NOTES
1. FOR BLOW-OFF OPERATIONS, REMOVE PIPE CAP AND ADD A 2" PIPE EXTENSION AND 2" CHECK VALVE ASSEMBLY.
2. BACK-FLOW PREVENTION DEVICES REQ'D FOR ALL BLOW-OFF ASSEMBLIES.
EXISTING GROUND/ FINISH GRADE

6"-3/4" CRUSHED ROCK

STANDARD METER BOX

3/4" CURB STOP

3/4" COPPER SERVICE LINE

3/4" CORPORATION

WATER MAIN

MANUAL AIR-RELEASE ASSEMBLY
BOLT-DOWN DETAIL

1 1/4" O.D. S.S. WASHER, 3/32" THICK, 3 REQUIRED PER COVER

FLAT RUBBER WASHER, 3 REQUIRED PER COVER

1/4" NEOPRENE GASKET, OMIT FOR TAMPER-PROOF COVER

1/2" HEX HEAD S.S. CAP SCREW, 3 REQUIRED PER COVER

BOLT-DOWN DETAIL

MANHOLE FRAME PLAN

SPECIFY LETTERING

SEE BOLT-DOWN DETAIL

MANHOLE FRAME PLAN

SECTION A-A

BOLT-DOWN MANHOLE RING AND COVER

SECTION B-B

24-3/4" + 1/8"

23" + 1/8" FILLET

30-3/4"

1/8" RADIUS
NOTE:
BOLTS TO BE FURNISHED WITH STANDARD HEX-HEAD NUTS & COTTER KEYS. COVER AND RING TO BE MACHINED TO A TRUE BEARING AT CONTACT POINTS.

PLAN

COVER SECTION

SECTION A-A

CAM-LOCK ASSEMBLY

STANDARD CAM-LOCK ALUMINUM FRAME AND COVER (SANITARY AND STORM)

FRAME SECTION

STANDARD CAM-LOCK CAST IRON FRAME AND COVER

CAM-LOCK MANHOLE COVER AND FRAME DETAILS CAST IRON AND ALUMINUM
NOTES:
1. PRECAST BASE WALLS MAY BE A MINIMUM OF 4" THICK.
2. CONCRETE SHALL BE CLASS 3000.
3. APPROVED CAST IRON FRAMES AND GRATES MAY BE ACCEPTED.

SECTION A-A

FRAME: 1/4" X 2" X 2" STEEL (ASTM A-36) ANGLE

SECTION B-B

FRAME AND GRATE PLAN

SECTION C-C

CENTER BAR WIDENED TO 4" FOR STRENGTH

CATCH BASIN
CAST IRON COVER

AC OR CONCRETE PAVING OR OTHER SURFACING

CONCRETE PAD REQUIRED IN PAVED AREAS ONLY

CLASS 3000 CONCRETE
MECHANICAL PLUG

AS SPECIFIED

NOTE:
ALL CLEANOUT MATERIAL TO BE SAME AS CARRIER PIPE.

4" CONCRETE
MECHANICAL PLUG

CLEANOUT

BEDDING
FOR FLOOR EL.

LEVELING NUTS & NONSHRINK GROUT

NOTE: SEE PLAN OR SCHEDULE FOR SIZES OF COLUMNS, ANCHOR, BOLTS AND CONCRETE PIERS

CONCRETE ENCASEMENT FOR COLUMN.

SEE PLAN FOR FINISHED FLOOR EL.

SEE PLAN OR SCHED. FOR BASE PL SIZE

1/4" PREMOLDED JOINT FILLER (TYP)

ANCHOR BOLTS

CONC. PIER

DOWELS SAME SIZE & NUMBER AS VERTICAL REINF.

SEE FTG. SCHED. FOR FTG. SIZE & REINF.

CONCRETE ENCASEMENT FOR COLUMN.

SEE PLAN FOR TOP OF FOOTING EL.

3" CLR

24 DIA

TYPICAL COLUMN BASE, PIER & FOOTING DETAIL
**TYPICAL COLUMN BASE & FOOTING DETAIL**

- **COLUMN & FOOTING**
- **SEE COLUMN SCHED. FOR SIZE**
- **SEE COL. SCHED. FOR BASE PLATE & ANCHOR BOLTS**
- **SEE PLAN FOR TOP OF FOOTING ELEVATION**

**PROVIDE CONCRETE COVER & PAINT PROTECTION AROUND STRUCTURAL STEEL BELOW GRADE**

- **SEE PLAN FOR FINISHED FLOOR EL 1/2" PREMOULDED EXPANSION JOINT**

**1/4" LEVELING PLATE & 3/4" GROUT**

**SEE COLUMN SCHED. FOR FOOTING SIZE & REINF.**
COLUMN—SEE PLAN OR SCHEDULE FOR TYPE AND SIZE

SEE PLAN OR SCHED. FOR SIZE OF BASE P & ANCHOR BOLTS

1/4” PREFORMED JOINT FILLER

CONCRETE ENCASEMENT FOR COLUMN.

SEE PLAN FOR FINISHED FLOOR EL.

LEVELING NUT AND ** THICK (MAX.) NON-SHRINK GROUT

SEE PLAN FOR TOP OF FTG. ELEV.

SEE FTG. SCHED. FOR FTG. SIZE & REINF.

3” CLR

TYPICAL COLUMN BASE & FOOTING DETAIL
TYPICAL SLAB ON GRADE COLUMN ISOLATION JOINT DETAIL

BASE P L (BELOW)

JOINT FILLER

1/4" PREMOLDED

STEEL COL.

