

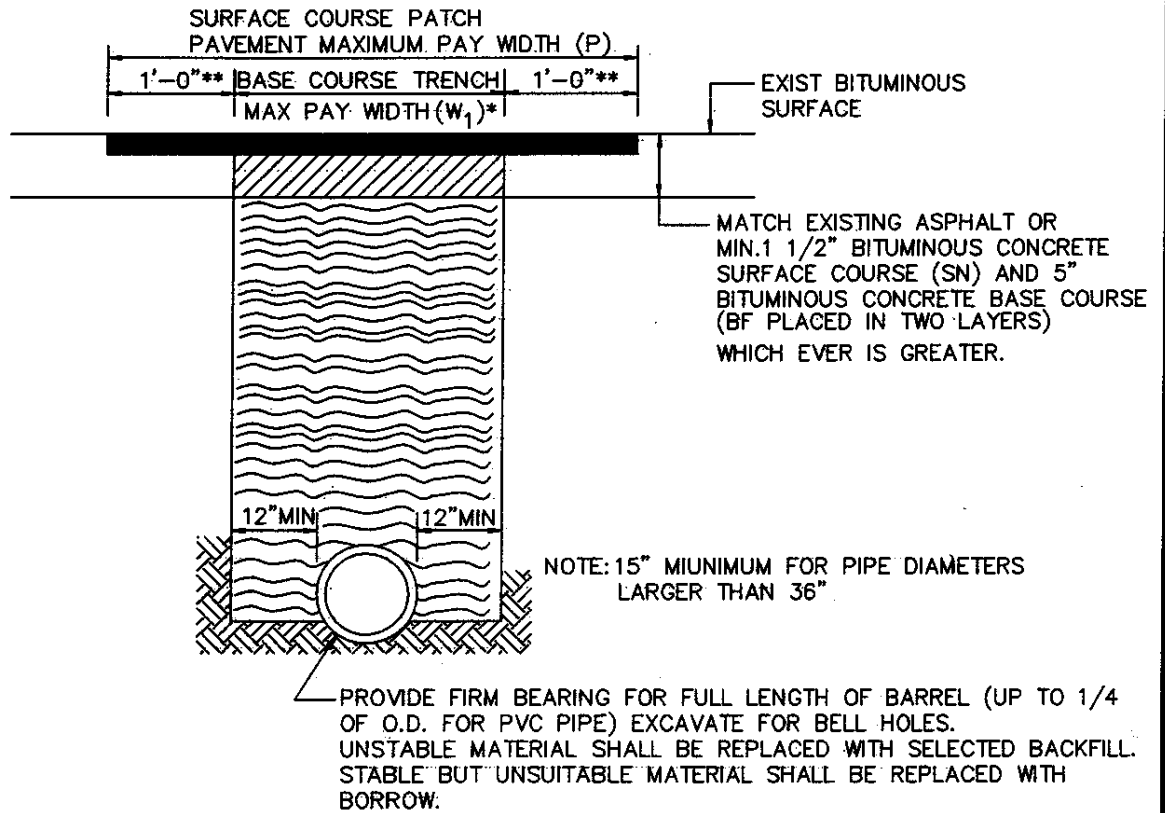
SECTION V
SANITARY SEWER

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DETAIL OF CUTTING & REPLACING PAVEMENT IN ROADWAYS OTHER THAN STATE ROADS
(BITUMINOUS CONCRETE FOR SURFACE COURSE & BASE COURSE IN LBS. PER LINEAR FOOT PER INCH ARE FOR ESTIMATING ONLY)

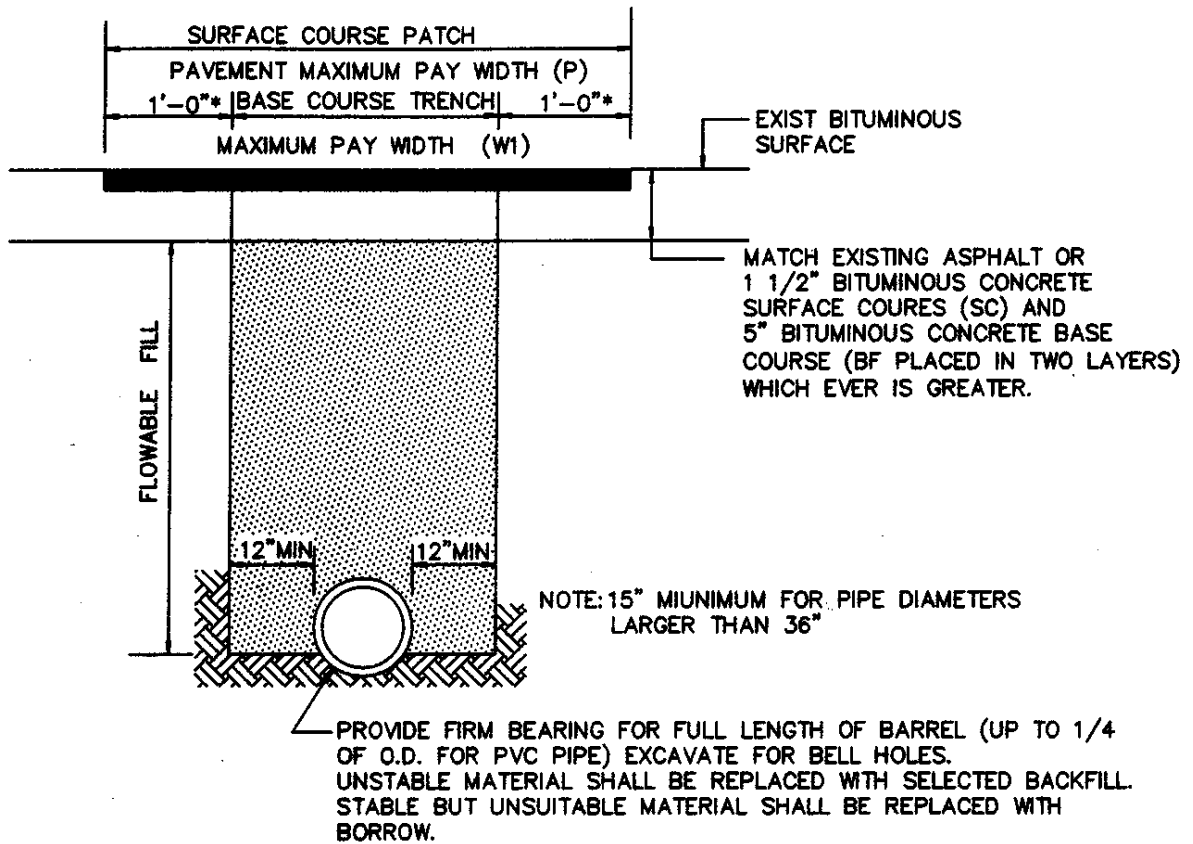
PIPE DIAMETER	MAXIMUM TRENCH PAY WIDTH	PATCH PAVEMENT PAY QUANTITIES			
		BIT. CONC. SURFACE COURSE		BIT. CONC. BASE COURSE	
		SQ. YDS./L.F.	LBS/L.F./INCH-DEPTH*	SQ. YDS./L.F.	LBS/L.F./INCH-DEPTH*
UNDER 21"	60"	0.78	88 LBS.	0.56	63 LBS.
21" - 24"	66"	0.83	94 LBS.	0.61	69 LBS.
27" - 30"	72"	0.89	100 LBS.	0.67	75 LBS.
33" - 36"	78"	0.94	106 LBS.	0.72	81 LBS.

