUCTION DETAILS USED BY VARIOUS CONTRACTING AGENCIES IN MARICOPA COUNTY. THEY ARE TO BE USED IN CONJUNCTION WITH THE CURRENT EDITION OF THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION" SPONSORED AND DISTRIBUTED BY THE MARICOPA ASSOCIATION OF GOVERNMENTS.

2. MANY NOTES WITHIN THESE DETAILS REFER TO VARIOUS SECTIONS OF THE "UNIFORM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION." WHERE THIS REFERENCE IS MADE, ONLY THE ABBREVIATION "SECT." IS USED. AN EXAMPLE OF THIS REFERENCE WOULD BE: "CLASS 'A' CONCRETE PER SECT. 725."

3. MANY NOTES WITHIN THESE DETAILS REFER TO OTHER DETAILS WITHIN THIS BOOK. WHERE THIS REFERENCE IS MADE, THE ABBREVIATION "DETAIL" IS USED. AN EXAMPLE OF THIS WOULD BE: "SEE DETAIL 391 FOR VALVE BOX INSTALLATION."


5. AN EFFORT HAS BEEN MADE TO INCLUDE THE MOST COMMONLY USED CONSTRUCTION DETAILS IN THIS BOOK. ITEMS WHICH REQUIRE DESIGN CONSIDERATION BY THE DESIGNING ENGINEER HAVE NOT BEEN INCLUDED.

6. SOME OF THE DETAILS PRINTED HEREIN MAY BE USED BY SOME OF THE AGENCIES BUT NOT OTHERS. THE DESIGNING ENGINEER SHOULD THEREFORE CONTACT THE AGENCY WITHIN WHOSE JURISDICTION HE IS WORKING FOR DIRECTION AS TO WHICH DETAIL OR PORTIONS OF DETAILS SHOULD BE USED.

7. DETAIL DRAWINGS ARE NOT TO SCALE.
SEWER CLEANOUT
SURVEY MONUMENT
SURVEY MONUMENT IN HANDHOLE
CELLULAR TOWER
BITUMINOUS (SECTION)
CONCRETE (SECTION)
AGGREGATE BASE COURSE (SECTION)
ripprap (plan & section)
obliterate pavement
tapered mill
uniform mill
earth (section)

WOOD UTILITY POLE
STEEL UTILITY POLE
CONCRETE UTILITY POLE
STREET LIGHT ON MAST ARM
POLE MOUNTED LIGHT
ELECTRIC, GAS METER
TRANSFORMER
DOWN GUY & ANCHOR

NOTES:
1. PLAN SYMBOLS FOR EXISTING FEATURES ARE TO BE DASHED, GRAY SCALDED, OR DRAWN USING THIN LINENWORK.
2. ADD LABELS TO PLAN SYMBOLS AS NEEDED FOR CLARITY.
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<td>FIBER OPTIC</td>
<td>WATER LINE *(GREATER THAN 12&quot;)</td>
</tr>
<tr>
<td>CABLE TELEVISION</td>
<td></td>
</tr>
<tr>
<td>OVERHEAD CABLE TELEVISION</td>
<td>* SCALE TO ACTUAL WIDTH</td>
</tr>
<tr>
<td>TELEPHONE DUCT BANK</td>
<td></td>
</tr>
</tbody>
</table>
DIMENSION SHOULD BE GIVEN ONCE ON EACH SHEET AND SHOULD BE PLACED NEAR THE CENTER OF THE SHEET. IF ANY OF THE GIVEN CONDITIONS CHANGE, THEY SHOULD BE REDIMENSIONED AT THE POINT OF CHANGE.

GIVEN DIMENSIONS IN ORDER STARTING WITH THE LONGEST AND ENDING WITH THE SHORTEST, AS SHOWN IN THE SKETCH.

GIVE COMPLETE DIMENSIONS.

IF THE CENTERLINE OF PAVEMENT DOES NOT FALL ON THE SECTION LINE OR MONUMENT LINE OF THE STREET, DIMENSION AS ABOVE AND SHOW THE DIFFERENCE BETWEEN THE SECTION OR MONUMENT LINE AND THE CENTERLINE.
NOTES:

1. TYPE 'A' TO BE USED AT INTERSECTIONS OF MAJOR STREETS & COLLECTOR STREETS, SECTION CORNERS, SECTION 1/4 CORNERS, CENTER OF SECTIONS, AND AT OTHER POINTS AS SHOWN ON PLANS.

2. TYPE 'B' TO BE USED (EXCEPT WHERE TYPE 'A' IS SPECIFIED) AT INTERSECTION OF STREET CENTERLINES, PC'S, PT'S AND PI'S OF CURVES, SECTION 1/16 CORNERS, SUBDIVISION CORNERS, CHANGE IN ALIGNMENT OF SUBDIVISION BOUNDARIES, AND AT OTHER POINTS AS SHOWN ON PLANS.

3. TYPE 'C' TO BE USED AT CORNERS OF AND CHANGE IN ALIGNMENT OF SUBDIVISION BOUNDARIES WHERE CORNERS OR CHANGES IN ALIGNMENT FALL OUTSIDE OF PAVED AREAS OR UNPAVED ALLEYS AND STREETS.

4. CAP TO BE CONSTRUCTED OF RED BRASS OR BRONZE.

5. LETTERS TO BE APPROX. 1/32" WIDE & 1/32" DEEP.

6. FLATTENING THE BOTTOM 2" OF THE GALVANIZED PIPE IS OPTIONAL.

7. TOP OF CONCRETE POST IS CHAMFERED 3/4" EXCEPT WHEN SET FLUSH WITH PAVEMENT.

8. THE CAP SHALL SHOW THE POINT SURVEYED BY A PUNCH MARK OR SCRIIBED CROSS AND THE CAP SHALL BE STAMPED WITH THE YEAR AND THE REGISTERED LAND SURVEYOR'S (RLS) REGISTRATION NUMBER.

9. WHEN APPLICABLE, THE CAP SHALL BE STAMPED WITH THE APPROPRIATE PUBLIC LAND MARKING PER CURRENT MANUAL OF INSTRUCTIONS FOR THE SURVEY OF PUBLIC LANDS OF THE UNITED STATES, PREPARED BY THE BUREAU OF LAND MANAGEMENT.

10. SUBMIT TO THE ENGINEER A COPY OF THE RECORDED CORNER RECORD OR RESULTS OF SURVEY TO DOCUMENT COMPLIANCE WITH THE ARIZONA BOARD OF TECHNICAL REGISTRATION REQUIREMENTS.
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NOTES:

1. LOCATE PAVEMENT MARKER IN CENTER OF TRAVEL LANE AND ALIGN WITH HYDRANT.
2. FOR MULTIPLE LANE ROADS LOCATE PAVEMENT MARKER IN LEFT MOST THROUGH TRAFFIC LANE.
3. ADJUST MARKER LOCATION TO BE LOCATED OUTSIDE OF ANY DELINEATED CROSSWALK AREA.
4. FOR HYDRANT LOCATED ON FAR SIDE OF RAISED MEDIAN, LOCATE PAVEMENT MARKER ON TOP OF MEDIAN CURB ALIGNED WITH HYDRANT.
5. OMIT FOR CUL-DE-SAC GREATER THAN 250' IN LENGTH.
6. FIRE HYDRANT PAVEMENT MARKERS SHALL BE 2-WAY RETROREFLECTIVE BLUE: ADOT TYPE B8, 911A-BLUE BY FIRE LITE AMERACE CORPORATION, OR APPROVED EQUAL.
NOTES:

1. FASTEN WITH 1/2" x 5" LAG SCREWS WITH 2 FLAT WASHERS OR (2) 5/8" BOLTS, WITH 4 FLAT WASHERS.

2. 2" x 8" DOUGLAS FIR PLANK (LENGTH TO BE DETERMINED ON PLANS.)

3. WHEN BARRICADE (TYPE "A") IS CONSTRUCTED ON BASES INSTEAD OF POSTS SET INTO THE GROUND, IT MAY BE DESIRABLE TO BALLAST THE BASES WITH SAND BAGS OR BY STAKING TO PROVIDE RESISTANCE TO OVERTURNING DURING PERIODS OF HIGH WINDS.

4. TWO COATS OF WHITE PAINT PER SECTION 790 SHALL BE APPLIED TO ALL EXPOSED SURFACES OF THE BARRICADE. AN ADDITIONAL TWO COATS OF ORANGE PAINT PER SECTION 790 SHALL BE APPLIED TO CREATE THE ALTERNATE ORANGE AND WHITE STRIPES FOR TEMPORARY BARRICADES AND TWO COATS OF RED PAINT PER SECTION 790 SHALL BE APPLIED TO CREATE ALTERNATE RED AND WHITE STRIPES FOR PERMANENT BARRICADES. HIGHWAY SAFETY SPHERES (BEADS) PER ADOT 708-2.02 SHALL BE APPLIED BY HAND TO ALL CROSS MEMBERS, FRONT AND BACK AND ON BOTH COLORS, IMMEDIATELY AFTER PAINTING. THE STRIPES SHALL SLOPE DOWNWARD IN THE DIRECTION TRAFFIC IS TO PASS.
FLANGED STEEL 'U' CHANNEL (2 LBS. OR 3 LBS. PER SQUARE FOOT AS SPECIFIED)

2-1/2" DIA. STANDARD PIPE GALVANIZED OR 2-3/8" O.D. STANDARD PIPE GALVANIZED (AS SPECIFIED)

NOTES

TYPE 'A'
USE DRIVING HEAD FOR DRIVING ALL FLANGED STEEL 'U' CHANNEL POSTS.

IN LIEU OF DRIVING FLANGED STEEL 'U' CHANNEL POSTS MAY BE SET IN CONCRETE BASE FOUNDATION AS PER TYPE 'B' BASE.

TYPE 'B' & TYPE 'C'
CONCRETE BASE FOUNDATIONS SHALL BE CLASS 'C' CONCRETE AS PER SECT. 505 AND 725.
TYPE 1 PERMANENT

FILL WITH GROUT AND CROWN TOP

6" RETROREFLECTIVE ENGINEER'S TAPE (3M HIGH DENSITY YELLOW PRESSURE SENSITIVE TAPE OR APPROVED EQUIVALENT), TYP.

4" OR 6" DIA. STEEL GUARD POST, SCH. 40, GALVANIZED

36" MINIMUM

EXISTING GRADE, TYP.

CLASS B CONCRETE PER SECT. 725

6" DIA. x 5¾" DIAMETER CAP PLATE SEAL WELD ALL AROUND

5" DIA. STEEL GUARD POST SCH. 40

3/8" A-36 STEEL COLLAR 5¼" ID X 7¼" OD, FILLET WELD TO GUARD POST BOTH SIDES, ALL AROUND

1" SLEEVE PROJECTION

CLASS B CONCRETE PER SECT. 725

3" MIN. TYP.

3" CLEAR

6" DIA. x 34" SCH. 40 GROUND SLEEVE WITH ¼" X 6¾" CAP PLATE SEAL WELD ALL AROUND

36" MINIMUM

FINISHED GRADE, TYP.

REMOVAL HOLES SEE NOTE 2

30'

TYPE 2 REMOVABLE

NOTES

1. BOLLARDS SHALL HAVE A HEIGHT OF 3 FEET OR BE EQUAL TO THE HEIGHT OF THE BACK SCREEN WALL OF BIN ENCLOSURES. POSTS SHALL BE PLACED A MINIMUM OF 4" FROM THE WALL.

2. REMOVABLE POSTS SHALL HAVE 1" DIA. HOLES DRILLED THROUGH AT A DISTANCE ⅔ THE OVERALL POST LENGTH FROM TOP.

3. REMOVABLE POST – GRIND SMOOTH ALL SHARP EDGES PRIOR TO GALVANIZATION. GALVANIZE PER ASTM A54 AFTER FABRICATION.
TYPE 1 SURFACE MOUNT

TYPE 2 GROUND MOUNT

NOTES

1. CONTRACTOR SHALL CLEAN ROADWAY SURFACE PRIOR TO PLACEMENT OF FLEXIBLE TUBULAR MARKER.
2. FLEXIBLE TUBULAR MARKERS SHALL BE CEMENTED TO THE PAVEMENT SURFACE WITH AN EPOXY ADHESIVE IN ACCORDANCE WITH THE TUBULAR MARKER MANUFACTURER’S SPECIFICATIONS.
3. YELLOW TUBULAR MARKERS SHALL HAVE A YELLOW POST AND YELLOW "HIGH INTENSITY GRADE" RETROREFLECTIVE SHEETING. ORANGE TUBULAR MARKERS SHALL HAVE AN ORANGE POST AND WHITE HIGH INTENSITY RETROREFLECTIVE SHEETING.
4. POST SHALL BE FLEXIBLE, HIGH IMPACT RESISTANT PLASTIC MATERIAL.
NOTES:

1. POSTS AND RAILS SHALL BE 1.5" SCHEDULE 40 HOT-DIPPED GALVANIZED STEEL PIPE ASTM A 53, GRADE B (2.72 #/LF, 1.9' 0.D.). GALVANIZING SHALL BE IN ACCORDANCE WITH SECTION 771.

2. PAINT RAIL PER MAG SPECIFICATIONS SECTION 530 WHEN REQUIRED BY PLANS. SHOP PRIME WITH RUST INHIBITING PRIMER (FIELD REPAIR PRIMER AS NEEDED). COLOR PER PLANS.

3. VERTICAL POSTS TO BE EVENLY SPACED.

4. REMOVE ALL SHARP EDGES.

5. INSTALL SAFETY RAIL AS REQUIRED BY PLANS OR SPECIFICATIONS.

6. THE EMBEDMENT FOR ANCHOR TYPES 1, 2 AND 3 SHALL BE LOCATED INSIDE THE WALL REINFORCEMENT CAGE.

7. SAFETY RAIL IS NOT TO BE USED AS A PEDESTRIAN BRIDGE RAIL.

NOTE: SEE PLANS FOR ANCHORAGE DETAILS FOR ATTACHMENT TO SINGULARLY REINFORCED AND NON-REINFORCED WALLS.
5/8" HOLE FOR 1/2" DIA. PIN, 24" LONG, HOT ROLLED STEEL

TYPE A

5/8" HOLE OR 1/2" DIA. PIN, 24" LONG, HOT ROLLED STEEL

TYPE B-1 = 36"
TYPE B-2 = 48"
TYPE B-3 = 72"

RADIUS 3/4" MIN. - 1" MAX.
NO. 3 REINFORCING BAR AS PER SECTION 727
69" FOR TYPES 'A' AND 'B-3'
45" FOR TYPE 'B-2'

TYPICAL SECTION

NOTES:
1. DIMENSIONAL AND REINFORCEMENT CHANGES WILL BE PERMITTED UPON PRIOR WRITTEN APPROVAL OF THE ENGINEER.
2. UNLESS OTHERWISE NOTED, CONCRETE SHALL BE CLASS 'A' PER SECTION 725.

1/2" DIA. PINS - 24" LONG, HOT ROLLED STEEL

6" DIA. CONCRETE CYLINDER
CONCRETE CLASS B PER SECTION 725

SAFETY CURB
INSTALLATION ON DIRT
NOTES

1. ALL CONCRETE SHALL BE CLASS 'C'
   PER SECT. 725.

2. FITTINGS NOT SPECIFICALLY DETAILED
   SHALL BE HEAVY DUTY DESIGN.

3. STRAIN POSTS SHALL BE SPACED AT
   500' MAXIMUM SPACING.

4. BOTH CORNER AND STRAIN POSTS
   SHALL HAVE STRAIN PANELS.

5. ALL POSTS SHALL BE CAPPED.

6. MEMBER SIZES SHALL BE THE
   FOLLOWING:

<table>
<thead>
<tr>
<th>MEMBER</th>
<th>AISC SIZE</th>
<th>OUTSIDE DIA.</th>
</tr>
</thead>
<tbody>
<tr>
<td>CORNER POST</td>
<td>2-1/2&quot;</td>
<td>2.875&quot;</td>
</tr>
<tr>
<td>LINE POST</td>
<td>1-1/2&quot;</td>
<td>1.900&quot;</td>
</tr>
<tr>
<td>STRAIN POST</td>
<td>1-1/2&quot;</td>
<td>1.900&quot;</td>
</tr>
<tr>
<td>BRACE</td>
<td>1-1/4&quot;</td>
<td>1.666&quot;</td>
</tr>
<tr>
<td>STRETCH BAR</td>
<td>3/16&quot;x3/4&quot;</td>
<td>3/16&quot;x3/4&quot;</td>
</tr>
<tr>
<td>GATE POST</td>
<td>3-1/2&quot;</td>
<td>4.000&quot;</td>
</tr>
<tr>
<td>TOP RAIL</td>
<td>1-1/4&quot;</td>
<td>1.666&quot;</td>
</tr>
</tbody>
</table>

7. CONSTRUCTION AND MATERIALS SHALL
   CONFORM TO SECT. 420 AND 772,
   RESPECTIVELY. SEE TABLE 772-1
   FOR WEIGHTS OF MEMBERS.
NOTES:

1. PAVEMENT MATCHING AND SURFACE REPLACEMENT SHALL BE IN ACCORDANCE WITH SECTION 336.
2. TYPE OF BACKFILL AND BASE (IF APPLICABLE) SHALL BE AS NOTED HEREIN UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS. IF NOT SPECIFIED, CLSM SHALL BE 1/2-SACK PER SECTIONS 604 AND 728.
3. TRENCHES LESS THAN 24" WIDE SHALL BE BACKFILLED FROM TOP OF BEDDING TO BOTTOM OF SURFACING MATERIALS WITH 1/2-SACK CLSM PER SECTIONS 604 AND 728.
4. BASE, BACKFILL, BEDDING AND FOUNDATION COMPACTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH SECTION 601.
5. ASPHALT CONCRETE SURFACE AND BASE COURSES SHALL COMPLY WITH SECTION 336.2.4.1 UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS.
6. USE TYPE "A" FOR LONGITUDINAL TRENCH REPAIR AND USE "T-TOP" FOR TRANSVERSE TRENCH REPAIR (SEE DETAIL 200-2) UNLESS OTHERWISE SPECIFIED IN CONTRACT DOCUMENTS. TYPE "B" TRENCH REPAIR MAY BE USED FOR TRANSVERSE TRENCH REPAIR IF SPECIFIED BY THE AGENCY.
7. PROVIDE MINIMUM 12" WIDE SHELF AS SHOWN IN "T-TOP" TRENCH REPAIR AT ENDS OF TYPE "A" TRENCH REPAIR EXCEPT WHERE EDGE ABUTS EXISTING CONCRETE.
8. USE "T-TOP" PAVEMENT REPLACEMENT WHERE A TRENCH IS NOT PARALLEL TO A STREET OR GOES THROUGH AN INTERSECTION.
9. SEE DETAIL 200-2 FOR REMNANT PAVEMENT REMOVAL REQUIREMENTS.
10. EXPOSED COPPER OR POLYETHYLENE WATER PIPE UP TO 2" IN DIAMETER IN TRENCHES TO BE BACKFILLED WITH CLSM SHALL BE WRAPPED WITH MINIMUM 3/4" THICK PREFORMED PIPE-COVERING FOAM INSULATION BEFORE PLACING CLSM.
LONGITUDINAL TRENCH
(TRENCH IN PAVEMENT PARALLEL TO TRAFFIC)

TRANSVERSE TRENCH
(TRENCH IN PAVEMENT NOT PARALLEL TO TRAFFIC)

NOTES:
1. SEE MAG DETAIL 200-1 FOR DETAILED TRENCH REPAIR REQUIREMENTS FOR TRENCH TYPES NOTED HEREBIN.
2. SEE MAG DETAIL 211 FOR REQUIREMENTS REGARDING THE USE OF PLATING TRANSVERSE TRENCHES. USE OF STEEL PLATES SHALL NOT EXCEED 72 HOURS AFTER COMPLETION OF BACKFILL AND PRIOR TO FINAL PATCHING.
A.C. PAVEMENT

AGGREGATE BASE
PER STANDARD
SECT. 310

GRADING PER
STANDARD
SECT. 301

TYPE 'A'

A.C. PAVEMENT

AGGREGATE BASE
PER STANDARD
SECT. 310

GRADING PER
STANDARD
SECT. 301

TYPE 'B'

OVERLAY OR FINISHING COURSE
TACK COAT

EXISTING PAVEMENT
OR NEW PAVEMENT
AGGREGATE BASE
PER STANDARD
SECT. 310
GRADING PER
STANDARD
SECT. 301

TACK COAT

EDGE ROADWAY PAVEMENT

UNPAVED SHOULD
RECOMPACT TO 95%

COMPACTED SUBGRADE

SAFETY EDGE

D = DESIGN THICKNESS OF A.C. PAVEMENT PLUS AGGREGATE BASE.
3/8" FLATHEAD STAINLESS STEEL CAP SCREW COUNTERSINK (6 EACH MIN.)