"T" VARIES,
SEE PLAN

2 SETS OF
#3 TIES

ANCHOR BOLTS

TYPICAL SLAB ON GRADE COLUMN ISOLATION JOINT DETAIL

PLAN

SECTION
4"X4"X6' CEDAR POST
PAINTED W/1ST QUALITY
WATER BLUE ENAMEL

GALVANIZED PIPE
BRASS INSECT SCREEN
OVER END

SHALLOW TYPE M.H. FRAME AND COVER
GROUT TO 24" T & G CONCRETE PIPE
FINISH GRADE

24" T & G
CONCRETE PIPE

COMBINATION
AIR VACUUM
RELEASE VALVE

G.I.P UNION
COPPER PIPE

ANGLE STOP
CORPORATION STOP

CONCRETE BLOCK

6" 3/4"-0" GRAVEL

COPPER PIPE
WATER MAIN

NOTES:
1. AIR-RELEASE AND VALVE ASSEMBLIES SHALL BE INSTALLED AT POINTS. THE BREATHER TUBE SHALL EXTEND ABOVE GROUND PROVIDED WITH DOWNWARD FACING, SCREENED ELBOW.
2. PIPE AND VALVE SIZES SHALL BE SPECIFIED FOR EACH PROJECT BY THE ENGINEER.
VARIABLE VALLEY GUTTER FILLET

"A"

SHAPE CHANNEL AS DIRECTED

ALIGN VALLEY GUTTER WITH STANDARD CURB AND GUTTER

"A"

CONSTRUCT CURBING MONOLITHIC WITH FILLET. INSTALL WHEELCHAIR RAMPS AS DESIGNATED ON PLANS (SECTION A-A).

PLAN VIEW

VALLEY GUTTER ACROSS INTERSECTION

SECTION "A-A"

STANDARD STRAIGHT CURB JOINTS AS DIRECTED

STD. SIDEWALK, WIDTH AS SPECIFIED

TOP OF CURB SHALL MATCH SIDEWALK GRADE

PLAN VIEW

COMMERCIAL DRIVEWAY APPROACH

NOTES:

1. ORDER OF CONSTRUCTION:
   A. CONSTRUCT VALLEY GUTTER AND TRANSITION SECTIONS.
   B. CONSTRUCT 8" SIDEWALK ACROSS DRIVEWAY AREA.
   C. CONSTRUCT APRON.
   D. PCC APRONS SHALL BE JOINTED IN ACCORDANCE WITH DRAWING 212.

2. CONCRETE SHALL BE CLASS 3300.
NOTE:
1. VAULTS SHALL BE SIZED PER SPECIFICATIONS AND MINIMUM CLEARANCE. WHEN REQUIRED VAULTS SHALL BE DESIGNED FOR SITE SPECIFIC CONDITIONS BY A LICENSED STRUCTURAL ENGINEER.

2. ALL VAULTS SHALL BE SUPPORTED WITH ADQUATE CONCRETE FLOOR AND SHALL BE DESIGNED TO PREVENT BOUYANCY FROM GROUNDWATER IF GROUNDWATER EXISTS AT ANY TIME DURING THE YEAR. VAULTS SHALL BE WATER-TIGHT.

3. PRECAST CONCRETE UTILITY VAULTS MAY BE USED IN LIEU OF CAST-IN-PLACE WHEN SIZES ARE AVAILABLE.

4. BACKFLOW DEVICES TO BE INSTALLED ON SERVICE AND IRRIGATION LINES AS REQUIRED.

5. STANDARD BYPASS SIZE IS 2 INCH.

6. SERVICE AND IRRIGATION LINE SIZES WILL VARY ACCORDING TO NEED.

7. TEES AND VALVES SHALL BE SUPPORTED WITH PIER BLOCKS OR JACKS.

8. VAULT DEPTH SHALL BE SUCH THAT THERE IS A MINIMUM CLEARANCE TO THE VAULT LID OF 6" WHEN THE VALVES ARE FULLY OPEN.
COMPACTED PIPE ZONE

1/4 PIPE OUTSIDE BARREL DIAMETER

MIN. 6" BELOW BELL OF PIPE

FOR FLEXIBLE PIPE, CRADLE SHALL BE 2/3 PIPE BARREL DIAMETER

PCC

6" MIN. OUTSIDE OF PIPE BELL

TRENCH WIDTH

ENCASEMENT DETAIL

6" MIN. OUTSIDE OF PIPE BELL

CAP DETAIL

NOTE:
THE CONCRETE SHALL BE CLASS 2000 MINIMUM.

CONCRETE CRADLE AND CAP DETAILS

1/4 PIPE OUTSIDE BARREL DIAMETER

MIN. 6" BELOW BELL OF PIPE

8" MIN. ABOVE PIPE BELL

6" MIN. OUTSIDE OF PIPE BELL

CONCRETE CRADLE AND CAP DETAILS

6" MIN. OUTSIDE OF PIPE BELL

COMPACTED PIPE BEDDING

NOTE:
THE CONCRETE SHALL BE CLASS 2000 MINIMUM.

CONCRETE CRADLE AND CAP DETAILS

6" MIN. OUTSIDE OF PIPE BELL

COMPACTED PIPE BEDDING

NOTE:
THE CONCRETE SHALL BE CLASS 2000 MINIMUM.

CONCRETE CRADLE AND CAP DETAILS

6" MIN. OUTSIDE OF PIPE BELL

COMPACTED PIPE BEDDING

NOTE:
THE CONCRETE SHALL BE CLASS 2000 MINIMUM.

CONCRETE CRADLE AND CAP DETAILS

6" MIN. OUTSIDE OF PIPE BELL

COMPACTED PIPE BEDDING

NOTE:
THE CONCRETE SHALL BE CLASS 2000 MINIMUM.

CONCRETE CRADLE AND CAP DETAILS

6" MIN. OUTSIDE OF PIPE BELL

COMPACTED PIPE BEDDING

NOTE:
THE CONCRETE SHALL BE CLASS 2000 MINIMUM.