* BASED ON 150 LBS/FT³

NOTES:

1. TEMPORARY SURFACE (EITHER GRADED AGGREGATE OR BITUMINOUS CONCRETE TO BE INSTALLED AND MAINTAINED AT THE CONTRACTORS EXPENSE.
2. CONTRACTOR RESPONSIBLE FOR TRENCH SUPPORT.
3. AGGREGATE SUBBASE SHALL BE CLEANED AND THOROUGHLY COMPACTED PRIOR TO PLACING PERMANENT PAVEMENT MATERIAL.
4. TRENCH SUPPORT MATERIAL TO BE REMOVED IN SUCH A MANNER THAT BACKFILL MATERIAL FOR FIRST TWO FEET ABOVE PIPE WILL BE COMPACTED AGAINST UNDISTURBED EARTH.
5. NOTED PAY WIDTHS ARE TO BE USED FOR MEASUREMENT REGARDLESS OF METHOD USED TO SUPPORT TRENCH.
6. CONTRACTOR RESPONSIBLE FOR MAINTAINING TEMPORARY TRENCH SURFACE PRIOR TO PLACING PERMANENT PAVING.
- * 7. FOR COMPACTION AND AGGREGATE DETAILS AND TRENCH PAY WIDTHS QUANTITIES SEE STD. PLATE S/1B.
- ** 8. AREA TO BE MILLED TO A DEPTH OF 1 1/2" TO ACCOMODATE PLACEMENT OF THE BITUMINOUS CONCRETE SURFACE COURSE.
9. SURFACE COURSE PATCH PAVING SHALL EXTEND A MINIMUM DISTANCE OF 1'-0" BEYOND ANY DISTURBED SURFACE PAVEMENT INDEPENDENT OF THE SURFACE COURSE PATCH PAVEMENT MAXIMUM PAY WIDTH.
10. REQUIRED THAT FLOWABLE FILL BE USED IN TRENCHES IN ROADS CLASSIFIED AS ARTERIAL OR ANY ROAD WHOSE PAVEMENT IS CUT WITHIN FIVE (5) YEARS OF THE ROAD BEING CONSTRUCTED OR RESURFACED SEE PLATE S/1B.

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED <i>Ronald C. Brown</i> 5/17/99 CHIEF ENGINEER DATE: <i>4/14/99</i> DESIGN ENGINEER	STANDARD SANITARY SEWER DETAILS REPAVING TRENCHES AND PAYMENT QUANTITIES	REVISED S 1
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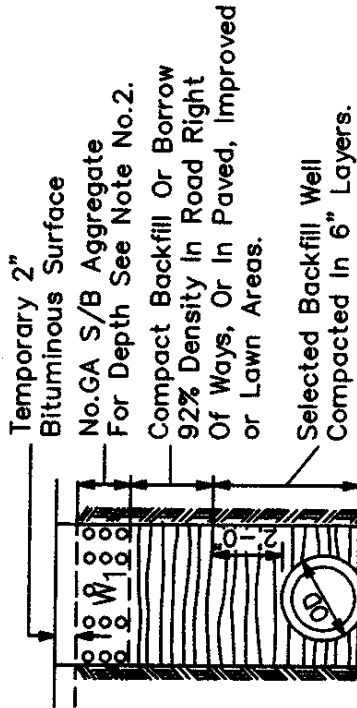
NOTES:

1. TEMPORARY SURFACE(EITHER GRADED AGGREGATE OR BITUMINOUS CONCRETE) TO BE INSTALLED AND MAINTAINED AT THE CONTRACTORS EXPENSE.
2. CONTRACTOR RESPONSIBLE FOR TRENCH SUPPORT.
3. PRIOR TO PLACEMENT OF THE FLOWABLE FILL THE CONTRACTOR SHALL PROVIDE POSITIVE CONTAINMENT OF THE FLOWABLE FILL MATERIAL TO PREVENT FLOW BEYOND THE DESIRED PLACEMENT LOCATION.
4. FOR PAY WIDTH QUANTITIES SEE STANDARD PLATE S/1.
5. CONTRACTOR RESPONSIBLE FOR MAINTAINING TEMPORARY TRENCH SURFACE PRIOR TO PLACENG PERMANENT PAVING.
- * 6. AREA TO BE MILLED TO A DEPTH OF 1 1/2" TO ACCOMODATE PLACEMENT OF THE BITUMINOUS CONCRETE SURFACE COURSE.
7. SURFACE COURSE PATCH PAVING SHALL EXTEND A MINIMUM DISTANCE OF 1'-0" BEYOND ANY DISTURBED SURFACE PAVEMENT INDEPENDENT OF THE SURFACE COURSE PATCH PAVEMENT MAXIMUM PAY WIDTH.
8. REQUIRED THAT FLOWABLE FILL BE USED IN TRENCHES IN ROADS CLASSIFIED AS ARTERIAL OR ANY ROAD WHOSE PAVEMENT IS CUT WITHIN FIVE YEARS OF THE ROAD BEING CONSTRUCTED OR RESURFACED

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED <i>Ronald A. Brown 5/17/99</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS TRENCH DETAILS FOR FLOWABLE FILL	REVISED	S 1 A
	DATE:			
	DESIGN ENGINEER <i>John R. ... 4/12/99</i>			

NOTES:

1. Temporary surface to be maintained at contractors expense.
2. Aggregate quantities are based on: Depth-6" for Dirt Roads, Shoulders, Driveways, Sidewalks, etc. 12" for Paved Roads and Shoulders. Weight-130 Lbs. Per Cubic Foot.
3. See detail S/1 for method of cutting & repairing openings in county roadways.



TRENCH

TRENCHES IN ROADS OTHER THAN STATE ROADS

PIPE DIAMETER	MINIMUM TRENCH PAY WIDTH (W1)	CIRCULAR	
		SQ.YDS./L.F.	GA S/B LBS./L.F./INCH-DEPTH*
UNDER 21"	60"	0.56	54 LBS.
21" - 24"	66"	0.61	60 LBS.
27" - 30"	72"	0.67	65 LBS.
33" - 36"	78"	0.72	70 LBS.

* BASED ON 130 LBS./FT. 3

GA S/B = Graded Aggregate for Subbase in LBS. per Linear Foot per Inch-depth, For Estimating only.

