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REVISED 1985
INDUSTRIAL WASTE CONTROL VAULT WITH MANHOLE
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DETAIL NO.
STANDARD DETAIL
INDEX

539 GRATES FOR CATCH BASINS, TYPE G AND H

Revised 10/05 1/17
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 "STD. DETAIL." IS USED. AN EXAMPLE OF THIS WOULD BE: "SEE STD. 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 HERE-IN MAY BE USED BY SOME OF THE AGENCIES AND NOT BY 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.
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 OF 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 ALSO SHOW DIFFERENCE BETWEEN \( L \) AND \( L' \).
1. TYPE 'A' TO BE USED AT INTERSECTIONS OF MAJOR
   STREETS & COLLECTOR STREETS, & AT OTHER SPECIAL POINTS
   IF REQUIRED BY ENGINEER, AS SHOWN ON PLANS.
2. TYPE 'B' TO BE USED AT INTERSECTION OF STREET C'S
   (EXCEPT WHERE TYPE 'A' IS SPECIFIED), CORNERS OR
   CHANGES IN ALIGNMENT OF SUBDIVISION BOUNDARIES (WHEN
   THEY FALL IN PAVEMENT), RIC'S & P.T.'S OF CURVES.
   WHEN P.I. FALLS IN PAVEMENT, THEN THE P.I. SHALL BE
   MONUMENTED.
3. TYPE 'C' TO BE USED AT CORNERS OF A CHANGE IN
   ALIGNMENT OF SUBDIVISION BOUNDARIES WHERE CORNERS OR
   CHANGE POINTS FALL OUTSIDE OF PAVED AREAS OR IN ALLEYS.
4. LETTERS TO BE APPROX. 1/32" WIDE & 1/32" DEEP.
5. USE STANDARD WROUGHT IRON WASHER 3" O.D. XII/64" THICK
   WITH 1-3/8" HOLE.
6. CAP TO BE CONSTRUCTED OF RED BRASS OR BRONZE.
7. FRAME & COVER TO INCLUDE CHAIN PER STD. DET. 270.
   (OPTIONAL PER AGENCY REQUIREMENT).
NOTES

1. TYPE 'D' NORMALLY USED AT STREET INTERSECTIONS, AS SUBDIVISION MONUMENTS AND 1/16 CORNERS.
2. TYPE 'E' NORMALLY USED ON SECTION CORNERS, 1/4 CORNERS AND AT THE CENTER OF SECTIONS. CONCRETE POST IS CHAMFERED 3/4" AT TOP, MIN. LENGTH OF POST 7-1/2", MAX. LENGTH 27-1/2". LENGTH DEPENDS ON SUBSURFACE OBSTRUCTIONS SUCH AS OLD CONCRETE PAVING, ROCK, ETC...
3/4" GALV PIPE SET IN THIS POST SHALL BE A MIN. OF 6" LONG AND A MAX. OF 24" EXCLUSIVE OF COUPLING, SEE PLANS.
3. CAP TO BE CONSTRUCTED OF RED BRASS OR BRONZE.
4. FRAME & COVER TO INCLUDE CHAIN PER STD. DETAIL 270.
FASTEN WITH 1/2" X 5" LAG SCREWS WITH 2 FLAT WASHERS OR (2) 5/8" BOLTS, WITH 4 FLAT WASHERS.

2" X 6" DOUGLAS FIR PLANK (LENGTH TO BE DETERMINED ON PLANS.)

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.

TYPE "A" AND "B" MARKINGS SHALL BE ALTERNATE RED AND WHITE ENGINEERING GRADE REFLECTIVE STRIPES (SLOPING DOWNWARD IN THE DIRECTION TRAFFIC IS TO PASS).
FLANGED STEEL "U" CHANNEL (2 lbs. or 3 lbs. PER FT. AS SPECIFIED)

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

2" DIA. STANDARD PIPE GALVANIZED

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" CONCRETE BASE FOUNDATIONS SHALL TYPE "C" BE CLASS "C" CONCRETE AS PER SECT. 505 & 725.

DETAIL NO. 131 STANDARD DETAIL STREET SIGN BASE

REVISED 1990
**FACE ELEVATION**

- **PROVIDE STD. HOLE IN ALL PLATES**
- **BEGIN SHOULDER TAPER**
- **NORMAL SHOULDER LINE**
- **FINISHED SHOULDER GRADE**
- **BEGIN SHOULDER TAPER**
- **USE APPROACH TREATMENT**
- **25:1 TAPER**
- **NOTE: LAP PLATES WITH EXPOSED EDGE AWAY FROM APPROACHING TRAFFIC.**

**MIN. 12 GA. PLATE**

- **1-3/4" X 3" X 3/16" WASHER WITH 1" X 11/16" SLOTTED HOLE**
- **5/8" X 18" BUTTON HEAD BOLT & RECESSED NUT**
- **60 SPIKES 2/BLOCK**

**SIDE ELEVATION**

- **FINISHED SHOULDER LINE**
- **SUBGRADE**
- **FINISHED SHOULDER LINE**

**PLAN**

- **NORMAL SHOULDER LINE**
- **P.V.M. STRUCT.**
- **SIDE ELEVATION**

**NOTES**

1. POSTS AND BLOCKS SHALL BE NOMINAL 8" X 8" ROUGH WOOD, PRESSURE TREATED AND UNPAINTED. HOLES SHALL BE BORED BEFORE TREATMENT. SEE SECT. 415.
2. ALL GUARD RAIL PLATE, FITTINGS, HARDWARE, ETC. SHALL BE GALVANIZED.
3. TYPE 'A' GUARD RAIL INSTALLED ON NORMAL SHOULDER LINE.
4. TYPE 'B' GUARD RAIL INSTALLED ON WIDENED ROADWAY SHOULDER LINE.
5. TYPE 'B' INSTALLATION SHOWN. TYPE 'A' INSTALLATION SAME EXCEPT THAT INSIDE FACE OF GUARD RAIL SHALL FALL ON THE NORMAL SHOULDER LINE AS INDICATED BY PLAN DRAWING.
"W" SECTION BACK-UP PLATE FOR STEEL POSTS

SLOT 3/4" X 2-1/2"

W6X8.5 STEEL POST

STEEL "W" SECTION, 12 GAUGE

"W" BEAM (STEEL POST)
NOTES
1. TOP AND RUB RAIL BOLTS SHALL NOT PROJECT MORE THAN 1", IF ADJUSTMENT SHORTENING IS REQUIRED, THREADS SHALL BE LEFT IN FUNCTIONAL CONDITION.
2. HORIZONTAL DISTANCE BETWEEN TOP RAIL AND MEDIAN CURB SHALL NOT EXCEED 1'.

DETAIL NO. 2 - MEDIAN BARRIER

INSTALLATION OF GUARD RAIL IN EMBANKMENT CURB SECTIONS

DET. NO. 3 - RUB RAIL SPlice (SPlice AT POSTS ONLY)

STEEL GUARD RAIL

REvised 1997
5/8" MACH. BOLT & 1-3/4" X 11/16" X 9/64" WASHER. LENGTH DETERMINED BY TOTAL BLOCK THICKNESS AND SELF DRILLING ANCHOR.

5/8" X 8-1/2" CARRIAGE BOLT. USE 2-1-3/4" X 3" X 3/16" WASHERS WITH 1" X 11/16" SLOTTED HOLES, ONE OF WHICH SHALL BE RECESSED 1" INTO BACK OF BLOCK.

NOTES
1. 5/8" BOLT SIZE SELF DRILLING ANCHOR SHALL HAVE A MINIMUM 1500# PULL OUT STRENGTH IN 2500 P.S.I. CONCRETE IN ACCORDANCE WITH MANUFACTURER’S SPECIFICATIONS.

PIER OR ABUTMENT

8" X 8" X 1-1/2" BLOCK

SECTION

DETAIL NO. 4
ATTACHMENT OF GUARD RAIL TO STRUCTURES

POST LENGTH AS REQUIRED

FINISHED GRADE

2-6" X 6" X 1/2" L

8' LONG

1" SQ. OR HEX. HEAD MACH. BOLT, NUT AND WASHERS.

SECTION A-A

ELEVATION

DETAIL NO. 5 - BUFFER END SECTION

4-5/8" BOLT SIZE SELF DRILLING ANCHOR & BOLTS. SEE NOTE 1.

DETAIL NO. 1 - GUARD RAIL
POST INSTALLATION ON STRUCTURES

DETAILED NO. 135-4
STANDARD DETAIL
STEEL GUARD RAIL

DETAILED NO. 135-4
THIS PAGE RESERVED FOR FUTURE USE
SAFETY POST SECTION
N.T.S.

6" REFLECTIVE ENGINEER'S TAPE
(3M HIGH DENSITY YELLOW PRESSURE SENSITIVE TAPE OR APPROVED EQUIVALENT)

FILL WITH GROUT AND CROWN TOP

4" DIA. OR 6" DIA. x 6' STEEL POST, SCHEDULE 40, GALVANIZED

EXIST. GRADE

EXIST. CONC. OR ASPHALT

CONCRETE (CLASS B)

4" MIN.

4" OR 6" POST DIA.
NOTE: DIMENSIONAL AND REINFORCEMENT CHANGES WILL BE PERMITTED UPON PRIOR WRITTEN APPROVAL OF THE ENGINEER.
3 STRANDS-4 POINT BARBED WIRE UNLESS OTHERWISE SPECIFIED

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; X 3/4&quot;</td>
<td>FLAT</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 SECTIONS 420 AND 772 RESPECTIVELY. SEE TABLE 772 FOR WEIGHTS OF MEMBERS.
NOTE: L-___ NUMBERS DESIGNATES FAA SPECIFICATION NO.,

L-822 FIXTURE (TAXIWAY)
L-802 FIXTURE (RUNWAY)

BREAKABLE COUPLING AND DISCONNECT PLUG
FINISHED GRADE

L-857 BASE
L-823 CONNECTOR
L-833 TRANSFORMER

L-824 TYPE 'B' CABLE 1/C, #8, 3KV

BARE COPPER COUNTERPOISE WIRE (IF SPECIFIED)

GROUND CLAMP

APPROXIMATELY 4" CONCRETE BACKFILL PER SECT. 725, CLASS 'A'.