CONCRETE CRADLE AND CAP DETAILS

6" MIN. OUTSIDE OF PIPE BELL

COMPACTED PIPE BEDDING

NOTE:
THE CONCRETE SHALL BE CLASS 2000 MINIMUM.
PREMOLDED JOINT MATERIAL 3/4" STEEL DOWEL

TYPICAL ISOLATION JOINT WITH DOWEL

TYPICAL CONTRACTION JOINT

TYPICAL ISOLATION JOINT WITHOUT DOWEL

NOTE:
ALL JOINTS TO BE TOOLED WITH 1/2" RADIUS UNLESS SAWCUT

CONCRETE PAVEMENT JOINTS
COMPACTED SUBGRADE

SLOPE TO DRAIN (1/4"/FT)

CONCRETE SIDEWALK

NO SCALE

SEE PLAN FOR WIDTH

1/4" R

1"

3 1/2"
CURB OR CURB AND GUTTER

EXPANSION JOINT MATERIAL

SEE PLAN FOR WIDTH

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

COMPACTED SUBGRADE

CONCRETE SIDEWALK

(TO BE USED WHERE ADJACENT TO CURB OR CURB AND GUTTER)
NOTES:
1. \( d^* \) = THICKNESS OF ASPHALT PAVING.
2. THE CONCRETE SHALL BE CLASS 3300.
3. THE TOTAL WIDTH OF THE NON-SYMMETRICAL "V" GUTTER MAY BE REDUCED TO 30" WHEN CONSTRUCTION WITH A CURB-EXTRUSION MACHINE.
4. CONSTRUCT 6" BENCH MONOLITHICALLY WITH VALLEY GUTTER TO EXTEND UNDER PAVING FOR PAVEMENT SUPPORT.
5. WHEN BENCH IS NOT REQUIRED, CONSTRUCT 1" BATTER ON VERTICAL FACE.
6. PLACE PREMOLDED FILLER AGAINST VERTICAL FACE WHERE VALLEY GUTTER ABUTS CONCRETE.
7. CONSTRUCT 6" x \( d \) DEPRESSED BENCH WHERE VALLEY GUTTER ABUTS ASPHALT PAVEMENT.
CONTRACTION JOINT DETAIL FOR CONCRETE PAVING

NOTES:

1. ALL TRANSVERSE CONTRACTION JOINTS SHALL MATCH AND ALIGN WITH JOINTS IN CURB AND GUTTER UNLESS PAVING AND CURBS ARE SEPARATED BY AN ISOLATION JOINT. JOINTS IN CUL DE SAC CURB SHOULD BE PLANNED TO MATCH JOINT PATTERN IN PAVING.

2. MAXIMUM JOINT SPACING IN FEET SHALL BE 2 1/2 TIMES THE PAVEMENT THICKNESS IN INCHES.

3. SPECIAL TREATMENT WILL BE REQUIRED FOR JOINTING ADJACENT TO MANHOLES, VAULTS, OR OTHER STRUCTURES INTRUDING INTO PAVING SURFACE.
CONSTRUCT 1/2" TO 3/4" RADIUS LIP

MIN. 3" SAWCUT AND VERTICAL BREAK

CONSTRUCT DRIVEWAY APRON

PLACE ADHESIVE ALONG JOINT IMMEDIATELY PRIOR TO POURING NEW CONCRETE

EXISTING COMBINATION CURB AND GUTTER

SEE NOTE 4

NOTES:

1. SAWCUT THROUGH GUTTER PLATE SHALL BE MADE AS CLOSE TO CURB FACE AS POSSIBLE.

2. COMPLETE CURB AND GUTTER SHALL NOT BE REMOVED UNLESS DIRECTED BY THE ENGINEER.

3. WHEN STRAIGHT CURBS ARE REMOVED, A MINIMUM OF 2 FEET OF PAVEMENT FROM THE FACE OF CURB SHOULD BE REMOVED AND REPLACED.

4. WHEN ENTIRE GUTTER PLATE IS REMOVED THE EXISTING PAVEMENT SHALL BE CUT BACK AND A 6" MONOLITHIC CONCRETE BENCH SHALL BE CONSTRUCTED WITH THE NEW GUTTER TO PROVIDE SUPPORT UNDER PAVEMENT.

CURB KNOCKOUT FOR DRIVEWAYS
NOTES:

1. ALL RADII SHALL BE 3/4" EXCEPT AS OTHERWISE SHOWN.

2. ISOLATION JOINTS SHALL BE PLACED ONLY AS SPECIFIED.

3. CONTRACTION JOINTS SHALL BE PLACED AT 15' INTERVALS AND SHALL EXTEND AT LEAST 50% THROUGH THE CURB OR CURB AND GUTTER.

4. A CONTRACTION JOINT SHALL BE PLACED ALONG AND OVER WEEP HOLE THROUGH THE CURB AND THROUGH THE SIDEWALK.

5. WHEN SIDEWALKS ARE CONSTRUCTED, EXTEND 3' PIPE TO BACK OF SIDEWALK AND INSTALL COUPLING.
USE 7 - #3 HOOK BARS @ 6” C.C. VERT & 3 - #5 BARS HORIZ. IN CURB AS SHOWN.

INSTALL 4” WEEP HOLES WITH GALVANIZED MESH SCREEN FOR SUBGRADE DRAINAGE.

SECTION A-A

SECTION B-B

COMBINATION GUTTER AND CURB INLET CATCH BASIN DETAILS

NOTES:
1. CONCRETE SHALL BE CLASS 3000.
2. USE FRAME AND GRATE DETAILS FROM STANDARD DRAWINGS FOR GUTTER INLET.
2" COUPLING WITH PLUG. ASSEMBLE WITH ANTI-SEIZE COMPOUND, (HAND TIGHT)

GRANULAR BACKFILL (TYPICAL)

2" GALVANIZED STEEL RISER

2" IRON BODY SCREWED GATE VALVE WITH 2" STANDARD OPERATING NUT

GRANULAR BACKFILL (TYPICAL)

2" MALLEABLE 90° ELBOW WITH TWO 1/4" DIA DRAIN HOLES AND ONE CUBIC FOOT OF DRAIN ROCK

2" GALVANIZED STEEL PIPE

DIELECTRIC INSULATING COUPLING

BRASS PIPING AND FITTINGS BETWEEN TAPPED PLUG AND GATE VALVE (TYPICAL)

THRUST BLOCK

DUCTILE IRON PLUG WITH 2" I.P.T. TAP. FOR ECCENTRIC TAPPED PLUGS, LOCATE TAP AT LOWEST POINT OF PIPE.