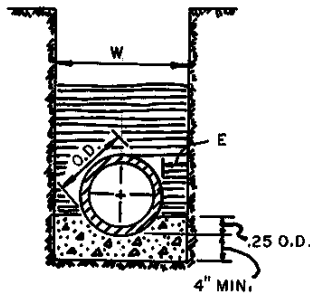
APPROVED: *[Signature]* 5/17/99
 CHIEF ENGINEER
 ANNE ARUNDEL COUNTY
 DEPARTMENT OF PUBLIC WORKS

DESIGNED BY: *[Signature]* 4/12/99
 DATE: _____
 DESIGN ENGINEER

STANDARD SANITARY SEWER DETAILS
TEMPORARY PAVEMENT, TRENCH DETAILS & CRUSHER RUN STONE PAYMENT QUANTITIES

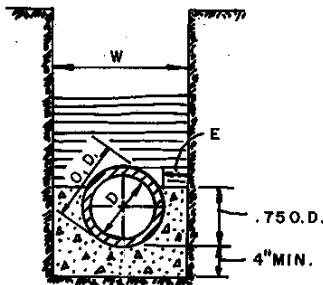
REVISED

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1B



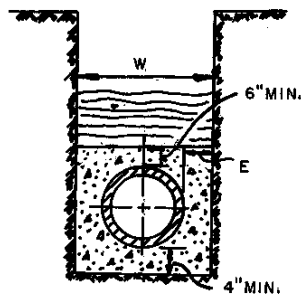
CONCRETE LOW CRADLE

PIPE DIA.	MAX. PAYMENT CU. FT. PER LIN. FT.		
	DIP	RCCP PCCP	PVC
6"	2.33	—	2.28
8"	2.52	—	2.46
10"	2.70	—	2.64
12"	2.85	—	2.80
14"	3.01	—	—
15"	—	3.29	3.01
18"	3.29	3.50	3.27
20"	3.42	—	—
21"	—	4.12	3.84
24"	4.08	4.31	4.02
27"	—	4.99	4.66
30"	4.91	5.16	—
33"	—	5.90	—
36"	5.80	6.06	—



CONCRETE HIGH CRADLE

PIPE DIA.	MAX. PAYMENT CU. FT. PER LIN. FT.		
	DIP	RCCP PCCP	PVC
6"	3.62	—	3.46
8"	4.14	—	3.98
10"	4.59	—	4.47
12"	5.03	—	4.89
14"	5.42	—	—
15"	—	6.09	5.42
18"	6.09	6.53	6.09
20"	6.37	—	—
21"	—	7.86	7.28
24"	7.78	8.20	7.66
27"	—	9.63	9.05
30"	9.51	9.86	—
33"	—	11.42	—
36"	11.28	11.54	—



CONCRETE ENCASEMENT

PIPE DIA.	MAX. PAYMENT CU. FT. PER LIN. FT.		
	DIP	RCCP PCCP	PVC
6"	6.78	—	6.56
8"	7.49	—	7.29
10"	8.12	—	7.94
12"	8.72	—	8.52
14"	9.26	—	—
15"	—	10.22	9.26
18"	10.22	10.86	10.05
20"	10.63	—	—
21"	—	12.90	12.04
24"	12.78	13.42	12.60
27"	—	15.63	14.72
30"	15.42	16.03	—
33"	—	18.40	—
36"	18.16	18.69	—

NOTE:

1. CRADLE AND ENCASEMENT VOLUMES ARE FOR PAYMENT PURPOSES ONLY.
2. ALL CONCRETE SHALL BE MIX NO. 1
3. W: TRENCH PAY WIDTH AS INDICATED ON DETAIL S/1
4. E = 1/2 (W-O.D.)

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS

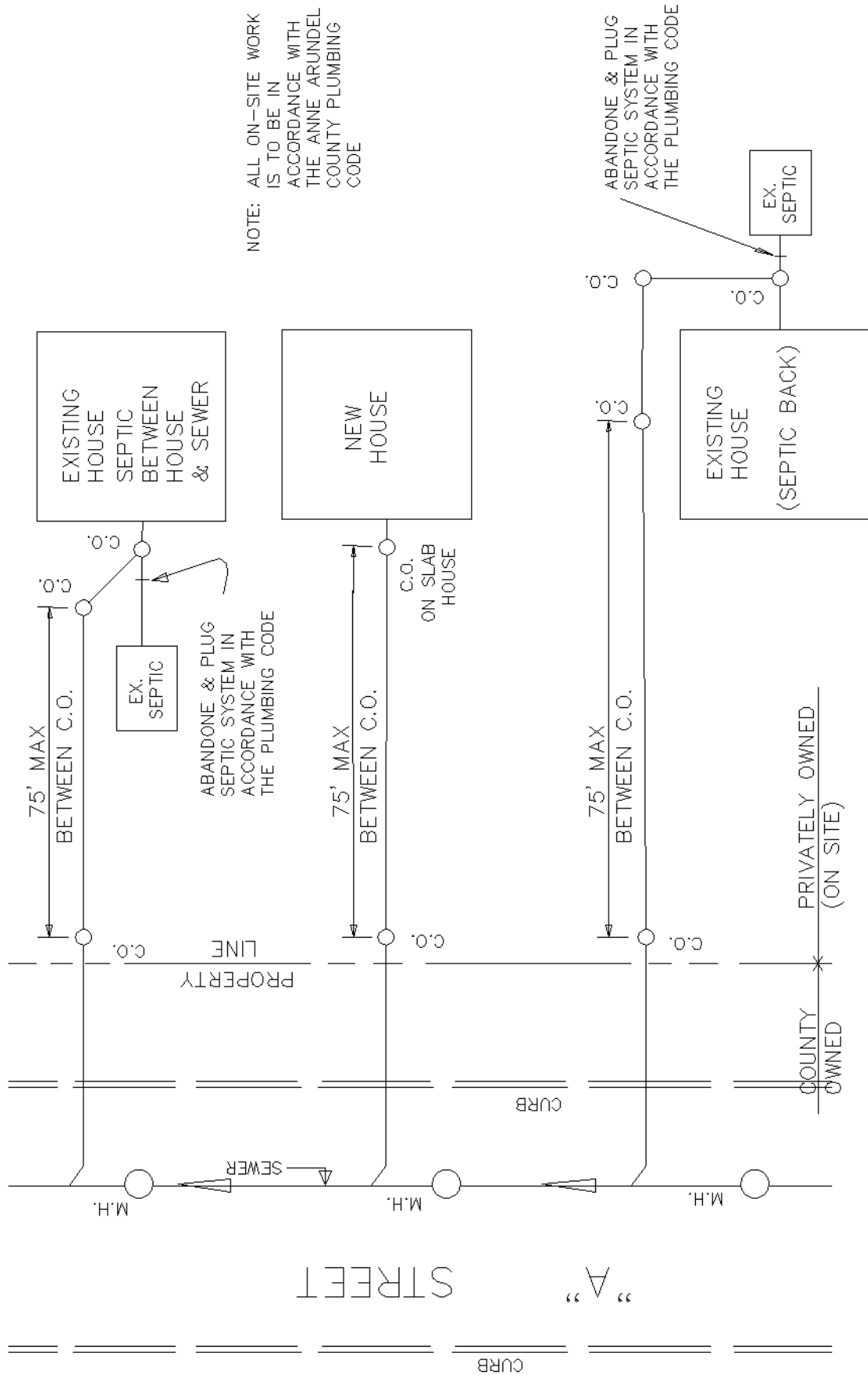
APPROVED: *[Signature]* CHIEF ENGINEER
[Signature] DESIGN ENGINEER
 DATE: 5/6/88