3/4" DIA. DRAIN HOLE

12"x12"x12" ABC PER SECT. 702.

BUILDING BLOCK (BRICK)
D = DRY DENSITY OF SAMPLE CONTAINING R PERCENT ROCK BY VOLUME
S = BULK SP. GR. OF ROCK
D = DRY DENSITY OF PORTION PASSING NO. 4 SIEVE, LB. PER CU. FT.
S = SPECIFIC GRAVITY OF ROCK
R = PERCENT ROCK BY VOLUME

EXAMPLE:
KNOWN:
SPECIFIC GRAVITY OF ROCK = 2.5
PERCENT OF ROCK IN TOTAL SAMPLE = 25
S = BULK SP. GR. OF ROCK

POINT E AT 122, 122 = DRY DENSITY IN LB. PER CU. FT. OF TOTAL SAMPLE CONTAINING 25% ROCK.

NOTE:
1. DRAW LINE AB.
2. DRAW LINE CD.
3. CHECK CONTACT WITH POINT E AT 122, 122.
4. DRAW LINE DE.
5. LOCATE D AT THE INTERSECTION WITH AB. DRAW LINE DE.
6. LOCATE D AT THE INTERSECTION WITH AB. DRAW LINE DE.
7. DRAW LINE DE.
8. LOCATE D AT THE INTERSECTION WITH AB. DRAW LINE DE.
9. DRAW LINE DE.
10. LOCATE D AT THE INTERSECTION WITH AB. DRAW LINE DE.
11. DRAW LINE DE.
12. LOCATE D AT THE INTERSECTION WITH AB. DRAW LINE DE.
13. DRAW LINE DE.
14. LOCATE D AT THE INTERSECTION WITH AB. DRAW LINE DE.
15. DRAW LINE DE.
16. LOCATE D AT THE INTERSECTION WITH AB. DRAW LINE DE.
A.C. PAVEMENT MATCH GRADATION & THICKNESS OF EXISTING PAVEMENT AND COURSES

TYPE A

A.B.C., GRANULAR BACKFILL, OR NATIVE BACKFILL PER SECT. 702 & 601

TYPE B

12" A.B.C. OR EXISTING SUBGRADE WHICHEVER IS GREATER

A.B.C. PER SECT. 702 & 601

"T" TOP (SEE NOTE 3)

A.C. SURFACE COURSE

A.C. BASE COURSE

TOTAL THICKNESS TO MATCH EXISTING

VARIES

12"

TYPE C

EXISTING PORTLAND CEMENT CONCRETE PAVEMENT

CLASS A CONCRETE PER SECT. 725

TYPE D

ASPHALT CONCRETE

CHIP SEAL COAT PER SECT. 330 & 336

OIL CAKE

TYPE E

COMPACTED BACKFILL DENSITY PER SECT. 601

SURFACE OUTSIDE OF TRENCH LINES DAMAGED DURING CONSTRUCTION SHALL BE RESTORED TO ORIGINAL THICKNESS AND CONDITION.

COMPACTED BACKFILL DENSITY PER SECT. 601

A.B.C. OR DECOMPOSED GRANITE PER SECT. 702

TYPE F

NOTES

1. BEDDING PER SECTION 601
2. ASPHALT CONCRETE SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECT. 321
3. 12" LIP IS REQUIRED ON THE SIDES OF A TRENCH THAT ARE NOT PARALLEL TO THE CENTER LINE OF THE STREET.
4. TYPES D & E REQUIRE 9" OF A.B.C. AT TOP OF TRENCH WHEN THERE IS AN EXISTING BASE.

DETAIL NO. 200
STANDARD DETAIL BACKFILL, PAVEMENT & SURFACE REPLACEMENT

DETAIL NO. 200
A. C. PAVEMENT

AGGREGATE BASE PER STD. SECT. 310.
GRADING PER STD. SECT. 301.

TYPE "A"

A. C. PAVEMENT

AGGREGATE BASE PER STD. SECT. 310.
GRADING PER STD. SECT. 301.

TYPE "B"

A. C. PAVEMENT

AGGREGATE BASE PER STD. SECT. 310.
GRADING PER STD. SECT. 301.

TYPE "C"

\( d = \text{DESIGN THICKNESS OF A.C. PAVEMENT PLUS AGGREGATE BASE} \)

2" X 6" REDWOOD HEADER (ROUGH)
PER STD. SECT. 778.

1" X 2" X 18" WOOD STAKeS
AT 5' O.C. PER STD. SECT. 778.
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 SECT. 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.

DETAIL C

DIAMOND PLATE

DIAMOND PLATE

SLOPE = .015 FT./FT.

NO. 4 REBAR, 4"
LONG 3 EACH SIDE, MIN.

SECTION 'A-A'

SECTION 'B-B'

CLASS "B" CONCRETE
PER SECT. 725 & 505

LIP OF GUTTER

GUTTER H.
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 & PERPENDICULAR TO THE CENTERLINE 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 CANNOT 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 & TYPE OF TURNOUT SHALL BE NOTED ON PLANS AS FOLLOWS:
   90°-NO RADIUS: W x L-SURFACE-TYPE; ((12' x 30')-AC.-TYPE 'B' TURNOUT).
   90°-WITH A RADIUS: W x L x R-SURFACE-TYPE; ((12' x 30' x 15')-AC.-TYPE 'C' TURNOUT).
   OTHER THAN 90° WITH 2 RADII-TYPE 'S': W x L x R1 x R2-SURFACE-TYPE;
   ((12' x 30' x 15' x 50')-AC.-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 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, A.S.T.M. D-1751.
RIBBON CURB
(TYPE B)

NOTES
2. BROOM FINISH ALL SURFACES.
3. RIBBON CURB MAY SLOPE TOWARDS PAVEMENT OR PARKWAY AS INDICATED ON PLANS.
4. CONTRACTION JOINT SPACING 10' MAX.

VERTICAL CURB & GUTTER
(TYPE A)

NOTES
1. ALL EXPOSED SURFACES TO BE TROWEL FINISHED EXCEPT AS SHOWN. SEE SECTION 340.
2. H = 6" OR AS SPECIFIED ON PLANS.
3. CONTRACTION JOINT SPACING 10' MAX.
4. EXPANSION JOINTS AS PER STD. SECT. 340

ROLL TYPE CURB & GUTTER
(TYPE C)

NOTES
1. ALL WORK AND MATERIALS SHALL CONFORM TO SECT. 340, 505, 725 BROOM FINISH EXPOSED SURFACE.
2. CONTRACTION JOINT SPACING 10' MAX.
3. EXPANSION JOINTS AS PER STD. SECT. 340
CURB & GUTTER TRANSITION

INTEGRAL ROLL CURB, GUTTER & SIDEWALK

CURB WARNING BEACON

NOTES
1. THE CURB TRANSITION WILL BE PAID FOR AS TYPE C. WHEN A PROJECT CONSISTS OF TYPE C CURB & GUTTER THROUGHOUT, THE ENTIRE RETURN SHALL BE MEASURED AND PAID FOR AS TYPE A.

2. WHERE PROPOSED CONSTRUCTION IS TO BE CONNECTED TO EXISTING C.B.G., THE TRANSITION SHALL BE AS INDICATED ON PLANS.

CURB AND GUTTER
(TRANSITION, INTEGRAL & WARNING BEACON)

NOTES
1. CONCRETE TO BE MONOLITHIC POUR. EXPOSED SURFACE FINISH AS PER SIDEWALK AND GUTTER DETAIL.

2. CONTRACTION JOINT SPACING 16' MAXIMUM.

3. EXPANSION JOINTS PER SECT. 340.
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 SECTION 340
5. MAXIMUM SPACING OF CONTRACTION JOINTS IS 10'
6. CONCRETE TO BE CLASS "B" PER SECT. 725.

TYPICAL CURB TERMINATION

TYPE "A"

TYPE "B"
SECTION A-A

NOTE: LENGTH OF TRANSITION SHALL BE EQUAL TO RADIUS OF MEDIAN NOSE, (5' MIN.) FOR LOCATION SEE PLANS.
1. SIDEWALK CONSTRUCTION SHALL CONFORM TO SECT. 340.

2. EXPANSION JOINT FILLER SHALL BE 1/2 BITUMINOUS TYPE PREFORMED EXPANSION JOINT FILLER, A.S.T.M. D-1751.

3. LARGE AGGREGATE IN CONTRACTION JOINT, SHALL BE SEPARATED TO A DEPTH OF 1" FINISH DEPTH SHALL BE A MIN. OF 3/4".

4. EXPANSION JOINT 100 MAX. SPACING PER SECT. 340.

NOTES
NOTES
1. CONTROL ELEVATIONS SHOWN ARE IN RELATION TO THE GUTTER AND ARE LOCATED RADIALY. GUTTER ELEV = 0.
2. CLASS 'B' CONC. CONSTRUCTION AS PER SECT. 725.
3. WHEN CURB HEIGHTS OF 7" ARE SHOWN ON PLANS, USE DIMENSIONS SHOWN IN [ ] S.

CONTROL ELEVATIONS

SECTION B-B

SECTION A-A

REVISED 1986
NOTES
1. CONTROL ELEVATIONS SHOWN ARE IN RELATION TO THE GUTTER AND ARE LOCATED RADIALY, GUTTER ELEV = 0.
2. CLASS 'B' CONC. CONSTRUCTION AS PER SECTION 725.
3. WHEN CURB HEIGHTS OF 7" ARE SHOWN ON PLANS, USE DIMENSIONS SHOWN IN [ ].

CONTROL ELEVATIONS

RIGHT-OF-WAY LINE

SECTION A-A

RIGHT-OF-WAY LINE

SECTION B-B

RADIUS AS SHOWN ON PLANS.

