

- FOR SEWER MAINS 15" & SMALLER, USE 4'-0" DIA MANHOLES WITH 24" MANHOLE FRAME & COVER.
- 2. FOR SEWER MAINS 18" & LARGER, USE 5'-0" DIA MANHOLES WITH 36" MANHOLE FRAME & COVERS.
- 3. VERTICAL WALL OF CONE TO BE ON THE UPSTREAM SIDE OF MANHOLE. SEE STD DWG NO. F-5 FOR ACCESS LOCATIONS.
- 4. MANHOLES FOR SEWER MAINS 18" AND LARGER SHALL BE COATED AND LINED PER STD DWG NO. F-8.

LEGEND ON PLANS

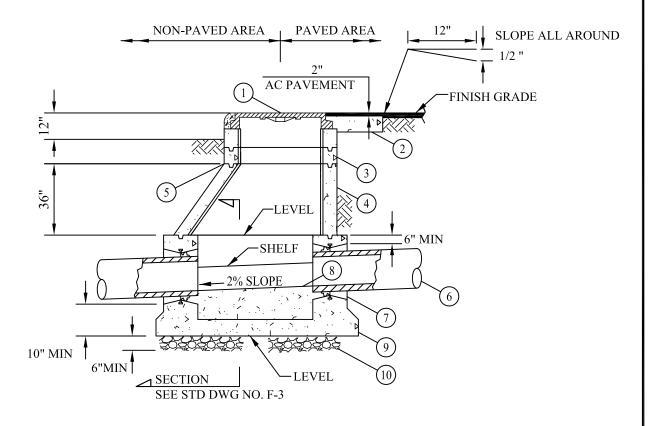
ITEM	DESCRIPTION	SPEC/DWG
1	24" OR 36" MANHOLE FRAME AND COVER(S)	03461/F-6/F-7
2	12" WIDE x 6" THICK CONCRETE RING	03000
3	24" OR 36" DIA PRECAST CONC GRADE RINGS, 6" TO 18" HIGH	03461
4	PRECAST CONCRETE ECCENTRIC CONE, 2'x4' OR 3'x5'	03461
5	4'-0" OR 5'-0" DIA PRECAST CONC SHAFT SECTIONS	03461
6	WATERTIGHT JOINTS	03461/F-5
7	SEWER MAIN	15065
8	MANHOLE PIPE CONNECTORS	03461/F-4
9	FIELD INSTALLED INVERT	03461/F-4
10	PRECAST OR CAST IN PLACE CONCRETE BASE	03461/03000/F-3
11	3/4" CRUSHED ROCK. 6" THICK	02223

OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE ENGINEERING CORPORATION 4'-0" AND 5'-0" DIAMETER PRECAST MANHOLE INSTALLATION

STD DWG NO. F-1

JUNE 2008



- FOR SEWER MAINS 15" & SMALLER, USE 4'-0" DIA MANHOLES WITH 24" MANHOLE FRAME & COVER.
- 2. FOR SEWER MAINS 18" & LARGER, USE 5'-0" DIA MANHOLES WITH 36" MANHOLE FRAME & COVERS.
- 3. VERTICAL WALL OF CONE TO BE ON THE UPSTREAM SIDE OF MANHOLE. SEE STD DWG NO. F-5 FOR ACCESS LOCATIONS.
- 4. MANHOLES FOR SEWER MAINS 18" AND LARGER SHALL BE COATED AND LINED PER STD DWG NO. F-8.

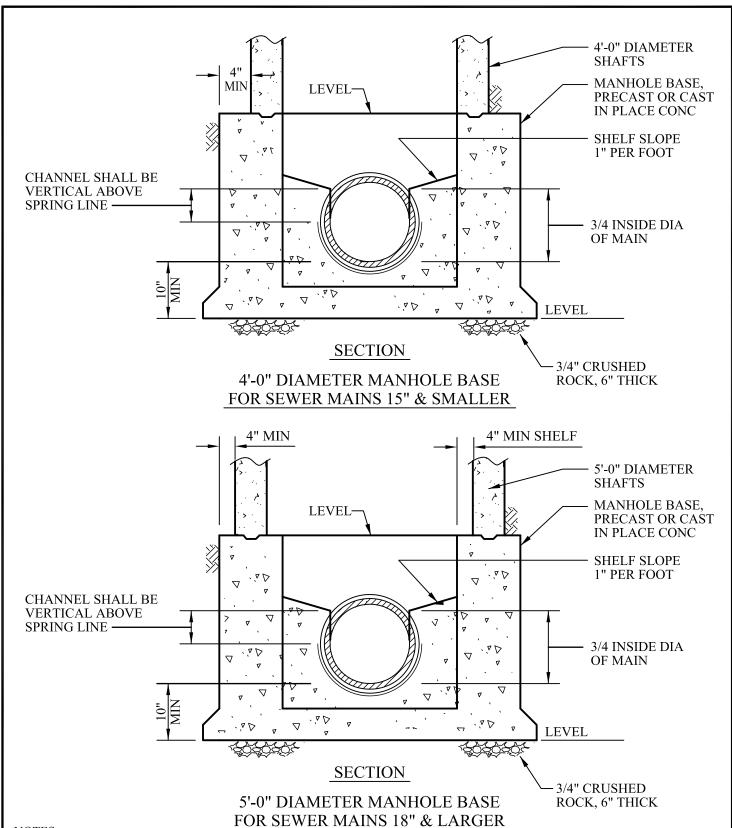
LEGEND ON PLANS

ITEM	DESCRIPTION	SPEC/DWG
1	24" OR 36" MANHOLE FRAME AND COVER(S)	03461/F-6/F-7
2	12" WIDE x 6" THICK CONCRETE RING	03000
3	24" OR 36" DIA PRECAST CONC GRADE RINGS, 6" TO 18" HIGH	03461
4	PRECAST CONCRETE ECCENTRIC CONE, 2'x4' OR 3'x5'	03461
5	WATERTIGHT JOINTS	03461/F-5
6	SEWER MAIN	15065
7	MANHOLE PIPE CONNECTORS	03461/F-4
8	FIELD INSTALLED INVERT	03461/F-4
9	PRECAST OR CAST IN PLACE CONCRETE BASE	03461/03000/F-3
10	3/4" CRUSHED ROCK, 6" THICK	02223

OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE ENGINEERING CORPORATION 4'-0" AND 5'-0" DIAMETER SHALLOW PRECAST MANHOLE INSTALLATION