STANDARD SANITARY SEWER DETAILS
 TRENCHES
 CRADLE AND ENCASEMENT

REVISED

5/6/81
 10/95

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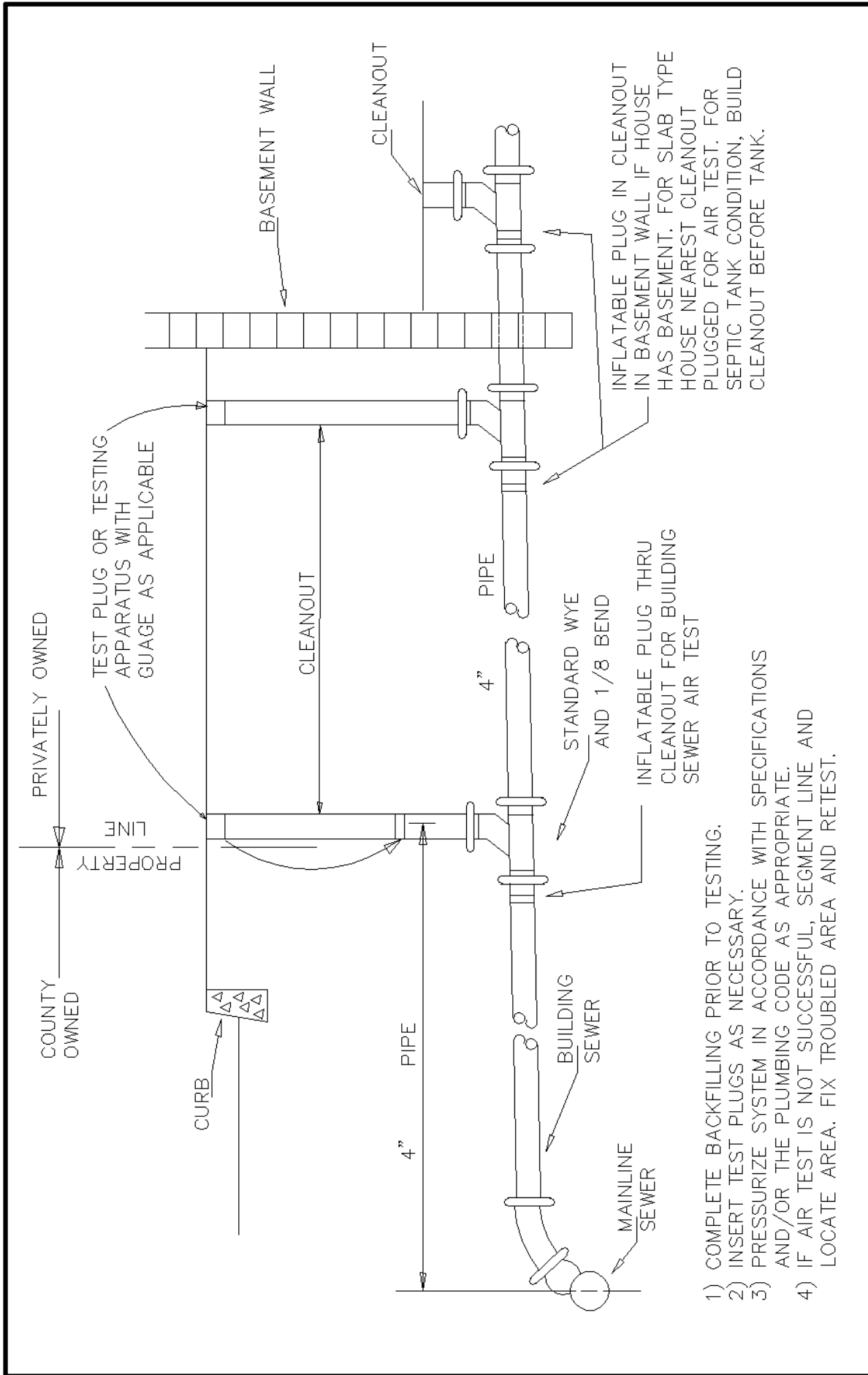


REVISION	

STANDARD SANITARY SEWER DETAILS
BUILDING SEWER LAYOUT
(CONCEPT FOR BUILDING SEWER)

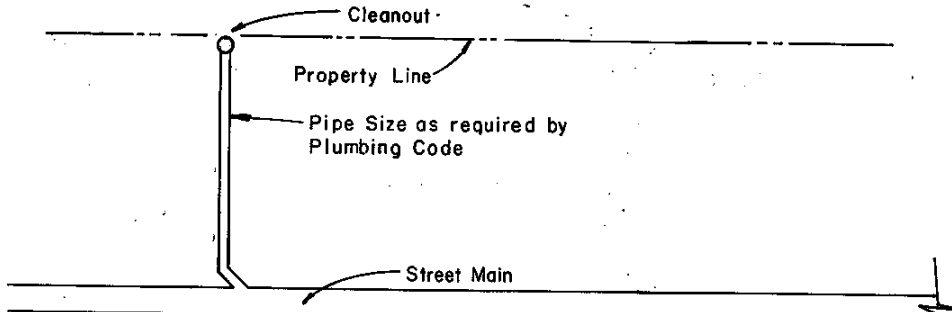
APPROVED	_____ CHIEF ENGINEER
DATE:	_____ DESIGN ENGINEER