TAPER (PAID AS S/W.)

4' S/W.

5' S/W.

CURB & GUTTER PER DET. NO. 220.

ROUGH BROOM FINISH, USE A RIPPLE SURFACE PATTERN.

1/4" GROOVES AT 1" O.C. FULL FACE OF RAMP

TOP OF S/W. TOP OF RAMP

BOTTOM OF RAMP CURB WHEN FORMED AND POURED SEPARATELY

SUBGRADE PREP. SEE SECTION 301.

FOR GROOVE SLOPING RAMP FACE, SEE DETAIL NO. 14 ON TYPE D RAMP DET. 234.
NOTES

1. CONTROL ELEVATIONS SHOWN ARE IN RELATION TO THE GUTTER. GUTTER ELEVATION = 0.
2. CLASS 'B' CONCRETE CONSTRUCTION AS PER SECT. 728.
3. WHEN CURB HEIGHTS OF 7" ARE SHOWN ON PLANS, USE DIMENSIONS SHOWN IN []S.

CONTROL ELEVATIONS

R.C. & S/W = 7-1/8"
(TYP.) [7-8-1/8"
BACK OF LANDING = 3-1/2"
T.C. = 6"
[7"
T.C. = 3"
T.C. = 6"
TOP RAMP = 3"
[7"
T.C. = 3"

SECTION B-B

SECTION A-A

SUBGRADE PREPARATION, SEE SECT. 301.
MATCH GUTTER F.L.
FOR GROOVE SLOPING RAMP FACE, SEE DETAIL NO. 1 ON TYPE D RAMP DET. 234.

ROUGH BROOM FINISH, USE A RIPPLE SURFACE PATTERN.

RAMP CURB HEIGHT MATCHES S/W ELEV.

1/4" GROOVES AT 1" O.C.
FULL FACE OF RAMP.

RAMP CURB (R.C.)
RIGHT-OF-WAY LINE

10:1 TAPER, TYP. BOTH SIDES (PAIRED AS S/W).

CURB & GUTTER AS PER DET. 220.

SIDEWALK WIDTH AS SHOWN ON PLANS.

TOP OF S/W. TOP OF LANDING

BOTTOM OF RAMP CURB WHEN FORMED AND Poured SEPARATELY

DETAIL NO. 233
STANDARD DETAIL
SIDEWALK RAMPS - TYPE C

DETAIL NO. 233
4" VERT OR ROLL TYPE CURB AND GUTTER STD. DET. 220 AS SHOWN ON PLANS.

NOTES
1. CONTROL ELEVATIONS SHOWN ARE IN RELATION TO THE GUTTER AND ARE LOCATED RADIALY. GUTTER ELEVATION = 0.
2. CLASS B' CONC. CONSTRUCTION AS PER SECT. 725.

CONTROL ELEVATIONS

SECTION A-A

SUBGRADE PREPARATION, SEE SECT. 301.
NOTES:
1. ALL CONCRETE TO BE CLASS "A" UNLESS OTHERWISE APPROVED, (SECT. 725).
2. 4'-0" ON PROJECTS UNDER THE JURISDICTION OF THE COUNTY ENGINEER & THE CITY OF MESA.
3. EITHER CONSTRUCTION JOINT OR CONTRACTION JOINT IS REQUIRED AT Q, OF STREET.
4. A SEPARATE CONCRETE PAD IS REQUIRED WHEN VALLEY GUTTER IS POURED HALF AT A TIME.

EXPANSION JOINT AS PER SECT. 729

CONCRETE PAD

SUBGRADE PREPARATION AS PER SECT. 301
1. DEPRESSED CURB SHALL BE PAID FOR AT THE UNIT PRICE BID FOR THE TYPE OF CURB USED AT THAT LOCATION.

2. WHEN WIDTH EXCEEDS 22' PROVIDE A CONTRACTION JOINT ON D/W CENTERLINE.

3. BACK OF D/W OR FACE OF FUTURE S/W.

4. MASTIC EXPANSION JOINT THROUGH CURB & GUTTER.

5. CURB & GUTTER NOT PERMITTED IN THE CITY OF MESA.

6. CLASS 'B' CONCRETE, SECT. 725.

7. SUBGRADE PREPARATION, SECT. 301.

8. FLOW LINE OF GUTTER.

9. DEPRESSED CURB.

10. SECTION A-A & ELEVATION, D/W VERTICAL CURB & GUTTER OR ROLL TYPE CURB & GUTTER.

11. ROLL TYPE CURB & GUTTER NOT PERMITTED IN THE CITY OF MESA.

12. 1/4" GROOVES AT 1" O.C. FULL WIDTH OF 5' WARP SECTION, EACH SIDE OF DRIVEWAY.

**COMMERCIAL & INDUSTRIAL**

<table>
<thead>
<tr>
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<th>MAX.</th>
<th>CLASS</th>
<th>DEPTH</th>
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<td>16'</td>
<td>40'</td>
<td>B</td>
<td>6&quot;</td>
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<td><strong>24&quot; FOR TWO WAY TRAFFIC</strong></td>
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**RESIDENTIAL**

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<tr>
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<td>B</td>
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<tr>
<td>LOCAL STREET</td>
<td>12'</td>
<td>30'</td>
<td>B</td>
<td>5&quot;</td>
</tr>
</tbody>
</table>

* 16' DESIRABLE
NOTES

1. DEPRESSED CURB SHALL BE PAID FOR AT THE UNIT PRICE BID FOR THE TYPE OF CURB USED AT THAT LOCATION.

2. WHEN WIDTH EXCEEDS 22' PROVIDE A CONTRACTION JOINT ON D/W CENTERLINE.

3. BACK OF D/W OR FACE OF FUTURE S/W.

4. MASTIC EXPANSION JOINT THROUGH CURB & GUTTER. EXPANSION JOINT FILLER SHALL BE 1/2" BITUMINOUS TYPE PREFORMED EXPANSION JOINT FILLER A.S.T.M. D-1751.

5. BACK OF CURB - CONSTRUCTION JOINT OR SCORE MARK.

6. CLASS 'B' CONCRETE, SECT. 725.

7. SUBGRADE PREPARATION, SECT. 301.

8. FLOW LINE OF GUTTER.

9. DEPRESSED CURB.

10. SECTION A-A & ELEVATION, D/W VERTICAL CURB & GUTTER OR ROLL TYPE CURB & GUTTER.

11. ROLL TYPE CURB & GUTTER NOT PERMITTED IN THE CITY OF MESA.

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### COMMERCIAL & INDUSTRIAL

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<th>Driveway Width</th>
<th>Min.</th>
<th>Max.</th>
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### RESIDENTIAL

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<td>30'</td>
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<tr>
<td>LOCAL STREET</td>
<td>#12'</td>
<td>30'</td>
<td>B</td>
<td>5&quot;</td>
</tr>
</tbody>
</table>

*16" DESIRABLE
NOTES

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

2. RADIUS, SIDEWALK, CURB & GUTTER, PAVING SLOPE AND CONCRETE APRON SHALL BE CONSTRUCTED AS FOR PARKING BAYS.

DETAIL "A"

INTEGRAL CONCRETE CURB & APRON EXPANSION JOINT

PARKING BAY

DETAIL NO. 252 STANDARD DETAIL

PARKING BAYS

DETAIL NO. 252
NOTES

1. EXPANSION JOINT FILLER SHALL BE 1/2" BITUMINOUS TYPE PREFORMED EXPANSION JOINT FILLER, ASTM D-1751. BETWEEN S/W & ALLEY ENTRANCE & THROUGH CURB & GUTTER.

2. CLASS "B" CONCRETE PER SECTION 725.

3. SUBGRADE PREPARATION, SECTION 301.

4. 1/4" GROOVES AT 1" O.C. FULL WIDTH OF 5' WARP SECTION, EACH SIDE OF ALLEY ENTRANCE. SEE DETAIL NO.1 ON TYPE D RAMP DETAIL NO.234.

ELEVATION

ALLEY ENTRANCE
(WITH COMBINED CURB & GUTTER)
SECTION A-A

EXPANSION JOINT FILLER SHALL BE 1/2" BITUMINOUS TYPE PREFORMED EXPANSION JOINT FILLER, ASTM D-1751.

NOTES
1. 1/4" GROOVES AT 1" O.C. FULL WIDTH OF 4' WARP SECTION, EACH SIDE OF ALLEY ENTRANCE. SEE DETAIL NO. 1 ON TYPE D RAMP DETAIL 234.
NOTE

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. 1/4" grooves at 1" O.C. Full width of 5' ramp section, each side of pantry entrance. See detail no. 1 on type D ramp detail no. 234.
SECTION A-A

EXPANSION JOINT FILLER SHALL BE 1/2"
BITUMINOUS TYPE PREFORMED EXPANSION
JOINT FILLER, ASTM D-1751.

ROLL TYPE CURB & GUTTER

CLASS "B" CONCRETE
PER SECT. 725.

SLOPE = 0.015' PER FOOT

4' MIN.
3-1/2" MAX.
WATER VALVE, SURVEY MONUMENT, OR SEWER CLEAN OUT FRAME & GRADE ADJUSTMENT

LEAVE CONC. COLLAR LOW AND SEAL WITH 3/8" DENSE GRADED PLANT MIX MATERIAL

EXISTING BITUMINOUS PAVEMENT

CLASS '8' CONC ALL AROUND FRAME PER SECT. 725.

TOP OF SURVEY MONUMENT (BRASS CAP), WATER VALVE BOX ('8' CONCRETE PIPE), SEWER PIPE (SIZE VARIES)

BASE COURSE

SUBGRADE

8" FRAME & COVER

COMPACT TO CONFORM TO SECT. 301 OR 601.

SUBGRADE PREP AS REQUIRED

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 1/2" OF LETTERS TO BE SUBMITTED FOR APPROVAL.

LETTER SIZE 5/8" X 3/4", RAISED 1/16" ABOVE LEVEL OF COVER, TYPE 1/2" OF LETTERS TO BE SUBMITTED FOR APPROVAL.