EXPANSION JOINT

EXPANSION JOINT

SEE NOTE 5

SEE NOTE 1

TRANSITION FROM ROLL CURB TO VERTICAL CURB

SECTION 'A–A'

SECTION 'B–B'

NOTES:
1. ANGLE EQUALS 45° UNLESS SPECIFIED ON PLAN.
2. DIMENSION 'B' EQUALS 'A' + 2
3. ( ) INDICATES DIRECTION OF FLOW.
4. PAINT STEEL ACCORDING TO SECTION 790.
   PAINT NUMBER 1–A OR 1–B.
5. R EQUALS 1" UNLESS OTHERWISE DIRECTED.
6. H EQUALS CURB FACE HEIGHT.
7. FOR ROLL CURB AND GUTTER, USE 2" TRANSITIONS TO VERTICAL CURB.
8. CONCRETE SHALL BE CLASS B PER SECT. 725 AND INSTALLED PER SECT. 505.

DETAIL C

NO. 4 REINFORCEMENT BAR, 4" LONG
3 EACH SIDE, MIN.

2" x 2" x 1/8"
ANGLE BOTH SIDES

STEEL DIAMOND PLATE A–36

DIAMOND PLATE

GUTTER FLOW LINE

SLOPE = 1.5%

LIP OF GUTTER

SEE NOTE 3
PLAN OF CONCRETE EQUIPMENT CROSSING

NOTES:

1. WHEN EQUIPMENT CROSSING LIES ADJACENT TO BRIDGE OR BOX CULVERT, CONSTRUCT THE EQUIPMENT CROSSING TO WIDTH OF BRIDGE ROADWAY.

2. ALL DOWELS IN CENTER JOINTS SHALL BE DEFORMED BARS AND SHALL HAVE UNBROKEN BOND. THEY SHALL BE HELD SECURELY IN PLACE, PARALLEL TO THE SUBGRADE AND PERPENDICULAR TO THE CENTER LINE OF THE ROAD.

3. THE EDGING TOOL USED FOR ALL LONGITUDINAL JOINTS SHALL BE SO CONSTRUCTED AS TO PROVIDE A SMOOTH TROWELED SURFACE 3” WIDE ON EACH SIDE OF THE JOINT.

4. IF APPROVED BY THE ENGINEER, OTHER DEFORMATIONS MAY BE USED IN LONGITUDINAL JOINT – DETAIL ‘C’.

5. DETAIL ‘C’ TO BE USED ONLY WHEN FULL WIDTH CAN NOT BE POURED IN ONE POUR. USE DETAIL ‘D’ IF FULL WIDTH IS POURED IN ONE POUR.
NOTES:
1. W - INDICATES WIDTH OF PAVED SURFACE OF TURNOUT.
   L - INDICATES LENGTH OF PAVED SURFACE OF TURNOUT.
   R - RADIUS.

2. SIZE AND TYPE OF TURNOUT SHALL BE NOTED ON PLANS AS FOLLOWS:
   90' - NO RADIUS: WxL-SURFACE-TYPE; (12' x 30'-A.C.-TYPE "B" TURNOUT).
   90' - WITH A RADIUS: WxLxR-SURFACE-TYPE; (12' x 20' x 15'-A.C.-TYPE "C" TURNOUT).
   OTHER THAN 90' WITH 2 RADIUS-TYPE "S": WxLxR1 xR2-SURFACE-TYPE;
   (12' x 20' x 15'-A.C.-TYPE "S" TURNOUT).
   OR IT MAY BE NOTED ON PLANS IN CONVENTIONAL TERMS.

3. TURNOUTS TO BE STRAIGHT TYPE UNLESS OTHERWISE NOTED ON PLANS.

4. A.C. AND BASE MATERIAL THICKNESS FOR TURNOUTS SHALL BE THE SAME AS SHOWN ON THE ROADWAY SECTION, UNLESS OTHERWISE NOTED.

5. ANY EXCAVATION OR EMBANKMENT FOR TURNOUTS IS INCLUDED IN THE ROADWAY QUANTITIES.

6. TURNOUTS ARE TO BE PLACED WHERE SHOWN ON PLANS, OR AS DIRECTED BY THE ENGINEER.

* UNLESS OTHERWISE NOTED ON PLANS
**SECTION A-A**

- Top of Curb
- Cutler Line
- Depression Line

**SECTION B-B**

- No. 4 Reinforced Bars, 8" O.C.
- See Note 2
- No. 4 Dowel Reinforced Bars, 16" O.C.
- All Walls
- Variance
- 6" Min
- 1'-1/2" Clear
- 6" Min
- Top of Sidewalk at Back Side of Scupper
- Curb Opening 4" (or as noted on plans)
- Curb Opening 4" (or as noted on plans)

**SECTION C-C SPILLWAY**

- Concrete Spillway
- Concrete Spillway
- See Note 5
- Dowels

**NOTES:**

1. Transition to Spillway/Channel as per approved plans.
2. A center wall shall be installed in Scuppers wider than 4' or if more than 1 Scupper is built in series.
3. Expansion Joint Filler shall be 1/2" Bituminous Type Preformed Expansion Joint Filler, ASTM D-1751.
4. Concrete for the Scupper shall be Class 'A' per Section 725. Concrete for the Spillway shall be Class 'A' or Class 'B'.
5. 1/2" Offset Distance shall be increased to 2'-6" for designated bicycle paths.
NO. 4 REINFORCEMENT
WELDED TO ANGLE SEE
DETAIL 536-1,
SECTION C-C

1

NOSE ANGLE
\( \leq 3'' \times 4'' \times 1/2'' \)

STANDARD CURB BATTER

CONCRETE EDGE

1/4''x3-1/2''x5-1/2'' ft

3/4''

2''

3/4''

3/4''

3/4''

5-1/2''

3/4''

2-1/2'' R

2''

6''

3-1/2''

WELD PLATE

SAFETY RAIL SEE
DETAIL 145 & NOTE 5

5'' SAFETY RAIL OFFSET

SEE DETAIL
ABOVE LEFT

SEE NOTE 6

S=1.5%

S=3.4%

6''

(SEE PLAN VIEW)

SECTION D-D

NOTES:

1. TRANSITION TO SPILLWAY/CHANNEL AS PER APPROVED PLANS.
2. A CENTER WALL SHALL BE INSTALLED IN SCUPPERS WIDER THAN 4'
   OR IF MORE THAN 1 SCUPPER IS BUILT IN SERIES.
3. EXPANSION JOINT FILLER SHALL BE 1/2'' BITUMINOUS TYPE PREFORMED
   EXPANSION JOINT FILLER, ASTM D-1751.
4. CONCRETE FOR THE SCUPPER SHALL BE CLASS 'A' PER SECTION 725.
   CONCRETE FOR THE SPILLWAY SHALL BE CLASS 'A' OR CLASS 'B'.
5. SAFETY RAIL SHALL BE CONTINUOUS BETWEEN THE SPILLWAY
   EXTERIOR WALLS.
6. USE WELD PLATES FOR SAFETY RAIL ANCHORS LOCATED IN THE
   5'' THICK CONCRETE.
NOTES:

1. HUMPS MUST BE THE FULL 3" FOR MAXIMUM EFFECT BUT SHALL NOT EXCEED 3.25".

2. HUMPS CONSTRUCTED OVER 3.25" OR LESS THAN 3.00" SHALL BE REMOVED AND REPLACED AT THE CONTRACTOR’S EXPENSE.

3. CROSS-SECTION ELEVATIONS SHALL HAVE A MAXIMUM TOLERANCE OF +0.25".

4. SPEED HUMPS SHALL NOT BE PLACED OVER MANHOLES, WATER VALVES, SURVEY MONUMENTS, JUNCTION CHAMBERS, ETC. OR IN CONFLICT WITH DRIVEWAYS.

5. SPEED HUMPS MUST BE PLACED AT LOCATIONS APPROVED BY THE AGENCY.

6. HUMP TO BE CONSTRUCTED WITH ASPHALT MIX APPROVED BY THE AGENCY. ASPHALT COMPACTION SHALL BE PER SECTION 321. A TACK COAT PER SECTION 713 SHALL BE APPLIED PRIOR TO APPLICATION OF PAVEMENT.

7. INSTALLATION JOINTS:
   A. STANDARD INSTALLATION:
      THE EXISTING ROADWAY SHALL BE MILLED TO A MINIMUM DEPTH OF 3/4" AROUND THE PERIMETER. CROSS SECTION DIMENSIONS DO NOT INCLUDE THE 3/4" MILLING. CONTRACTOR MUST PROVIDE VERIFICATION OF CROSS-SECTION DIMENSIONS.
   B. ALTERNATIVE INSTALLATION:
      FOR TRANSVERSE JOINTS (CROSS ROADWAY), THE EXISTING ASPHALT SHALL BE SAW CUT AND REMOVED FOR A WIDTH OF 24". THE ASPHALT SHALL BE REPLACED WITH THE SAME ASPHALT AND AT THE SAME TIME AS THE HUMP ASPHALT. FOR LONGITUDINAL JOINTS, THE EXISTING ASPHALT SHALL BE OVERLAID AND TAPERED IN 12". CROSS-SECTION DIMENSIONS REFLECT DISTANCES FROM THE SURFACE OF EXISTING ASPHALT.

8. CONTACT THE AGENCY (OR INSPECTOR) ONE WEEK PRIOR TO INSTALLATION TO COORDINATE PAVEMENT MARKINGS AND SIGNING.
NOTES:
1. USE TYPE 1 PLATE INSTALLATION WHERE POSTED SPEED LIMIT IS LESS THAN 30 MPH. USE TYPE 2 PLATE INSTALLATION WHERE POSTED SPEED LIMIT IS 30 MPH OR GREATER.
2. FOR TYPE 2 PLATE INSTALLATION, THE STEEL PLATE SHALL BE RECESSSED BY MILLING INTO THE EXISTING ASPHALT TO SET Flush WITH THE SURFACE OF THE EXISTING ASPHALT. FULL DEPTH CUTTING OF PAVEMENT SECTION OUTSIDE OF TRENCH IS NOT PERMITTED. MILLING DEPTH SHALL MATCH THICKNESS OF PLATE. THE GAP BETWEEN THE EDGE OF THE PLATE AND THE ADJACENT EXISTING ASPHALT PAVEMENT MUST BE FILLED WITH TEMPORARY ASPHALT.
3. TRENCH WIDTHS ARE BASED ON AN ANALYSIS PER THE 14TH EDITION OF STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES BY AASHTO. AN ASSUMED AXLE LOADING OF 12 TONS WITH A 30% IMPACT FACTOR WAS USED. THE AXLE LENGTH IS 6 FEET; THEREFORE THE NUMBER OF WHEELS CARRIED BY A PLATE DEPENDS ON THE ROADWAY WIDTH.
4. STEEL PLATE MUST BE ABLE TO WITHSTAND H-20 TRAFFIC LOADINGS WITHOUT ANY MOVEMENT.
5. PLATES SHALL BE FABRICATED FROM ASTM A36 STEEL (MIN).
6. PLATES SHALL BE SECURED FROM LATERAL MOVEMENT AND VERTICAL VIBRATION (ASSOCIATED NOISE) WHILE IN USE BY TEMPORARY ASPHALT (COLD MIX.)
TYPE A OR B PAVEMENT REPAIR
FLUSH WITH EXISTING PAVEMENT

ASPHALT
VARIABLE THICKNESS

BACKFILL MATERIAL OPTIONS:
- NATIVE SOIL PER SECTION 601.4.3 (TYPE B ONLY)
- ABC PER SECTION 702 (TYPE B ONLY)
- 1/2-SACK CLSM PER SECTION 728

HIGHEST EXISTING UTILITY(S)

SECTION VIEW

TYPE A PAVEMENT REPAIR

NOTES:
1. DIMENSIONS ARE NOMINAL.
2. EDGES SHALL BE CUT TO A NEAT VERTICAL FACE.
3. PLACE CLSM BACKFILL IN ACCORDANCE WITH SECTION 604.
4. PLACE AGENCY-APPROVED ASPHALT CONCRETE IN MAXIMUM 2" LIFTS.

PLAN VIEW

1 1

TACK EDGES

SECTION A–A

6" MIN. THICKNESS OR MATCH EXISTING, WHICHER IS GREATER.

TYPE B PAVEMENT REPAIR

NOTES:
1. CUT, REMOVE AND REPLACE PAVEMENT.
   PLUG IN ACCORDANCE WITH SECTION 355.
2. PLACE BACKFILL IN ACCORDANCE WITH SECTION 355.
3. BONDING MATERIAL SHALL BE AS SPECIFIED IN SECTION 708.

PLAN VIEW

18"–24" 18"–24"

SECTION A–A

1–1/2" TO 2" COMPACTED CRUSHED GRAVEL (ASTM C33 #8)
**NOTES: (TYPE A)**
1. ALL EXPOSED SURFACES TO BE TROWEL FINISHED EXCEPT AS SHOWN. SEE SECT. 340.
2. H=6" OR AS SPECIFIED ON PLANS.
3. CONTRACTION JOINT SPACING 10' MAXIMUM.
4. EXPANSION JOINTS AS PER SECT. 340.
5. CLASS 'B' CONCRETE PER 725.
6. WHEN THE ADJACENT PAVEMENT SECTION SLOPES AWAY FROM THE GUTTER, THE SLOPE OF THE GUTTER PAN SHALL MATCH PAVEMENT CROSS SLOPE.

**NOTES: (TYPE B)**
2. BROOM FINISH ALL SURFACES.
3. RIBBON CURB MAY SLOPE TOWARDS PAVEMENT OR PARKWAY AS INDICATED ON PLANS.
4. CONTRACTION JOINT SPACING 10' MAXIMUM.
5. CONCRETE SHALL BE CLASS 'B' PER SECT. 725 AND INSTALLED PER SECT. 505.

**NOTES: (C & D)**
1. ALL WORK AND MATERIALS SHALL CONFORM TO SECT. 304, 505 AND 725. BROOM FINISH TO EXPOSED SURFACE.
2. CONTRACTION JOINT SPACING 10' MAXIMUM.
3. EXPANSION JOINTS AS PER SECT. 340.
4. CLASS 'B' CONCRETE PER 725.
NOTES: (E & F)

1. ALL EXPOSED SURFACES TO BE TROWEL FINISHED EXCEPT AS SHOWN. SEE SECT. 340.
2. CONTRACTION JOINT SPACING 10’ MAXIMUM.
3. EXPANSION JOINTS PER SECT. 340.
4. CLASS ‘B’ CONCRETE PER SECT. 725.
5. WHEN THE ADJACENT PAVEMENT SECTION SLOPES AWAY FROM THE GUTTER, THE SLOPE OF THE GUTTER PAN SHALL MATCH THE PAVEMENT CROSS SLOPE.
CURB TRANSITION TYPE 'A' TO TYPE 'C'

NOTES: (CURB AND GUTTER TRANSITIONS)
1. TRANSITIONS WILL BE PAID FOR AS THE PREDOMINANT TYPE OF CURB AND GUTTER BEING TRANSITIONED. WHEN TYPE 'A' CURB AND GUTTER ARE USED AT CURB RETURNS AND TYPE 'C' CURB AND GUTTER IS PREDOMINANTLY USED ELSEWHERE, THE TYPE 'A' TO TYPE 'C' TRANSITIONS SHALL BE MEASURED AND PAID FOR AS TYPE 'C' CURB AND GUTTER.
2. WHERE PROPOSED CONSTRUCTION IS TO BE CONNECTED TO EXISTING CURB AND GUTTER, THE TRANSITION SHALL BE INDICATED ON PLANS.
3. CLASS 'B' CONCRETE PER SECTION 725.
4. TRANSITION BETWEEN TYPICAL SECTIONS SHALL BE ACCOMPLISHED BY THE USE OF DIRECT STRAIGHT LINE TRANSITIONS OF THE FLOW LINE AND OTHER SURFACE FEATURES.

CURB AND GUTTER TRANSITION

INTEGRAL ROLL CURB, GUTTER AND SIDEWALK

NOTES: (INTEGRAL ROLL CURB, GUTTER AND SIDEWALK)
1. CONCRETE TO BE MONOLITHIC POUR, EXPOSED SURFACE FINISH AS PER SIDEWALK AND GUTTER DETAIL.
2. CONTRACTION JOINT SPACING 5' MAXIMUM.
3. EXPANSION JOINTS PER SECTION 340.
4. CLASS 'B' CONCRETE PER SECTION 725.
NOTES:
1. ALL VERTICAL SURFACES TO BE FORMED.
2. VERTICAL SURFACES DOWN FROM 2" BELOW UNDISTURBED SOIL MAY BE PLACED AGAINST NEAT CUT IF APPROVED BY THE ENGINEER AND CONCRETE WILL NOT EXTEND MORE THAN 1" BEYOND THEORETICAL FACE.
3. ALL EXPOSED SURFACES TO BE STRIPPED GREEN AND TROWEL FINISHED.
4. CONCRETE CURBS CONFORM TO SECT. 340.
5. MAXIMUM SPACING OF CONTRACTION JOINTS IS 10'
6. CONCRETE TO BE CLASS ‘B’ PER SECT. 725.
7. WHEN PAVEMENT AND BASE COURSE EQUALS OR EXCEEDS 10" IN DEPTH, THE ENTIRE ROADWAY SIDE OF THE CURB SHALL BE FORMED. THE TOTAL CURB HEIGHT REMAINS 18" UNLESS NOTED OTHERWISE.