DUCTILE IRON WATER MAIN

TYPICAL MAIN DEAD-END BLOWOFF ASSEMBLY

NOTES:

1. WRAP MAIN AND FITTINGS IN THRUST BLOCK ZONE WITH TWO LAYERS OF POLYETHYLENE FILM TO FACILITATE FUTURE REMOVAL.

2. IN LIEU OF CONCRETE THRUST BLOCK, RESTRAIN PIPE OR POUR CONCRETE STRADDLE BLOCK.
2X2-14/14 W.W.F.

Remove Damaged Concrete To Expose 1'-0" of Exist. Reinf.

Grout #4 1'-0" at 1'-6" O/C in 1"-0" Hole.

NOTE: PROVIDE #6 HORIZ. BARS WHERE REQUIRED. LAP 1'-0" WITH EXIST. REINF.

DETAIL REPAIRS TO DAMAGED CURB
DETAIL-REPAIR TO BEAM EDGES

FOR EDGES OF PILE CAPS BEAMS
NOTES:

1. GRATES SHALL BE CONSTRUCTED FOR BICYCLE SAFETY.

2. PRECAST CONCRETE CATCH BASINS MAY BE USED WHEN SPECIFIED OR APPROVED.

AREA DRAINAGE BASIN
OR
FIELD INLET
ISOLATION JOINTS

CONTRACTION JOINT OR ISOLATION JOINT AS DIRECTED

SIDEWALK

3' TRANSITION SEE NOTE 3

DRIVEWAY / ALLEY APPROACH FOR CURBLINE SIDEWALK

CONTRACTION JOINT OR ISOLATION JOINT AS DIRECTED

SIDEWALK

3' TRANSITION SEE NOTE 3

DRIVEWAY / ALLEY APPROACH FOR SET-BACK SIDEWALK

NOTES:

1. RESIDENTIAL DRIVEWAYS AND SIDEWALK SECTIONS THROUGH DRIVEWAYS SHALL HAVE A NOMINAL THICKNESS OF SIX INCHES CLASS 3000 PCC.

2. CONCRETE FOR COMMERCIAL USE AND ALLEY APPROACHES SHALL HAVE A THICKNESS OF 8" CLASS 3300 PCC.

3. CURB TRANSITIONS FOR COMMERCIAL USE AND ALLEY APPROACHES.

4. PCC APRONS SHALL BE JOINTED IN ACCORDANCE WITH DRAWING 212.
NOTES

6" DUCTILE IRON PIPE
MECHANICAL JOINT
RETAINER GLAND

MECHANICAL JOINT x
FLANGE HYDRANT TEE

CONCRETE THRUST BLOCK

6" GATE VALVE
MECHANICAL JOINT TO FLANGE

SIDEWALK
VALVE BOX

36" x 36" x 6"
CONCRETE PAD (OPTIONAL)

BREAKAWAY FLANGE
WRAP HYDRANT BARREL
WITH 10 MIL PLASTIC
PRIOR TO POUR

2"-8" ABOVE
CONCRETE PAD OR
SURROUNDING DATUM

MIN 1/3 CUBIC YARD DR
ROCK TO 6" ABOVE DR HOLE

CONCRETE THRUST BLOCK

SOLID PRECAST BASE BLOCK

CONCRETE THRUST BLOCK

1. WHEN PIPE IS SHORTER THAN 18', NO JOINTS ALLOWED. USE MECHANICAL JOINT RETAINER GLANDS. TWO 3/4" GALVANIZED TIE RODS MAY BE USED IN LIEU OF THRUST BLOCKS FOR INSTALLATION LESS THAN 18' LONG. TIE RODS SHALL BE COATED WITH TWO COATS OF BITUMASTIC.
2. WHEN PIPE IS LONGER THAN 18', RETAINER GLANDS NOT REQUIRED.
3. THERE SHALL BE A MINIMUM OF 18" HORIZONTAL CLEARANCE AROUND HYDRANT.
4. WHEN PLACED ADJACENT TO CURB, HYDRANT PORT SHALL BE 24" FROM FACE OF CURB.
5. CONCRETE THRUST BLOCKS SHALL BE CONSTRUCTED AS PER THRUST BLOCK STANDARD DRAWING. DO NOT BLOCK DRAIN HOLES.
6. EXTENSIONS REQUIRED FOR HYDRANT SYSTEMS SHALL BE INSTALLED TO THE MANUFACTURER'S SPECIFICATIONS.
7. FIRE HYDRANTS SHALL BE PLACED TO PROVIDE A MINIMUM OF 5' CLEARANCE FROM DRIVEWAYS, POLES, AND OTHER OBSTRUCTIONS.
8. HYDRANT PUMPER PORT SHALL FACE DIRECTION OF ACCESS.

HYDRANT INSTALLATION
GROUT

PROVIDE FLEXIBLE JOINT WITHIN 6" OF CONCRETE ENCASEMENT WHEN RIGID NON-REINFORCED PIPE IS USED

REMOVABLE MECHANICAL PLUG

MANHOLE

GROUT

DROP PIPE SHALL BE PVC FLUSH WITH INSIDE OF MANHOLE BARREL, FASTENED TO WALL WITH 1 1/2" X 10 GA STAINLESS STEEL STRAPS AND 2 1/2" CADMIUM PLATED BOLTS. STRAPS SHALL BE SPACED EVERY 4 FEET WITH A 2 STRAP MINIMUM

TEE

INSTALL 45D BEND WITH 1 1/2" X 10 GA STAINLESS STEEL STRAPS, CONSTRUCT CONCRETE GROUT FILLET CHANNEL TO DIRECT FLOW. ANCHOR SECURELY, SO AS NOT TO FLAKE OR SPALL OUT OF PLACE.