DETAIL TYPICAL FOR BOTH FRAME AND COVER

CASTING TO CONFORM TO SECT. 787. MINIMUM WEIGHT 16 LBS. FOR COVER (AS REQUIRED)

CHAIN ATTACHMENT

FLATTEN BOLT END

SPACERS, AS REQ'D

LOCK WASHER

3/8" CHAIN

2" ROUNDHEAD BOLT

1/2" MIN.

FRAME AND COVER AND GRADE ADJUSTMENT

COVER SECTION A-A

8" C.I. FRAME AND COVER

SEWER WATER SURVEY

1/2" MIN.

1/32" R.

1/8" R.

1/2"

7/8" DIA.

1/2"

3/4" DIA.

10" DIA.

1/2"

1/2"

3/4"
CONCRETE FOOTING
CLASS "B" CONC.
PER SECT. 725

CONCRETE AS PER SECTION 725
FORM AS REQUIRED TO KEEP CLEAR OF JOINTS.

NOTE

CLASS C CONCRETE AS PER SECTION 725
FORM AS REQUIRED TO KEEP CLEAR OF JOINTS.

NOTE

THIS DETAIL COVERS WATER GATE VALVES,
4" TO 16" INCLUSIVE, REGARDLESS OF TYPE
OF PIPE USED. LARGER LINES TO BE
DETAILED ON PLANS.

WATER GATE VALVE

BLOCKING FOR
WATER GATE AND BUTTERFLY VALVES

BUTTERFLY VALVE

1. THIS DETAIL COVERS BUTTERFLY VALVE
INSTALLATION, 3" TO 12" INCLUSIVE, REGARD-
LESS OF TYPE OF PIPE OR JOINT USED. LARGER
LINES TO BE DETAILED ON PLANS.
2. VALVE BOX AND COVER REQUIRED PER STD.
DETAILS 270 AND 391.
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.
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. Holes shall be 1/8 inch larger than the rods.

For pipe larger than 12" in dia., 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 min. 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-III, 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.

5. Coating type: A.H.D asphaltic primer 719(A).—All exposed metal.
LRN = Shortest length of pipe restrained to the run of the tee fitting (both sides of tee)

DEAD ENDS

HORIZONTAL BENDS

TEES

VERTICAL UP BENDS

VERTICAL DOWN BENDS

DETAIL NO. 303-1

STANDARD DETAIL

JOINT RESTRAINT FOR DUCTILE IRON AND POLYETHYLENE WRAPPED DUCTILE IRON PIPE

DETAIL NO. 303-1

REVISED 1996
### Restrainted Lengths, LR, for Ductile Iron Pipe

#### Nominal Pipe Size

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<thead>
<tr>
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<th>TEES</th>
<th>VERTICAL OFFSETS</th>
<th>DEAD ENDS</th>
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<tr>
<td></td>
<td></td>
<td>90° BEND FITTINGS</td>
<td>45° BEND FITTINGS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45° Bend</td>
<td>22½° Bend</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>18</td>
<td>10</td>
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<td>6</td>
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#### Restrainted Lengths, LR, for Ductile Iron Pipe with Polyethylene Wrap

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<td>90° BEND FITTINGS</td>
<td>45° BEND FITTINGS</td>
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<td>22½° Bend</td>
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**Note:**
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 187.5 psi.
3. The minimum depth of bury shall be three feet to top of pipe.
4. Restrained lengths may be reduced when supported by engineering calculations.
DETAIL NO. 310  STANDARD DETAIL  CAST IRON WATER METER BOX COVER NO. 1

NUMBER 1 1-1/4" HIGH RAISED 1/8"

SECTION A-A

SECTION B-B

SECTION C-C

FOR CASTING SPECIFICATIONS SEE SECT. 787

LETTERS RAISED 1/8"
TOP OF COVER

SECTION A-A

NOTE
FOR CASTING SPECIFICATIONS SEE SECT. 787.

SECTION B-B

DETAIL

CAST IRON WATER METER BOX COVER NO. 2

REVISED 1983
1. Inspection plate is the same as used with meter box cover No. 4.
2. For casting specifications, see section 787.
TOP OF COVER

LETTERS RAISED 1/8" (TYP.)

WATER

1/8" (TYP.)

1/8"

1/4"

5 1/2"

5"

1 1/2" (TYP.)

5 9/16"

4 5/16"

BOX COVER

BOTTOM 4

TAPE

NOTE: FOR CASTING SPECIFICATIONS SEE SECT. 787. THE BEARING EDGES OF THESE CASTINGS SHALL BE MACHINED TO INSURE A FULL BEARING ON A FLAT SURFACE.
NOTES

1. FOR CASTING SPECIFICATIONS, SEE SECTION 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

PLAN VIEW

SECTION A-A

BREAK OUT IF NECESSARY TO
SET BOX TO PROPER GRADE

SECTION B-B

METER BOX DIMENSIONS

<table>
<thead>
<tr>
<th>DIM.</th>
<th>BOX NUMBER</th>
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<tbody>
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<tr>
<td>H</td>
<td>9&quot;</td>
</tr>
<tr>
<td>I</td>
<td>6&quot;</td>
</tr>
<tr>
<td>J</td>
<td>1 1/2&quot;</td>
</tr>
<tr>
<td>K</td>
<td>3/4&quot;</td>
</tr>
<tr>
<td>L</td>
<td>1/4&quot;</td>
</tr>
<tr>
<td>M</td>
<td>1 1/4&quot;</td>
</tr>
<tr>
<td>N</td>
<td>2 1/2&quot;</td>
</tr>
<tr>
<td></td>
<td>5/8&quot; OR 3/4&quot;</td>
</tr>
</tbody>
</table>

NOTES

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

2. USE CLASS AA CONCRETE PER SECTION 725.
ALTERNATE: 3/8" STL. PLATE (ASPHALT COATED) WITH 2' X 2' HINGED ACCESS DOOR.

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

CAST-IN-PLACE OR PRE-CAST TOP SECTION

CLASS 'A' CONCRETE AS PER SECT. 725

FINISH GRADE

REMOVEABLE SUPPORT

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

BLOCK MASONRY WITH SOLID GROUTED WALLS (GROUT TO CONFORM TO SECT. 776)

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

CAST-IN-PLACE VAULT SECTION

FOOTING FOR CAST-IN-PLACE VAULT

KEY

CAST-IN-PLACE FOOTING FOR PRE-CAST VAULT.
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. TAPS SHALL BE MADE BY CITY CREWS AT PREVAILING RATES OR BY APPROVED CONTRACTORS WHEN ALLOWED BY CITY.

6. 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)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; B LESS</td>
<td>3  SQUARE FOOT</td>
</tr>
<tr>
<td>6&quot;</td>
<td>4  &quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>6  &quot;</td>
</tr>
<tr>
<td>10&quot;</td>
<td>9  &quot;</td>
</tr>
<tr>
<td>12&quot;</td>
<td>13 &quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>23 &quot;</td>
</tr>
</tbody>
</table>

CONCRETE: CLASS "B" PER SECT. 725
NORMALLY, CURE 24 HRS. BEFORE BACKFILLING.
OPTIONAL BLOCKING - 2"X8"X12"
SOLID CONCRETE MASONRY UNITS AS INDICATED.
FOR VAULT CONSTRUCTION
SEE STD. DETAIL 321.

CONCRETE SUPPORT UNDER
NO. 4 5 11 12
SECTION A-A
6" x 6" x 6" CONCRETE BASE

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

FINISH GRADE

WOOD SHIMS
BY-PASS

2" GALV. PIPE SUPPORT

TYPICAL
BOTH SIDES

2" GALV. PIPE SUPPORT

FLOOR

FLOW

TYPICAL
BOTH SIDES

(3) VARIES

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

INSULATE WATER MAIN
FROM CONCRETE BOX
WITH EXPANSIVE MAT' L.

VAULT DIMENSION TABLE

<table>
<thead>
<tr>
<th>A.C.P. SIZE</th>
<th>3&quot;</th>
<th>4&quot;</th>
<th>6&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A)</td>
<td>8'-4&quot;</td>
<td>10'-6&quot;</td>
<td>12'</td>
</tr>
<tr>
<td>(B)</td>
<td>4'-4&quot;</td>
<td>5'</td>
<td>5'</td>
</tr>
</tbody>
</table>

NOTE: METER VAULTS MAY BE EITHER BLOCK MASONRY OR
CAST-IN-PLACE OR PRE-CAST CONCRETE, SEE STD.
DETIAL 321 FOR VAULT CONSTRUCTION.

SOLDER 2" COPPER TO MALE
THREAED ADAPTERS

2" TYPE 'K' COPPER
BY-PASS

(A) - VARIES, SEE TABLE OF VAULT SIZES BELOW

A

3' MIN.

6" MIN.

(A) - VARIES, SEE TABLE OF VAULT SIZES BELOW

18" MIN.

4" CRUSHED ROCK

4"

24"

18"

46"

6" MINIMUM

6" MINIMUM

6" MIN."
**CONCRETE PRESSURE PIPE TAPPING SLEEVE**

*DIMENSIONS TO BE FIELD VERIFIED*
FOR VAULT CONSTRUCTION
SEE STD. DETAIL 321.

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

3' MIN.

FLOW

(b) - VARIES

SEE TABLE OF VAULT SIZES

FLOW

SOLDER 2" COPPER TO MALE
THREAD ADAPTERS

2" TYPE K COPPER
BY-PASS

(A) - VARIES, SEE TABLE OF VAULT SIZES BELOW

CONCRETE SUPPORT UNDER
NO. 11112

6" X 6"

SECTION A-A

4" CRUSHED
ROCK.

4" GALV PIPE SUPPORT

FINISH GRADE

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

INSULATE WATER MAIN
FROM CONCRETE BOX
WITH EXPANSIVE MAT' L.