TYPICAL CURB TERMINATION
MEDIAN LANDSCAPING OR SURFACE AS REQUIRED

ROAD MEDIAN

WIDTH AS SHOWN ON PLANS

FACE OF CURB

12"

4" THICK, CLASS 'B' CONCRETE PLACED IN MEDIAN NOSE TO 1 FOOT BACK FROM TRANSITION. USE A LIGHT BROOM FINISH.

CURB HEIGHT VARIES (5" MINIMUM)

NOTE:
LENGTH OF TRANSITION SHALL BE EQUAL TO RADIUS OF MEDIAN NOSE, (5" MINIMUM). FOR LOCATION SEE PLANS.
NOTES:

1. 1/2 INCH EXPANSION JOINT, ASTM D-1751 PER SEC. 729 AND ELASTOMERIC SEALANT PER SEC. 342
2. CONTRACTION JOINTS PER SEC. 342
3. MATERIALS AND CONSTRUCTION PER SEC. 342
4. PORTLAND CEMENT CONCRETE SHALL BE CLASS A
5. DESIGN PARAMETERS FOR THE THICKNESS IS BASED ON:
   - ASSUMES MODULUS OF SUBGRADE REACTION (K) = 100 psi
   - CONCRETE WORKING STRESS f' = 300 psi
   - TERMINAL SERVICABILITY INDEX f" OF 2.5 OVER 20 YEARS AND 1 MILLION TOTAL EQUIVALENT 18-KIP SINGLE-AXLE LOAD APPLICATIONS
NOTES:

1. SIDEWALK CONSTRUCTION SHALL CONFORM TO SECTION 340.
2. EXPANSION JOINTS SHALL BE 1/2" BITUMINOUS TYPE PREFORMED
   EXPANSION JOINT FILLER, PER SECTION 729.
3. LARGE AGGREGATE, IN CONTRACTION JOINT SHALL BE SEPARATED TO A
   DEPTH OF 1", FINISH DEPTH SHALL BE A MINIMUM OF 3/4".
4. EXPANSION JOINTS SHALL CONFORM TO SECTION 340, BE INSTALLED
   PRIOR TO CONCRETE PLACEMENT, AND AT A MAXIMUM SPACING OF 50'.
5. CONCRETE SHALL BE CLASS 'B' PER SECTION 725.
6. WHEN SIDEWALK AND ADJACENT CURB ARE CONSTRUCTED MONOLITHICALLY,
   ALL EXPANSION AND CONTRACTION JOINTS SHALL EXTEND ACROSS THE CURB.
Curb Ramp Control Point @ Face of Curb

Curb Width Varies

Depressed Curb Width

Back of Curb

Vertical Curb & Gutter

Straight Alignment at Back of Depressed Curb to Match Edge of Detectable Warning Strip

Plan View
**NOTES:**

1. CLASS 'B' CONCRETE PER SECTION 725.
2. EXPANSION JOINTS SHALL CONFORM TO SECTION 340.
3. SIDEWALK SURFACE TO MATCH 1½% SLOPE FROM TOP OF CURB.
4. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENTS.
5. DETAIL IS ADA COMPLIANT FOR \( S_G \leq 2\% \).

---

**TYPE 'A' (DETACHED SIDEWALK)**

**SECTION A-A**
SECTION B-B

**TYPE 'B'**

CURB RAMPS

**NOTES:**
1. CLASS 'B' CONCRETE PER SECTION 725.
2. EXPANSION JOINTS SHALL CONFORM TO SECTION 340.
3. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENTS.
4. INCREASE 'L' OR 'D' AS NEEDED TO HAVE THE TOP OF RAMP FORM A RADIAL LINE.
5. WHEN TOP OF RAMP IS LESS THAN 4' FROM CURB RETURN, EXTEND RAMP TO THE CURB RETURN.
6. DETAIL IS ADA COMPLIANT FOR $S_o \leq 2\%$.

| Curb Height | L (min) | $S_o \leq 1\%$ | $S_o \leq 2\%$
<table>
<thead>
<tr>
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<td>7&quot;</td>
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$S_o =$MAXIMUM GUTTER SLOPE WITHIN RAMP LIMITS

**SECTION A-A**

**RIGHT-OF-WAY LINE**

**TOP OF S/W**

**TOP OF LANDING**

**BOTTOM OF RAMP CURB WHEN FORMED AND POURED SEPARATELY**

**CONTRACTION JOINT 1" DEEP OR FORMED SEPARATELY**

**LANDING @ 1 1/2 % SLOPE**

**2'-0" MINIMUM LANDING**

**RAMP**

**VARIES**

**5'-0" MINIMUM LANDING**

**1'-5"**

**2"**

**7"**

**1/2"**

**DETECTABLE WARNING**

**SUBGRADE PREPARATION, SEE SECTION 301**

**GUTTER FLOW LINE**

**CURB MODIFICATION SEE DETAIL 234**

**ROUGH BROOM FINISH, USE A RIPPLE SURFACE PATTERN**

**EXPANSION JOINT AT CURB RETURN**

**RAMP CURB HEIGHT TO MATCH S/W ELEVATION AT EACH END**

**EXPANSION JOINT AT CURB RETURN**

**SEE NOTE 4 & 5**

**TAPE**

**CURB AND GUTTER DETAIL 220, TYPE A**
RIGHT-OF-WAY LINE

ROUGH BROOM FINISH. USE A RIPPLE SURFACE PATTERN

SIDEBIKE WIDTH AS SHOWN ON PLANS

CURB AND GUTTER
DETAIL 220, TYPE A

EXPANSION JOINT

DETECTABLE WARNING

EXPANSION JOINT

GUTTER FLOW LINE

NOTES:
1. CLASS ‘B’ CONCRETE PER SECTION 725.
2. EXPANSION JOINTS SHALL CONFORM TO SECTION 340.
3. SIDEWALK SURFACE TO MATCH 1 1/2% SLOPE FROM TOP OF CURB.
4. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY’S REQUIREMENTS.
5. DETAIL IS ADA COMPLIANT FOR S₀ ≤ 2%.

### Table: Curb Height vs. Curb Ramp Minimum Length

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<th>S₀ ≤ 2%</th>
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<td>6&quot;</td>
<td>7 1/2&quot;</td>
<td>6.0'</td>
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<td>7&quot;</td>
<td>9&quot;</td>
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S₀ = MAXIMUM GUTTER SLOPE WITHIN RAMP LIMITS

SECTION A-A

TYPE ‘D’ DETACHED SIDEWALK
SECTION B-B

SECTION A-A

TYPE 'E'

NOTES:
1. CLASS B' CONCRETE PER SECTION 725.
2. EXPANSION JOINTS SHALL CONFORM TO SECTION 340.
3. DETECTABLE WARNING IS TO COMPLY WITH THE JURISDICTIONAL AGENCY'S REQUIREMENTS.
4. DETAIL IS ADA COMPLIANT FOR $S_G \leq 2\%$. 

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<tr>
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<th>$S_G \leq 1%$</th>
<th>$S_G \leq 2%$</th>
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</tr>
<tr>
<td>7&quot;</td>
<td>6.5'</td>
<td>7.5'</td>
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</table>

$S_G =$ MAXIMUM GUTTER SLOPE WITHIN RAMP LIMITS
NOTES:

1. ALL CONCRETE TO BE CLASS 'A' UNLESS OTHERWISE APPROVED (SECTION 725).

2. EITHER A CONSTRUCTION JOINT OR CONTRACTION JOINT IS REQUIRED AT THE STREET CENTERLINE.

3. A SEPARATE CONCRETE PAD IS REQUIRED AT ALL EXPANSION JOINTS AND ALL CONSTRUCTION JOINTS.

4. EXPANSION JOINTS SHALL CONFORM TO SECTION 340.

5. CONTRACTION JOINTS SHALL SEPARATE LARGE AGGREGATE BY MOVING THE AGGREGATE TO EITHER SIDE OF THE JOINT FOR A MINIMUM DEPTH OF 2½ INCHES. THE FINISHED JOINT SHALL HAVE 1/4 INCH MAXIMUM RADIUS AT THE TOP SURFACE AND BE A MINIMUM OF 3/4 INCHES OF DEPTH.

CONTRACTION JOINT AT APPROXIMATELY 1/3 DISTANCE FROM EXPANSION JOINT.
(MATCH TO CURB RAMP JOINT OR SIDEWALK JOINT)
NOTES:
1. DEPRESSED CURB SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE TYPE OF CURB USED AT THAT LOCATION.
2. CONTRACTION JOINT ON D/W CENTERLINE.
3. CONTRACTION JOINT.
4. 1/2-INCH EXPANSION JOINTS SHALL COMPLY WITH SECTION 340.
5. BACK OF CURB — CONSTRUCTION JOINT.
6. CONCRETE CLASS AS NOTED IN TABLE: CONCRETE PER SECTION 725.
7. SUBGRADE PREPARATION, SECT. 301.
8. FLOW LINE OF GUTTER.
9. DEPRESSED CURB.
10. SECT. A—A AND ELEVATION: D/W SHOWN WITH VERTICAL CURB AND GUTTER, ROLL TYPE CURB AND GUTTER TREATED SIMILARLY.
11. ROUGH BROOM FINISH FULL WIDTH OF RAMP AND WINGS.
12. TROWEL AND USE LIGHT HAIR BROOM FINISH FOR WALKWAY AREA.
13. 'DRIVEWAY ENTRANCE WIDTH' IS THE DRIVEWAY WIDTH PLUS ADDITIONAL WIDENING REQUIRED BY THE LOCAL JURISDICTION.
14. ELEVATION AT TOP OF DRIVEWAY RAMP SHALL BE EQUAL TO OR HIGHER THAN NORMAL CURB ELEVATION.

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<th>COMMERCIAL AND INDUSTRIAL</th>
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<tr>
<td>INDUSTRIAL</td>
<td>16'</td>
<td>40'</td>
<td>A</td>
<td>9&quot;</td>
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<td>#24' MIN. FOR TWO WAY TRAFFIC</td>
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<table>
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<tr>
<td>DRIVEWAY ENTRANCE WIDTH</td>
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<tr>
<td>MAJOR STREET</td>
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<td>COLLECTOR STREET</td>
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<tr>
<td>LOCAL STREET</td>
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<td>*16' DESIRABLE</td>
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</table>

SECTION A—A

Curb and gutter

1/2" R

MATCH
FLOWLINE

3/4"±1/4"

Slope

1.5% DESIRABLE

2.0% MAXIMUM

Depth 'x'

6" OR DEPTH
WHICHEVER IS GREATER

DETAIL NO. 250-1

STANDARD DETAIL
ENGLISH

DRIVEWAY ENTRANCES WITH
DETACHED SIDEWALK

REVISED 01-01-2014

DETAIL NO. 250-1
NOTES:

1. SUFFICIENT RIGHT-OF-WAY MUST BE AVAILABLE TO CONSTRUCT THE BUS BAY.

2. 1/2" BITUMINOUS PREFORMED EXPANSION JOINT FILLER ASTM D-1751 PER SPECIFICATION SECTION 729.

3. SUBGRADE PREPARATION PER SPECIFICATION SECTION 301 COMPACTED TO 95% MINIMUM DENSITY.

4. CONCRETE SHALL BE CLASS 'A' PER SPECIFICATION SECTION 725.

5. CONCRETE BUS BAY PAVEMENT SHALL BE BROOM FINISHED, EXCEPT WHERE OTHERWISE NOTED.

6. CONTRACTION JOINTS IN THE BUS BAY PAVEMENT SHALL MATCH THOSE IN THE CURB, 15 FT. MAXIMUM SPACING.

7. CONCRETE BEARING PAD (SECTION A-A) TO BE Poured SEPARATELY FROM CONCRETE BUS BAY PAVEMENT.
TYPE A - WITHOUT RETAINING CURB
* SEE PLANS FOR ALLEY SURFACING REQUIREMENTS

TYPE B - WITH RETAINING CURB
* SEE PLANS FOR RETAINING CURB LENGTHS,
TOP OF CURB ELEVATIONS, AND ALLEY SURFACING REQUIREMENTS

NOTES:
1. CLASS "A" CONCRETE PER SECTION 725.
2. LIMITS OF HEAVY ROUGH BROOM FINISH.
3. EXPANSION JOINTS PER SECTION 340.
4. SUBGRADE PREPARATION PER SECTION 301.
5. SINGLE CURB PER DETAIL 222, TYPE "B".
6. ALLEY SURFACING PER PLANS.
7. DEPRESSED CURB SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE TYPE OF CURB USED AT THAT LOCATION.
8. CONTROL JOINT.
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NOTES:

1. IF ALLEY ENTRANCE IS USED FOR DRAINAGE, THE CENTER BACK OF ALLEY ENTRANCE MAY BE DEPRESSED 2" FOR 4" CURB OR 3" FOR 6" CURB.
2. ROUGH BROOM FINISH FULL WIDTH OF 5' WARP SECTION, EACH SIDE SIDE OF ALLEY ENTRANCE.
3. CLASS 'B' CONCRETE CONSTRUCTION PER SECT. 725.
4. SUBGRADE PREPARATION, PER SECT. 301.
5. EXPANSION JOINTS SHALL CONFORM TO SECTION 340.
NOTES:

1. CLASS 'B' CONCRETE CONSTRUCTION PER SECT. 725.
2. EXPANSION JOINTS SHALL CONFORM TO SECT. 340.
3. SUBGRADE PREPARATION PER SECTION 301.
NOTES:
1. CASTING TO CONFORM TO SECT. 787.
2. LETTERS ON COVER TO BE AS FOLLOWS:
   "SEWER", "WATER", OR "SURVEY" AS DIRECTED TOTAL WIDTH OF WORD "SEWER" OR "WATER"
   3–3/4".; TOTAL WIDTH OF WORD "SURVEY" 4-1/2"; LETTER SIZE 5/8" x 3/4", RAISED 1/16"
   ABOVE LEVEL OF COVER, TYPE OF LETTERS TO BE SUBMITTED FOR APPROVAL.
3. Indicates machine finished surface.
**NOTES:**

1. THIS DETAIL COVERS BUTTERFLY VALVE INSTALLATION, 3" TO 12" INCLUSIVE, REGARDLESS OF TYPE OF PIPE OR JOINT USED. LARGER LINES TO BE DETAILED ON PLANS.

2. VALVE BOX AND COVER REQUIRED PER DETAILS 270 AND 391.
Table:

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<tbody>
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<td>4&quot;</td>
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<td>10-1/8&quot;</td>
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<td>1-3/4&quot;</td>
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<td>19-3/16&quot;</td>
<td>6-3/4&quot;</td>
<td>5-7/8&quot;</td>
</tr>
</tbody>
</table>

RODS ARE ATTACHED TO LUGS CAST ON BELL OF HYDRANT. IF HYDRANT IS NOT FITTED WITH LUGS, RODS ARE ATTACHED AS SHOWN BY THE DOTTED LINES.
This detail is for use only on underground installations where the use of concrete thrust blocking per detail 380 cannot be used because of obstructions, or requirements of the specifications...

- **Clamps** shall be 1/2 by 2 inches for pipe 4 and 6 inches in diameter; 5/8 by 2 1/2 inches for pipe 8 and 10 inches; 5/8 by 3 inches for pipe 12 inches. Bolt holes shall be 1/16 inch in diameter larger than bolts.

- **Rods** shall be 3/4 inches in diameter for pipes 4, 6, and 8 inches in diameter; 7/8 inches for pipe 10 inches and 1 inch in diameter for pipe 12 inches.

- **Bolts** shall be 5/8 inches in diameter for pipe 4, 6 and 8 inches in diameter; 3/4 inches for pipe 10 inches and 7/8 inches in diameter for pipe 12 inches.

- **Washers** may be cast iron or steel, round or square. Dimensions for cast iron washers are 5/8 by 3 inches for pipe 4, 6, 8 and 10 inches in diameter and 3/4 by 3 1/2 inches for pipe 12 inches. Dimensions for steel washers are 1/2 by 3 inches for pipe 4, 6, 8 and 10 inches in diameter and 1/2 by 3 1/2 inches for pipe 12 inches in diameter. Holes shall be 1/8 inch larger than the rods.

For pipe larger than 12 inches in diameter, restraint details shall be submitted for approval prior to installation.

1. All tie rods, rod couplings, turnbuckles, bolts and nuts for these joints shall be of carbon steel equivalent to A.S.T.M. A-307, grade B, with cadmium plating in accordance with A.S.T.M. A-165. Except that the minimum thickness of the plating shall be .0002 of an inch. Cadmium plated bolts shall have class 2A threads and the nuts, rod couplings and turnbuckles shall have 2B threads.

2. High strength, heat treated cast iron tee-head bolts with hexagon nuts, all in accordance with the strength requirements of A.W.W.A. C-111, may be used in lieu of the cadmium plated bolts and nuts.

3. The sketches in this series of figures show acceptable methods of providing anchorage. There is no particular significance to be attached to whether the sketch shows a bell and spigot joint or a standard mechanical joint. The anchoring procedure illustrated applies in most cases to either type of joint. In some cases, dimensions of the particular pipe or hub and space available for working around the particular joint will influence the choice of methods used.

4. In certain assemblies of rods and clamps shown, rods run from a lug on the fitting (or a clamp behind the hub of a bell) to a clamp against a face of a bell. Note that this arrangement anchors only one joint. The stability of the joint where the clamp is against the face of the bell depends on having soil above a relatively long piece of pipe on both sides of the joint. Consequently, if the distance between the first and second joints is less than 12 feet, the second joint shown shall be anchored by a clamp behind the hub of the bell and rods to a clamp at the face of the next bell.


---

**Sheet 2 of 2**

**Detail No.** 302-2  **Standard Detail** English  **Joint Restraint with Tie Rods**

**Revised** 01-01-1998  **Detail No.** 302-2
DEAD ENDS

LRN = SHORTEST LENGTH OF PIPE RESTRAINED TO THE RUN OF THE TEE FITTING (BOTH SIDES OF TEE).