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS

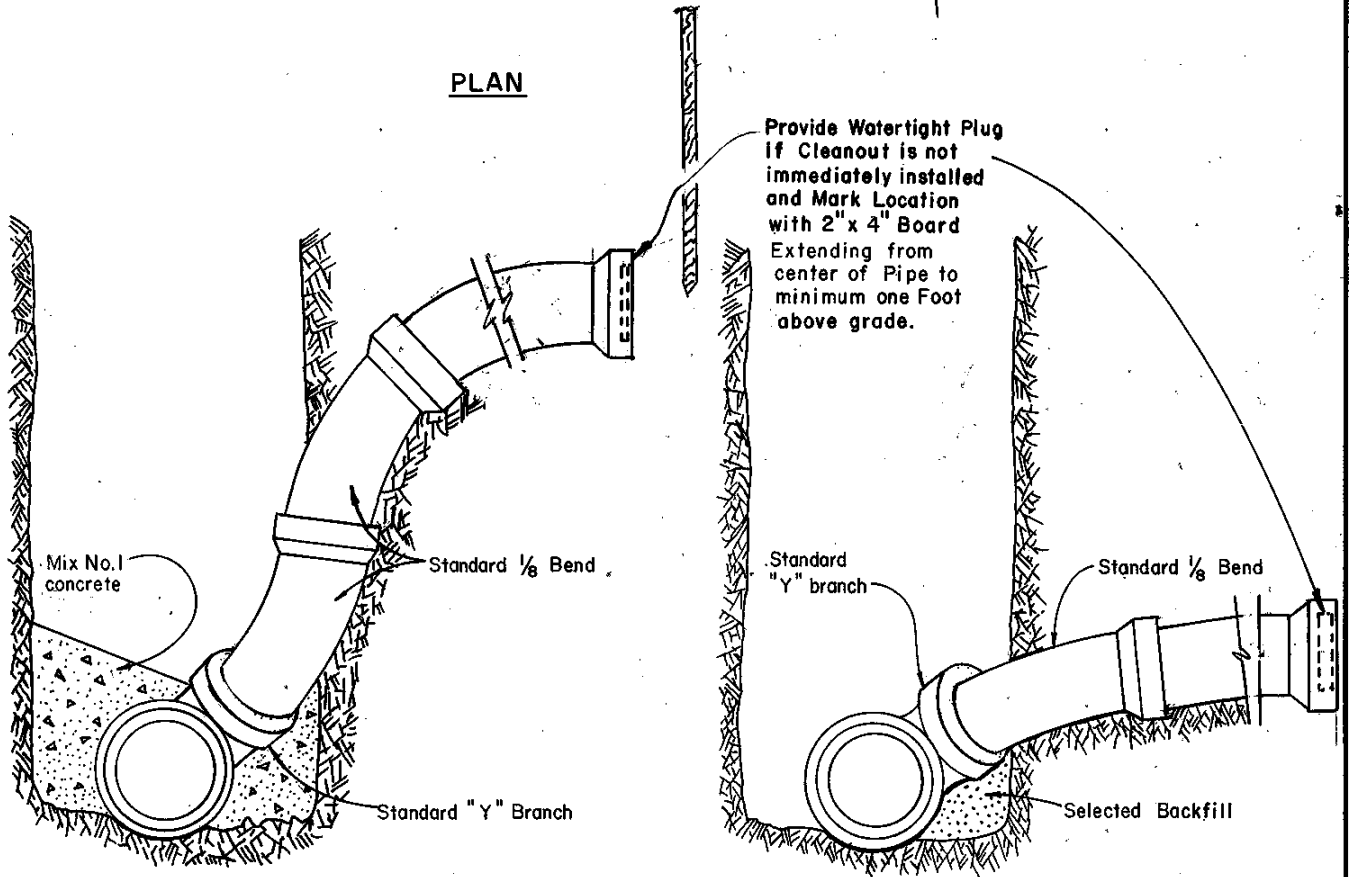


- 1) COMPLETE BACKFILLING PRIOR TO TESTING.
- 2) INSERT TEST PLUGS AS NECESSARY.
- 3) PRESSURIZE SYSTEM IN ACCORDANCE WITH SPECIFICATIONS AND/OR THE PLUMBING CODE AS APPROPRIATE.
- 4) IF AIR TEST IS NOT SUCCESSFUL, SEGMENT LINE AND LOCATE AREA. FIX TROUBLED AREA AND RETEST.

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER _____ DESIGN ENGINEER DATE:	STANDARD SANITARY SEWER DETAILS TYPICAL AIR TEST DETAIL FOR BUILDING SEWER	REVISED _____ _____ _____ _____
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PLAN



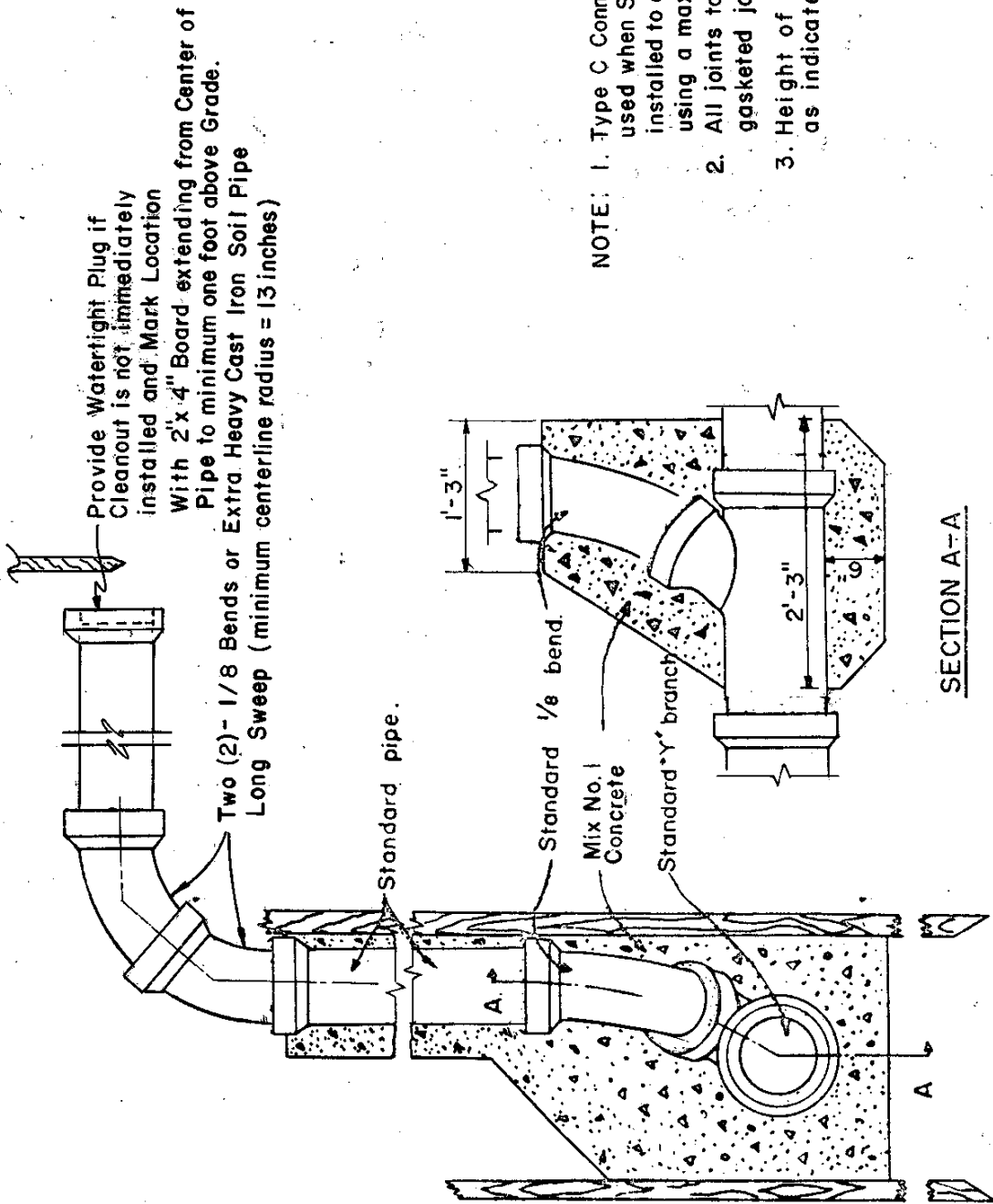
TYPE "A"

TYPE "B"

NOTE:

1. Connection pipe to be same material and as pipe in trench.
2. All Joints to be push on rubber gasketed joints.
3. Minimum grade of House Connection to be 2%.

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED: <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS STANDARD HOUSE CONNECTIONS	REVISED 11-9-84	S 5
	DESIGN ENGINEER DATE: 6/5/84		5/6/88 10 / 95	



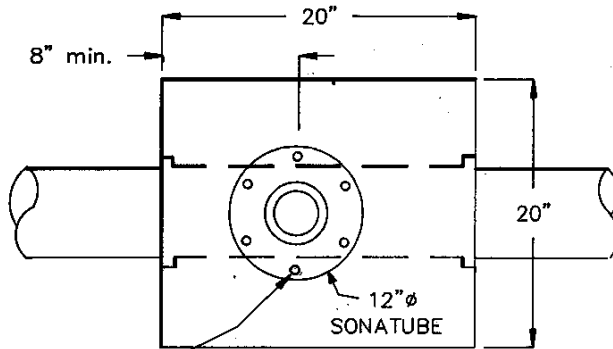
Provide Watertight Plug if
Cleanout is not immediately
installed and Mark Location
With 2'x4" Board extending from Center of
Pipe to minimum one foot above Grade.

Two (2)- 1/8 Bends or Extra Heavy Cast Iron Soil Pipe
Long Sweep (minimum centerline radius = 13 inches)

- NOTE:
1. Type C Connections are only to be used when Service Line cannot be installed to appropriate elevation using a maximum slope of 1:1.
 2. All joints to be push-on rubber gasketed joints.
 3. Height of Riser Pipe to be as indicated on Drawings.