VAULT DIMENSION TABLE

<table>
<thead>
<tr>
<th>A.C.P. SIZE</th>
<th>3&quot;</th>
<th>4&quot;</th>
<th>6&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A)</td>
<td>8'-4&quot;</td>
<td>10'-6&quot;</td>
<td>12'</td>
</tr>
<tr>
<td>(B)</td>
<td>4'-4&quot;</td>
<td>5'</td>
<td>5'</td>
</tr>
</tbody>
</table>

NOTE: METER VAULTS MAY BE EITHER BLOCK MASONRY OR
CAST-IN-PLACE OR PRE-CAST CONCRETE, SEE STD.
DETAIL 321 FOR VAULT CONSTRUCTION.
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 'turb' 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.
12. Turbometer U.L. Approved: Rockwell W-5000 Dr. or W-2000 Dr. or Hersey FM.-CT. or Neptune Turbine - FS-UL
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" ROB ON 6" CENTERS EACH WAY ON TOP AND 12" CENTERS EACH WAY ON THE SIDES.

3. COVERS TO CONSIST OF TWO METER BOX COVERS STD. 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 PROOF EQUAL.

6. VAULT SHALL BE CONSTRUCTED IN OWNERS PROPERTY AGAINST THE FRONT PROPERTY LINE OR ANOTHER APPROVED LOCATION, WALLS & FENCES SHALL NOT OBSTRUCT ACCESS.

7. CITY CONTROL VALVE TO BE REQUIRED AT MAIN.

8. PARTS OF PIPE TO BE EMBEDDED IN CONCRETE SHALL BE WRAPPED WITH 30# ASPHALT ROOFING FELT.

9. REMOTE READING DEVICE SHALL BE OF SELF GENERATING ELECTRICAL TYPE.

10. CONCRETE TO BE CLASS "B" PER SECT. 725.
NOTES:
1. JOINTS BETWEEN THE VALVE AND THE MAIN SHALL BE FLANGED TYPE. JOINTS BETWEEN THE VALVE AND HYDRANT SHALL BE FLANGED OR MECHANICAL TYPE.
2. 90° BEND NOT REQUIRED IF SUFFICIENT ROOM FOR PERPENDICULAR INSTALLATION.
3. FOR CONCRETE THRUST BLOCKS SEE STD. DETAIL 380
4. A FLANGE JOINT BY MECHANICAL JOINT VALVE MAY BE USED AS THE TRANSITION BETWEEN THE JOINT TYPES.
5. SEE STANDARD DETAIL 362 FOR LOCATION OF HYDRANT.

SEE STD. DETAIL 391
FOR VALVE BOX INSTALLATION

6" SHORT BODY
90° 1/4 BEND.
SEE NOTE NO. 2

PUMPER CONNECTION TO FACE CURB

WATER VALVE BLOCKING
SEE STD. DETAIL 301.

CRUSHED ROCK TRENCH,
MIN. OF 8 CU. FT., ALONG PIPE AND ABOVE DRAIN HOLE.

GROUN D LINE

COREY TYPE

WATER MAIN
NOTES
1. OBSTRUCTIONS SUCH AS UTILITY POLES, STREET SIGNS, IRRIGATION BOXES, FENCES, ETC., MUST NOT BE PLACED BETWEEN CURB AND HYDRANT.
2. RADIUS VARIES BY MUNICIPALITY.
3. DIMENSIONS SHOWN ON CONSTRUCTION DRAWINGS SUPERSEDE LOCATIONS SHOWN HERE.
4. ON LOCATIONS IN MIDBLOCK, THE FIRE HYDRANT WILL BE ALIGNED WITH A PROPERTY LINE.

PARKWAY AREA OR NO SIDEWALK

AREA WITH SIDEWALK
CAST IRON

MECHANICAL JOINT

CAST IRON BENDS MAY BE USED IN PLACE OF CAST IRON OFFSETS, AS SHOWN

6" MIN. CLEARANCE BACKFILLED WITH SELECTED FINE MATERIAL OR SAND.

CAST IRON

ASBESTOS CEMENT

6" MIN. CLEARANCE BACKFILLED WITH SELECTED FINE MATERIAL OR SAND.

NOTES:
1. THIS DETAIL COVERS MOVING OF WATER MAINS, 2" TO 12" ONLY.
2. THRUST BLOCKING AS PER STD. 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.
TYPICAL LOCATIONS OF THRUST BLOCKS

NOTE: THRUST BLOCKS ARE TO EXTEND TO UNDISturBED GROUND. CONCRETE TO BE CLASS C, SECT. 725.

AREA REQUIRED FOR 90° BEND

1/2 AREA REQUIRED FOR 90° BEND

TOTAL AREA EQUALS AREA REQUIRED FOR TEE

AREA FOR TEE

MINIMUM THRUST BLOCK AREA REQUIRED (Y x W)

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>TEE, DEAD END, 90° BEND</th>
<th>45° &amp; 22 1/2° BENDS</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot; &amp; LESS</td>
<td>3 SQ. FEET</td>
<td>3 SQ. FEET</td>
</tr>
<tr>
<td>6&quot;</td>
<td>4&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>8&quot;</td>
<td>6&quot;</td>
<td>&quot;</td>
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<tr>
<td>10&quot;</td>
<td>9&quot;</td>
<td>&quot;</td>
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<tr>
<td>12&quot;</td>
<td>13&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>16&quot;</td>
<td>23&quot;</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

NOTES:
1. TABLE IS BASED ON 3000#/SQ.FT. SOIL. IF CONDITIONS ARE FOUND TO INDICATE SOIL BEARING IS LESS, THE AREAS SHALL BE INCREASED ACCORDINGLY.
2. AREAS FOR PIPE LARGER THAN 18" SHALL BE CALCULATED FOR EACH PROJECT.
3. FORM ALL NON-BEARING VERTICAL SURFACES.
NOTE

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.

<table>
<thead>
<tr>
<th>PIPE SIZE</th>
<th>MIN. BAR SIZE</th>
<th>&quot;A&quot;-DIMENSION (HOOK)</th>
<th>MIN. BLOCK DIM.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td># 6</td>
<td>6&quot;</td>
<td>3' x 3' x 3'</td>
</tr>
<tr>
<td>8&quot;</td>
<td># 6</td>
<td>9&quot;</td>
<td>4' x 4' x 2.5'</td>
</tr>
<tr>
<td>12&quot;</td>
<td># 8</td>
<td>9&quot;</td>
<td>4' x 5' x 5'</td>
</tr>
</tbody>
</table>

* FOR 125 PSI WORKING PRESSURE

NOTES

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.
**TYPE 'A'**

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 EXIST. GALVANIZED PIPE TO ASPEN TOS CEMENT PIPE OR CAST IRON PIPE.

**TYPE 'B'**

1. VALVE BOX TO BE SUPPORTED ON BRICKS TO PREVENT VERTICAL LOADS FROM BEING TRANSMITTED TO THE SMALL PIPE.
CAST IRON WATER METER BOX COVER PER STD. DETAIL 311.

GROUND LEVEL

CONC. WATER METER BOX NO. 2 PER STD. DETAIL 320.

2" P.E. OR COPPER PIPE

2" CORP STOP

2" BRASS COUPLING

2" BRASS ELL

WATER MAIN

2" TAPPED CAP (CAST IRON)

VALVE BOX LOCATION MAY VARY IF APPROVED BY THE CITY ENGINEER

CAST IRON WATER METER BOX COVER PER STD. DETAIL 311.

GROUND LEVEL

CONC. WATER METER BOX NO. 2 PER STD. DETAIL 320.

2" ADAPTER BRASS OR COPPER

6" GRAVEL BED

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

2" COPPER PIPE

2" BRONZE CURB STOP

TAPPED PLUG OR CAP

BRONZE OR BRASS FITTINGS

WATER LINE

CONC. THRUST BLOCK PER STD. DET. 380

TYPE 'A'

TYPE 'B'
NOTES

1. VALVE BOX SHALL BE ADJUSTED TO THE FINISHED GRADE PRIOR TO PLACING OF THE ASPHALTIC 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.

TYPE 'A'
(TO BE USED IN AREAS SUBJECT TO VEHICULAR TRAFFIC.)

TYPE 'B'
(ALTERNATE BRICKS
(NOT SUBJECT TO VEHICULAR TRAFFIC.)

TYPE 'C'

COVER ONLY

CLASS "B" CONC. AS PER SECT. 725.

FINISH GRADE

FOR DEPTHS OVER 5' EXTENSION STEM REQ'D (SEE SHEET 2)

SEE NOTE 2.

SEE NOTE 3.

SEE NOTE 1.

CONCRETE RING NOT REQUIRED WHEN ADJUSTED IN UNPAVED AREAS

CONCRETE TO BE ON UNDISTURBED OR COMPACTED SOIL.

6" THICK CONC. RING W/30" OUTSIDE DIA.

VIEW A-A

2:1/2"

16" (Typ.)

1" (Typ.)

A

A

CLASS "B" CONC. AS PER SECT. 725.

TYPE 'A'

8" CONC. PIPE; PIPE LENGTH CUT IN FIELD TO SUIT. (Typ.)

6" THICK & 40" IN DIA.

FOR UNPAVED STREETS & ALLEYS.

8" C.I. FRAME & COVER AS PER STD. DETAIL 270.

(MAX.) 1/4"

6"

FINISH GRADE

ASPHALTIC CONC.
PAVEMENT

THE WORD "WATER" ON COVER (Typ.)

SEE SHEET 2

10"
NOTES

1. EXTENSION STEM: WITH SQUARE SOCKET ON BOTTOM TO FIT 2" SQUARE VALVE NUT. EXTENSION TO VALVE STEMS 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.P. PIPE RUBBER GASKET COUPLING TO JOIN PIPE. WHERE RISER LENGTH EXCEEDS 10' USE 12" A.C.P. 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.

SHEET 2 OF 2

DETAIL NO. 391-2 STANDARD DETAIL VALVE BOX INSTALLATION
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 SLIPPAGE, A MINIMUM VERTICAL FORCE OF 50 POUNDS, AT A LOADING RATE OF 1.0 IN./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.