STD DWG NO. F-2 JUNE 2008

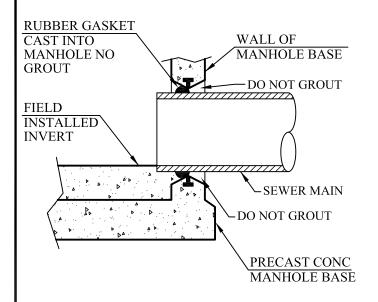


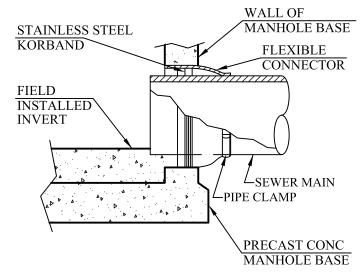
- 1. SEE STANDARD SPECIFICATION SECTION 03461.
- 2. FOR MANHOLE INSTALLATIONS, SEE STD DWG NO. F-1 AND F-2.
- 3. MANHOLES FOR SEWER MAINS 18" AND LARGER SHALL BE COATED AND LINED PER STD DWG NO. F-8

OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE
ENGINEERING
CORPORATION

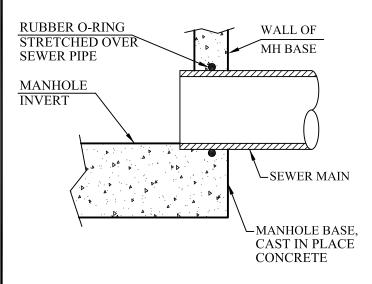
4'-0" AND 5'-0" DIAMETER MANHOLE BASES STD DWG NO. F-3 JUNE 2008

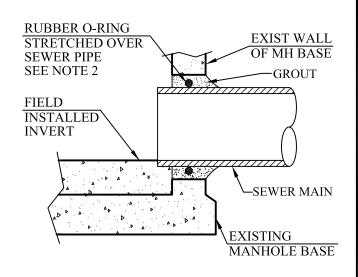




PRECAST MANHOLE BASE TYPE "A"

PRECAST MANHOLE BASE TYPE "B"





CAST IN PLACE MANHOLE BASE

BREAKING INTO EXISTING MANHOLE BASE

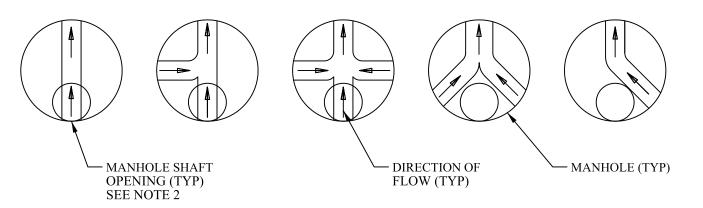
NOTES:

- 1. SEE STANDARD SPECIFICATION SECTION 03461.
- 2. A RUBBER O-RING OR A FLEXIBLE CONNECTOR (AS SHOWN IN PRECAST MANHOLE BASE TYPE "B") CAN BE USED WHEN BREAKING INTO EXISTING MANHOLES.
- 3. MANHOLES FOR SEWER MAINS 18" AND LARGER SHALL BE COATED AND LINED PER STD DWG NO. F-8

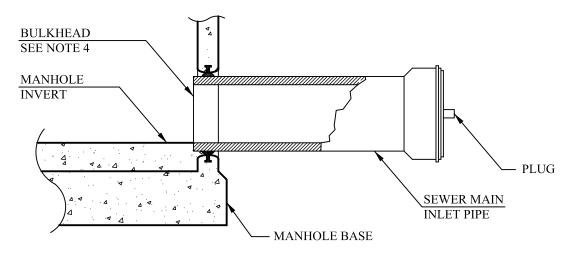
OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE ENGINEERING CORPORATION MANHOLE PIPE CONNECTORS

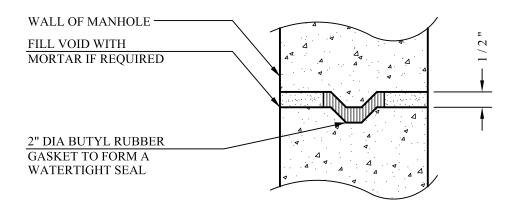
STD DWG NO. F-4 JUNE 2008



MANHOLE ACCESS LOCATION PLAN VIEW



MANHOLE STUB OUT FOR FUTURE CONNECTION



WATERTIGHT MANHOLE JOINT

NOTES:

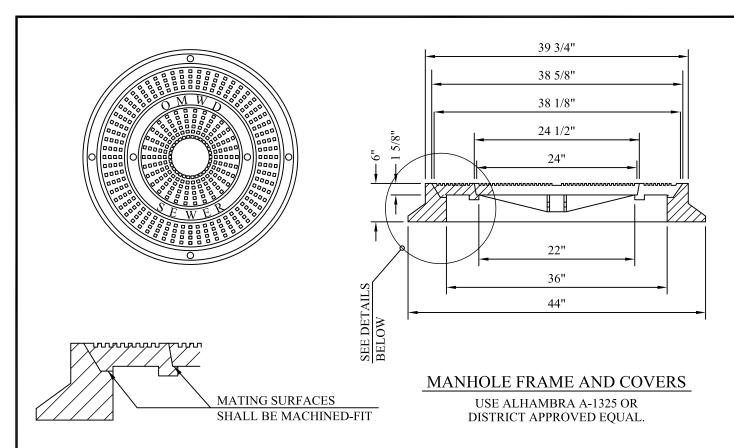
- 1. SEE STANDARD SPECIFICATION SECTION 03461.
- 2. VERTICAL WALL OF CONE TO BE ON THE UPSTREAM SIDE OF MANHOLE.
- 3. MANHOLES FOR SEWER MAINS 18" AND LARGER SHALL BE COATED AND LINED PER STD DWG NO. F-8.
- 4. BULKHEADS SHALL BE INSTALLED AT THE MANHOLE END OF STUBS.
- 5. SEWER MAINS TO BE LAID WITH BELLS UP-GRADE.

OLIVENHAIN MUNICIPAL WATER DISTRICT

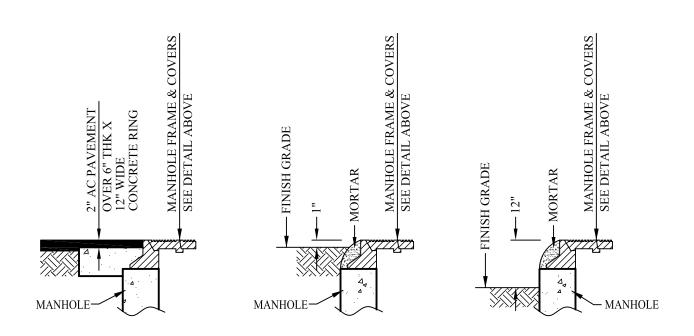
BOYLE ENGINEERING CORPORATION MANHOLE ACCESS LOCATIONS AND STUB OUT AND JOINT DETAILS

STD DWG NO. F-5

JUNE 2008



MACHINED DETAIL



NOTE:

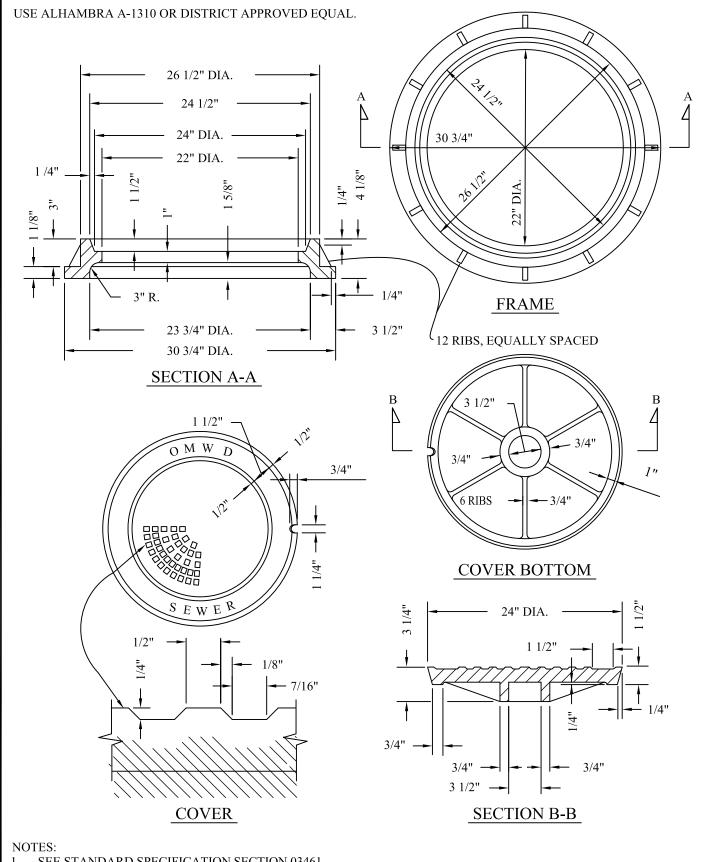
1. SEE STANDARD SPECIFICATION SECTION 03461.

OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE ENGINEERING CORPORATION

36" MANHOLE FRAME AND COVERS

STD DWG NO. F-6 JUNE 2008



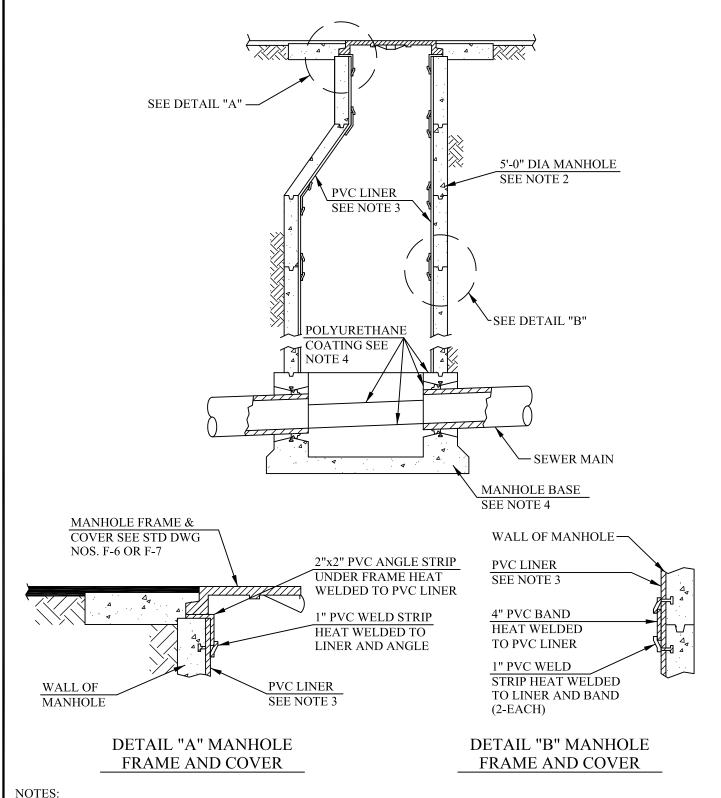
- SEE STANDARD SPECIFICATION SECTION 03461.
- FOR MANHOLE FRAME TO MANHOLE CONNECTIONS, SEE STD DWG NO. F-6.

OLIVENHAIN MUNICIPAL WATER DISTRICT

ENGINEERING CORPORATION

24" MANHOLE FRAME AND COVER

STD DWG NO. F-7 JUNE 2008

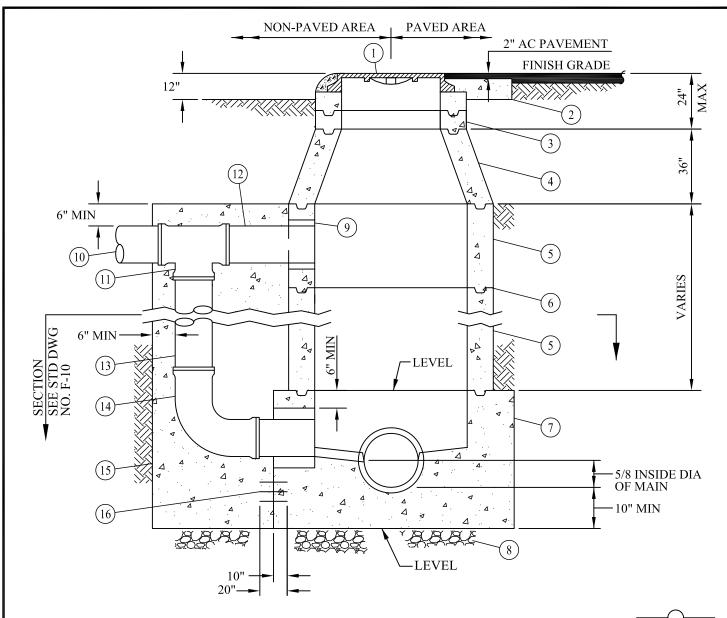


- SEE STANDARD SPECIFICATION SECTION 03461.
- 2. MANHOLES FOR SEWER MAINS 18" AND LARGER SHALL BE COATED AND LINED.
- MANHOLE SHAFT, CONE SECTION, AND GRADE RINGS SHALL HAVE A PVC LINER WITH T-SHAPED SUPPORTS INTERGRALLY CAST INTO THE CONCRETE.
- ELASTOMERIC POLYURETHANE COATING SHALL BE APPLIED TO THE INTERIOR OF MANHOLE BASES.