NOTE:
ONLY ONE INSIDE DROP CONNECTION ALLOWED PER MANHOLE.

MINIMUM MANHOLE DIAMETER WITH DROP CONNECTION SHALL BE 48-INCHES.

MAXIMUM DROP PIPE DIAMETER SHALL BE 8-INCHES.

DETAILS FOR INSIDE DROP CONNECTION FOR MANHOLES
BASE I.D. | 60" | 72" | 84" | 96"
---|---|---|---|---
**TYPE** | **DEPTH** | 0'-15' | 15'-30' | 0'-15' | 15'-30' | 0'-15' | 15'-30' | 0'-15' | 15'-30'
---|---|---|---|---|---|---|---|---|---
Ts | 7.0" | 9.0" | 7.0" | 9.0" | 8.0" | 10.0" | 9.0" | 11.0"
---|---|---|---|---|---|---|---|---|---
E BARS | #4 @ 12" | #4 @ 9" | #4 @ 9" | #4 @ 6" | #4 @ 8" | #5 @ 9" | #4 @ 7" | #5 @ 8"
---|---|---|---|---|---|---|---|---|---
F BARS | #4 @ 12" | #4 @ 9" | #4 @ 9" | #4 @ 6" | #4 @ 8" | #5 @ 9" | #4 @ 7" | #5 @ 8"
---|---|---|---|---|---|---|---|---|---

*INVERT TO STREET GRADE

**NOTE:**
CONCRETE SHALL BE CLASS 3000. STEEL $f_g =$ GRADE 60.

LARGE CAST-IN-PLACE
CONCRETE MANHOLE BASE
CONCRETE FILL

STANDARD 48” MANHOLE SECTION
FLAT TOP REDUCER

PRECAST BASE CAST-IN-PLACE BASE

SECTION A-A

NOTES:
1. MANHOLES MAY HAVE EITHER PRECAST OR CAST-IN-PLACE BASES.
2. MANHOLE SECTIONS SHALL BE MANUFACTURED IN ACCORDANCE WITH C478.
3. LARGE MANHOLE BASES SHALL BE USED FOR PIPE SIZES LARGER THAN 24”.

LARGE CONCRETE MANHOLE BASES
SAW CUT SQUARE AND REMOVE PAVEMENT 2-FOOT MINIMUM LARGER THAN MANHOLE FRAME DIMENSION

REPLACE WITH 2-INCH THICK AC. PAVING

APPLY TACK COAT TO EDGES OF EXISTING PAVEMENT BEFORE INSTALLING PATCH. FINISH JOINT WITH ASPHALTIC SEAL AND SAND.

SECTION A-A
TYPICAL MANHOLE GRADE ADJUSTMENT IN STREET

MANHOLE ADJUSTMENT RINGS FOR RESURFACING

MATERIAL SHALL BE ALUMINUM ALLOY 319.2, 356.2 OR A-360

SECTION B-B
MANHOLE ADJUSTMENT DETAILS
CONSTRUCT INVERT CHANNELS TO UNIFORM FLOW LINES WITH GRADUAL TRANSITION SECTIONS.

PLAN

48" I.D.

6" MIN

BENCH SLOPE 12:1

EXTEND PIPE INTO MANHOLE AND GROUT SMOOTH

SHAPE CHANNEL TO MATCH BOTTOM HALF OF PIPE.

COMPACTED 3/4"-0 CRUSHED AGGREGATE BASE

SECTION A-A

NOTES:
1. CONCRETE SHALL BE CLASS 3000.
2. CHANNELS SHALL BE CONSTRUCTED TO PROVIDE SMOOTH SLOPES AND RADII TO OUTLET PIPE.
3. BASES MAY BE PRECAST OR POUR ED IN PLACE.
4. THIS MANHOLE BASE SECTION SHALL BE USED FOR PIPE SIZES UP TO 24".

MANHOLE
BASE SECTION
MANHOLE FRAME AND COVER AS SPECIFIED.

FRAME AND RISER RINGS SHALL BE SEALED WITH PREFORMED PLASTIC OR RUBBER TO FORM A WATERTIGHT SEAL. GROUT MAY BE USED FOR STORM SYSTEMS.

PRECAST RISER RINGS

MANHOLE STEPS SHALL NOT BE PROVIDED UNLESS SPECIFIED.

ALL JOINTS SHALL BE SEALED WITH PREFORMED PLASTIC OR RUBBER RING TO FORM A WATERTIGHT SEAL. GROUTED JOINTS MAY BE USED FOR STORM DRAIN SYSTEMS

STANDARD PRECAST MANHOLE SECTIONS AS REQUIRED.

NOTE:
STANDARD PRECAST MANHOLE SECTION DIAMETER SHALL BE 48".
MARKER POST AT MANHOLE OR CLEANOUT

NOTES:

1. AS DIRECTED THE POST SHALL BE LOCATED ON THE STRAIGHT SIDE OF MANHOLE CONE.
2. POSTS SHALL BE SET IN CONCRETE.
3. AS AN ALTERNATIVE, A TREATED 4 x 4 POST OR 4" CONCRETE FILLED PVC PIPE POST MAY BE USED, IF APPROVED.
4. POSTS SHALL BE PAINTED WHITE.
NOTES:
1. Vault shall be constructed per the "Compound Meter Installation" drawing.
2. Precast utility vaults and standard premanufactured doors may be used, as specified.
3. Door(s) shall be sized to accommodate meter.
PLAN

FLEXIBLE JOINT WITHIN 6" OF CONCRETE ENCASEMENT WHEN RIGID NON-REINFORCED PIPE IS USED

4" CLEAR - 3 SIDES

PIPE DIAMETER TO MATCH MAIN LINE PIPE DIAMETER

1/4 BEND

CLASS 3000 CONCRETE

SECTION A-A

DETAIL FOR OUTSIDE DROP CONNECTION FOR MANHOLES
CENTER PILE VERT.