HORIZONTAL BENDS

VERTICAL UP BEND

VERTICAL DOWN BENDS

UNDISTURBED SOIL
# Restraint Lengths, LR, for Ductile Iron Pipe

## Nominal Pipe Size (Inches)

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<thead>
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<th>HORIZONTAL BENDS</th>
<th>TEES</th>
<th>VERTICAL OFFSETS</th>
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<tr>
<td>90°</td>
<td>45°</td>
<td>22-1/2°</td>
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## Nominal Pipe Size (Inches) with Polyethylene Wrap

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<td>45°</td>
<td>22-1/2°</td>
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<td>16</td>
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<td>24</td>
<td>113</td>
<td>47</td>
<td>22</td>
<td>337</td>
</tr>
</tbody>
</table>

**Notes:**
1. All joints within the specified length LR must be restrained. All lengths are given in feet.
2. The maximum test pressure shall not exceed 200 psi.
3. The minimum depth of bury shall be 3' to top of pipe.
4. Restrained lengths may be reduced when supported by engineering calculations.
NUMBER "2", 1-1/4" HIGH, RAISED 1/8"

SEE SLOT DETAIL BELOW

SECTION A–A

SECTION B–B

NOTE:
FOR CASTING SPECIFICATIONS SEE SECT. 787.

TOP OF COVER

SLOT DETAIL

CAST IRON WATER METER BOX
COVER NO. 2
PLAN OF COVER

SECTION A-A

NOTES:
1. INSPECTION PLATE IS SAME AS USED WITH METER BOX COVER NO. 4.
2. FOR CASTING SPECIFICATIONS, SEE SECTION 787.
3. THE BEARING EDGES OF THESE CASTINGS SHALL BE MACHINED TO INSURE A FULL BEARING ON A FLAT SURFACE.

DETAIL NO. 312
STANDARD DETAIL
ENGLISH
CAST IRON WATER METER BOX
COVER NO. 3

LETTERING DETAIL

DETAIL NO. 312
REVISED 01-01-1998
NOTES:
1. FOR CASTING SPECIFICATIONS, SEE SECT. 787. THE BEARING
2. THE BEARING EDGES OF THESE CASTINGS SHALL BE MACHINED TO INSURE A FULL BEARING ON A FLAT SURFACE.

WATER

LETTERS RAISED 1/8"
NOTES:
1. FOR CASTING SPECIFICATIONS, SEE SECT. 787.
2. THE BEARING EDGES OF THESE CASTINGS SHALL BE MACHINED TO INSURE A FULL BEARING ON A FLAT SURFACE.
CAST IRON WATER METER BOX
LID FITTING BOX NO. 1, 2, 3 OR 4 AS REQUIRED.

SEE APPLICABLE DETAIL

NOTES:
1. THE METER BOXES SHALL CONFORM TO THE DIMENSIONS AS SHOWN AND SHALL BE MADE OF PORTLAND CEMENT CONCRETE Poured AND TAMPEd (OR VIBRATED) IN TRUE FORMS.

2. USE CLASS 'AA' CONCRETE PER SECT. 725.

<table>
<thead>
<tr>
<th>METER BOX DIMENSIONS</th>
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</thead>
<tbody>
<tr>
<td>DIMS</td>
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<tr>
<td></td>
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<tr>
<td>M</td>
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<tr>
<td>N</td>
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<td></td>
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</tbody>
</table>
ALTERNATE: 3/8" STEEL PLATE (ASPHALT COATED) WITH 2" x 2" HINGED ACCESS DOOR

FINISH GRADE

PRE-Cast VAULT TOP OPENING

NOTE: TO FACILITATE INSTALLATION OF PRE-Cast VAULT USING CAST-IN-PLACE FOOTINGS, SET CENTER SECTION ON BLOCKS TO GRADE THEN POUR FOOTING. DO NOT BACKFILL CENTER SECTION UNTIL VAULT TOP IS IN PLACE AND FOOTING IS Poured.

PRE-Cast VAULT SECTION

NOTE: PRECAST REINFORCED VAULT SECTIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND DETAILS AS APPROVED BY ENGINEER.

CAST-IN-PLACE OR PRECAST TOP SECTION

CLASS "A" CONCRETE AS PER SECT. 725

REMOVABLE SUPPORT

(2) CI. METER BOX COVERS SEE DETAIL 314

NO. 5 REBAR 6" O.C. EACH WAY

CONCRETE MASONRY UNITS (BLOCK) WITH SOLID GROUTED WALLS (GROUT CONFORM TO SECT. 776, CMU CONFORM TO SECT. 775)

BLOCK MASONRY MAY BE USED IN LIEU OF CAST-IN-PLACE VAULT WALLS, NO. 4 REBAR IN EVERY OTHER CORE.

CAST-IN-PLACE VAULT SECTION

FOOTING FOR CAST-IN-PLACE VAULT

KEY

MARICOPA ASSOCIATION OF GOVERNMENTS

STANDARD DETAIL
ENGLISH

STANDARD WATER METER VAULT

DETAIL NO. 321

REvised 01-01-1998

DETAIL NO. 321
NOTES:

1. TAPPING SLEEVE TO BE PLACED A MINIMUM OF 18" FROM ANY BELL COUPLING, VALVE, FITTING OR OTHER OBSTRUCTION.

2. CONTRACTOR SHALL EXCAVATE AS SHOWN AND SHALL SET TAPPING SLEEVE AND VALVE AND TIGHTEN ALL BOLTS PRIOR TO THE PRESSURE TEST.

3. ALL TAPPING SLEEVES AND VALVES MUST BE PRESSURE TESTED PRIOR TO BLOCKING OR TAPPING. THE TEST MUST BE WITNESSED AND APPROVED BY THE INSPECTOR.

4. BLOCKS ARE TO EXTEND TO UNDISTURBED GROUND AND BE INSTALLED BEFORE THE TAP IS MADE. ALL FLANGE BOLTS SHALL BE FREE AND CLEAR OF CONCRETE.

5. CONCRETE THRUST BLOCKS SHALL BE CLASS ‘B’ PER SECT. 725. NORMALLY, CURE TIME FOR CONCRETE IS 24 HOURS BEFORE BACKFILLING.

6. TAPS SHALL BE MADE BY CITY CREWS AT PREVAILING RATES OR BY APPROVED CONTRACTORS WHEN ALLOWED BY AGENCY.

7. THIS DETAIL COVERS TAPPING SLEEVES 4" THROUGH 16" IN SIZE ON DUCTILE IRON, CAST IRON AND ASBESTOS CEMENT PIPE. ANY OTHER SIZE OR TYPE OF PIPE WILL REQUIRE A SEPARATE SUBMITTAL AND APPROVAL BY THE ENGINEER.

<table>
<thead>
<tr>
<th>SIZE OF PIPE BEING CONNECTED</th>
<th>MINIMUM THRUST AREA REQUIRED EQUALS (AXB) (SQUARE FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; AND LESS</td>
<td>3</td>
</tr>
<tr>
<td>6&quot;</td>
<td>4</td>
</tr>
<tr>
<td>8&quot;</td>
<td>6</td>
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<td>10&quot;</td>
<td>9</td>
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<td>12&quot;</td>
<td>13</td>
</tr>
<tr>
<td>16&quot;</td>
<td>23</td>
</tr>
</tbody>
</table>
CONCRETE PRESSURE PIPE TAPPING SLEEVE

EXIST. MAIN

SADDLE LENGTH

4" (TYP.)

GLAND

GASKET

SLEEVE

DRAW FLANGE

GLAND FLANGE

GROUT HOLE

DRAW STUD AND NUTS

PRESSURE PLATE

INNER NECK

VALVE STUD AND NUT

LOAD BEARING SET SCREW 3-REQ'D.

BODY PLATE

CENTERLINE LENGTH

LUG BOLT NUT & WASHER

* DIMENSIONS TO BE FIELD VERIFIED

EXISTING MAIN

Body Plate

O.D. CONC. OF EXIST. MAIN

O.D. STEEL OF EXIST.

Detail No. 342

Maricopa Association of Governments

Standard Detail

English

Concrete Pressure Pipe Tapping Sleeve

Revised 01-01-1998

Detail No. 342
FOR VAULT CONSTRUCTION
SEE DETAIL 321

FINISH GRADE

CONCRETE SUPPORT UNDER NO. 4 (5) 11 12

CRUSHED ROCK

6"x6"x6" CONCRETE BASE

WOOD SHIMS

FOR GALED PIPE

WRAP EXPOSED END OF GALV. PIPE IN CONCRETE WITH TAR PAPER OR BUILDING PAPER.

HOLE DIAMETER IS 1" LARGER THAN FLANGE O.D.

FLOW

SOLDER 2" COPPER TO MALE THREAD ADAPTERS

6" MIN. TYP.

18" MIN

INSULATE WATER MAIN FROM CONCRETE BOX WITH EXPANSIVE MATERIAL

A.C.P. SIZE 3" 4" 6"

(A) 8'-4" 10'-6" 12'-0"

(B) 4'-4" 5'-0" 5'-0"

NOTE: METER VAULTS MAY BE EITHER CONCRETE MASONRY UNITS OR CAST-IN-PLACE OR PRE-CAST CONCRETE. SEE DETAIL 321 FOR VAULT CONSTRUCTION.

SECTION A-A

3", 4", 6" WATER METER
LEGEND

1. DOUBLE STRAP ALL BRONZE SERVICE SADDLES.
2. CORP. STOP, 2" (BALL TYPE).
3. ADAPTER, FLANGED, TO MECH. JOINT FOR A.C.P.
4. GATE VALVE, FLANGED, WITH HAND WHEEL, OPEN LEFT.
5. TURBOMETER: ROCKWELL SERIES 'W' OR HERSEY SERIES 'M.H.R.' OR NEPTUNE TRIDENT TURBINE.
6. FLANGED SWING CHECK VALVE WITH EXTERNAL LEVER AND WEIGHT.
7. 2" BRONZE CHECK VALVE.
8. 2" TURBOMETER: ROCKWELL 'W-160' OR HERSEY 'M.H.R.' OR NEPTUNE TRIDENT TURBINE.
9. STRAINER (3", 4", 6") AVAILABLE FROM METER MANUFACTURER, INSTALL ONLY WHEN 'TURBO' IS USED.
10. FLANGED SPOOL (3 PIPE DIAMETERS IN LENGTH).
11. O.S.&Y. GATE VALVE, FLANGED WITH HAND WHEEL OPEN LEFT, AND RISING STEM.
13. 6" OR 10" STRAINER, U.L. APPROVED.
14. 2" THREADED OUTLET AND GATE VALVE.

NOTES

1. FOR LARGER METERS, SPECIAL VAULT DESIGN IS REQUIRED.
2. USE OF REMOTE READING DEVICE AT OPTION OF UTILITY.
3. CERTAIN AGENCIES AND/OR UTILITIES PREFER TO CONSTRUCT VAULT, CONTACT AGENCY INVOLVED PRIOR TO VAULT CONSTRUCTION.
NOTES:

1. Fireline from city main to property line shall be constructed of cast iron pipe.
2. Reinforcing to be 1/2" diameter rebar on 6" centers each way on top and 12" centers each way on the sides.
3. Covers to consist of two meter box covers det. 314.
4. By-pass meter to be according to governing agency.
5. Check valve to be globe model "A" Grinnel, Hersey model D.C., Viking model "A" or approved equal.
6. Vault shall be constructed in owners property against the front property line or another approved location. Walls and fences shall not obstruct access.
7. City control valve to be required at main.
8. Parts of pipe to be embedded in conc. shall be wrapped with 30 lb. asphalt roofing felt.
9. Remote reading device shall be of self generating electrical type.
10. Concrete to be class 'B' per sect. 725.

<table>
<thead>
<tr>
<th>Dia. of Pipe</th>
<th>X</th>
<th>Y</th>
<th>Z</th>
<th>By-Pass Meter Size</th>
<th>A</th>
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</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>60&quot;</td>
<td>66&quot;</td>
<td>49&quot;</td>
<td>5/8&quot; x 3/4&quot;</td>
<td>30&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>66&quot;</td>
<td>72&quot;</td>
<td>49&quot;</td>
<td>5/8&quot; x 3/4&quot;</td>
<td>30&quot;</td>
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<tr>
<td>8&quot;</td>
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<td>72&quot;</td>
<td>58&quot;</td>
<td>1&quot;</td>
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<td>78&quot;</td>
<td>72&quot;</td>
<td>69&quot;</td>
<td>1-1/2&quot;</td>
<td>36&quot;</td>
</tr>
</tbody>
</table>

See Note 2
NOTES:

1. JOINTS BETWEEN THE VALVE AND THE MAIN SHALL BE FLANGED TYPE. JOINTS BETWEEN THE VALVE AND HYDRANT SHALL BE RESTRAINT OR MECHANICAL TYPE.

2. RERAINTS SHALL BE MECHANICAL RESTRAINT OR THRUST BLOCK PER DETAIL 380.

3. A FLANGE JOINT BY MECHANICAL JOINT VALVE SHALL BE USED AS THE TRANSITION BETWEEN THE JOINT TYPES.

4. PIPING BETWEEN WATER VALVE AND HYDRANT SHALL BE DUCTILE IRON.

5. SEE DETAIL 362 FOR LOCATION OF HYDRANT.

6. PUMPER CONNECTION SHALL FACE THE STREET.

7. NO VALVES ARE TO BE LOCATED IN CURB.

8. NATIONAL STANDARD THREADS REQUIRED ON ALL CONNECTIONS UNLESS OTHERWISE DIRECTED.

9. SEE DETAIL 360-3 FOR CONCRETE PAD.

10. FIRE HYDRANT SHALL BE FRESHLY PAINTED PRIOR TO FINAL ACCEPTANCE.

11. SEE SECTION 756 FOR HYDRANT MATERIAL.
NOTES:

1. JOINTS BETWEEN THE VALVE AND THE MAIN SHALL BE FLANGED TYPE. JOINTS BETWEEN THE VALVE AND HYDRANT SHALL BE MECHANICAL RESTRAINT MECHANICAL TYPE.
2. RESTRAINTS SHALL BE MECHANICAL RESTRAINT OR THRUST BLOCK PER DETAIL 380.
3. A FLANGE JOINT BY MECHANICAL JOINT VALVE SHALL BE USED AS THE TRANSITION BETWEEN THE JOINT TYPES.
4. PIPING BETWEEN WATER VALVE AND HYDRANT SHALL BE DUCTILE IRON.
5. SEE DETAIL 362 FOR LOCATION OF HYDRANT.
6. PUMPER CONNECTION SHALL FACE THE STREET.
7. NO VALVES ARE TO BE LOCATED IN CURB.
8. NATIONAL STANDARD THREADS REQUIRED ON ALL CONNECTIONS UNLESS OTHERWISE DIRECTED.
9. SEE DETAIL 360-3 FOR CONCRETE PAD.
10. FIRE HYDRANT SHALL BE FRESHLY PAINTED PRIOR TO FINAL ACCEPTANCE.
11. THE HYDRANT SHALL HAVE 2- 2½” PORT AND 1- 4½” PORT (INDUSTRIAL OR COMMERCIAL).
12. THE HYDRANT SHALL HAVE 1- 2½” PORT AND 1- 4½” PORT (RESIDENTIAL).
NOTES:
1. CONCRETE FOR PAD SHALL BE CLASS "A".
2. SCORE LINE SHALL BISECT CONCRETE PAD AT MID POINT OF ALL SIDES.
3. CONCRETE COLOR SHALL MATCH ADJACENT CONCRETE. THE FINISHED CONCRETE SURFACE SHALL HAVE A ROUGH BROOM FINISH (SURFACE ONLY).
4. MULTIPLE OFFSET FITTINGS SHALL NOT BE ALLOWED.
5. MINIMUM 36" CLEARANCE PER NFPA-24 AROUND FIRE HYDRANT.
6. 1/2" BITUMINOUS EXPANSION SHALL BE PLACED AROUND THE BARREL OF THE FIRE HYDRANT AT THE CONCRETE PAD.
NOTES:

1. Obstructions such as utility poles, street signs, irrigation boxes, fences, etc., must not be placed between curb and hydrant and within the radius for fire dept. access.

2. Dimensions shown on construction drawings supersede locations shown here.

3. On locations in midblock, the fire hydrant will be aligned with a property line.

Acceptable location if curb radius is 20’ or more

Pavement

Radius for fire dept. access shall be 3’ or as otherwise specified by agency fire dept. See note #1

Curb

Pavement

4’-0” 6’-0”

P.T. or P.C. of curb return

Property line

6’ max. 1’ min.

Parkway area or no sidewalk

Area with sidewalk
**CAST IRON**

- New pipe is located below the existing pipe.
- Solid sleeve exists between the two pipes.
- 6" min. clearance backfilled with selected fine material or sand.
- Remainder of trench to be backfilled per Sect. 601.

**CAST IRON MECHANICAL JOINT**

- Bell & Spigot connections are used.
- 6" min. clearance backfilled with selected fine material or sand.
- Remainder of trench to be backfilled per Sect. 601.

**NOTES:**

1. This detail covers moving of water mains 2" to 12" only.
2. Thrust blocking as per Det. 380 & 381.
3. If offset is to go over obstruction, joint restraints must be used.
4. Pipe is to be cast iron or ductile iron.

**ASBESTOS CEMENT**

- New pipe is located below the existing pipe.
- Solid sleeve exists between the two pipes.
- 6" min. clearance backfilled with selected fine material or sand.
- Remainder of trench to be backfilled per Sect. 601.
- C.I. B. & S. offset.
TYPICAL LOCATIONS OF THRUST BLOCKS

NOTES:
1. TABLE IS BASED ON 200 P.S.I. TEST PRESSURE AND 3,000 LBS/SQ FT. SOIL. IF CONDITIONS ARE FOUND TO INDICATE SOIL BEARING IS LESS, THE AREAS SHALL BE INCREASED ACCORDINGLY.
2. AREAS FOR PIPES LARGER THAN 18" SHALL BE CALCULATED FOR EACH PROJECT.
3. FORM ALL NON-BEARING VERTICAL SURFACES.
4. THRUST BLOCKS ARE TO EXTEND TO UNDISTURBED GROUND. CONCRETE TO BE CLASS 'C', SECT. 725.

<table>
<thead>
<tr>
<th>MINIMUM THRUST BLOCK AREA REQUIRED (YxW) (SQ. FT.)</th>
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<tbody>
<tr>
<td>PIPE SIZE</td>
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<tr>
<td>4&quot; OR LESS</td>
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<td>10&quot;</td>
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<td>12&quot;</td>
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<tr>
<td>16&quot;</td>
</tr>
</tbody>
</table>

SECTION A-A
NOTES:

1. EITHER THIS DETAIL OR RESTRAINT RODS CAN BE USED WHEN IT IS ALLOWED TO RELOCATE A WATER LINE UPWARD OR DOWNWARD TO CROSS A CONFLICT.

2. DUCTILE IRON PIPE MAY BE USED.

3. BARS TO CONCRETE THRUST BLOCK TO BE COATED WITH 2 COATS COAL TAR, EPOXY OR BY OTHER APPROVED METHOD. BARS TO HAVE 90° HOOK ON LOWER END, AS PER TABLE.
NOTES:

1. CURB STOP TO BE MUELLER ORISEAL (H-10283), FORD BALL VALVE B11-777, HAYES BULLETIN 400, J. JONES (J-1900) OR APPROVED EQUAL.