OLIVENHAIN MUNICIPAL WATER DISTRICT

ENGINEERING CORPORATION MANHOLE COATING AND LINING SYSTEM

STD DWG NO. F-8 **JUNE 2008**



1. FOR DROP MANHOLE NOTES, SEE STD DWG NO. F-10.

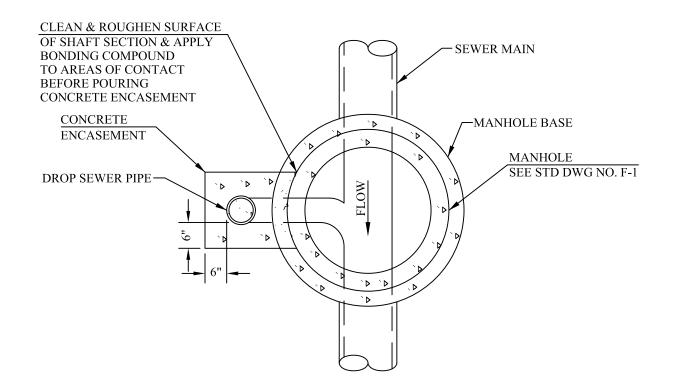
LEGEND ON PLANS

ITEM	DESCRIPTION	SPEC/DWG
1	24" OR 36" MANHOLE FRAME AND COVER(S)	03461/F-6/F-7
2	12" WIDE x 6" THICK CONCRETE RING	03000
3	24" OR 36" DIA PRECAST CONC GRADE RINGS, 6" TO 18" HIGH	03461
4	PRECAST CONCRETE ECCENTRIC CONE, 2' x 4' OR 3' x 5'	03461
5	4'-0" OR 5'-0" DIA PRECAST CONC SHAFT SECTIONS	03461
6	WATERTIGHT JOINTS	03461/F-5
7	PRECAST OR CAST IN PLACE CONCRETE BASE	03461/03000/F-3
8	3/4" CRUSHED ROCK, 6" THICK	02223
9	MANHOLE PIPE CONNECTORS	03461/F-4
10	SEWER PIPE	15065
11	GASKETED TEE, RUN & BRANCH SAME SIZE AS ITEM 10	15065
12	SEWER PIPE, 12" LONG	15065
13	DROP SEWER PIPE, LENGTH AS REQUIRED	15065
14	GASKETED 90° LONG RADIUS BEND	15065
15	CONCRETE ENCASEMENT	02223
16	#4 DOWELS @ 6" ON CENTER, EPOXY INTO EXST OR NEW MH	03000

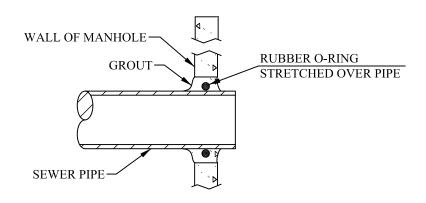
OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE ENGINEERING CORPORATION 4'-0" AND 5'-0" DIAMETER DROP MANHOLE FOR SEWER MAINS

STD DWG NO. F-9 JUNE 2008



DROP MANHOLE SECTION



DROP MANHOLE PIPE CONNECTOR

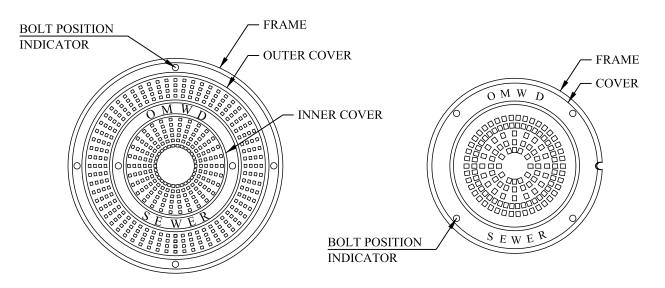
NOTES:

- 1. SEE STANDARD SPECIFICATION SECTION 03461.
- VERTICAL WALL OF CONE TO BE ON THE UPSTREAM SIDE OF MANHOLE. SEE STD DWG NO. F-5 FOR ACCESS LOCATIONS.
- 3. DROP MANHOLES INSTALLED ON SEWER MAINS 18" AND LARGER SHALL INCORPORATE A 4" SHELF AS SHOWN ON STD DWG NO. F-3.
- 4. INSIDE SURFACES OF DROP MANHOLES TO BE COATED AND LINED, PER STD DWG NO. F-8.
- 5. DROP MANHOLES SHALL BE INSTALLED ONLY WITH PRIOR APPROVAL OF THE DISTRICT.

OLIVENHAIN MUNICIPAL WATER DISTRICT

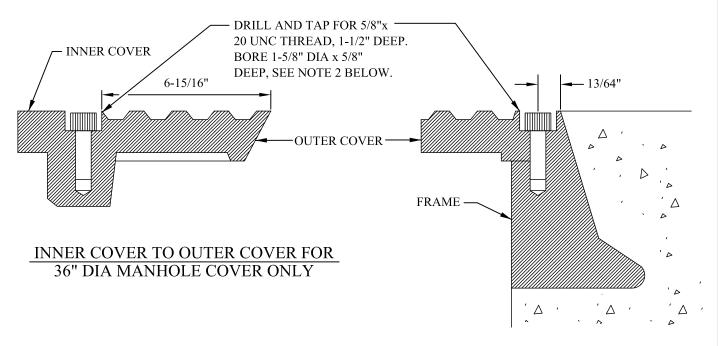
BOYLE ENGINEERING CORPORATION 4'-0" OR 5'-0" DIAMETER DROP MANHOLE SECTION, DETAIL AND NOTES

STD DWG NO. F-10 JUNE 2008



CONCENTRIC COVERS AND FRAME BOLT PLACEMENT-36" DIA MANHOLE

COVER AND FRAME
BOLT PLACEMENT-24" DIA MANHOLE



OUTER COVER TO FRAME

NOTES:

- 1. SEE STANDARD SPECIFICATION SECTION 03461.
- 2. 5/8" x 20 UNC THREAD, 316 STAINLESS STEEL SOCKET HEAD CAP SCREW AND 1-1/2" OD x 11/16" ID x 5/64" THICK 316 STAINLESS STEEL WASHER.
- 3. BOLTDOWN PATTERNS:

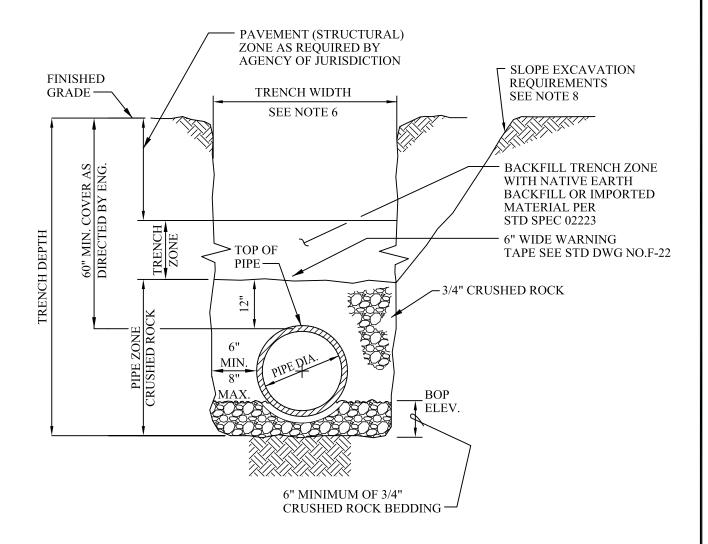
BETWEEN INNER AND OUTER COVERS, INSTALL TWO (2) BOLTS AT 180-DEGREES. BETWEEN OUTER COVER AND FRAME, INSTALL FOUR (4) BOLTS AT 90-DEGREES.

OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE ENGINEERING CORPORATION

LOCKING MANHOLE COVER

STD DWG NO. F-11 JUNE 2008



TRENCH SECTION

NOTES:

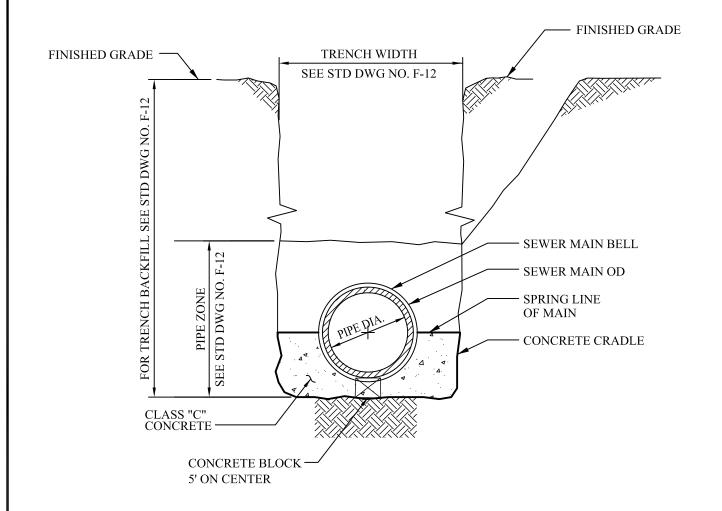
- SEE STANDARD SPECIFICATION SECTION 02223 AND 15065.
- 2. PAVING OR PAVEMENT REPAIR TO BE DONE IN ACCORDANCE WITH AGENCY OF JURISDICTION.
- 3. ALL PIPELINE TRENCHES SHALL BE EXCAVATED SO THAT THE DISTANCE BETWEEN TRENCH WALLS AT THE TOP OF PIPE SHALL BE AS CALLED OUT IN NOTE 6.
- 4. CONCRETE CRADLE PER STD DWG NO. F-13 SHALL BE USED WHEN THE TRENCH WIDTH AT THE UPPER LIMIT OF THE PIPE ZONE EXCEEDS THE MAXIMUM WIDTH SPECIFIED.
- 5. EXCAVATE BELL HOLES AT EACH JOINT TO PERMIT PROPER ASSEMBLY AND INSPECTION OF THE ENTIRE JOINT.
- 6. THE TRENCH WIDTH EQUALS, SEWER MAIN OD PLUS 12" MIN., 16" MAX.
- 7. FOR BEDDING AND BACKFILL OF TRENCHES FOR POTABLE WATER AND RECYCLED WATER FACILITIES SEE STD DWG NO. E-2.1.
- 8. CONTRACTOR IS SOLELY RESPONSIBLE FOR JOBSITE AND TRENCH SAFETY AND SHALL ASSURE ALL OSHA AND OTHER FEDERAL, STATE AND LOCAL REGULATIONS AND REQUIREMENTSPRETAINING TO TRENCH CONSTRUCTION ARE MET.

OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE ENGINEERING CORPORATION

PIPE BEDDING AND TRENCH BACKFILL FOR SEWER FACILITIES

STD DWG NO. F-12 JUNE 2008



TRENCH SECTION

NOTES:

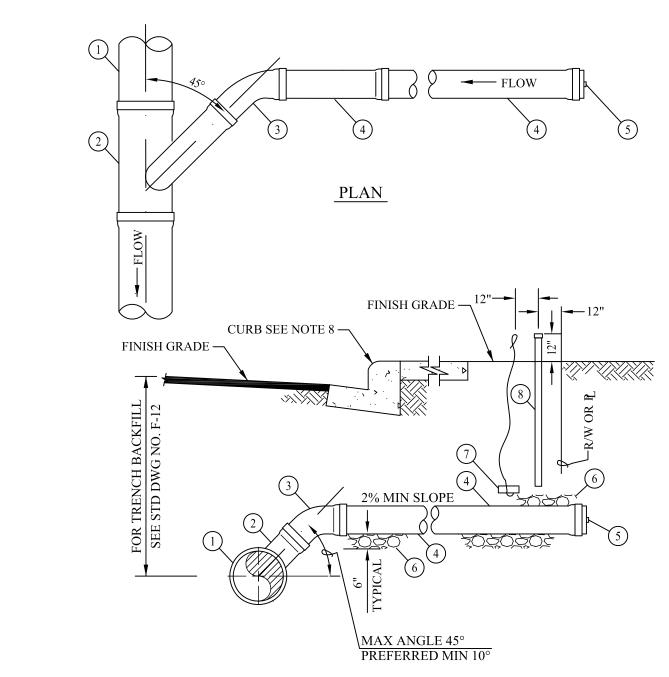
- SEE STANDARD SPECIFICATION SECTION 02223.
- CONCRETE CRADLE SHALL BE USED AS DIRECTED BY THE DISTRICT ENGINEER WHEN THE TRENCH WIDTH AT THE UPPER LIMIT OF THE PIPE ZONE EXCEEDS THE MAX WIDTH SPECIFIED ON STD DWG NO. F-12.
- 3. ALTERNATE PIPE MATERIALS MAY BE USED, SUCH AS AWWA C-900 OR C-905 WATER PIPE AS DIRECTED BY THE DISTRICT ENGINEER.
- 4. FOR PIPE BEDDING AND TRENCH BACKFILL, SEE STD DWG NO. F-12.

OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE ENGINEERING CORPORATION

CONCRETE PIPE CRADLE

STD DWG NO. F-13 JUNE 2008



ELEVATION

(INDICATE SIZE)

NOTE:

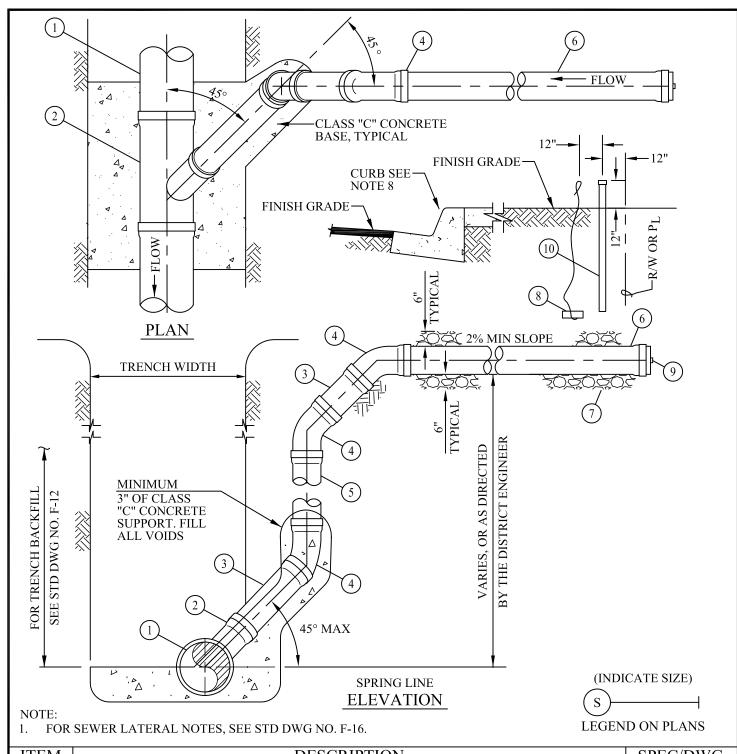
1. FOR SEWER LATERAL NOTES, SEE STD DWG NO. F-16

LEGEND ON PLANS

ITEM	DESCRIPTION	SPEC/DWG
1	SEWER MAIN	15065
2	45° WYE	15065
3	45° ELBOW	15065
4	PVC PIPE LATERAL, SEE NOTES 3 & 5	15065/F-16
5	PVC PLUG OR CAP	15065
6	3/4" CRUSHED ROCK, 6" THICK	02223
7	#10 WIRE ATTACHED TO A BRICK	15065
8	4" PVC PIPE WITH GLUED CAP	15065

OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE ENGINEERING CORPORATION 4" AND 6" SEWER LATERAL INSTALLATION STD DWG NO. F-14 JUNE 2008

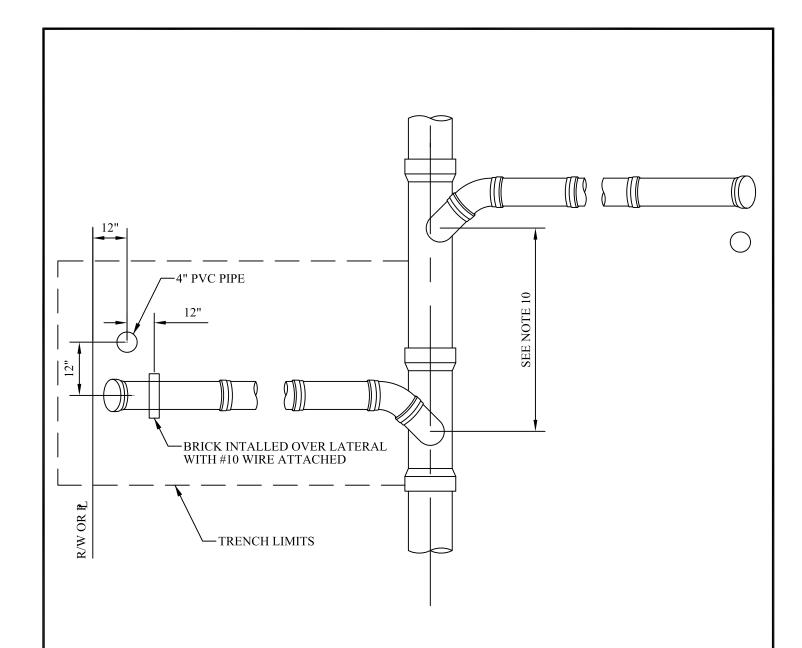


ITEM	DESCRIPTION	SPEC/DWG
1	SEWER MAIN	15065
2	45° WYE	15065
3	PVC PIPE	15065
4	45° BELOW	15065
5	PVC PIPE, SEE NOTE 6	15065/F-16
6	PVC PIPE LATERAL, SEE NOTES 3 & 5	15065/F-16
7	3/4" CRUSHED ROCK, 6" THICK	02223
8	#10 WIRE ATTACHED TO A BRICK	15065
9	PVC PLUG OR CAP	15065
10	4" PVC PIPE WITH GLUED CAP	15065

OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE ENGINEERING CORPORATION 4" AND 6" DEEP-CUT SEWER LATER INSTALLATION STD DWG NO. F-15

JUNE 2008



SEWER LATERAL DETAIL

SEE NOTE 10 BELOW

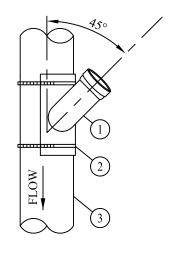
NOTES:

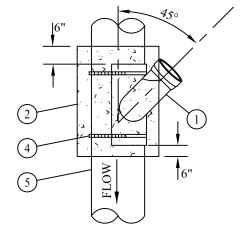
- SEE STANDARD SPECIFICATION SECTION 15065.
- IN NO CASE SHALL A LATERAL CONNECT DIRECTLY ON TOP OF A SEWER MAIN.
- LATERAL SHALL BE INSTALLED TO PROPERTY LINE UNLESS SPECIFIED ON PLANS.
- 4. MINUMUM 4' COVER ABOVE LATERAL AT PROPERTY LINE.
- 5. LATERAL TO HAVE A MINUMUM SLOPE OF 2%.
- 6. VERTICAL PIPE SHALL BE BRACED WHILE BACKFILLING TRENCH.
- 7. INSTALL WARNING/IDENTIFICATION TAPE AS SHOWN ON STD DWG NO. F-22.
- 8. STAMP OR CHISEL A 2" HIGH "S" IN CURB FACE OVER LATERAL TO IDENTIFY SEWER LATERAL LOCATION.
- 9. FOR SEWER LATERAL INSTALLATIONS, SEE STD DWG NOS. F-14 AND F-15.
- 10. SEWER MAIN SHALL HAVE A MINIMUM 3' SECTION OF PIPE BETWEEN FITTINGS.

OLIVENHAIN MUNICIPAL WATER DISTRICT

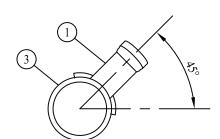
BOYLE ENGINEERING CORPORATION SEWER LATERAL NOTES AND DETAIL

STD DWG NO. F-16 JUNE 2008

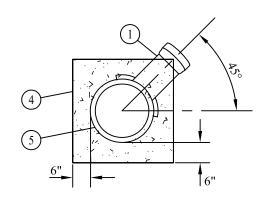




PLAN



PLAN



ELEVATION

CUT IN WYE CONNECTION
FOR EXISTING PVC PIPE
TYPE A

ELEVATION

CUT IN WYE CONNECTION
FOR EXISTING PVC PIPE
TYPE B

NOTES:

- 1. SEE STANDARD SPECIFICIATION SECTION 15065.
- 2. CONNECTIONS TO EXISTING SEWER MAINS TO BE MADE BY DISTRICT PERSONNEL UNLESS OTHERWISE NOTED ON PLANS.
- 3. IN NO CASE SHALL CONNECTION BE MADE DIRECTLY ON TOP OF SEWER MAIN.
- 4. NO MORE THAN ONE CUT IN WYE WILL BE ALLOWED FOR EACH LENGTH OF ANY EXISTING VCP SEWER MAIN.
- 5. FOR SEWER LATERAL INSTALLATION, SEE STD DWG NOS. F-14 AND F-15.
- 6. FOR TRENCH BACKFILL, SEE STD DWG NO. F-12.