6. THE HANDLE AND/OR BODY OF THE CAP SHALL BE INTEGRALLY COLORED IF REQUIRED BY THE AGENCY. IF REQUIRED THE COLOR SHALL CONFORM TO THE ONE CALL LOCATING SERVICE (BLUE STAKE) COLORS (ARS 40-360.21)

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.
1. Lay pipe to line and grade on brick cradle.
2. Place Class "C" conc. per Sect. 725 & 505, in such a manner as not to float the pipe.
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.

SCHEDULE OF REQUIRED SUPPORTS

<table>
<thead>
<tr>
<th>PERMANENT</th>
<th>TEMPORARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEWER LINES</td>
<td>CAST IRON PIPE</td>
</tr>
<tr>
<td>CONC. STORM DRAIN</td>
<td>CONC. BOX CULVERT</td>
</tr>
<tr>
<td>CONC. IRRIG. PIPE</td>
<td>BURIED TELEPHONE</td>
</tr>
<tr>
<td>Traffic Control Conduit</td>
<td>GAS PIPES</td>
</tr>
<tr>
<td>WATER &amp; SEWER LINES</td>
<td></td>
</tr>
</tbody>
</table>

NOTE: OTHER UTILITIES AS NOTED ON THE PLANS OR AS REQUIRED BY THE ENGINEER AT TIME OF CONSTRUCTION.
EXISTING CROSSING PIPE

NEW PIPE

NEW DUCTILE IRON PIPE
CLASS 52 SIZE TO MATCH EXISTING PIPE

JOINT METHOD WILL VARY DEPENDING ON EXISTING PIPE MATERIAL

NOT TO EXCEED ONE PIPE LENGTH

5' min.

5' min.

VARIES

BACKFILL & COMPACT PER SECTION 601

VARIES

REVIS 1983
NOTES:

1. THE ENCASEMENT SHALL EXTEND AT LEAST 6' ON EACH SIDE OF BOTH PIPES AND MUST INCLUDE THE NEAREST JOINT.

2. PROTECTION IS REQUIRED WHEN THE DISTANCE FROM THE BOTTOM OF THE WATER TO THE TOP OF THE SEWER IS 24" OR LESS. WHEN THE SEWER IS A 4" OR 6" HOUSE CONNECTION, NO PROTECTION IS REQUIRED IF THE DISTANCE IS MORE THAN 12". MECHANICAL JOINT OR RESTRAINED JOINT DUCTILE IRON PIPE MAY BE USED AS AN ALTERNATIVE.

REPLACE ALL PAVING ACCORDING TO SECTION 336

NEW CONSTRUCTION

EXISTING SEWER CONNECTION OR MAIN BROKEN DURING EXCAVATION FOR NEW CONSTRUCTION.

PLAN VIEW OF REPLACEMENT

COMPACTION SHALL BE DONE IN ACCORDANCE WITH SECTION 601

6" MIN. WHEN USING CAULDER CONNECTION

SAW SOUND PIPE SQUARE

12" MIN. SOLID BEARING ON EACH SIDE

REPLACEMENT WHEN NEW TRENCH MORE THAN 2' WIDE

6" MIN. WHEN USING BELL CONNECTION

EXCAVATE 6" BEYOND UNBROKEN BELL TO ALLOW ROOM FOR INSPECTION

SAW SOUND PIPE SQUARE

12" MIN. SOLID BEARING EA SIDE

NEW CONSTRUCTION

REPLACEMENT WHEN NEW TRENCH 2' WIDE OR LESS

NOTE

I. BROKEN PIPE SHALL BE REPLACED WITH A MINIMUM OF ONE FULL JOINT AND TWO SHORT LENGTHS WITH UNBROKEN BELLS. CONSTRUCTION & JOINTS TO BE MADE AS PER SECT. 615.

CONC. PER SECT. 725, CLASS C

DIAMETER AT BELL

REBAR TO BE NO. 4 WITH MAX. OF 6" BET. & MIN. OF 3 BARS

SECTION 'A'-'A'

DETAIL NO. 405 STANDARD DETAIL BROKEN SEWER LINE REPLACEMENT

DETAIL NO. 405

REVISED 1983
NOTES
1. PRE-CAST, REINFORCED M.H. SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH A S.T.M. C-478 EXCEPT AS MODIFIED BY STANDARD DETAILS BELOW LEFT.
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 STD.DET. 428 FOR M.H. STEP).
3. USE LOW ALKALI CEMENT ONLY.

FLOW

ADJUSTING RING DETAIL

(2) NO. 2 HOOPS FOR 4" RING TIED WITH NO. 4 A.S. & S.W. GAUGE WIRE. 6" & 8" RING REQUIRE (4) NO. 2 HOOPS.

DETAIL NO. 420
STANDARD DETAIL
PRE-CAST CONCRETE SEWER MANHOLE

REvised 1994
AGENCY IDENTIFICATION

FACE OF COVER
CAST IRON

FOR COVER LETTERING SEE NOTE ON STANDARD DETAIL 424.

BACK OF COVER

CAST IRON MANHOLE RING

SECTION OF COVER
APPROX. WEIGHT 1276 LBS.

DETAIL

1/2" 3/4" 31-1/2"

BATTER 1/8"

MACHINE LIMITS

NOTES
1. WEIGHT OF CASTING SHALL BE NO MORE THAN 2% LESS THAN THE APPROXIMATE WEIGHT SPECIFIED.
2. CASTINGS SHALL CONFORM TO SECT. 787

SECTION OF RING
APPROX. WEIGHT 210 LBS.

1/4" R. (TY) TREAD RING

3/4" MACHINE LIMITS BATTER 1/8"
BATTER 1/16"

1/2"

1/4"

3-7/8"
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 1/8" ABOVE LEVEL OF COVER. TYPE OF LETTERS TO BE SUBMITTED FOR APPROVAL. WEIGHT OF CASTINGS SHALL BE NO MORE THAN 2% LESS THAN THE APPROXIMATE WEIGHT SPECIFIED. CASTINGS SHALL CONFORM TO SECTION 787.
MATERIAL SHALL CONFORM TO ASTM STANDARDS
B 179-65 ALLOY CN42A
B 108-65 ALLOY SC103A
(ALL 3 ACCEPTABLE)

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 1/8" ABOVE LEVEL OF COVER. TYPE OF
LETTERS TO BE SUBMITTED FOR APPROVAL.
WEIGHT OF CASTINGS SHALL BE NO MORE THAN
2% LESS THAN THE APPROXIMATE WEIGHT
SPECIFIED, CASTINGS SHALL CONFORM TO
SECTION 787

SHALL CONFORM TO SECT. 625.3.1-(FRAME
& 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"
NOTES:
1. ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE NOTED.
2. CASTING AS PER SECT. 787.

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.
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 G.P.M.

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 MANUFACTURERS 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. CONSTRUCTION DETAIL APPLIES WHERE CONTRACTOR BUILDS HOUSE CONNECTION. TAP EXTENDS TO PROPER LINE IN ALLEYS OR STREETS OR TO ESMT. LINE.

2. SIZE OF TAP SHALL BE DESIGNATED ON PLANS.

3. DETAILS SHOWN MUST BE MET FOR MINIMUM CONDITION OF LESS THAN 5'-0".

4. CONSTRUCT TAP AT MIN. SLOPE IF COVER WILL BE LESS THAN 5 FEET AT PROPERTY LINE.

5. IF DEPTH REQUIRES, MIN. SLOPE CAN BE REDUCED TO 1/8" PER FOOT PROVIDED STUB IS STACKED TO GRADE.

6. FOR DEEPER LATERAL OR TRUNK SEWER CONDITION, THE WYE AND 1/8 BEND OR THE TEE AND 1/16 BEND WILL BE ROTATED TOWARD THE VERTICAL POSITION AS REQUIRED TO OBTAIN 5'-0" COVER OVER TAP AT PROPERTY LINE OR EASEMENT LINE.

7. END OF TAP TO BE SEALED AND MARKED AS NOTED.
THE WORD 'SEWER' ON COVER

UNPAVED STREETS & ALLEYS

8" C.I. FRAME & COVER STD. DET. 270.

PAVED STREETS & ALLEYS

1/2" MAX.

5" MIN.

COMPACTED BACKFILL OR UNDISTURBED EARTH

CLASS 'B' CONC. PER SECTION
725, 6" THICK, 40" DIAMETER

SIZE OF PIPE AS SHOWN ON PLANS

STANDARD 45° BEND

VIT. CLAY PIPE PER
SECTION 743

TO BE LAID ON UNDISTURBED EARTH OR COMPACTED SELECT MATERIAL (TYPE B) OR A.B.C.

STATION & LENGTH SHOWN ON PLANS TO THIS POINT

FLOW LINE ELEVATION SHOWN ON PLANS TO THIS POINT

8" V.C.P.

4" OR 6" V.C.P.

TAP TO PROPERTY LINE

ONE FULL LENGTH OF PIPE

6" X 8" OR 4" X 8" VITRIFIED CLAY INCREASER

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

CLEANOUT INSTALLATION

SEWER TAP AT CLEANOUT

DETAIL NO. 441 STANDARD DETAIL
SEWER CLEANOUT

DETAIL NO. 441
DOUBLE PIPE HEADWALL

WALL BLOCKS TO BE 8" x 8" x 16".

FOOTING BLOCKS TO BE 8" x 4" x 16". FILL ALL CORES WITH GROUT MIX 1:3.

ELEVATION

CONC. BLOCK HDWL. JOINED WITH CEMT. MORTAR & CONC. PLASTERED BOTH SIDES OF WALL. FULL HGT.8 SHALL BE CURED PER SECT. 726.

HEADWALL DIMENSIONS

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<tr>
<th>PIPE DIA</th>
<th>L1</th>
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<td>2-2</td>
<td>5-9</td>
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NOTES:
1. ALL CONCRETE SHALL BE CLASS "A" PER SECT. 505 & 725.
2. CONCRETE BLOCK PER SECT. 510, 775 & 776.
3. CONCRETE REINF. SHALL BE NO. 4 BAR, 12" O.C. BOTH WAYS.