BATTER INSIDE RING 1 ON 20

BATTER OUTSIDE RING 1 ON 12

PLAN

ELEV. 10.0'

9 TURNS AROUND INSIDE RING

12 TURNS

10 TURNS AROUND INSIDE RING

12 TURNS

ALL PILES 60' LONG

3/4" / GALV. WIRE ROPE WRAPPING WITH 3/8" X 4" STAPLED AT EACH TURN AT EACH PILE.

19 PILE DOLPHIN
NATIVE SOIL

UNDISTURBED TRENCH WALL

INSTALL 3" WEEP HOLES AT BOTTOM OF TRENCH WITH 1/4" GALVANIZED SCREEN OVER UPSTREAM END.

NOTES:

1. CONCRETE ANCHOR WALLS (CLASS 3000) SHALL BE CONSTRUCTED USING FORMS WHEN SEWERS, STORM DRAINS, AND OTHER PIPELINES ARE CONSTRUCTED WITH SLOPES 20 PERCENT OR GREATER. REMOVE FORMS PRIOR TO BACKFILLING TRENCH.

2. SPACING OF ANCHOR WALLS SHALL BE:

<table>
<thead>
<tr>
<th>SLOPE</th>
<th>SPACING</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-34%</td>
<td>35 FEET</td>
</tr>
<tr>
<td>35-50%</td>
<td>25 FEET</td>
</tr>
<tr>
<td>50+ %</td>
<td>15 FEET OR CONCRETE ENCASEMENT</td>
</tr>
</tbody>
</table>

PIECE ANCHOR DETAIL
NOTES:

1. ALL FABRICATED METAL PARTS SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION.

2. CONCRETE SHALL BE CLASS 3000.

3. FOR STEEP GRADES USE STD. PRECAST INLET WITH 4'-0" OPENING OR TWO 2'-6" OPENING INLETS.

4. CURB INLET BASE MAY BE PRECAST OR CAST-IN-PLACE.
ROOT BARRIER, 10'-0" LONG X 4'-0" HIGH X 10 GAGE GALANIZED STEEL

WATER PIPE

SECTION

TREE

10'-0" OR LESS

PLAN

1'-0"

ROOT BARRIER, 10'-0" LONG X 4'-0" HIGH X 10 GAGE GALANIZED STEEL

WATER PIPE

SECTION ROOT BARRIER

Samples from www.AutoCADDetails.net

Samples from www.AutoCADDetails.net
**SHALLOW TRENCH SERVICE CONNECTION**

**NOTES:**

1. PIPE AND FITTINGS SHALL BE COMPATIBLE. ONLY MANUFACTURED FITTINGS SHALL BE USED.
2. MINIMUM DEPTH AT RIGHT OF WAY OR EASEMENT LINE SHALL BE 4 FEET.
3. MARKER POSTS AND BLOCKING SHALL BE TREATED WOOD. POST SHALL BE 2"x4" FIR. POST TO EXTEND 12" MINIMUM ABOVE FINISH GRADE AND EXPOSED AREA SHALL BE PAINTED WHITE
4. WHEN REQUIRED, A CLEANOUT SHALL BE INSTALLED.

**SHALLOW TRENCH SERVICE CONNECTION BLOCKING AND MARKERS**
CONSTRUCTION AREA

6.5'

6" TOPSOIL

SEEDING OPERATIONS UTILIZING BIODEGRADABLE PAPER FABRIC NET MATERIAL (OR SOD AT CONTRACTORS OPTION)

2'MIN

DIVERSION SWALE

FILL MATERIAL

APPROX. EXISTING GRADE

NOTE: PROVIDE AS SOON AS FINAL GRADE IS ACHIEVED FOR SLOPES TO REMAIN EXPOSED FOR 30 DAYS OR MORE.

SLOPE PROTECTION (SP)
SQUARE FOOTING MAY BE USED IF DESIRED

SLOPE-1" PER FOOT

MODIFY OPEN GUTTER TO SUIT PIPE LOCATIONS

FRAME, COVER & GRATING
FED. SPEC. RR-F-621
TRAFFIC (SIZE 22A)

FRAME
COVER
GRATING STYLE 1
NON-TRAFFIC (SIZE 22)
FRAME-FIG.4
COVER-FIG.12
GRATING-FIG.15

1" GROUT

- 8" BRICK W/CEMENT MORTAR 1/2" THICK PARGETING OR CONCRETE

WALLS TO BE 12" THICK FOR PORTION BELOW 12'-0" DEPTH

MANHOLE STEPS AT 16" MAX OC
SEE FED. SPEC. RR-F-621 FIG. 19

PLAN

FINISHED GRADE

INVERT ELEV OF INLET PIPING GIVEN HERE

REVERSE Y-BRANCH

FLOW

LEAN CONCRETE BACKFILL
BRICK OR CONCRETE FILL
CROWN OF INLET & OUTLET PIPES TO BE SAME ELEV
1" CEMENT MORTAR FINISH IN OPEN GUTTER
CONCRETE FOOTING

SECTION

STANDARD DROP SANITARY MANHOLE

(This item may be cast-in-place or ASTM C478 precast)

N.T.S.
NOTE: PROVIDE BEDDING IN ACCORDANCE WITH THE SPECIFICATIONS.

### STANDARD PIPE TRENCH WIDTH

<table>
<thead>
<tr>
<th>PIPE DIA &quot;D&quot;</th>
<th>MAXIMUM &quot;A&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot; TO 15&quot;</td>
<td>8&quot;</td>
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<tr>
<td>16&quot; TO 21&quot;</td>
<td>10&quot;</td>
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<tr>
<td>24&quot; TO 30&quot;</td>
<td>12&quot;</td>
</tr>
<tr>
<td>33&quot; TO 42&quot;</td>
<td>15&quot;</td>
</tr>
<tr>
<td>48&quot; &amp; LARGER</td>
<td>18&quot;</td>
</tr>
</tbody>
</table>

MAXIMUM TRENCH WIDTH "W" TAKEN AT TOP OF PIPE
STRAW BALES ARE TO BE WIRE OR NYLON BOUND

DUMPED ROCKED EXCAVATION, LOGS OR BALED STRAW

BALING WIRE SECURED TO PICKETS

BOTTOM ROW OF BALES TO BE 6 IN THE GROUND

SECTION A - A

STRAW BALE CHECK DAM (SD)
PLACE "C" MIX AC MINIMUM THICKNESS OF 4" OR THE THICKNESS OF THE REMOVED PAVEMENT, WHICHEVER IS GREATER. COMPACT AS SPECIFIED EXIST. PAVEMENT UNDISTURBED BASE (EXIST.)