2. REDUCER MAY BE USED WHEN CONNECTING TO SMALLER GALVANIZED PIPE.

3. THIS DETAIL IS TO BE USED WHEN CONNECTING EXISTING GALVANIZED PIPE TO ASBESTOS CEMENT PIPE OR CAST IRON PIPE.

NOTE:

1. VALVE BOX TO BE SUPPORTED ON BRICKS TO PREVENT VERTICAL LOADS FROM BEING TRANSMITTED TO THE SMALL PIPE.
TYPE 'A'

Valve box location may vary if approved by the city engineer.

TYPE 'B'

CAST IRON VALVE BOX (LOCKING) PER DETAIL 391-1 BASE TO REST ON THRUST BLOCK

2" BRONZE CURB STOP

TAPPED PLUG OR CAP

WATER MAIN

2" TAPPED CAP (CAST IRON)

WATER LINE

CONCRETE THRUST BLOCK PER DETAIL 380

CAST IRON WATER METER BOX COVER PER DETAIL 311

CONCRETE WATER METER BOX NO. 2 PER DETAIL 320

2" P.E. OR COPPER PIPE

2" BRASS COUPLING

2" BRASS ELL

2" COPPER PIPE

2" ADAPTER BRASS OR COPPER

6" GRAVEL BED

GROUND LEVEL

CONCRETE WATER METER BOX COVER PER DETAIL 311
NOTES:

1. VALVE BOX SHALL BE ADJUSTED TO THE FINISHED GRADE PRIOR TO PLACING OF THE PORTLAND CEMENT CONCRETE SURFACE.

2. USE PARKSON TYLER, APCO OR EQUAL DEEP SKIRTED LID (4" OR MORE) TYPE, SLIDING ADJUSTABLE CAST IRON VALVE BOX C.I. MIN. T.S. 30,000 P.S.I.

3. GROUND BELOW CONCRETE PAD OR 3 BRICKS TO BE COMPACTED 95% OF MAX. DENSITY.
NOTES:

1. EXTENSION STEM: WITH SQUARE SOCKET ON BOTTOM TO FIT 2" SQUARE VALVE NUT. EXTENSION TO VALVE STEM'S REQUIRED ON ALL VALVES INSTALLED WHERE OPERATING NUT IS OVER 5" BELOW SURFACE. LENGTH TO FIT EACH INSTALLATION. OPERATING NUT TO BE HELD ON TOP OF EXTENSION WITH STOP NUT.

2. IF TWO OR MORE JOINTS OF A.C.P. ARE USED TO MAKE RISER, USE STANDARD A.C. PIPE RUBBER GASKET COUPLING TO JOIN PIPE, WHERE RISER LENGTH EXCEEDS 10" USE 12" A.C. PIPE.

3. STEM PAINTING: ALL STEEL TO HAVE PRIME COAT OF PAINT NO. 1-D AND ONE HEAVY APPLICATION (FINISH COAT) OF PAINT NO. 9 AS PER SECT. 790.
NOTES:

1. THE DEBRIS CAP SHALL BE DESIGNED AND INSTALLED TO PREVENT DEBRIS SUCH AS DIRT, DUST, SAND, ETC., FROM PASSING AROUND THE CAP AND DOWN INTO THE VALVE HOUSING. THE CAP SHALL BE HELD IN PLACE BY A MECHANISM WHICH WILL NOT DAMAGE THE VALVE HOUSING. ONCE INSTALLED THE CAP MUST WITHSTAND, WITHOUT SLIPAGE, A MINIMUM VERTICAL FORCE OF 50 POUNDS AT A LOADING RATE OF 1 INCH/MINUTE.

2. THE CAP SHALL BE MANUFACTURED OF CORROSIVE RESISTANT MATERIALS.

3. DEBRIS CAP SHALL BE INSTALLED AS CLOSE UNDER THE CAST IRON COVER WITHOUT INTERFERING WITH COVER OPERATION.

4. THE CAP SHALL BE CAPABLE OF SECURELY HOLDING A STANDARD LOCATING COIL, "SCOTCH MARK" 4 DISK MARKER BY 3M OR EQUAL.

5. THE CAP SHALL BE CONSTRUCTED TO ALLOW THE DEVICE TO BE SECURED BY A LOCK. THE LOCK (PAD, BARREL, ETC.) SHALL BE SUPPLIED BY THE AGENCY.


7. THE CAP SHALL BE INSTALLED IN ALL VALVE HOUSINGS AS REQUIRED BY THE CONTRACT DOCUMENTS OR BY THE AGENCY'S POLICIES.

8. THE DEBRIS CAP SHALL BE MANUFACTURED BY SW SERVICES, INC. PHOENIX, ARIZONA OR EQUAL.
NOTES:

1. TYPE 'A' PIPE SUPPORT MAY BE USED FOR ANY TYPE CROSSING CONDITION.

2. TYPE 'C' PIPE SUPPORT MAY BE USED FOR CROSSING PIPES WITH A BELL DIAMETER OF 18" OR LESS IF SUFFICIENT CLEARANCE OVER STORM SEWER IS AVAILABLE AND TOTAL SPAN IS LESS THAN 34'.

3. INTERMEDIATE PIPE SUPPORT SHALL BE USED IN CONJUNCTION WITH TYPE 'C' PIPE SUPPORT IF TOTAL SPAN EXCEEDS MAX. 'W' IN TABLE.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL SUPPORTS BOTH PERMANENT AND TEMPORARY. TEMPORARY SUPPORTS SHALL NOT BE A SEPARATE PAY ITEM.

5. PERMANENT PIPE SUPPORTS MAY BE DECREASED FROM PLAN QUANTITIES OR EXTENDED TO INCLUDE SOME LISTED BELOW AS TEMPORARY SUPPORTS IF CONDITIONS WARRANT THESE CHANGES AT THE TIME OF CONSTRUCTION. DECISION SHALL BE MADE BY THE ENGINEER.


7. USE TYPE 'B' PIPE SUPPORT INSTEAD OF TYPE 'C' WHEN CLEARANCE IS LESS THAN 'Y' IN TABLE, BETWEEN PIPES.

8. CLASS 'A' CONCRETE AS PER SECT. 725 UNLESS OTHERWISE NOTED.

SCHEDULE OF REQUIRED SUPPORTS

<table>
<thead>
<tr>
<th>PERMANENT</th>
<th>TEMPORARY</th>
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</thead>
<tbody>
<tr>
<td>SEWER LINES</td>
<td>CAST IRON PIPE</td>
</tr>
<tr>
<td>OTHER UTILITIES AS NOTED ON THE PLANS OR AS REQUIRED BY THE ENGINEER AT TIME OF CONSTRUCTION.</td>
<td>BURIED TELCO.</td>
</tr>
<tr>
<td></td>
<td>GAS PIPES</td>
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<tr>
<td></td>
<td>CONC. STORM DRAIN</td>
</tr>
<tr>
<td></td>
<td>CONC. BOX CULVERT</td>
</tr>
<tr>
<td></td>
<td>TRAFFIC CONTROL CONDUIT</td>
</tr>
<tr>
<td></td>
<td>WATER &amp; SEWER LINES</td>
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</tbody>
</table>
### TABLE

**DEPTH OF COVER ON SUPPORTS**

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<tr>
<th>'W'</th>
<th>0' TO 8'</th>
<th>8' TO 16'</th>
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<tbody>
<tr>
<td></td>
<td>BAR NO.</td>
<td>Y</td>
</tr>
<tr>
<td>TO 6'</td>
<td>5</td>
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</tr>
<tr>
<td>7'</td>
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<td>9”</td>
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<td>10”</td>
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<td>18”</td>
</tr>
<tr>
<td>17'</td>
<td>8</td>
<td>19”</td>
</tr>
</tbody>
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**PLAN FOR TYPE 'B' SUPPORT**

**SECTION D–D**

**SECTION C–C**

**INTERMEDIATE SUPPORT FOR TYPE 'B' CROSSINGS**
WATER LINE EXCLUSION AND EXTRA PROTECTION ZONES*

GRAVITY SANITARY SEWER

PRESSURIZED SANITARY SEWER

NOTES:
ZONE A: NO WATER LINES ALLOWED/MINIMUM SEPARATION.
ZONE B: EXTRA PROTECTION REQUIRED FOR WATER LINES.
* REFER TO STANDARD 610, WATER LINE CONSTRUCTION.
WATER LINE EXTRA PROTECTION

DUCTILE IRON PIPE WITH RESTRAINED OR MECHANICAL JOINTS*

EXTRA PROTECTION DUCTILE IRON PIPE
(GRAVITY OR PRESSURIZED) SEWER LINE

NOTES:
* REFER TO MAG STANDARD SPECIFICATION SECTION 610.
ENCASEMENT FOR PIPE CROSSING*

No. 3 Stirrups 36" O.C.
(4) No. 4 Bars

Higher Water or Sewer Main

Lower Water or Sewer Main

NOTES:
1. Class 'C' Concrete as per Section 725.
*Refer to Maricopa Standard Specification Section 610.
REPLACE ALL PAVING ACCORDING TO SECTION 336

NEW CONSTRUCTION

EXISTING SEWER CONNECTION OR MAIN BROKEN DURING EXCAVATION FOR NEW CONSTRUCTION

PLAN VIEW OF REPLACEMENT

EXCAVATE 6” BEYOND UNBROKEN BELL TO ALLOW ROOM FOR INSPECTION

18” MIN. WHEN USING BELL CONNECTION

COMPACTION SHALL BE DONE IN ACCORDANCE WITH SECT. 601

6” MIN. WHEN USING CAULDER CONNECTION

REPLACE WHEN NEW TRENCH

2’ WIDE OR LESS

SAW SOUND PIPE SQUARE

NEW CONSTRUCTION

12” MIN. SOLID BEARING ON EACH SIDE

REPLACE WHEN NEW TRENCH

MORE THAN 2’ WIDE

SAW SOUND PIPE SQUARE

12” MIN. SOLID BEARING ON EACH SIDE

COMPACTION SHALL BE DONE IN ACCORDANCE WITH SECT. 601

6” MIN. WHEN USING CAULDER CONNECTION

REBAR TO BE NO. 4 WITH MAX. OF 6” BETWEEN & MIN. OF 3 BARS

DIAMETER AT BELL

CONC. PER SECT. 725, CLASS 'C'

SECTION 'A-A'

NOTES:

1. BROKEN PIPE SHALL BE REPLACED WITH A MINIMUM OF ONE FULL JOINT AND TWO SHORT LENGTHS WITH UNBROKEN BELLS. CONSTRUCTION AND JOINTS TO BE MADE AS PER SECTION 615.
**ALTERNATE BASE WITH KNOCKOUTS FOR PIPES.
CLEARANCE AROUND PIPES
1" MIN. — 3" MAX.
EXCEPT LOWER CORNERS**

NOTES:

1. PRE-CAST, REINFORCED M.H. SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH A.S.T.M. C-478 EXCEPT AS MODIFIED HEREIN.

2. M.H. STEPS SHALL BE INSTALLED AT SITE OF M.H. SECTION MANUFACTURE. MINIMUM CLEARANCE EACH SIDE OF M.H. LEG SHALL BE 1". STEPS SHALL BE MOUNTED WITH 2 TO 1 SAND/CEMENT DRY PACK MORTAR. (SEE DET. 428 FOR M.H. STEP.) STEPS REQUIRED IN 48" DIAMETER MANHOLE, STEPS NOT REQUIRED IN 60" DIAMETER MANHOLE.

3. USE LOW ALKALI CEMENT ONLY.
PIPE SIZE & ELEVATION AS SHOWN ON PLANS

TROWEL FINISH

MANHOLE STEPS PER SECT. 625

10" MIN.

48" I.D. FOR 8" - 14" PIPE
60" I.D. FOR 15" - 30" PIPE

MANHOLE RING & COVER PER DETAIL 423, 424 & 425
MANHOLE TO BE BRICK OR PRECAST PER SECT. 625
BRICK SHALL BE IN ACCORDANCE WITH SECT. 775

1:3 CEMENT MORTAR COAT OUTSIDE OF MORTAR WITH MEMBRANE TYPE CURING COMPOUND IMMEDIATELY AFTER PLASTER HAS BEEN PLACED & FINISHED, "HUNT PROCESS" OR EQUAL

CLASS 'A' CONCRETE PER SECT. 725, 505

ROWLOCK RADIAL COURSE (BRICK M.H.)

MIN. VARIABLE

4" VARIABLE

3" MIN.

TROWEL FINISH SMOOTH

COMBINED CURB AND GUTTER

MIN. VARIABLE

1/2

PAVEMENT

VARIES

5"

8"

12" 12""
FOUR STEEL SPACERS, 4" x 2"
THICKNESS AS REQUIRED FROM
1/2" to 2" WHEN
THICKNESS IS LESS THAN 1/2"
USE MORTAR. WHEN GREATER
THAN 1/2", USE BRICK.

M.H. FRAME AND
COVER PER
SECT. 625

M.H. STEP
IS 48"
M.H. ONLY

PIECE SIZE & ELEVATION
AS SHOWN ON PLANS

M.H. RING &
COVER STD.
DETAIL 423,
424 & 425

MEDIUM BROOM
FINISH WITH RADIALLY
SCORED MARKS (4 MIN.)

EXISTING OR RECENTLY
INSTALLED PAVEMENT

48" I.D., PIPE < 6"
50" I.D., PIPE > 6.5"

12" MAX.
26-3/4" MIN.
24" MAX.

SUBGRADE PREPARATION TO CONFORM
TO SECT. 301 OR 601

CLASS 'AA'
CONCRETE AS
PER SECT. 725, 505

M.H. WALL THICKNESS
AND MATERIAL VARIES

1:3 CEMENT MORTAR
COAT OUTSIDE WITH
MEMBRANE TYPE
CURING COMPOUND
AFTER MORTAR HAS
BEEN PLACED &
FINISHED, "HUNT
PROCESS" OR EQUAL

BRICK SHALL BE
IN ACCORDANCE
WITH SECT. 775

COARSE BRICK IN
MORTAR OR CLASS
'C' CONCRETE PER
SECT. 725, 505

CLASS 'A'
CONCRETE PER
SECT. 725, 505

TROWEL
SMOOTH
12" FOR M.H. OVER
13' DEEP

BRICK SEWER MANHOLE
AND COVER FRAME ADJUSTMENT

REVISED
01-01-2012

DETAIL NO.
422

STANDARD DETAIL
ENGLISH

DETAIL NO.
422
NOTE:
LETTERING ON MANHOLE COVER TO CONTAIN NAME OF AGENCY AND UTILITY FOR WHICH MANHOLE IS NEEDED, (IE. "PHOENIX SANITARY SEWER"), OR AS DIRECTED. THE TOTAL WIDTH OF INDIVIDUAL LETTERS TO BE SUCH THAT LETTERS AND WORDS ARE EQUALLY SPACED AND BALANCED TO FORM A COMPLETE CIRCLE WITH SPACERS BEFORE AND AFTER THE WORD IDENTIFYING THE AGENCY INVOLVED. LETTERS TO BE 2" IN HEIGHT AND RAISED FLUSH W/ TOP OF RINGS. TYPE OF LETTERS TO BE SUBMITTED FOR APPROVAL. WEIGHT OF CASTINGS SHALL BE NO MORE THAN 2% MORE OR LESS THAN THE APPROXIMATE WEIGHT SPECIFIED. CASTINGS SHALL CONFORM TO ASTM A-48, CLASS 35 AND AASHTO M306. THE BEARING SURFACES OF THE FRAMES AND COVERS SHALL BE MACHINED AND THE COVERS SHALL SEAT FIRMLY WITHOUT ROCKING. ALL DIMENSIONS SHALL HAVE A 1/16" TOLERANCE.
NOTE:
LETTERING ON MANHOLE COVER TO CONTAIN NAME OF AGENCY AND UTILITY FOR WHICH MANHOLE IS NEEDED, (I.E. "PHOENIX SANITARY SEWER"), OR AS DIRECTED. THE TOTAL WIDTH OF INDIVIDUAL LETTERS TO BE SUCH THAT LETTERS AND WORDS ARE EQUALLY SPACED AND BALANCED TO FORM A COMPLETE CIRCLE WITH SPACERS BEFORE AND AFTER THE WORD IDENTIFYING THE AGENCY INVOLVED. LETTERS TO BE 2" IN HEIGHT AND RAISED FLUSH W/ TOP OF COVER. TYPE OF LETTERS TO BE SUBMITTED FOR APPROVAL. WEIGHT OF CASTINGS SHALL BE NO MORE THAN 2% MORE OR LESS THAN THE APPROXIMATE WEIGHT SPECIFIED. CASTINGS SHALL CONFORM TO ASTM A-48, CLASS 35 AND AASHTO M306. THE BEARING SURFACES OF THE FRAMES AND COVERS SHALL BE MACHINED AND THE COVERS SHALL SEAT FIRMLY WITHOUT ROCKING. ALL DIMENSIONS SHALL HAVE A 1/16" TOLERANCE.
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SECTION VIEW OF FRAME AND COVER WITH CAM LOCKING DEVICE

NOTES:

1. MATERIAL SHALL CONFORM TO A.S.T.M. STANDARDS:
   A. B 179-65 ALLOY SN122A
   B. B 179-65 ALLOY CN42A
   C. B 108-65 ALLOY SC103A
   (ALL 3 ACCEPTABLE)

2. LETTERING ON MANHOLE COVER TO CONTAIN NAME OF AGENCY AND UTILITY FOR WHICH MANHOLE IS NEEDED. (I.E. "PHOENIX SANITARY SEWER"), OR AS DIRECTED. THE TOTAL WIDTH OF INDIVIDUAL LETTERS TO BE SUCH THAT LETTERS AND WORDS ARE EQUALLY SPACED AND BALANCED TO FORM A COMPLETE CIRCLE WITH SPACERS BEFORE AND AFTER THE WORD IDENTIFYING THE AGENCY INVOLVED. LETTERS TO BE 2" RAISED 1/8" ABOVE LEVEL OF COVER. TYPE OF LETTERS TO BE SUBMITTED FOR APPROVAL.