PIECE SIZE BAND

| PIPE SIZE | BAND
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<tr>
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DETAIL "A"
**NOTES**

1. ALL CONCRETE SHALL BE CLASS A, PER SECT. 725.
2. ALL REINFORCING BARS SHALL BE #8 EXCEPT #6 BARS OVER PIPE. BAR SPACING APPROXIMATELY 1'-0" C TO C UNLESS OTHERWISE NOTED.
3. 30° WING WALL FLARE SHOWN; 45° NORMALLY 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, 1'-0" C TO C
   AND 3" CLEAR TO INSIDE OF WALLS AND FLOOR.

PIPE

<table>
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<th>W</th>
<th>A</th>
<th>B</th>
<th>E</th>
<th>F</th>
<th>H</th>
<th>J</th>
<th>K</th>
<th>CONC.</th>
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</table>
PIPE MAY ENTER WALL

SEE NOTE 4

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 MIN. EL. NOTED 3 FEET BEYOND CONNECTION TO UNDISTURBED EXISTING DITCH.


4. 1/4" PLATE SHALL NOT EXTEND BELOW TOP OF PIPE.
STD. 8"x6"x16" CONCRETE BLOCKS AS PER A.S.T.M. C-129

PIPE CROSSING STREET

PLASTER INSIDE WITH FLOAT FINISH

CONCRETE MORTAR

PIPE TO DITCH

GRAUT SOLID, FLOAT FINISH TOP

VARIES

3/8" Ø HANDLES WELDED TO MESH

2-1/2"x1-1/2"x1/8" ANGLES WELDED TO 1 1/2" NO. 9 EXPANDED METAL (PENMETAL OR EQUAL)

WELD EYEBOLT TO ANGLE

FINISH EDGES WITH 18 GAGE x 1" BINDING, PENMETAL NO. 501 OR EQUAL

S/W GRADE

6" MIN.

SIZE OF PIPE AS SHOWN ON PLANS

CLASS 'B' CONCRETE PER SECT. 725

SECTION A-A

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

ELEV. OF BOTTOM OF PAVEMENT SUBGRADE

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

DETAIl NO. 504 STANDARD DETAIL CONCRETE BLOCK JUNCTION BOX

DETAIl NO. 504
NOTES

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 USE NEXT SIZE LARGER.

4. OMIT 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.

* $A =$ ANGLE OF DEFLECTION

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**TABLE**

<table>
<thead>
<tr>
<th>D.</th>
<th>L.</th>
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NOTE: CONTRACTOR MAY USE PRECUT FITTINGS IF DESIRED. BID ITEM INCLUDES LATERAL PIPE, RISER, PAD, VALVE, LABOR AND INCIDENTAL MATERIAL REQUIRED FOR INSTALLATION.
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 SECT. 601 FOR TRENCH PREPARATION. CONCRETE TO BE CLASS 'A' PER SECT. 725.
6. COVER TO BE APPROVED BY ENGINEER.

LONGITUDINAL SECTION

PIPE O.D. ANY TYPE

BRICK OR CONCRETE BLOCK

SIDE FORMS AS REQUIRED. SEE NOTE 2

END SECTION
R=1/2 O.D.

C.M.P., C.P., OR C.M.P.
SEE BAND DETAIL BELOW
C.M.P. TYPE "A" OR TYPE "B"
3/8"

C.M.P. STORM DRAIN
T-BOLT - SEE DETAIL BELOW

CONNECTOR CROSS SECTION

STANDARD THREAD (COARSE)

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

T-BOLT

C.M.P. MAIN STORM DRAIN

C.M.P. PER A.A.S.H.T.O. SPEC. M-36, EXTERIOR COATING & INTERIOR COATING PER A.A.S.H.T.O. SPEC. M-190, MAY BE TYPE "A" OR "D".

C.M.P. CONNECTION TO MAIN STORM DRAIN

24" PIPE AND SMALLER

8 HOLES 9/16" DIA.
CONNECTOR PIPE
12 GAGE BITUMINOUS COATED GALVANIZED METAL PLATE.

BAND DETAIL

2"X2"X12 GA. WELDED WELDED WIRE FABRIC W/12"
CIRCUMFERENTIAL OVERLAP.

DETAIL NO. 510
STANDARD DETAIL
CORRUGATED METAL PIPE & INSTALLATION

REVISED 1991
1. All concrete to be class 'A' per section 725.505.
2. Match spring lines of pipes entering M.H. 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' conc. over ends of all cut pipe.
4. Invert and base of M.H. to be poured and invert to be shaped by hand to make smooth transition. Finish with rubber float.
5. Center M.H. on pipe joint where pipe changes sizes, leaving a gap of 12" min., 24" maximum.
1. Line pipe & 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 1/2" unless shown otherwise.

5. Concrete encasement shall be Class 'A' per Sect. 725,505.

Table of Values for 'f'

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Newman Shaft per Std. Detail 522

Precast pipe with vertical stub

Precast pipe with vertical stub

Encasement

Section A-A

Section B-B

Storm Drain Manhole Base (51" and larger)

Detail No. 521

Standard Detail

Revised 1996
2. Brick may be used in lieu of, or in combination with, conc. adjusting rings.
3. Precast conc. sections 48" dia. pipe may be furnished in standard lengths.
4. Unless otherwise shown on plans, use 2'-2 1/2" precast conc. adjusting rings on improved streets & 4'-2 1/2" rings on unimproved streets.
5. M.H. steps shall begin 2' below fin. grade & continue at 1' intervals to approx. 2' above M.H. shelf (as required by agency).
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 THROUGH FIVE.

NOTES:

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

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 STD. DET.424, 24" MANHOLE FRAME AND COVER.

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

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

7. 1/4" STAINLESS STEEL CABLE. SECURED WITH CABLE CLAMPS.

8. 1/2" X 9" HOOK & EYE TURNBUCKLE.

9. 1/2" EYE BOLT WITH 1" DIA. EYE.

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

11. TRIPLE WRAP TURNBUCKLES & 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 STD. DET. 424.

5. REFER TO STD. DET. 523-1 FOR INSTALLATION PROCEDURES.
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 INCH.
5. IF θ IS 45° OR LESS USE TYPE 1.
SECTION A-A

CLASS A CONCRETE AS PER SECTION 725

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

INSTALL QUANTITIES SHOWN AT INDICATED LOCATION

NO. 3 REINFORCED BARS (BOTH WAYS) SEE DETAIL*

NO. 4 ANCHOR BARS SEE DETAIL*

SECTION B-B

HAND TROWEL CURVED SURFACES (TREAT AS CURB FACING)

1/4 DIAMOND FLOOR PLATE COVER

S = 0.15/FT.

T = 3 6" UNLESS OTHERWISE SPECIFIED.

DIMENSIONS

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 STD. DETAIL 536. FOR DETAILS AND SECTIONS COMMON TO ALL CURB OPENING CATCH BASINS.

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 TROWELED 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. 1D PAINT & TWO FIELD COATS OF NO. 10 PAINT AS PER SECTION 790.

CURB A B
4" 3'3" 11'
6" 1'9" 8'
7" 1'0" 6'6"

SYM. PLAN VIEW

ACCESS OPENING—SEE DETAIL 536 & 536-1

REVISED 1996

DETAIL NO. 530 STANDARD DETAIL
3'-6" CURB OPENING CATCH BASIN • TYPE "A"

DETAIL NO. 530
SECTION A-A

CLASS 'A' CONC. AS PER SEC. 725.

NO. 3 DOVEL BARS (NOT USED IF TOP IS PRECAST) SEE DETAIL

NO. 3 REINF. BARS - BOTH WAYS

SUBGRADE OPTIONAL WITH CONTRACTOR

SECTION B-B

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. 1D PAINT & TWO FIELD COATS OF NO. 10 PAINT AS PER SEC. 790.

DIMENSIONS

<table>
<thead>
<tr>
<th>CURB</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>4&quot;</td>
<td>3'-3&quot;</td>
<td>13&quot;</td>
</tr>
<tr>
<td>6&quot;</td>
<td>1'-9&quot;</td>
<td>10&quot;</td>
</tr>
</tbody>
</table>
| 7"   | 1'-8"| 9'-9"

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

* * 4' IN LOCATIONS WHERE 4' S/W. IS REQUIRED.

DETAIL NO. 531

STANDARD DETAIL

5'-6" CURB OPENING CATCH BASIN · TYPE "B"

REVISED 1996
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. 10 paint & two field coats of No. 10 paint as per Sect. 790.

**DIMENSIONS**

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 noted.

**SEE DETAIL 536.539-L** for details and sections common to all curb opening catch basins.

**NOT TO SCALE**
GRATE DETAIL
N.T.S.
GRATE OPENING: 4.344 SQ.FT.
THIS PAGE RESERVED FOR FUTURE USE
NOTE: ALL CONCRETE, CLASS "A", AS PER SECT. 725

SECTION A-A

SECTION B-B

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. I PAINT AND TWO FIELD COATS OF NO. IO PAINT AS PER SECT. 790.

DIMENSION

V = 3'-0" UNLESS OTHERWISE SPECIFIED.
*DIMENSIONAL CHANGE WITH STD. DETAIL 534-3 AND STD. DETAIL 534-4.
BOLT CURB BOX TO FRAME W/ 1/2" - 13X2 1/2" STEEL HEX BOLTS, NUTS, WASHERS

CROSS-SECTIONAL AREA: 1.53 SQ. IN.

1/2"
5/8"
3 1/4" R.

VANE DETAIL

36 1/2"

FLOW

DIRECTION OF FLOW

35 1/2"

12 EQUAL SPACES AT 2 13/16"

43"

SECTION A-A

CAST IRON FRAME - GRATE - CURB BOX

SECTION B-B

DATE

CURB BOX ADJUST. TO 9" HIGH.