(INDICATE SIZE)



LEGEND ON PLANS

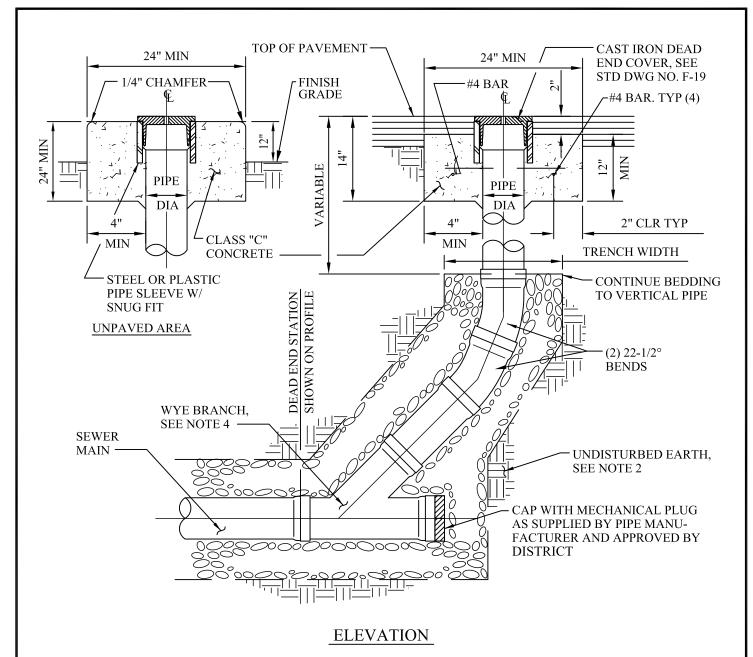
ITEM	DESCRIPTION	SPEC/DWG
1	45° SADDLE WYE WITH GASKET	15065
2	STAINLESS STEEL HOSE CLAMPS (2-EACH)	15065
3	EXISTING PVC SEWER MAIN	-
4	CLASS "C" CONCRETE ENCASEMENT	02223
5	EXISTING VCP SEWER MAIN	-

OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE ENGINEERING CORPORATION SEWER CUT
IN WYE CONNECTIONS

STD DWG NO. F-17

JUNE 2008



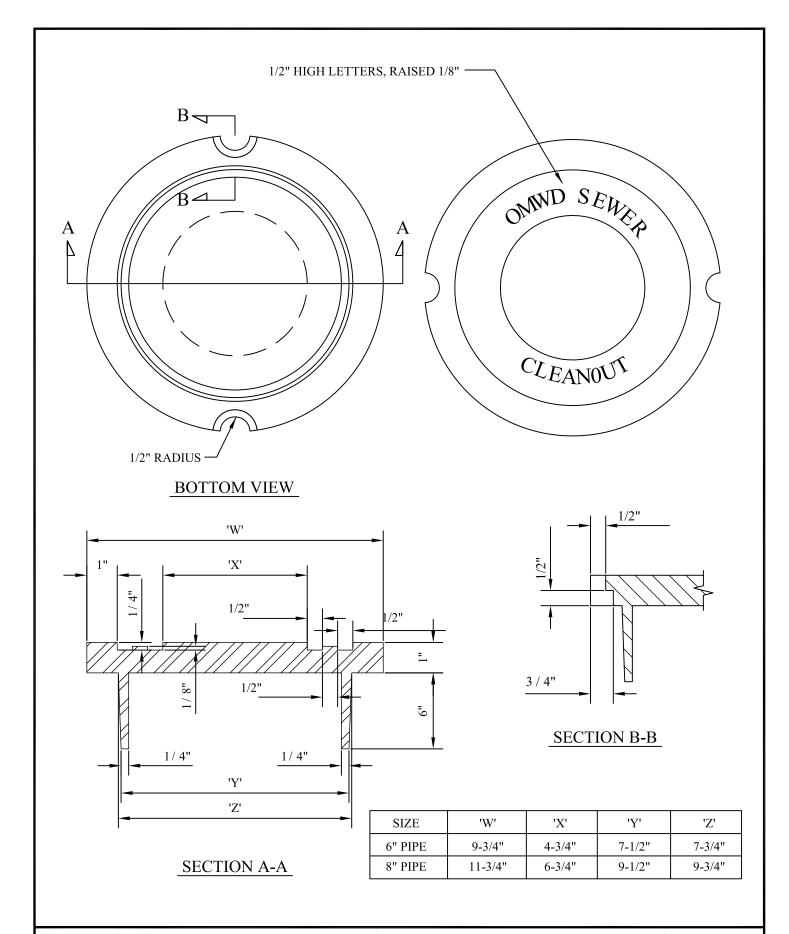
- THE SEWER MAIN SHALL BE LAID FOR THE FULL LENGTH AND DEPTH SHOWN ON THE PLAN AND PROFILE TO THE POINT MARKED DEAD END (D.E.).
- 2. THE TRENCH FOR A DEAD END SHALL BE EXCAVATED ONLY TO SUBGRADE, WHICH IS THE BOTTOM OF THE SLOPING PIPE AND FITTINGS. SHOULD THE EXCAVATION FOR ANY REASON BE CARRIED BELOW SUBGRADE, IT SHALL BE REFILLED TO SUBGRADE WITH CRUSHED ROCK WHICH SHALL BE TAMPED UNTIL FIRM AND UNYIELDING. SHOULD A FIRM AND UNYIELDING FOUNDATION BE UNOBTAINABLE BY THIS METHOD A CONCRETE PIPE CRADLE SHALL BE USED.
- 3. DEAD END SHALL BE SAME SIZE PIPE DIAMETER AS THE MAIN LINE SEWER.
- 4. WYE BRANCH SHALL BE REPLACED WITH (2) 22-1/2° BENDS, IN AREAS WHERE SEWER WILL NOT BE EXTENDED.
- 5. CLEANOUT COLLAR SHALL BE CENTERED IN CONCRETE COLLAR.

OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE
ENGINEERING
CORPORATION

STANDARD DEAD END (CLEANOUT)

STD DWG NO. F-18 JUNE 2008

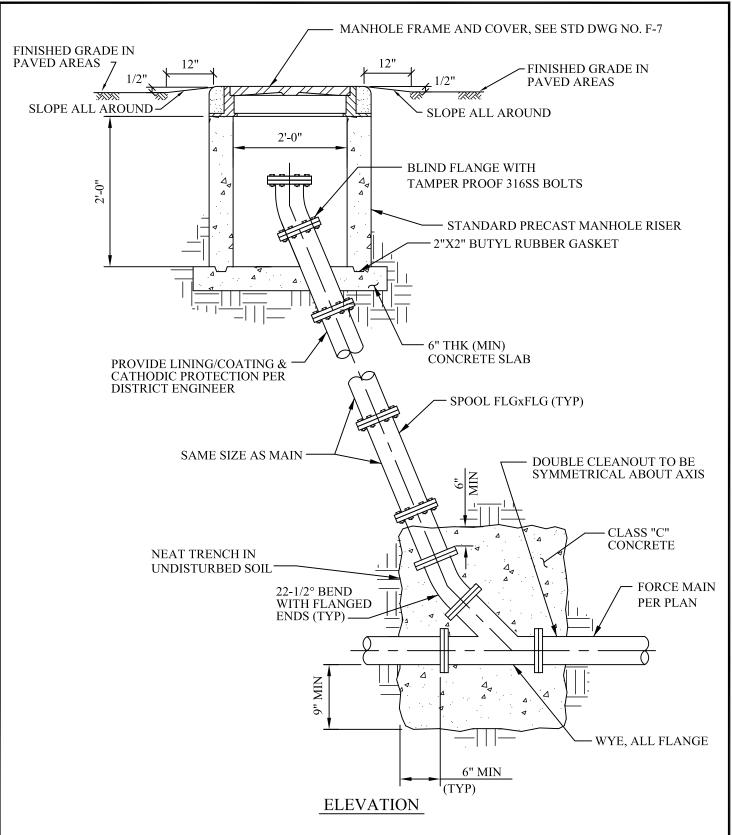


OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE ENGINEERING CORPORATION

STANDARD CLEANOUT COVER

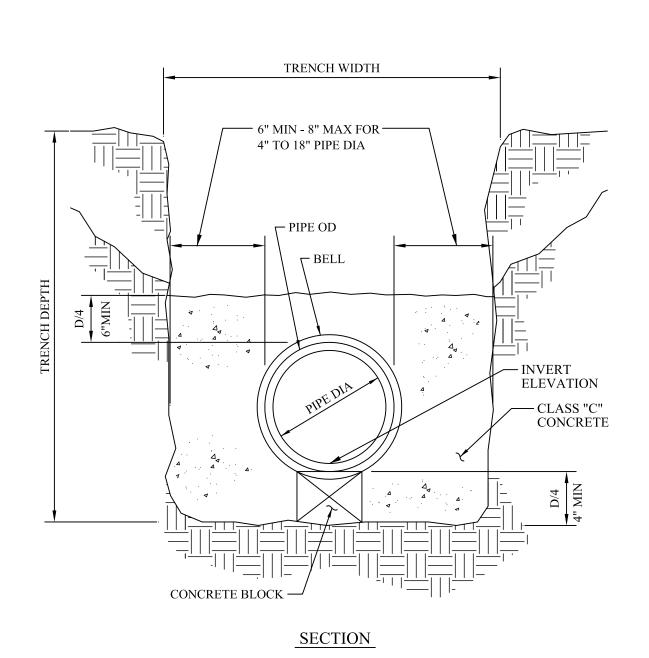
STD DWG NO. F-19 JUNE 2008



- 1. SIMILAR POLYVINYL CHLORIDE COMPONENTS SHALL BE USED IN ACCORDANCE WITH ASTM D3033 AND HAVE SOLVENT CEMENT JOINTS.
- 2. CONCRETE SLAB TO BE CLASS "C".

OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE ENGINEERING CORPORATION CLEANOUT SEWER FORCE MAIN STD DWG NO. F-20 JUNE 2008

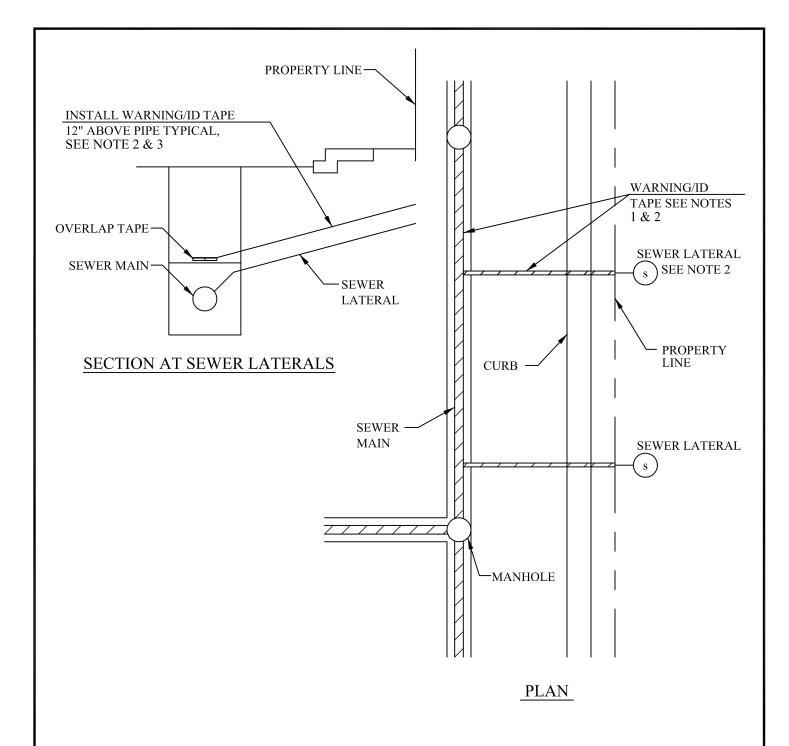




1. ENCASE PIPE TO NEAREST FLEXIBLE JOINT.

OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE ENGINEERING CORPORATION CONCRETE ENCASEMENT STD DWG NO. F-21 JUNE 2008



- 1. SEWER LINES SHALL HAVE A 6" WIDE GREEN WARNING/IDENTIFICATION TAPE MARKED "CAUTION SEWER LINE BURIED BELOW" SEE NOTE 3.
- 2. WARNING/IDENTIFICATION TAPE SHALL BE INSTALLED 12"
 ABOVE THE PIPE AND PLACED CONTINUOUSLY ALONG THE
 ENTIRE LENGTH OF THE PIPE AND ALL RELATED
 APPURTENANCES.
- 3. FOR SEWER LATERALS EXTEND TAPE TO PROPERTY LINE.
- 4. FOR PIPE BEDDING AND TRENCH BACKFILL, SEE STD DWG NO. F-12.

OLIVENHAIN MUNICIPAL WATER DISTRICT

BOYLE
ENGINEERING
CORPORATION

WARNING / IDENTIFICATION
TAPE INSTALLATION

STD DWG NO. F-22 JUNE 2008