3. WEIGHT OF CASTINGS SHALL BE NO MORE THAN 2% LESS THAN THE APPROXIMATE WEIGHT SPECIFIED.

4. CASTINGS SHALL CONFORM TO SECT. 787.

5. SHALL CONFORM TO SECT. 625.3.1 - (FRAME AND COVER).
NOTES:

1. NOTE: COMPACT SOIL AT END OF PIPE TO 95% OF MAXIMUM DENSITY.

2. IF DEPTH OF COVER IS LESS THAN 5' OR GREATER THAN 10' INCREASE PLUG THICKNESS A MIN. OF 4".

SEWER LINE

VIT. CLAY PIPE

#20 COPPER WIRE WITH YELLOW INSULATION OR 2" x 4" STAKE

ANCHOR WITH BRICK OR STAKE AT TRENCH BOTTOM OR TIE TO BELL END

PREFORMED JOINT

VIT. CLAY OR PLASTIC PLUG

SHELL SEAL COUPLING

VIT. CLAY PIPE

TYPICAL STUB OUT

SEWER MANHOLE WALL

INVERT ELEVATION ACCORDING TO PLAN

BELL END

PLUG (SEE DETAIL RIGHT)

SIZE ACCORDING TO PLAN

DRY PACK FOR PRECAST CONCRETE MANHOLE

1/2" LAYER CEMENT PLASTER (WATERTIGHT)

BLOCK OR BRICK AND MORTAR PLUG (SEE NOTE)

PIPE SIZE

12" - 36"
39" - 48"
51" - 72"
75" - 90"
96" - 114"
120" - 132"
138" - 150"

PLUG THICKNESS 'A'

8"
12"
18"
24"
32"
36"
40"

DRAIN LINE

GROUND LINE
NOTES
1. ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE NOTED.
2. CASTING AS PER SECT. 787.

CAST IRON MANHOLE STEP

NOTES
1. STEPS SHALL BE PLACED INTO WET CONCRETE WALL DURING MANUFACTURE OR MORTARED INTO HOLES AFTER CONCRETE HAS SET.
2. POLYPROPYLENE MUST MEET REQUIREMENTS OF A.S.T.M. 2146, TYPE II, GRADE 16906.

POLYPROPYLENE MANHOLE STEP
NOTES:

1. THIS CONTROL VAULT WITH MANHOLE AND COVER SHALL BE USED ON 6" AND 8" DIAMETER SEWER WITH FLOWS IN THE RANGE OF 40 TO 340 GPM.

2. VAULT TO BE CONSTRUCTED ON STRAIGHT RUN OF BUILDING SEWER, ACCESSIBLE AND SAFELY LOCATED ON THE OWNERS PROPERTY ADJACENT TO A PUBLIC RIGHT-OF-WAY.

3. THE PALMER BOWLUS FLUME SHALL BE INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS.

4. THE PRE-CAST CONCRETE VAULT SHALL BE RECTANGULAR WITH MINIMUM INSIDE DIMENSIONS OF 4" WIDE AND 6" LONG AND AT A DEPTH OF THE DESIGN OF THE BUILDING SEWER.

5. A SHOP DRAWING SHALL BE SUBMITTED TO THE CONTRACTING AGENCY FOR APPROVAL BEFORE INSTALLATION OF THE VAULT AND THE PALMER BOWLUS FLUME WILL BE ALLOWED.
NOTES:

1. ELECTRONIC MARKER SHALL BE A 3M MODEL 1424–XR/ID [4" DIAMETER SELF LEVELING MARKER BALL GREEN IN COLOR] OR APPROVED EQUAL OR AS REQUIRED BY THE LOCAL AGENCY.

2. MARKER SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER’S DIRECTIONS, 2’ BACK FROM THE END OF THE SEWER SERVICE STUB AND CINCH TIED TO PIPE OR ABOVE PIPE AS REQUIRED BY LOCAL AGENCY. AN ADDITIONAL MARKER SHALL BE INSTALLED AT EACH SERVICE STUB BEND.

3. ELECTRONIC MARKER SHALL BE RESTORED BY CONTRACTOR IF DISTURBED WHEN PRIVATE SERVICE LINE CONNECTION IS INSTALLED.

4. MARKER SHALL BE USED IN ADDITION TO A 2"x4" METAL STUD.

5. CONSTRUCTION DETAIL APPLIES WHERE CONTRACTOR BUILDS HOUSE CONNECTION. TAP EXTENDS TO PROPERTY LINE IN ALLEYS OR STREETS OR TO EASEMENT LINE.

6. SIZE OF TAP SHALL BE DESIGNATED ON PLANS.

7. CONSTRUCT TAP AT MINIMUM SLOPE IF COVER WILL BE LESS THAN 5’ AT PROPERTY LINE.

8. ALL FITTINGS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D–2321. THE CONTRACTOR MAY VARY FROM THE DRAWING TO USE THE APPROPRIATE WYES, TEE–WYES AND BENDS TO ENSURE NO MISALIGNMENT OF THE PIPE AND FITTINGS. BLOCK OR BRACE FITTINGS JOINTS TO ENSURE ZERO DEGREES ANGULAR JOINT DEFLECTION.

9. END OF TAP TO BE SEALED AND MARKED AS NOTED.
NOTES:

1. CONSTRUCTION DETAIL APPLIES WHERE CONTRACTOR BUILDS HOUSE CONNECTION. TAP EXTENDS TO PROPERTY LINE IN ALLEYS OR STREETS OR TO EASEMENT LINE.

2. SIZE OF TAP SHALL BE DESIGNATED ON PLANS.

3. CONSTRUCT TAP AT MINIMUM SLOPE IF COVER WILL BE LESS THAN 5' AT PROPERTY LINE.

4. IF DEPTH REQUIRES, MINIMUM SLOPE CAN BE REDUCED TO 1/8" PER FOOT PROVIDED STUB IS STAKED TO GRADE.

5. ALL FITTINGS SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D-2321. THE CONTRACTOR MAY VARY FROM THE DRAWING TO USE THE APPROPRIATE WYES, TEE WYES AND BENDS TO ENSURE NO MISALIGNMENT OF THE PIPE AND FITTINGS. BLOCK OR BRACE FITTING JOINTS TO ENSURE ZERO DEGREES ANGULAR JOINT DEFORMATION.

6. END OF TAP TO BE SEALED AND MARKED AS NOTED.

7. ELECTRONIC MARKER SHALL BE A 3M MODEL 1424-XR/ID [4" DIAMETER SELF LEVELING MARKER BALL GREEN IN COLOR] OR APPROVED EQUAL OR AS REQUIRED BY THE LOCAL AGENCY.

8. # 14 BARE COPPER LOCATOR WIRE ACCESSIBLE AT R/W AND AT PROPERTY OWNER CLEANOUT BOX NO GREATER THAN 4" DEEP.

9. STAMP OR WELD THE LETTER "S" ON LID OF METER BOX.
4" OR 6" 45° WYE BRANCH

NOTES:
1. CONSTRUCTION DETAIL APPLIES WHERE CONTRACTOR BUILDS HOUSE CONNECTION. TAP EXTENDS TO PROPERTY LINE IN ALLEYS OR STREETS OR TO EASEMENT LINE.
2. SIZE OF TAP SHALL BE DESIGNATED ON PLANS.
3. CONSTRUCT TAP AT MIN. SLOPE IF COVER WILL BE LESS THAN 5' AT PROPERTY LINE.
4. IF DEPTH REQUIRES, MINIMUM SLOPE CAN BE REDUCED TO 1/8" PER FOOT PROVIDED STUB IS STaked TO GRADE.
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6. END OF TAP TO BE SEALED AND MARKED.
7. ELECTRONIC MARKER SHALL BE A 3M MODEL 1424=XR/ID [4" DIAMETER SELF LEVELING MARKER BALL GREEN IN COLOR] OR APPROVED EQUAL OR AS REQUIRED BY THE LOCAL AGENCY.
8. INSTALL RAISED 4" THREADED PLUG IN CLEANOUT INCORPORATING 3M MODEL 1414 ELECTRONIC DISC MARKER, GREEN IN COLOR: LOCATOR PLUG TO BE QPK PRODUCTS MODEL #228—0004 DM OR APPROVED EQUAL.
9. STAMP OR WELD THE LETTER "S" ON LID OF METER BOX.

R/W LINE OR PROPERTY LINE
2"x4" METAL STUD ON SURFACE TO END OF TAP
#1 METER BOX PER DETAIL 320
THREADED CAP W/ ELECTRONIC MARKER SEE NOTE 8
1-WAY CLEANOUT TOWARDS MAIN
4" OR 6" SEWER PIPE
INVERT OF SERVICE LINE TO BE AT OR ABOVE CROWN OF MAIN
MAIN (SIZE VARIABLE)
LEVEL
SLOPE: MIN: 4" OR 6" = 1/4" PER FT.
MAX: 4" = 1-1/2" PER FT.
MAX: 6" = 7/8" PER FT.

DETAIL NO. 440–3
STANDARD DETAIL ENGLISH
TYPE 'C' — SEWER BUILDING CONNECTION
ONE-WAY CLEANOUT AND METER BOX
(WHEN SPECIFIED BY LOCAL AGENCY)
REVISED 01–01–2007 DETAIL NO. 440–3
NOTES:
1. STAMP TOP OF CURB WITH 4" TALL BY 1/4" DEEP "S" TO DESIGNATE SEWER SERVICE LINE CROSSING.
THE WORD 'SEWER' ON COVER
UNPAVED STREETS AND ALLEYS
CLASS 'AA' CONC.
PER SECT. 725, 6"-8"
THICK, 40" DIA.
SIZE OF PIPE AS SHOWN ON PLANS
STANDARD 45' BEND
FLOW LINE ELEVATION SHOWN ON PLANS TO THIS POINT

8" C.I. FRAME AND COVER DET. 270
PAVED STREETS AND ALLEYS
COMPACTED BACKFILL OR UNDISTURBED EARTH
STANDARD 45' BEND
VIT. CLAY PIPE PER SECT. 743
TO BE LAID ON UNDISTURBED EARTH OR COMPACTED SELECT MATERIAL (TYPE B) OR A.B.C.
STATION AND LENGTH SHOWN ON PLANS TO THIS POINT

NOTE:
END OF SEWER TAP TO BE SEALED AND MARKED IN ACCORDANCE WITH DET. 440

8" V.C.P.
ONE FULL LENGTH OF PIPE
4" OR 6" V.C.P. TAP TO PROPERTY LINE
6"x8" OR 4"x8" VITRIFIED CLAY INCREASER
8"x8" WYE

CLEANOUT INSTALLATION
SEWER TAP AT CLEANOUT
SECTION B-B

CLASS "A" CONC. AS PER SECT. 725

ANGLE OF HEADWALL TO MEET O.D. OF PIPE

SPRAY BANDS WITH CURING COMP.

BLOCK

CLASS "A" CONC. AS PER SECT. 725

NO. 4 REINF. BAR FULL LENGTH IN EACH CORE. CORES TO BE FILLED WITH GROUT MIX 1:3

REINF. CONC. CLASS "A" PER SECT. 725

'U' TYPE

PLAN

'L' TYPE

'U' TYPE

FOOTING

DITCH BANK

S=1/2 L^1 MIN., 0.707 L^1 MAX.

B

BLOCK

L^1

L^2

L^3

B

DITCH BANK

30" MIN. 45" MAX.

18"

6"

30" MIN. 45" MAX.

18"

6"
DOUBLE PIPE HEADWALL

ELEVATION
CONCRETE MASONRY UNITS (BLOCK)
HEADWALLS JOINED WITH CEMENT MORTAR PLASTERED BOTH SIDES
OF WALL FULL HEIGHT AND SHALL BE CURED PER SECT. 726.

WALL BLOCKS TO BE 8"x8"x16"
FILL ALL CORES WITH GROUT MIX 1:3.

FOOTING BLOCKS TO BE 8"x8"x16"

HEADWALL DIMENSIONS

<table>
<thead>
<tr>
<th>*NOMINAL PIPE SIZE</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
<th>L4</th>
<th>L5</th>
</tr>
</thead>
</table>
| 12"                | 1'-0" | 2'-0" | 3'-8" | 0'-10" | 2'-10"
| 15"                | 1'-4" | 2'-0" | 3'-8" | 0'-10" | 2'-10"
| 18"                | 1'-0" | 2'-8" | 3'-8" | 4'-8" | 1'-2" | 3'-4"
| 21"                | 1'-4" | 2'-8" | 4'-0" | 5'-4" | 1'-3" | 3'-8"
| 24"                | 2'-8" | 4'-0" | 5'-4" | 6'-8" | 1'-6" | 3'-11"
| 30"                | 2'-8" | 5'-4" | 6'-8" | 7'-4" | 1'-10" | 4'-7"
| 36"                | 3'-4" | 6'-8" | 8'-0" | 1'-10" | 5'-2"
| 42"                | 4'-0" | 8'-0" | 9'-4" | 2'-2" | 5'-9"

* NOMINAL PIPE SIZE GIVEN FOR REINFORCED CONC. PIPE.

NOTES:
1. ALL CONCRETE SHALL BE CLASS ‘A’ PER SECT. 505 & 725.
2. CONCRETE MASONRY UNITS (BLOCK) PER SECT. 510, 775 & 776.
3. CONCRETE REINF. SHALL BE NO.4 BAR 12" O.C. BOTH WAYS.
2 - NO. 6 BARS BEND TO CONFORM TO PIPE

ELEVATION

SECTION B-B

3/4" CHAMFER, ALL EXPOSED CORNERS

SECTION A-A

NOTES:

1. ALL CONCRETE SHALL BE CLASS 'A' PER SECT. 725.

2. ALL REINFORCING BARS SHALL BE NO. 4 EXCEPT NO. 6 BARS OVER PIPE. BAR SPACING APPROXIMATELY 12" C TO C UNLESS OTHERWISE NOTED.

3. 30° WING WALL FLARE SHOWN; 45° NORMAL DESIRABLE.
**NOTES:**

1. **HIGH POINT OF HEADWALL SHALL NOT PROJECT MORE THAN 3" ABOVE SLOPE.**

2. **ALL CONCRETE SHALL BE CLASS 'A' PER SECT. 725.**

3. **ALL REINFORCING BARS SHALL BE NO. 4, 12" C TO C AND 3" CLEAR TO INSIDE OF FLOOR AND WALLS.**
**POURED WALLS**

NO. 4 REINFORCED BARS 12" O.C. BOTH WAYS, CLASS 'A' CONC PER SECT. 505, 725 & 727.

**BLOCK WALLS**

BLOCK HEADWALL TO HAVE ONE NO.4 REINF. BAR CENTERED IN EACH CORE FOR FULL HEIGHT AND CORES FILLED WITH CONCRETE OR CEMENT GROUT (3:1 RATIO). ALL BLOCKS TO BE JOINTED WITH MORTAR. PLASTERED ON EXPOSED SURFACES THEN SPRAY WITH WHITE PIGMENTED CURING COMPOUND. SECT. 510, 727 & 776.

**NOTES:**

1. REMOVE ALL SCALE FROM RACK BARS. METAL SPRAY OR PAINT WITH ONE COAT ZINC CHROMATE OR RED LEAD PRIMER (INDUSTRIAL QUALITY). OVERCOAT WITH GREY INDUSTRIAL ENAMEL SECT. 790.

2. SHAPE, COMPACT AND PLASTER NEW DITCH FROM HEADWALL TO UNDISTURBED EXISTING DITCH. PLASTER TO EXTEND TO MINIMUM ELEVATION NOTED 3 FEET BEYOND CONNECTION TO UNDISTURBED EXISTING DITCH.


4. 14" PLATE SHALL NOT EXTEND BELOW TOP OF PIPE.
CONCRETE MANSIONRY UNITS (BLOCK)

REINF. CONC. CLASS 'A' PER SECT. 725

'Straight Type'

'U' Type

CONC. LINING THICKNESS 1-1/2" MIN., 2" MAX.

SLOPE 1:1 MIN., 1:1.5 MAX.

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PIPE SIZE</th>
<th>NO. OF BARS</th>
<th>LENGTH OF BARS</th>
<th>DIMENSIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>18&quot;</td>
<td>6</td>
<td>3'-7&quot;</td>
<td>X: 1'-9&quot;</td>
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<tr>
<td></td>
<td>24&quot;</td>
<td>8</td>
<td>3'-7&quot;</td>
<td>Y: 2'-5&quot;</td>
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<tr>
<td></td>
<td>42&quot;</td>
<td>12</td>
<td>5'-10\5/8&quot;</td>
<td>Y: 3'-9&quot;</td>
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<tr>
<td></td>
<td>48&quot;</td>
<td>14</td>
<td>6'-7\3/4&quot;</td>
<td>Z: 4'-5&quot;</td>
</tr>
</tbody>
</table>

1/2" x 4'-1/2" GALV. BOLT SUNK IN PLASTER WITH BRASS NUT

LOCK TYPE WASHER AND 5/8" NUT

TOP BANK

1/4" x 2" STEEL BAR PLATE

C-C SPACING

3" GALV. PIPE

1" GALV. PIPE

45°

SECTION A-A

WALL

10" FOR BLOCK HEADWALLS
8" FOR REINF. CONC. HEADWALL

EYE BOLT

PROVIDE PLASTIC SLEEVE 3/4" DIA.
NOTES:

1. BRACE TO BE INSTALLED EVERY 2'.

2. INSTALL 1/2" BOLTS INTO LEAD PLUG DRILLED TO WITHIN 1" OF OUT SIDE OF STANDPIPE. SPACERS TO BE INSTALLED AT EACH BOLT BETWEEN HEADGATE FRAME AND INSIDE OF STAND PIPE.

3. LOCATION OF 2" HOLE FOR GATE STEM TO BE DETERMINED AFTER INSTALLATION OF GATE.

4. CONCRETE SHALL BE CLASS A PER SECT. 725.

PAINT ARROW ON OUTSIDE OF STANDPIPE INDICATING DIRECTION "TO OPEN" HEADGATE.

SEE NOTE 1

SEE NOTE 2

SEE NOTE 3

(4) 3/8" BOLTS TO BE GROUTED INTO STANDPIPE EQUI-DISTANT WITH 1-1/2" x 3" RECTANGULAR WASHERS AND NUTS

GALVANIZED EXPANDED METAL LID (9 GAUGE)

4" 3/8" BOLTS TO BE GROUTED INTO STANDPIPE EQUI-DISTANT WITH 1-1/2" x 3" RECTANGULAR WASHERS AND NUTS

REINF. CONC. PIPE

VARIES MIN.

52" MAX.

FINISH GRADE

1" C.R.S. LIFT ROD

HEADGATE TO BE SWANSON 800 SERIES OR APPROVED EQUAL

FORM CONC. AROUND END OF PIPE BEHIND HEADGATE FRAME

TYPE 'A'
PLAN OF COVER

TO SECURE COVER TO STRUCTURE, USE 1/4"x3" GALVANIZED EYEBOLT AND 1/4"x6" GALVANIZED EYEBOLT BENT TO FORM ANCHOR, AND 3/16" GALVANIZED CHAIN 2" LONG

SECTION A-A

SIZE OF PIPE AS SHOWN ON PLANS

CLASS "B" CONCRETE PER SECTION 725

SECTION B-B

NOTES:
1. SIZE OF JUNCTION BOX TO BE DETERMINED BY THE ENGINEER.
2. GATE TYPE, SIZE AND NUMBER REQUIRED AS SHOWN ON PLANS OR AS SPECIFIED.
3. CONCRETE MASONRY UNITS (BLOCK) PER SECT. 510, 775 & 776
1. A concrete collar is required where pipes of different diameters or materials are joined, or where the change in alignment or grade exceeds that allowed for on ordinary joints.