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.
BOLT CURB BOX TO FRAME W/(2) 1/2"-13x2 1/2" STEEL HEX HEAD BOLTS, NUTS & WASHERS

CURB BOX ADJUSTABLE TO 9" HIGH.

DATE

4"

6"

3 1/4"

2 1/4"

3/4"

1 1/4" R

17 3/4"

5 1/8"

6"

6"

11/4" R

SECTION B-B

CROSS-SECTIONAL AREA 1.53 SQ. IN.

VANE DETAIL

1/2"

5/8"

3 1/4" R

60°

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"x7.7 lbs. MATERIAL CAST GRAY IRON ASTM A-48-83 CLASS 35B. FRAME WEIGHT 197 lbs., GRATE 40 lbs., CURB BOX 92 lbs.
NOTE: CONSTRUCT BOX AS PER CATCH BASIN TYPE "E" (LOWER PORTION ONLY)
NOTES

1. FRAME SHALL BE NON-LOCKING.

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

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

SECTION A-A

FRAME GRATE SUPPORT

SECTION C-C

DETAIL NO. 537
STANDARD DETAIL
CATCH BASIN - TYPE G

APPROVED PUBLIC WORKS COMMITTEE
CHAIRMAN
DATE 537

REVISED 1986
CUT HOLE IN PIPE 24" LONG FOR SINGLE GRATE STRUCTURES AND 49" LONG FOR DOUBLE GRATE. WIDTH DEPENDS ON DIA. OF PIPE, NOT TO EXCEED 22" MIN. WIDTH TO BE SET BY PROJECT ENGINEER.

WHEN DOUBLE GRATE IS USED INCREASE THE LENGTH OF THE STRUCTURE ACCORDINGLY.

SECTION A-A

SECTION A-A

SECTION A-A

DETAIL OF ANGLE FRAME GRATE SUPPORT

27" x 27" FRAME
26" x 26" GRATE

2.1/2" x 2.1/2" ANGLE IRON FRAME
1/2" O x 6" LUGS WELDED TO FRAME,
4 EA."1 ON EACH COR. OF FRAME

FOR PIPE LARGER THAN 24" DIA.
8" MIN.

B (VARIES)

CUT

CUT

CUT

D (VARIES)

THESE DIMENSIONS VARY WITH DEPTH & DIA. OF PIPE.

THESE DIMENSIONS VARY WITH DEPTH & DIA. OF PIPE.
DELETE ANCHORS ON ONE SIDE FOR CURB OPENING BASIN

DELETE ANCHORS ON ONE END FOR BASINS USING "I" BEAM GRATE SUPPORT

PLAN I

PLAN I A

PLAN IB

TB-1 = 2'-2"
TB-2 = 1'-8"

1-3/8" OR 2"

2-1/4"3/16" HOLES

BAR SPACER DETAIL
CAST IRON, CAST STEEL OR STEEL BAR STOCK

SPOT WELD OR PEELED NUT & CUT WASHERS

"X" (SEE TABLE)

SECTION A-A

SECTION

GRADE TYPES TW-1 & TW-2

<table>
<thead>
<tr>
<th>TYPE</th>
<th>CLEAR SPACING</th>
<th>NO. BARS</th>
<th>X</th>
<th>GRADE OPENING SQ. FT.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TW OR TB 1.0</td>
<td>7/8&quot;</td>
<td>26</td>
<td>1&quot;</td>
<td>3.21</td>
</tr>
<tr>
<td>TW OR TB 1.1</td>
<td>1-3/8&quot;</td>
<td>24</td>
<td>1&quot;</td>
<td>3.32</td>
</tr>
<tr>
<td>TW OR TB 1.2</td>
<td>2&quot;</td>
<td>16</td>
<td>1&quot;</td>
<td>4.66</td>
</tr>
<tr>
<td>TW OR TB 2.0</td>
<td>1&quot;</td>
<td>26</td>
<td>1&quot;</td>
<td>2.32</td>
</tr>
<tr>
<td>TW OR TB 2.1</td>
<td>1-3/8&quot;</td>
<td>24</td>
<td>1&quot;</td>
<td>2.41</td>
</tr>
<tr>
<td>TW OR TB 2.2</td>
<td>2&quot;</td>
<td>16</td>
<td>1&quot;</td>
<td>2.65</td>
</tr>
</tbody>
</table>

NOTES:

1. GRATING UNITS AND FRAMES SHALL BE FABRICATED FROM STRUCTURAL STEEL EXCEPT AS NOTED.
2. WELDING SHALL BE IN ACCORDANCE WITH STD. WELDING SPEC.
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.

DETAIL NO. 540-1

STANDARD DETAIL

CATCH BASIN - GRATES

DETAIL NO. 540-1
CROSS BARS: 3/8" 9, 4" C TO C. BEARING BARS: 3-1/2" X 1/4", 1-7/8" C TO C.
END BARS: 2-1/2" X 1/4" CROSS BARS MAY BE FILLET WELDED, RESISTANCE WELDED OR ELECTROFORGED TO BEARING BARS.

NOTES:
1. LW INDICATES LONGITUDINAL WELDED.
2. LB INDICATES LONGITUDINAL BOLTED.
3. EF INDICATES ELECTROFORGED.
4. GRATING UNITS AND FRAMES SHALL BE FABRICATED FROM STRUCTURAL STEEL "A-36" EXCEPT AS NOTED.
5. ALL WELDING SHALL BE IN ACCORDANCE WITH STANDARD WELDING SPECIFICATIONS.
6. THE COMPLETED ASSEMBLY SHALL BE GIVEN ONE SHOP COAT OF NO.1 PAINT.
7. FRAMES AND GRATES SHALL FIT TO A MAXIMUM ROCK OF 0.093 AT ANY POINT.
1. Design of end section shall conform to standards for reinforced conc. pipe.
2. End section joint configuration 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.

<table>
<thead>
<tr>
<th>PIPE DIA.</th>
<th>APPROX. WEIGHT</th>
<th>DIMENSIONS—INCHES</th>
<th>APPROX. SLOPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>24&quot;</td>
<td>1520 lbs.</td>
<td>3 9 1/2 43 1/2</td>
<td>30 73 1/2 48  3</td>
</tr>
<tr>
<td>27&quot;</td>
<td>1930 lbs.</td>
<td>3 1/4 10 1/2</td>
<td>49 1/2 24 73 1/2 54 3</td>
</tr>
<tr>
<td>30&quot;</td>
<td>2190 lbs.</td>
<td>3 1/2 12 54</td>
<td>73 3/4 60 3</td>
</tr>
<tr>
<td>36&quot;</td>
<td>4100 lbs.</td>
<td>4 15 63</td>
<td>34 3/4 97 3/4 72 3</td>
</tr>
<tr>
<td>42&quot;</td>
<td>5380 lbs.</td>
<td>4 1/2 21 63</td>
<td>35 98 78 3</td>
</tr>
<tr>
<td>48&quot;</td>
<td>6550 lbs.</td>
<td>5 24 72</td>
<td>26 98 84 3</td>
</tr>
<tr>
<td>54&quot;</td>
<td>8240 lbs.</td>
<td>5 1/2 27 65</td>
<td>33 1/4 98 1/4 90 2 1/2</td>
</tr>
</tbody>
</table>

Plan

Spacing for multiple installation

Front elevation

Slope

Right angle culvert

Skewed culvert

Detail No. 545

NOTES
1. WHERE ROCK IS ENCOUNTERED THE OUTLET MAY BE OMITTED.
2. ALL PORTIONS OF SPILLWAY TO BE TROWEL FINISHED.

SECTION A-A

SINGLE INLET

6X6-W1.4XW1.4 WIRE MESH

FINISH GRADE

A.C.

SPILLWAY SECTION

6X6-W1.4XW1.4 WIRE MESH CONT.

BOTTOM & SIDES

1-0" WIRE MESH IN APRON

6-0"

1-0"

5-0"

MAX. INTER.

FILL SLOPE

NOTES
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 ON SPILLWAY &

DOUBLE INLET
NOTES
1. PLAIN ROCK OR GROUTED ROCK MAY BE SUBSTITUTED FOR SACKED CONCRETE.
2. GROUT FOR RIPRAP MAY BE PNEUMATICALLY PLACED MORTAR.

ELEVATION
TYPE 1 RIPRAP

ELEVATION A-A
TYPE 2 RIPRAP

TYPICAL GABIONS
EXISTING GROUND LINE OR STREAM BED
CUT BANK TO DEPTH "C" BEFORE PLACING GABIONS
GABIONS FILLED WITH STONE

ELEVATION

PLAN

LENGTH

PLAN

PER PLANS

PLAN

VARIAS

EXIST. GROUND LINE OR STREAM BED

PLAN

C SWALE OR DITCH

AS CALLED FOR ON PLANS

1'-2"
MIN.

1'-0"
MIN.

2'-0"
MIN.

DETAIL NO. 555
STANDARD DETAIL
EROSION PROTECTION / RIPRAP

DETAIL NO. 555

2'-0"
MIN.

GABIONS FILLED WITH STONE

CUT BANK TO DEPTH "C" BEFORE PLACING GABIONS

ELEVATION

NOTES
1. PLAIN ROCK OR GROUTED ROCK MAY BE SUBSTITUTED FOR SACKED CONCRETE.
2. GROUT FOR RIPRAP MAY BE PNEUMATICALLY PLACED MORTAR.

ELEVATION
TYPE 1 RIPRAP

ELEVATION A-A
TYPE 2 RIPRAP

TYPICAL GABIONS
EXISTING GROUND LINE OR STREAM BED
CUT BANK TO DEPTH "C" BEFORE PLACING GABIONS
GABIONS FILLED WITH STONE

ELEVATION

PLAN

VARIAS

EXIST. GROUND LINE OR STREAM BED

PLAN

C SWALE OR DITCH

AS CALLED FOR ON PLANS

1'-2"
MIN.

1'-0"
MIN.

2'-0"
MIN.

DETAIL NO. 555
STANDARD DETAIL
EROSION PROTECTION / RIPRAP

DETAIL NO. 555