MINIMUM TRENCH PATCH WIDTH
ROLLER WIDTH PLUS 2"

6" MIN.
TACK COAT CUT EDGES
6" MIN.

SEAL SURFACE OVER JOINT WITH TACK MATERIAL AND SAND (AC PATCH ONLY)

EXIST. PAVEMENT
UNDISTURBED BASE (EXIST.)

12" Minimum

NOTES:
1. ALL EXISTING AC OR PCC PAVEMENT SHALL BE SAWCUT PRIOR TO REPAVING.
2. CONCRETE PAVEMENT SHALL BE REPLACED WITH CONCRETE TO A MINIMUM THICKNESS OF 6" OR TO THE THICKNESS OF REMOVED PAVEMENT, WHICHEVER IS GREATER.

8" MINIMUM COMPACTED AGGREGATE BASE OR FULL DEPTH ASPHALT

COMPACTED TRENCH BACKFILL AS SPECIFIED

STREET CUT

TRENCH WIDTH (ACTUAL)
Main Street USA

STREET SIGN
BLADE TO BLADE BRACKET
STREET SIGN
POST TO BLADE BRACKET

2 3/8" O.D. GALV.
STEEL POST

FIN. GRADE

3/8" STEEL ROD
(MIN) 6" LONG

CONCRETE

ELEV

POST TO BLADE BRACKET

SET SCREWS

PLAN

SAMPLES FROM www.AutoCADDetails.net

STREET SIGN POST

STREET SIGN POST

NO SCALE
NOTES:

1. CONCRETE SHELL BE CLASS 3000.
2. FRAME AND COVER SHALL BE CAST IRON OR ALUMINUM.
3. COVER SHALL HAVE "MONUMENT" CAST INTO TOP.

ELEVATION

SURVEY

MONUMENT BOX
### (Horizontal) Bearing Area of Thrust Blocks in Square Feet

<table>
<thead>
<tr>
<th>Fitting Size</th>
<th>TEE, WYE, Dead End and Hydrant</th>
<th>Straddle Block</th>
<th>90° Plugged on Run A-1</th>
<th>45° Bend A-1</th>
<th>22-1/2° Bend</th>
<th>11-1/4° Bend</th>
<th>90° Bend</th>
<th>45° Bend</th>
<th>22-1/2° Bend</th>
<th>11-1/4° Bend</th>
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### (Vertical) Volume of Thrust Block in Cubic Yards

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<tr>
<th>Fitting Size</th>
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### Notes:
1. Above bearing areas based on test pressure of 150 PSI and an allowable soil bearing stress of 2000 pounds per square foot. To compute bearing areas for different test pressures and soil bearing stresses, use the following equation:
   \[
   \text{Bearing Area} = \left( \frac{\text{Test Pressure}}{150} \right) \times \left( \frac{2000}{\text{Soil Bearing Stress}} \right) \times \left( \text{Table Value} \right)
   \]
2. Above volumes based on test pressure of 150 PSI and the weight of concrete = 4050 pounds per cubic yard. To compute for different test pressures, use the following equation:
   \[
   \text{Volume} = \left( \frac{\text{Test Pressure}}{150} \right) \times \left( \text{Table Value} \right)
   \]

### Thrust Blocking

**Notes:**
1. Concrete blocking to be poured against undisturbed earth.
2. All concrete to be Class 2400 minimum.
3. Install isolation material between pipe and/or fittings before pouring concrete blocking.
4. Concrete shall be kept clear of all joints and accessories.
5. TIE RODS SHALL BE DEFORMED GALVANIZED COLD ROLLED STEEL, 40000 PSI TENSILE STRENGTH.
6" MIN

PLAN BENDS

COMPACTED OR UNDISTURBED EARTH (TYP.)

24" MIN 12" & LARGER PIPE
18" MIN 10" & SMALLER PIPE

SECTION X-X
BENDS & TEES

BENDS & TEES

PLAN & ELEVATION PLUGS

<table>
<thead>
<tr>
<th>SIZE</th>
<th>1/4 BENDS</th>
<th>1/8 BENDS</th>
<th>1/16 BENDS</th>
<th>TEES</th>
<th>PLUGS</th>
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</tbody>
</table>

THRUST BLOCKS

NO SCALE
WHERE THE EXISTING CONCRETE REINFORCING IS EXPOSED OR EXPOSED DURING REMOVAL OF DETERIORATED MATERIAL, REMOVE EXISTING CONCRETE TO 3/4" BEYOND REINFORCING STEEL; OTHERWISE REMOVE EXISTING DETERIORATED MATERIAL TO SOUND CONCRETE.

EXISTING CONCRETE PILE CAP

BOTTOM OF PILE CAP ELEVATION

EXISTING BARS THOROUGHLY CLEANED BY WIRE BRUSHING PROVIDE NEW BAR OF SAME DIAMETER WHERE BAR DIAMETER IS LESS THAN 3/4 OF ORIGINAL DIAMETER

CAST-IN-PLACE CONCRETE

RUBBER SEAL

ORIGINAL PILE SIZE

EXISTING CONCRETE PILE

VERTICAL SECTION

ELEVATION

HAND PLACED MORTAR BETWEEN TOP OF NEW CONCRETE AND PILE CAP

6" COLLAR

TIME FORM

STEEL BANDS

MLW

3"

STEEL BANDS

EXISTING CONCRETE PILE

MLW
PIPE BEDDING
3/4" MINUS CRUSHED AGGREGATE

PIPE ZONE
3/4" MINUS CRUSHED AGGREGATE

CLASS A
EXCAVATED NATIVE MATERIAL

CLASS B
3/4"-0" CRUSHED ROCK

CLASS C
CLEAN SAND (1/4" MAX.)