2. Where pipes of different diameters are joined with a concrete collar, L and T should be those of the larger pipe, D=D–1, or D–2 whichever is greater.

3. For pipe sizes not listed and less than 66” use next size larger.

4. Ommit reinforcing on pipe 24” or less in diameter.

5. Where reinforcing is required, the diameter of the circular ties shall be... outside diameter of pipe + T.

6. Field closures of pipe of the same diameter and without change in grade or alignment shall be made with a concrete collar.

7. Concrete shall be Class B per sect. 725.

\[ A^* = \text{angle of deflection} \]

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<td>57&quot;</td>
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<td>60&quot;</td>
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<td>66&quot;</td>
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</tbody>
</table>
NOTE:
CONTRACTOR MAY USE PRECUT FITTINGS IF DESIRED.
BID ITEM INCLUDES LATERAL PIPE, RISER, PAD, VALVE,
LABOR AND INCIDENTAL MATERIAL REQUIRED FOR
INSTALLATION.

CONSTRUCT OPTIONAL
CONCRETE SCOURING
BASIN AROUND VALVE
ASSEMBLY WHERE SPECIFIED

CLASS 'C' CONCRETE
PER SECTION 725
WITH TROWEL FINISH

BREAK PIPE
AND MAKE
WATERTIGHT
JOINTS PER
DETAIL 524

MAIN

CONCRETE PIPE
SECT. 735 & 736

PIPE DIAMETER
TO BE SAME AS
VALVE SIZE

PLUG END PER
DETAIL 427

PIPE DIAMETER
TO BE SAME AS
VALVE SIZE

GROUT AS PER
DETAIL 524

CONCRETE TEE
OR ELBOW

SLOW, IDEAL,
WATERMAN ALFALFA
VALVE OR EQUAL

VARIABLE

VARIABLE

12"
NOTES:

1. THIS DETAIL SHALL BE REQUIRED WHEN NEW OR EXISTING PIPE INSTALLATIONS WILL BE SUBJECT TO DAMAGE ANYTIME IN THE FUTURE DUE TO LACK OF PROPER COVER, AS DETERMINED BY THE ENGINEER.

2. FOR PIPE OVER 18” I.D. WOOD, METAL OR GYPSUM BOARD FORMS MUST BE USED TO FORM THE SIDES OF THE ENCASEMENT. GYPSUM BOARD FORMS MAY BE LEFT IN THE GROUND BELOW THE TOP OF THE ENCASEMENT. THIS SHALL BE OPTIONAL WITH POURING AGAINST TRENCH WALLS FOR ENCASEMENT OF 18” AND SMALLER PIPE.

3. FOR ALL SITUATIONS WHERE SIDE FORMS ARE USED, TRENCH WALLS SHALL BE OVER—EXCAVATED TO ALLOW SUFFICIENT ROOM TO OPERATE PROPER MECHANICAL COMPACTION EQUIPMENT.

4. CONCRETE WHICH SPILLS BEYOND 12” FROM THE SIDES OF THE PIPE FOR ANY REASON SHALL BE REMOVED BACK TO THE PROPER LINE PRIOR TO BACKFILLING.

5. SEE SECTION 601 FOR TRENCH PREPARATION.

6. CONCRETE TO BE CLASS ‘A’ PER SECT. 725.

7. COVER TO BE APPROVED BY ENGINEER.
CONNECTOR CROSS SECTION

NOTE:
USE 5/8" WASHER AND NUT, ALL PIECES (NUTS, WASHERS, AND FABRICATED BOLTS) TO BE GALVANIZED AS PER A.S.T.M. A-123 LATEST REVISION.

C.M.P. MAIN STORM DRAIN
1:2 MORTAR
2"x2"x12" GAUGE WELDED WIRE FABRIC WITH 12" CIRCUMFERENTIAL OVERLAP

BAND DETAIL

C.M.P. CONNECTION TO MAIN STORM DRAIN
24" PIPE AND SMALLER

CONNECTOR PIPE
8 HOLES 9/16" DIA.

T-BOLT

WELD ALL AROUND

O.D. + 24"

O.D. + 24"

12 GAUGE BITUMINOUS COATED GALVANIZED METAL PLATE

C.M.P. STORM DRAIN

SEE BAND DETAIL

C.M.P. TYPE 'A' OR TYPE 'B'

SEE T-BOLT DETAIL

R=C.P., C.P. OR C.M.P.

R=1/2 O.D.


SELECT MATERIAL

TYP. BOTH SIDES AND BOTTOM

6" MIN.

1/2"

STANDARD THREAD (COARSE)

2-1/2"

1-3/4"

1-1/4"

1/2"

CATCH BASIN
NOTES

1. ALL CONCRETE TO BE CLASS 'A' PER SECT. 725, 505.

2. MATCH SPRING LINES OF PIPE ENTERING MANHOLE UNLESS OTHERWISE NOTED.

3. CUT PIPES TO ALLOW SETTING OF 4' DIA. CYLINDRICAL FORM FROM 6" ABOVE MAIN LINE PIPE TO SPRING LINE. CUT PIPE 2" LARGER THAN FORM TO ALLOW 2" CONCRETE OVER ENDS OF ALL CUT PIPE.

4. INVERT AND BASE OF MANHOLE TO BE Poured AND INVERT TO BE SHAPED BY HAND TO MAKE SMOOTH TRANSITION. FINISH WITH RUBBER FLOAT.

5. CENTER MANHOLE ON PIPE JOINT WHERE PIPE CHANGES SIZES, LEAVING A GAP OF 12" MINIMUM, 24" MAXIMUM.
NOTES:

1. LINE PIPE AND STUB MAY BE CAST MONOLITHICALLY OR STUB MAY BE CAST ON TO LINE PIPE SECTION PRIOR TO COMPLETE CURING.

2. ALL LINE PIPE REINFORCEMENT SHALL BE TURNED UP INTO STUB.

3. THE VERTICAL STUB TO BE A.S.T.M. C-76 CLASS II WALL 'A' AND THE HORIZONTAL PIPE TO BE EQUAL TO STRENGTH OF PIPE ENTERING MANHOLE.

4. ALL REINFORCING STEEL SHALL CLEAR FACE OF CONCRETE BY 1-1/2" UNLESS SHOWN OTHERWISE.

5. CONCRETE ENCAESENT SHALL BE CLASS 'A' PER SECT. 725 AND 505.

TABLE OF VALUES FOR 'F' & 'D'

<table>
<thead>
<tr>
<th>D</th>
<th>51”</th>
<th>54”</th>
<th>57”</th>
<th>60”</th>
<th>63”</th>
<th>66”</th>
<th>69”</th>
<th>72”</th>
<th>78”</th>
<th>84”</th>
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<tbody>
<tr>
<td>F</td>
<td>13-3/4&quot;</td>
<td>14-1/2”</td>
<td>15”</td>
<td>15-1/2”</td>
<td>16-1/4”</td>
<td>16-3/4”</td>
<td>17-1/2”</td>
<td>18”</td>
<td>19-1/4”</td>
<td>20-1/2”</td>
<td>21-3/4”</td>
<td>23”</td>
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</tbody>
</table>

MAN HOLE SHAFT PER DETAIL 522

PRECAST PIPE WITH VERTICAL STUB

ENCASEMENT
NOTES:
1. PRECAST CONCRETE CONES AND SECTIONS TO BE A.S.T.M. C-478.
2. BRICK MAY BE USED IN LIEU OF OR IN COMBINATION WITH CONCRETE ADJUSTING RINGS.
3. PRECAST CONCRETE SECTIONS 48" DIA PIPE MAY BE FURNISHED IN STANDARD LENGTHS.
4. UNLESS OTHERWISE SHOWN ON PLANS, USE (2) 2-1/2" PRECAST CONCRETE ADJUSTING RINGS ON IMPROVED STREETS AND (4) 2-1/2" RINGS ON UNIMPROVED STREETS.
5. MANHOLE STEPS SHALL BEGIN 2'-0" BELOW FINISHED GRADE AND CONTINUE AT 12" INTERVALS TO APPROXIMATELY 2' ABOVE MANHOLE SHELF. (AS REQUIRED BY AGENCY.)
6. CONCRETE SHALL BE CLASS A PER SECTION 725 AND 505.

DETAIL NO. 522
STANDARD DETAIL ENGLISH
STORM DRAIN MANHOLE SHAFT

REINFORCED CONCRETE ADJUSTING RING
2-1/2" RINGS SHALL BE REINFORCED WITH TWO 1/4" ROUND STEEL HOOPS; 6" AND 8" RINGS SHALL BE REINFORCED WITH FOUR 1/4" HOOPS, TIED WITH NO. 14 A.S.& W. GAUGE WIRE 8" O.C.
FOR A 30" M.H. OPENING, USE THE STD. WATER TIGHT 30" M.H. FRAME & COVER, AND ANCHOR THE FRAME AS OUTLINED IN THE INSTRUCTIONS NOTED ON THIS SHEET.

FOR A 24" M.H. OPENING, MODIFY THE STD. 24" M.H. FRAME & COVER, FOLLOWING THE NOTED PROCEDURES, ONE THRU FIVE.

NOTES:

① DRILL (8) HOLES 17/32" IN COVER FOR 1/2" CAPSCREWS, COUNTERBORE 1/2" DEEP BY 1-1/8" DIA. TO ACCOMODATE CAPSCREW AND SOCKET WRENCH. SPACE EQUALY.

② DRILL (8) HOLES AND TAP FOR 1/2" – 13 THREAD NATIONAL COARSE BOLT.

③ DRILL, TAP AND COUNTERBORE (2) HOLES FOR 1/2" CAPSCREWS TO BE USED FOR LIFTING COVER. PLUG WITH CAPSCREWS.

④ COVER AND FRAME MUST BE MATCHED, DRILLED AND TAPPED IN SETS.

⑤ CASTING DIMENSIONS GIVEN ABOVE ARE FROM DET. 424, 24" MANHOLE FRAME AND COVER.

⑥ BOTH 24" AND 30" FRAMES TO BE ANCHORED AS FOLLOWS:

⑦ DRILL 1/2" HOLE IN FILLET. DO NOT USE ADJACENT FILLETS.

⑧ 1/4" STAINLESS STEEL CABLE. SECURED WITH CABLE CLAMPS.

⑨ 1/2"x9" HOOK AND EYE TURNBUCKLE.

⑩ INSTALL THREE CABLES PER 24" COVER (FOUR CABLES FOR 30" COVERS). EYEBOLTS TO BE SET DIRECTLY BELOW FILLETS USED.

⑪ TRIPLE WRAP TURNBUCKLES AND CABLE CLAMPS WITH 1" WIDE TAPE, SAFE-T-CLAD, F.O.S. 655, OR APPROVED EQUAL.
NOTES:

1. DRILL (6) HOLES IN 30" COVER (4 HOLES IN 24" COVER) 17/32" CORED RECESS FOR 1/2" CAPSCREWS. SPACE EQUALLY (304 S.S.)

2. DRILL (6) HOLES IN 30" FRAME (4 HOLES IN 24" FRAME) AND TAP FOR 1/2" – NATIONAL COARSE BOLT (HEX HEAD).

3. COVER AND FRAME MUST BE MATCH MARKED, DRILLED AND TAPPED IN SETS.

4. DIMENSIONS, LETTERING, WEIGHTS AND MATERIALS SHALL CONFORM TO DET. 424.

5. REFER TO DETAIL 523–1 FOR INSTALLATION PROCEDURES.

COVER SECTION

FRAME SECTION

3/4" DIA. CORED HOLES IN GUSSET

2"

TYP.

TYP. BOLT PAD

BOLT HOLE DETAIL

PICKHOLE DETAIL

1 1/2"

1 1/2"

3/4" W x 1 1/2" D

GROUNDED MATCH MARK

(2) CONCEALED PICKHOLES 180 DEG. APART
NOTES:
1. D SHALL BE 24" OR LESS. FOR LARGER VALUE OF D USE MANHOLE OR JUNCTION STRUCTURE.
2. IN NO CASE SHALL THE OUTSIDE DIAMETER OF THE INLET EXCEED ONE HALF THE INSIDE DIAMETER OF THE MAIN STORM DRAIN.
3. CENTERLINE OF INLET SHALL BE ON RADIUS OF MAIN STORM DRAIN EXCEPT WHEN ELEVATION S IS SHOWN ON PLANS.
4. THE MINIMUM OPENING INTO THE STORM DRAIN SHALL BE THE OUTSIDE DIAMETER OF THE CONNECTING PIPE PLUS 1".
5. IF ANGLE X FROM HORIZONTAL IS 45° OR LESS USE TYPE 1.
   IF ANGLE X IS 45° OR OVER USE TYPE 2.
NOTES:

1. THE ENTIRE CATCH BASIN COVER MAY BE Poured IN PLACE OR PRECAST.

2. CONNECTION PIPES MAY BE PLACED IN ANY POSITION AROUND THE WALLS PROVIDED THE POSITION IS CONSISTENT WITH THE PLAN.

3. OUTLET PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE CONCRETE IS Poured.

4. FLOOR OF BASIN SHALL BE TROWELLED TO A HARD SMOOTH SURFACE AND SHALL SLOPE FROM ALL DIRECTIONS TO OUTLET.

5. ALL STRUCTURAL STEEL TO BE PAINTED ONE SHOP COAT OF NO. 1 D PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECTION 790.

6. CONCRETE SHALL BE CLASS A PER SECTION 725.

**DIMENSIONS**

<table>
<thead>
<tr>
<th>CURB</th>
<th>A</th>
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<tr>
<td>4&quot;</td>
<td>3'–3&quot;</td>
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<tr>
<td>6&quot;</td>
<td>1'–9&quot;</td>
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<td>7&quot;</td>
<td>1'–0&quot;</td>
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* T=6" IF V=4' OR LESS
  T=8" IF V IS BETWEEN 4' AND 8'
  T=10" IF V IS 8' OR MORE (IF V EXCEEDS 10' SPECIAL DESIGN IS REQUIRED)
  V=3'–6" UNLESS OTHERWISE SPECIFIED.

** SEE DETAILS 536–1 AND 536–2 FOR DETAILS AND SECTIONS COMMON TO ALL CURB OPENING CATCH BASINS.

** 4' LOCATIONS WHERE 4' S/W IS REQUIRED.
NOTES:

1. THE ENTIRE CATCH BASIN COVER MAY BE POURED IN PLACE OR PRECAST.

2. CONNECTION PIPES MAY BE PLACED IN ANY POSITION AROUND THE WALLS PROVIDED THE POSITION IS CONSISTENT WITH THE PLAN.

3. OUTLET PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE CONCRETE IS POURED.

4. FLOOR OF BASIN SHALL BE TROWELLED TO A HARD SMOOTH SURFACE AND SHALL SLOPE FROM ALL DIRECTIONS TO OUTLET.

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6. CONCRETE SHALL BE CLASS A PER SECTION 725.

** DIMENSIONS **

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<th>CURB</th>
<th>4&quot;</th>
<th>3'-3&quot;</th>
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<tbody>
<tr>
<td>T=6&quot; IF V=4&quot; OR LESS</td>
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<tr>
<td>T=8&quot; IF V IS BETWEEN 4' AND 8'</td>
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<tr>
<td>T=10&quot; IF V IS 8' OR MORE (IF V EXCEEDS 10' SPECIAL DESIGN IS REQUIRED)</td>
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V=3'-6" UNLESS OTHERWISE SPECIFIED.

* SEE DETAILS 536-1 AND 536-2 FOR DETAILS AND SECTIONS COMMON TO ALL CURB OPENING CATCH BASINS.

** 4" LOCATIONS WHERE 4" S/W IS REQUIRED.***
SECTION A-A

CURB SUPPORT
SEE DET. 533-1
(DET. NO. 2)

MIN. SLOPE
(TYP.)

NO. 3 DOWEL BARS
(NOT USED IF TOP IS PRECAST)

NOTES:
1. THE ENTIRE CATCH BASIN COVER MAY BE POURED IN PLACE OR PRECAST.
2. CONNECTION PIPES MAY BE PLACED IN ANY POSITION AROUND THE WALLS PROVIDED THE POSITION IS CONSISTENT WITH THE PLAN.
3. OUTLET PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE CONCRETE IS POURED.
4. FLOOR OF BASIN SHALL BE TROWELLED TO A HARD SMOOTH SURFACE AND SHALL SLOPE FROM ALL DIRECTIONS TO OUTLET.
5. ALL STRUCTURAL STEEL TO BE PAINTED ONE SHOP COAT OF NO. 1 D PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SEC. 790.
6. CONCRETE SHALL BE CLASS A PER SECTION 725.

DIMENSIONS

CURB A

4" 3'-3"
6" 1'-9"
7" 1'-0"

T=6" IF V=4" OR LESS
T=8" IF V IS BETWEEN 4" AND 8"
T=10" IF V IS 8" OR MORE (IF V EXCEEDS 10" SPECIAL DESIGN IS REQUIRED)
V=4" UNLESS OTHERWISE SPECIFIED.

* SEE DETAILS 536-1 AND 536-2 FOR DETAILS AND SECTIONS COMMON TO ALL CURB OPENING CATCH BASINS.
** 4" LOCATIONS WHERE 4" S/W IS REQUIRED.

PLAN VIEW

ALT HANGE

SYN

4"-0" CURB OPENING
CATCH BASIN – TYPE 'C'

REVIEWED
01-01-1998

DETAIL No. 532

STANDARD DETAIL
ENGLISH

MARICOPA ASSOCIATION OF GOVERNMENTS

DETAIL NO. 532
NOTES:
1. SINGLE C.B. (ILLUSTRATED). SUMP WITH WING BASIN UPSTREAM.
2. DOUBLE C.B. SUMP WITH SYMMETRICAL WING BASINS EACH SIDE.
3. PIPES CAN BE PLACED IN ANY WALL EXCEPT WALL ADJACENT TO A WING BASIN. PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE CONCRETE IS PLACED.
4. SUMP FLOOR SHALL HAVE A WOOD TROWEL FINISH AND A MIN. SLOPE OF 4:1 IN ALL DIRECTIONS TOWARD OUTLET PIPE.
5. ALL REBAR SHALL BE NO. 3 1/8" C TO C BOTH WAYS AND 1-1/2" CLEAR TO INSIDE OF WALLS AND OUTSIDE WING BASIN FLOOR EXCEPT AS SHOWN. SEE SECT. 727.
6. ALL CONCRETE SHALL BE CLASS 'A', PER SECT. 725.
7. CONSTRUCTION JOINTS SHALL BE PLACED TO MEET FIELD CONDITIONS.
8. ALL EXPOSED STEEL SHALL BE GALVANIZED OR PAINTED WITH ONE SHOP COAT OF #1 PAINT AND TWO FIELD COATS OF #10 PAINT.

PLAN VIEW

SECTION A-A

SECTION B-B

REINFORCEMENT DETAIL

DIMENSIONS
V = 3'-3" MIN. WHEN L = 3'
V = 3'-5" MIN. WHEN L = 6'
V = 3'-7" MIN. WHEN L = 10'
V = 4'-0" MIN. WHEN L = 17'
T = 6" WHEN V IS LESS THAN 8'
T = 8" WHEN V IS EQUAL TO OR GREATER THAN 8'
H = CURB HEIGHT PRIOR TO THE TRANSITION

NOTE: REINFORCING BARS SHOWN ARE FOR ROOF SLAB ONLY. SEE NOTE NO. 5 AND SECTIONS FOR OTHER REINFORCING.
APRON FOR TYPE 'D' CATCH BASIN

PLAN VIEW

SECTION D–D

SECTION E–E

APRON NOTES:

9. APRON IS CONSTRUCTED ONLY WHEN SPECIFIED ON PLANS.

10. CONCRETE IN APRON SHALL BE NOT LESS THAN 8" THICK.

11. CURB FACES AT CATCH BASIN OPENING AND POINT G SHALL BE THAT OF THE EXISTING CURB FACE PLUS 2" OR AS OTHERWISE SHOWN.

12. ELEVATION AT THE OUTER CORNERS OF THE LOCAL DEPRESSION SHOWN ON THE PLANS ARE FOR THE FINISHED SURFACE.

13. SEE DETAIL 533–1 FOR ADDITIONAL DIMENSIONS, REBAR PLACEMENT AND OTHER INFORMATION TO CONSTRUCT CATCH BASIN.

M AND N SHALL BE ON A STRAIGHT GRADE BETWEEN TOPS OF END HEADERS.

FOR S/W INSTALLATION BEHIND CATCH BASIN SEE DETAIL 230

FOR S/W INSTALLATION PER DETAIL 221 BOTH SIDES

GRATE FRAME

GRATE SUPPORT ANCHORS SEE DETAIL 536–1, SECTION C–C

SIDEWALK WHEN REQ'D.
FRAME AND GRATE NOTES

14. FRAME AND GRATING SHALL BE TESTED FOR ACCURACY OF FIT AND SHALL BE MARKED IN SETS BEFORE DELIVERY.

15. ALL WELDING SHALL BE IN ACCORDANCE WITH STANDARD WELDING SPECIFICATIONS.

16. CROSS BARS AND END BARS MAY BE FILLET WELDED, RESISTANCE WELDED OR ELECTRO FORGED TO BEARING BARS.

17. ANCHORS SHALL BE 3/8" DIA. STEEL ROD, NO. 3 REBAR, 3/8" DIA. x 8" BOLTS OR 8" NELSON STUDS.

18. ALL PARTS SHALL BE OF STRUCTURAL GRADE STEEL.

19. ALL EXPOSED STEEL SHALL BE GALVANIZED OR PAINTED WITH ONE COAT #1 PAINT AND TWO FIELD COATS OF #10 PAINT.
GRATE DETAIL
GRATE OPENING: 4.344 SQ. FT.

CROSS BARS:
1/2 DIA. x 24-7/8" ROD,
4" C. TO C., 9 EACH

BEARING BARS:
3-1/2"x1/2"x39-1/2"
1-7/8" C. TO C., 14 EACH

END BARS:
2-1/2"x1/4"x24-7/8"
2 EACH.
NOTES:

1. ADJUSTABLE CURB, FRAME AND GRATING UNITS SHALL BE STRUCTURAL STEEL OR CAST IRON.

2. PIPES MAY ENTER OR LEAVE ANY WALL. BOTTOM OF BOX TO BE SLOPED TO OUTLET PIPE FROM ALL DIRECTIONS AND TROWELLED TO A HARD SMOOTH SURFACE.

3. CONNECTION PIPES MAY BE PLACED IN ANY POSITION AROUND THE WALLS PROVIDED THE POSITION IS CONSISTENT WITH THE PLAN.

4. OUTLET PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE CONCRETE IS Poured.

5. ALL STRUCTURAL STEEL TO BE PAINTED ONE SHOP COAT OF NO. 1 PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECT. 790.

6. ALL CONCRETE, CLASS 'A' AS PER SECTION 725.
CROSS SECTION

8” x 3/8” TOP PLATE

1/4” WELD

13” x 3/8” BACK PLATE

2” x 1/4” x 6” LUGS

1/2” x 8” BOLTS

1/2” RODS THREADED BOTH ENDS

NOTE:
WELD ALL PLATES TO 6” x 6” ANGLES.

DRILL (2) 1” HOLES FOR BOND AS SHOWN

8” x 3/8” TOP PLATE

3’-5”

8”

2” x 1/4” END

1/4” WELD

5” x 3” x 3/8”

NO. 4 x 1”-6”

13” x 3/8” BACK PLATE

6” x 6” x 3/8” x 13-3/8”

2’-5”

1/2” x 8” BOLTS

1/4” R

1/4” WELD

1/4” WELD

1”-9”

2-1/2”

6”/10.5#

1/4”

12” x 1/4” BOND PLATE

NOTE:
WELD ALL PLATES TO 6” x 6” ANGLES.

DRILL (2) 1” HOLE FOR BOND AS SHOWN

8” x 3/8” TOP PLATE

3’-5”

8”

2” x 1/4” END

1/4” WELD

5” x 3” x 3/8”

NO. 4 x 1”-6”

13” x 3/8” BACK PLATE

6” x 6” x 3/8” x 13-3/8”

2’-5”

1/2” x 8” BOLTS

1/4” R

1/4” WELD

1/4” WELD

1”-9”

2-1/2”

6”/10.5#

1/4”

12” x 1/4” BOND PLATE

NOTE:
WELD ALL PLATES TO 6” x 6” ANGLES.

DRILL (2) 1” HOLE FOR BOND AS SHOWN

8” x 3/8” TOP PLATE

3’-5”

8”

2” x 1/4” END

1/4” WELD

5” x 3” x 3/8”

NO. 4 x 1”-6”

13” x 3/8” BACK PLATE

6” x 6” x 3/8” x 13-3/8”

2’-5”

1/2” x 8” BOLTS

1/4” R

1/4” WELD

1/4” WELD

1”-9”

2-1/2”

6”/10.5#

1/4”

12” x 1/4” BOND PLATE

NOTE:
WELD ALL PLATES TO 6” x 6” ANGLES.

DRILL (2) 1” HOLE FOR BOND AS SHOWN

8” x 3/8” TOP PLATE

3’-5”

8”

2” x 1/4” END

1/4” WELD

5” x 3” x 3/8”

NO. 4 x 1”-6”

13” x 3/8” BACK PLATE

6” x 6” x 3/8” x 13-3/8”
BOLT CURB BOX TO FRAME
WITH 1/2" x 13" x 2-1/2" STEEL
HEX BOLTS, NUTS AND WASHERS

CURB BOX ADJUST.
TO 9" HIGH

DATE

CROSS-SECTIONAL
AREA: 1.53 SQ. IN.

3-1/4" R

NOTE:
DIMENSIONAL CHANGE REQUIRED FROM 3'-5"
WIDTH TO 3'-0" AND 1'-9" DEPTH TO 2'-0"
MATERIAL CAST GRAY IRON ASTM A-48-83 CLASS 35B.
FRAME WEIGHT 209 LBS; GRATE 140 LBS; CURB BOX 92 LBS.

SECTION A-A
CAST IRON FRAME - GRATE - CURB BOX

SECTION B-B

VANE DETAIL

DATE
BOLT CURB BOX TO FRAME
WITH 1/2" x 13" x 2-1/2" STEEL HEX
HEAD BOLTS, NUTS AND WASHERS

SECTION A–A

DOUBLE UNIT CAST IRON FRAME – GRATE – CURB BOX

SECTION B–B

CROSS-SECTIONAL AREA: 1.53 SQ. IN.

VANE DETAIL

NOTE:
DIMENSIONAL CHANGE REQUIRED FROM 3"–5"
WIDTH TO 6"–2", AND 1"–9" DEPTH TO 2"–0"
REQUIRES ONE CENTER STEEL I-BEAM 4" x 7.7 LBS.
MATERIAL CAST GRAY IRON ASTM A–48–83 CLASS 35B.
FRAME WEIGHT 197 LBS.; GRATE 140 LBS.; CURB BOX 92 LBS.
NOTES:

1. PIPES MAY ENTER OR LEAVE ANY WALL. BOTTOM OF BOX TO BE SLOPED TO OUTLET PIPE FROM ALL DIRECTIONS AND TROWELLED TO A HARD SMOOTH SURFACE.

2. CONNECTION PIPES MAY BE PLACED IN ANY POSITION AROUND THE WALLS PROVIDED THE POSITION IS CONSISTENT WITH THE PLAN.

3. OUTLET PIPE SHALL BE TRIMMED TO FINAL SHAPE AND LENGTH BEFORE CONCRETE IS Poured.

4. ALL STRUCTURAL STEEL TO BE PAINTED ONE SHOP COAT OF NO. 1 PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECT. 790.

5. ALL WELDS ON FRAME AND SIDE BARS ON GRATE SHALL BE FULL LENGTH OF JOINT.

6. TOTAL COMBINED CLEARANCE BETWEEN FRAME AND GRATE IS 1/2".

NOTE:
SEE DETAIL 534-1 FOR THICKNESS AND SLOPE DIMENSIONS OF BOTTOM.
SECTION C-C
FOR DETAILS 531, 532 AND 533

SECTION D-D

NOTES:
1) HORIZONTAL PLAIN ROUND GALVANIZED STEEL PROTECTION BAR SHALL BE USED WHEN CURB FACE IS 9" OR MORE.
2) THE BAR SHALL BE EMBEDDED 5" AT EACH END.

PLAN VIEW

DOWEL BAR

COMMON DETAILS AND SECTIONS FOR CURB OPENING CATCH BASINS

DETAIL NO. 536-1
STANDARD DETAIL ENGLISH

MARICOPA ASSOCIATION OF GOVERNMENTS

REVISED
01-01-1999
DETAIL NO. 536-1
NOTES:

1. FRAME SHALL BE NON-LOCKING.

2. FRAME AND COVER SHALL BE CAST IRON OR ASTM A-36 STL. HORIZONTAL SURFACE OF COVER IN CONTACT WITH FRAME SHALL BE MACHINE. ASA B-46 ROUGHNESS SHALL NOT EXCEED 1/32".

3. COVER SHALL BE FILLED WITH CONCRETE AND BROOM FINISHED.

4. SMALL VARIATIONS IN DIMENSIONS OF FEATURES OF A MINOR NATURE THAT ARE PART OF THE FOUNDRY'S CASTING ARE PERMISSIBLE.
29" x 29" I.D. GRATE FRAME

PLAN

SINGLE GRATE

29" x 53" I.D. GRATE FRAME

PLAN

DOUBLE GRATE

SECTION B-B

DETAIOL OF ANGIE FRAME
GRATE SUPPORT

3" x 2-1/2" x 1/2"
1/2" x 3-1/2" BOLT OR WELDED LUG, 4 EACH - ONE ON EACH CORNER

1/2" DIA X 1" EYE BOLT
2-3/8" x 3-1/8" x 1/4" BEVELED SIDES FOR WELDS

BAR GRATE
SEE DETAIL 539

1/4" x 1-3/4" x 24" CHAIN TO 1" x 6" EYE BOLT IN WALL. BEND BOLT 1" ON END.

PIPE SIZE AS REQUIRED BY PLANS
SLOPE FLOOR TO OUTLET

SECTION A-A

SECTION C-C

ALL CONCRETE SHALL BE CLASS 'A' PER Sect. 725.
EXPOSED EDGES SHALL BE FINISHED WITH A 1/2" RADIUS.

WELD INTO 2ND SPACE

1/4" x 1-3/4" x 24" CHAIN

DETAILS - 01-03-2002

MARICOPA ASSOCIATION OF GOVERNMENTS

DETAIL NO. 537

STANDARD DETAIL
ENGLISH

CATCH BASIN - TYPE 'G'

REVISED

DETAIL NO. 537
WHEN DOUBLE GRATE IS USED INCREASE THE LENGTH OF THE STRUCTURE ACCORDINGLY.

CUT HOLE IN PIPE 24" LONG FOR SINGLE GRATE STRUCTURES AND 48" LONG FOR DOUBLE GRATE. WIDTH DEPENDS ON DIA. OF PIPE, NOT TO EXCEED 22" MIN. WIDTH TO BE SET BY PROJECT ENGINEER.

SEE DETAIL 539 FOR GRATE

29" x 29" I.D. SINGLE FRAME
29" x 53" I.D. DOUBLE FRAME

3" x 2-1/2" x 1/2" ANGLE IRON FRAME
1/2" DIA x 6" LUGS WELDED TO FRAME, 4 EACH – 1 ON EACH CORNER OF FRAME

FOR PIPE LARGER THAN 24" DIA. (NOMINAL)

D=(VARIES)

B=(VARIES)

C=3'-4"

SECTION A-A

SECTION A-A

SECTION A-A

24" PIPE (NOMINAL)
(6) 1/2" DIA. x 28-1/2" SINGLE, 52-1/2" DOUBLE TRANSVERSE RODS, 4" ON CENTER
FLUSH WITH GRATE SURFACE.

(2) 2" x 1/4" x 28-1/2" SINGLE, 52-1/2" DOUBLE END BARS

(15 SINGLE, 26 DOUBLE) 2-1/2" x 1/2" x 28" BEARING BAR
APPROXIMATELY 2" ON CENTER

3/16" EACH BAR & ROD

NOTES:

2. WELDING SHALL BE IN ACCORDANCE WITH A.W.S. SPECIFICATIONS.
3. FRAME AND GRATE SHALL BE TESTED FOR ACCURACY OF FIT
AND SHALL BE MARKED IN SETS BEFORE DELIVERY.
4. THE COMPLETED ASSEMBLY SHALL BE GIVEN ONE SHOP COAT OF
NO. 1 PAINT AND TWO FIELD COATS OF NO. 10 PAINT AS PER SECTION 790.
5. THE GRATE SHALL BE FABRICATED TO WITHIN 1/8"
SPECIFIED DIMENSIONS.
NOTES:

1. GRATING UNITS AND FRAMES SHALL BE FABRICATED FROM STRUCTURAL STEEL EXCEPT AS NOTED.
2. WELDING SHALL BE IN ACCORDANCE WITH STD. WELDING SPECS.
3. THE COMPLETED ASSEMBLY SHALL BE GIVEN TWO SHOP COATS OF NO. 1 PAINT AS PER SECT. 790.
4. FRAME AND GRATE SHALL FIT TO A MAX. ROCK OF 0.093" AT ANY POINT.
5. RESTRICT USE TO GRADES OF 3% OR LESS.
NOTES:

1. INSTALL WHEN REQUIRED BY PLANS, SPECIFICATIONS, OR APPROVED BY THE ENGINEER.

2. SEE PROJECT PLANS FOR CATCH BASIN DETAILS AND PAVEMENT STRUCTURAL SECTION.

CURB OPENING INLET

GRATE OPENING INLET
### NOTES

1. Design of end section shall conform to standard for reinforced concrete pipe.

2. End section joint conformation shall match the pipe joints.

3. Embankment slope shall be warped to match slope of end section.

4. Culvert length is as shown on plans.

---

### PIPE DIAMETER (INCHES) & WEIGHT (LBS.)

<table>
<thead>
<tr>
<th>PIPE DIA.</th>
<th>APPROX. WEIGHT (LBS.)</th>
<th>T</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
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<td>3</td>
<td>9-1/2</td>
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<td>73-1/2</td>
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<td>1930</td>
<td>3-1/4</td>
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<td>3-1/2</td>
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<td>19-3/4</td>
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<td>15</td>
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<td>2 1/2</td>
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### DIAGRAMS

- **Plan**
- **Section A-A**
- **Front Elevation**
- **Skewed Culvert**
- **Right Angle Culvert**

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**Culvert**

- **Culvert Length**
- **Embankment Slope**
- **Right Angle Culvert**
- **Skewed Culvert**
- **Normal Toe of Slope**

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**Detail No.**

545

**Revised**

01-01-1998
NOTES:
1. WHERE ROCK IS ENCOUNTERED THE OUTLET MAY BE OMITTED.
2. ALL PORTIONS OF SPILLWAY TO BE TROWEL FINISHED.
3. CONCRETE FOR THE SPILLWAY INLET, SPILLWAY AND OUTLET SHALL BE CLASS 'B' PER SECT. 725.
4. WHEN THE OUTLET IS USED, THE WIRE MESH SHALL EXTEND THROUGH THE JOINT INTO THE OUTLET IN LIEU OF BENDING INTO THE KEY.

SECTION A–A

SPILLWAY SECTION

SECTION ON SPILLWAY C

DOUBLE INLET

SPILLWAY INLET AND OUTLET
CONCRETE SURFACE FORD CONCRETE WALLS

NOTES:
1. FORD WALLS SHALL BE CLASS 'A' CONCRETE PER SECT. 725.
2. DEPTH GAUGE SHALL BE PAINTED 2 COATS WHITE ENAMEL. NUMERALS AND MARKERS SHALL BE 1 COAT BLACK ENAMEL.
3. NUMBERS ON DEPTH GAUGE TO BE 2" HIGH.
4. HEIGHT OF DEPTH GAUGE OPTIONAL.
5. TWO DEPTH GAUGES MAY BE USED. ONE ON EACH END OF UPSTREAM WALL. START WITH 2" INSTEAD OF 1".

BITUMINOUS SURFACE FORD CONCRETE WALLS

DEPTH GAUGE DETAIL
(OPTION OF THE CONTRACTING AGENCY)

VERTICAL ALIGNMENT TO BE AS NEAR AVERAGE TRANSVERSE GRADE OF STREAM BED AS POSSIBLE

DEPTH GAUGE
FINISHED GRADE
WALL TO BE BUILT ONE FOOT ABOVE HIGH WATER LEVEL

WALL MAY BE BUILT TO THIS LINE

3% MAX
UPSTREAM WALL
3" WEEP HOLE
20' C TO C
**TYPICAL GABIONS**

1. HEAVY GAUGE FRAME WIRE.
2. HEAVY GAUGE TRIPLE-TWIST HEXAGONAL MESH (OR EQUAL) FASTENED TO FRAME WIRE.
3. CONTINUOUS HEAVY GAUGE WRAPPED AROUND FRAMES TO FASTEN GABIONS TO EACH OTHER.
4. PARTITIONS TO PREVENT SHIFTING, NORMALLY ONE PER 3’ LENGTH, INSTALLED AT FACTORY.

**NOMINAL SIZE COMBINATIONS**

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<tr>
<th>LENGTH</th>
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<td>3’</td>
<td>1’</td>
</tr>
<tr>
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<td>3’</td>
<td>1’</td>
</tr>
<tr>
<td>12’</td>
<td>3’</td>
<td>1’</td>
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**NOTE:**

OTHER SIZES AVAILABLE FROM MANUFACTURER.