CLASS D
PIT OR BAR-RUN MATERIAL (3" MAX.)

BASE MATERIAL

"SURFACING" MATCH EXISTING MATERIAL

TOPSOIL OR AS DIRECTED

TRENCH FOUNDATION STABILIZATION, AS REQUIRED

TRENCH BACKFILL, BEDDING, AND PIPE ZONE

6" MIN. BEDDING BELOW OUTSIDE OF PIPE BELL

6" MIN. OUTSIDE DIAMETER

24" MIN.

12" MIN. ABOVE OUTSIDE OF PIPE BELL

8" MIN.

COMPACTED BACKFILL

SAMPLES FROM
WWW.AUTOCADETDETAILS.NET
NOTES:
1. ALL EDGES SHALL BE TOOLED WITH 3/4" RADIUS.
2. CONCRETE TO BE CLASS 3300.

PLAN

RESIDENTIAL ALLEY = 6" THICK
COMMERCIAL ALLEY = 8" THICK

2-4% SLOPE

3/4" - 0 LEVELING COURSE CRUSHED AGGREGATE

TYPICAL ALLEY (INVERTED CROWN) SECTION
Typical Pile Cap Elevation

3" CLR.

3" CLR.

4"

DEPTH

3" CLR.

(TYP.)

BOTT. REINF.
TYPICAL SLAB ON GRADE
CONSTRUCTION JOINT DETAIL

Vapor Barrier
Porous Fill (4" Min.)
Compacted Subgrade
PREVIOUS POUR

NEW POUR

1'-6"

1'-6"

1/2" PEJ

GREASE OR COVER THIS END OF BAR TO PREVENT BOND

3/4"x3'-0" @ 2'-0" O/C

T/3

THICKNESS VARIES SEE PLAN

SEE PLAN FOR REINF

NOTE:
EXPANSION JOINT MAY REPLACE CONTROL JOINT

TYPICAL SLAB ON GRADE EXPANSION JOINT DETAIL

VAPOR BARRIER

POROUS FILL

COMPACTED SUBGRADE
NOTES:

1. Manholes should not be installed in wheel path.
2. Four foot minimum cover for distribution facilities to cross.
3. Water transmission and sewer to be located under paved area.
4. Vaults, hydrants, pedestals that block zones should be resolved with involved utilities prior to placement.
5. Recommended for less than 60 foot right of way.
6. Laterals to be installed from sanitary sewer line to right of way during initial construction.

UTILITY LOCATIONS

Attention:
Vertical and horizontal separation distances are controlled by the Department of Environmental Quality, Department of Commerce, State Health Division, and local utility companies.
VALLEY GUTTER DETAIL
COVER PLAN

RAISED LETTERING

CAST IRON COVER
CAST IRON VALVE BOX
VALVE BOX EXTENSION

2" SQUARE OPERATOR NUT
WELDED TO PIPE SHAFT

OPERATOR EXTENSION
1 1/2" SCHEDULE 80
PIPE SHAFT

ROCK GUARD,
1/8" STEEL PLATE;
DIAMETER = VALVE BOX
EXTENSION INSIDE
DIAMETER MINUS 1/2"

FLAT BAR
2-1/2" x 2-1/2" x 3/8"

3/8" x 3/4" SQUARE
HEAD CUPPED CAPSCREWS

3" x 3" x 3/8" x 2"
LONG STEEL SQUARE
TUBE WELDED ALL
AROUND TO FLAT BAR

NOTES:
1. VALVE BOX NOT TO REST ON OPERATING ASSEMBLY.
2. OPERATOR EXTENSION REQUIRED WHEN VALVE NUT IS
   DEEPER THAN 4 FEET FROM FINISH GRADE.
3. CENTER VALVE BOX ON AXIS OF OPERATOR NUT.
4. VALVES 12" AND SMALLER SHALL BE PROVIDED WITH
   CLASS B BASE ON UNDISTURBED GROUND. VALVES
   GREATER THAN 12" SHALL BE INSTALLED ON
   PRECAST CONCRETE PIER BLOCK.
5. VALVE BOX EXTENSION SHALL BE CAST IRON OR PVC
   (ASTM D 3034).
USE FELT STRIP OR 10 MIL POLY. ISOLATION JOINT IF METER BOX IS SET IN CONCRETE.

NOTES:
1. METER TO BE CENTERED AND SET PLUMB INSIDE METER BOX.
2. MANUFACTURED METER SETTER MAY BE USED FOR 3/4" TO 2" SERVICES.
3. SET METER BOX 4" MINIMUM BEHIND CURB OR SIDEWALK.
4. METER BOXES SET IN DRIVEWAYS SHALL HAVE TRAFFIC LIDS.

3/4" TO 2" WATER METER SETTING DETAIL
CENTER RAMP FOR PROPERTY LINE SIDEWALK (RESIDENTIAL AREAS)

CENTER RAMP FOR CURB LINE SIDEWALK (RESIDENTIAL AREAS)

SECTION THROUGH RAMP - ALL VIEWS

END RAMPS FOR PROPERTY LINE SIDEWALKS (COMMERCIAL AREAS OR ARTERIAL STREETS)

NOTE:
THE "AMERICANS WITH DISABILITIES ACT" REQUIRES THAT ACCESS RAMPS TO SIDEWALKS HAVE NO SLOPES GREATER THAN 12 HORIZONTAL TO 1 VERTICAL.

WHEELCHAIR AND BICYCLE RAMPS
YARD HYDRANT DETAIL

CONC. PAD

2 CU. FT. OF GRAVEL

AUTOMATIC DRAIN

SIZE VARIES