SECTION A-A

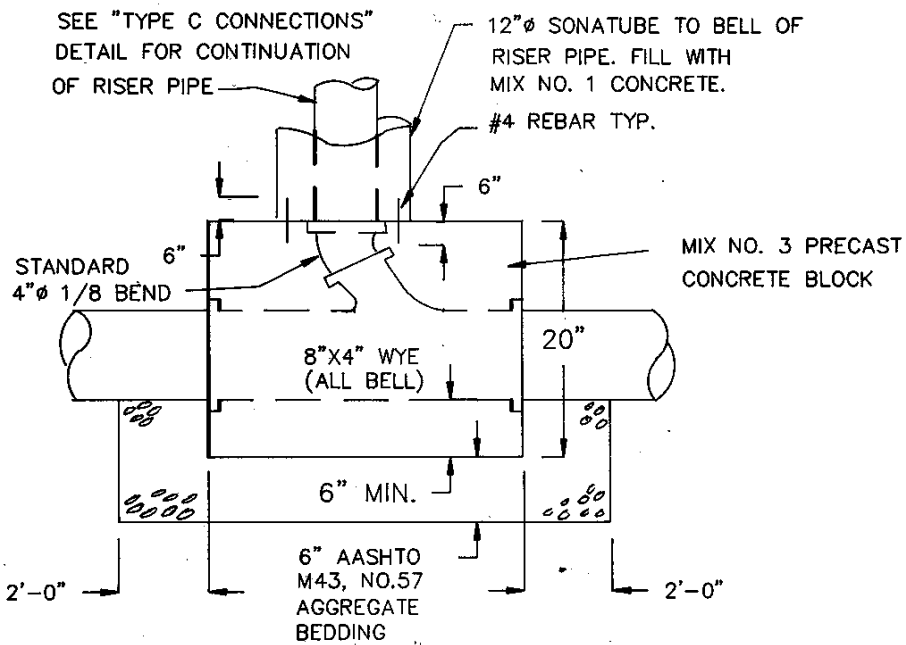
ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS TYPE C CONNECTIONS	REVISED	10 6
	DATE: 6/15/84		11-9-84	
			4-3-87	
			5/6/88	
			10 / 95	



INSTALL
6-#4 REBARS ON
A 11 1/2" CIRCLE

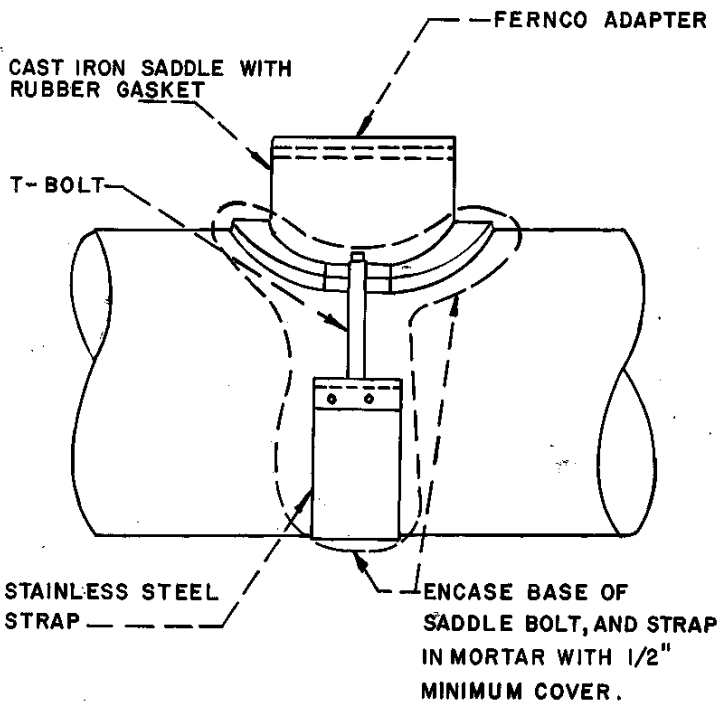
PLAN

- NOTES:
1. ALL JOINTS TO BE RUBBER GASKETS.
 2. TO BE USED AS AN ALTERNATIVE ONLY AT LOCATIONS APPROVED FOR TYPE "C" CONNECTIONS.
 3. EXCEPT AS SHOWN ON THIS DETAIL, THE RISER AND SERVICE LATERAL SHALL BE INSTALLED AS INDICATED ON OTHER APPROPRIATE STANDARD DETAILS.
 4. BEDDING AND DISTANCES TO FIRST JOINTS ON MAIN TO BE AS SHOWN ON STANDARD PRECAST MANHOLE DETAIL.
 5. HEIGHT OF RISER PIPE AND SONATUBE TO BE AS INDICATED ON CONTRACT DRAWINGS.



ELEVATION

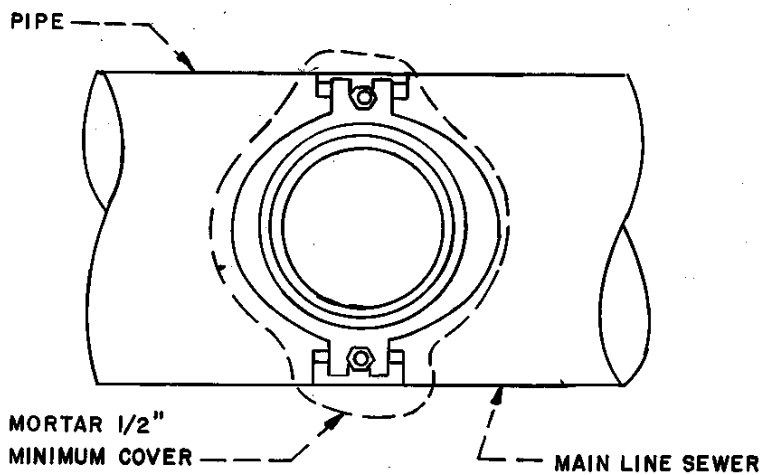
ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED: <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS ALTERNATE TYPE "C" CONNECTION PRECAST WYE	REVISED 10 / 95 <i>[Signature]</i>	S 7
	DESIGN ENGINEER DATE: 5/6/88		[Blank]	
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ELEVATION

WHEN CONNECTING TO CONCRETE SEWERS THE FOLLOWING LISTED SADDLE SIZES SHALL BE USED:

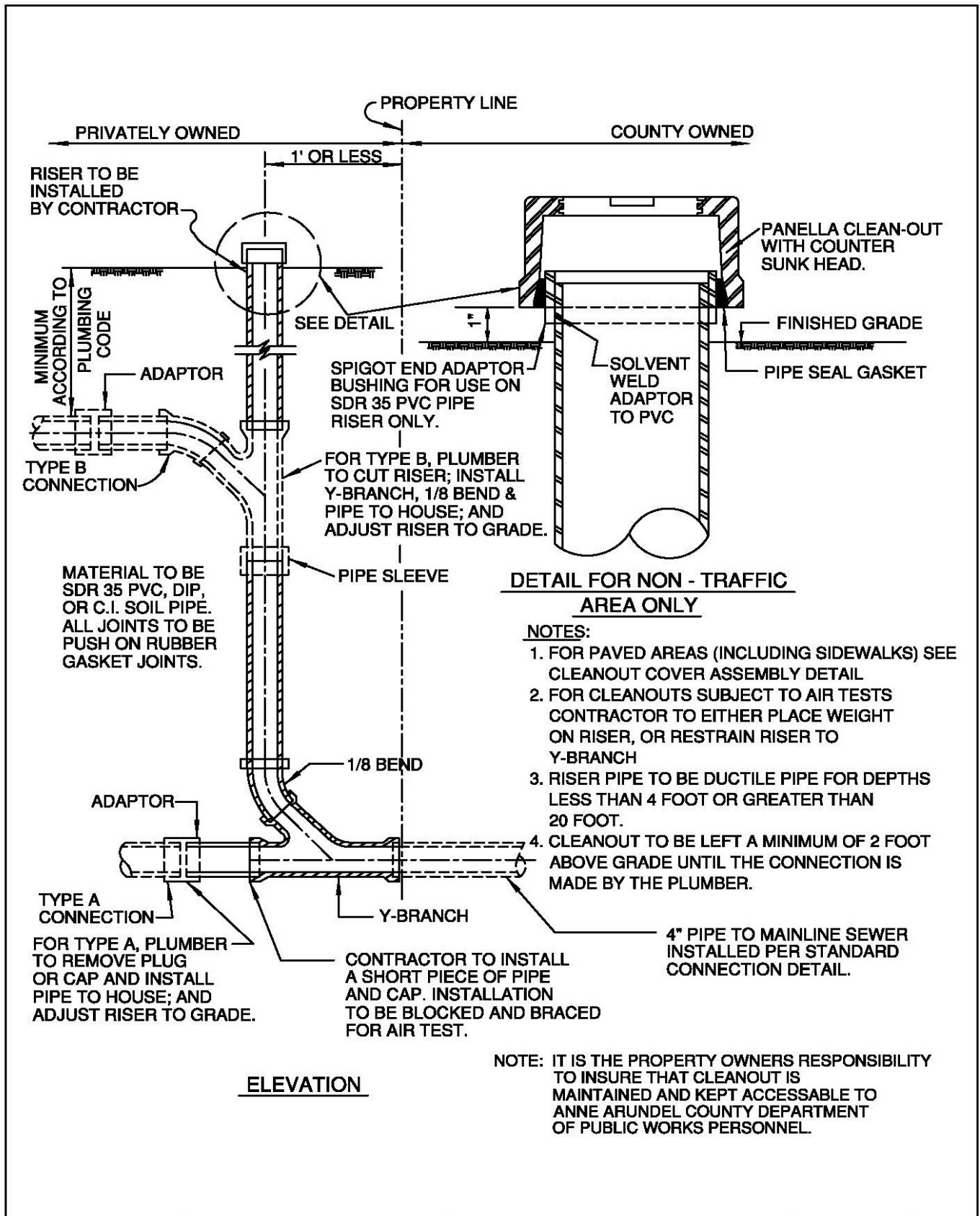
CONCRETE SEWER PIPE	SADDLE SIZE
6"	4" x 8"
8"	6" OR 4" x 10"
10"	6" OR 4" x 12"



PLAN

JOINT BETWEEN SADDLE AND HOUSE CONNECTION PIPE TO BE FERNCO COMPRESSION GASKET. OPENING IN SEWER PIPE WALL TO BE MECHANICALLY CORED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATION.

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS SADDLE INSTALLATION DETAIL MAINLINE SEWER TO 4" HOUSE CONNECTION	REVISED <i>[Signature]</i> 10 / 95
	DESIGN ENGINEER <i>[Signature]</i>		S / 8
	DATE: 5/6/88		S / 8
	S / 8		S / 8

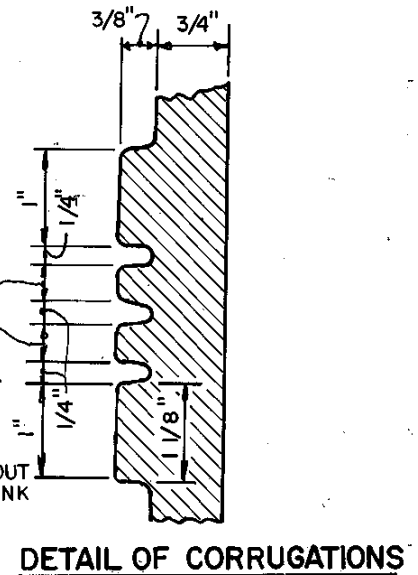
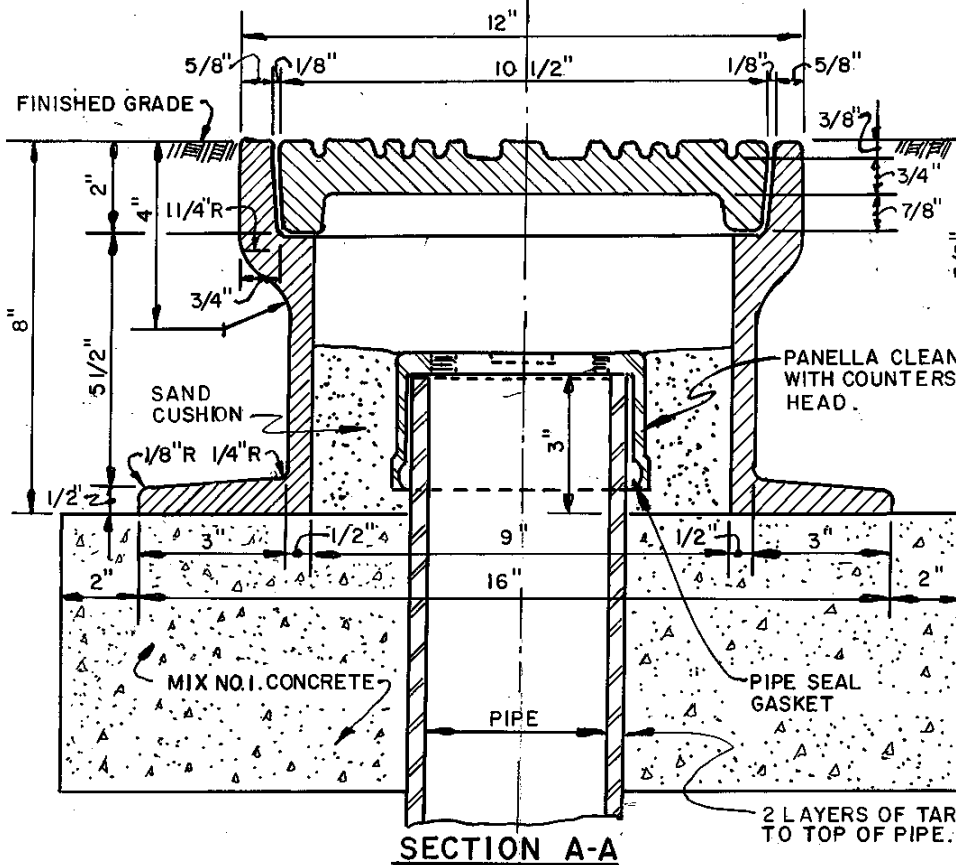
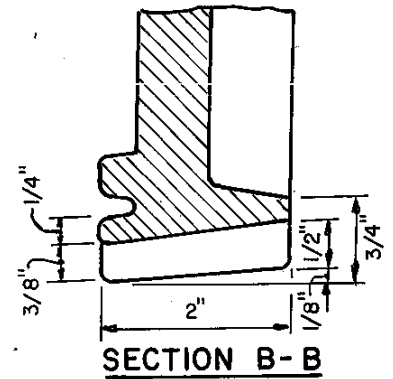
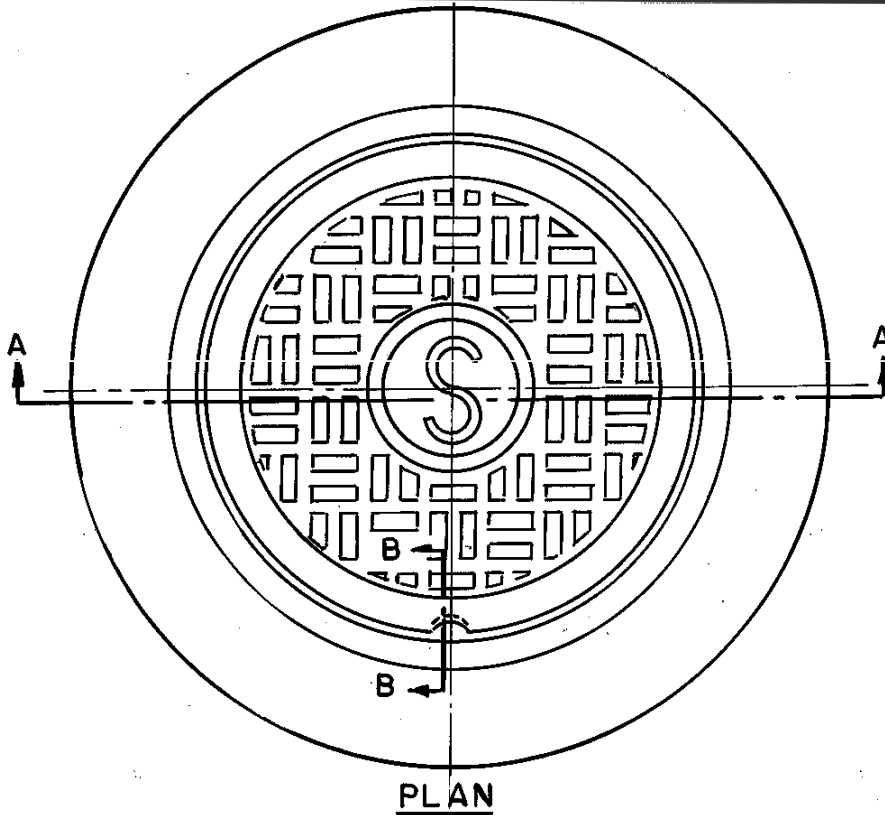


ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS STANDARD CLEANOUT	REVISED _____	S 9
	_____ DESIGN ENGINEER		_____	
	DATE:		_____	
	_____		_____	

6/2018

Published: 02/20 Revised:

NOTE: ASSEMBLY TO BE USED
IN ROADWAYS, SIDEWALKS,
DRIVEWAYS, AND ALL
OTHER PAVED AREAS.



ANNEARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS CLEANOUT COVER ASSEMBLY FOR ALL PAVED AREAS	REVISED	S 10
	DESIGN ENGINEER DATE: _____		5/6/88 10/98	

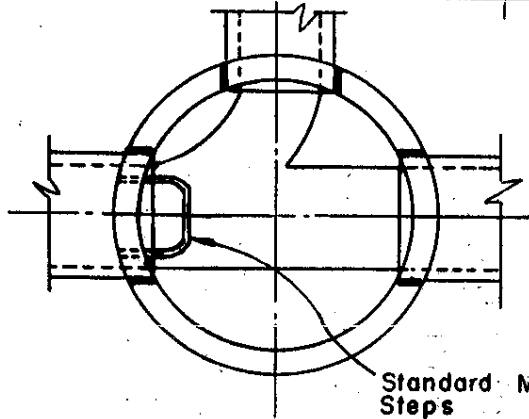
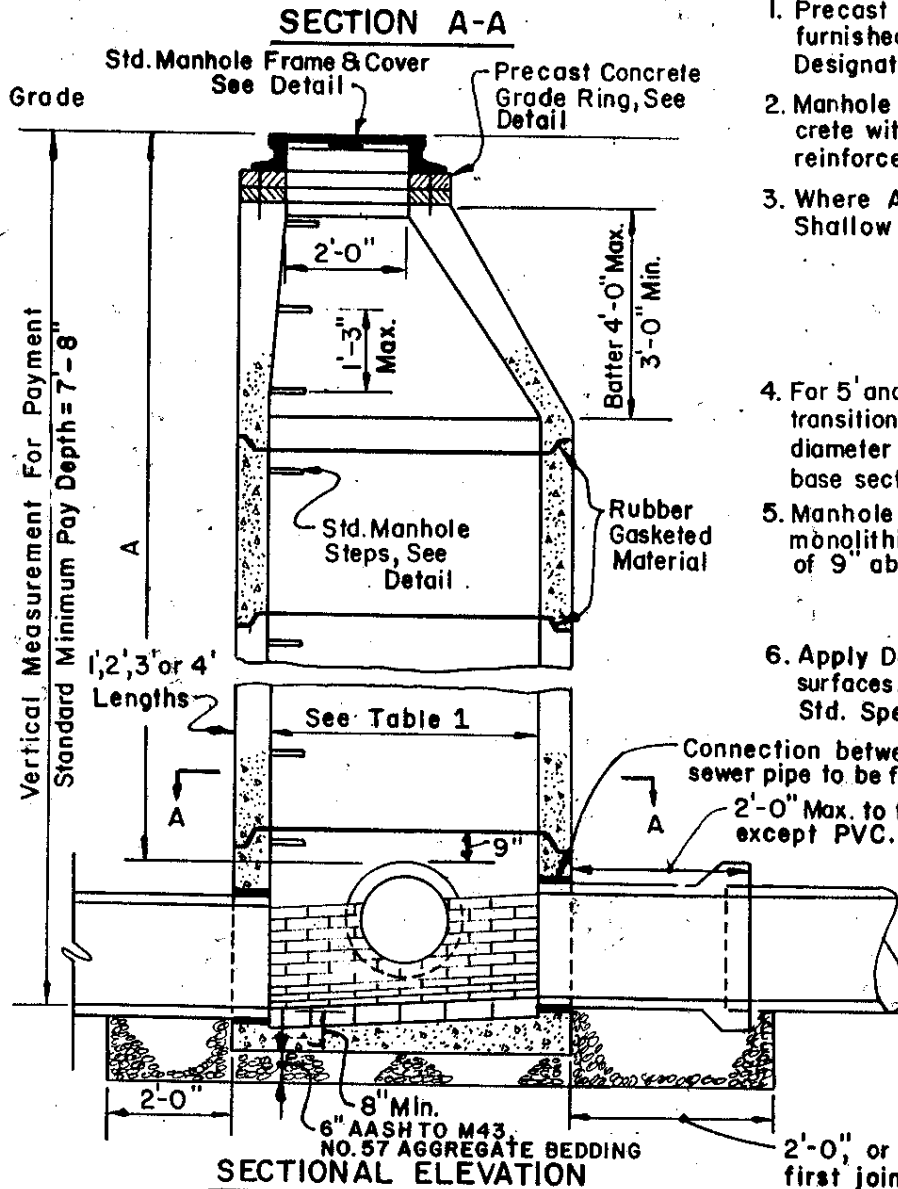


TABLE 1	
PIPE SIZE	REQUIRED M.H. DIA.
8" - 24"	4'-0"
27" - 36"	5'-0"
42" - 72"	6'-0"

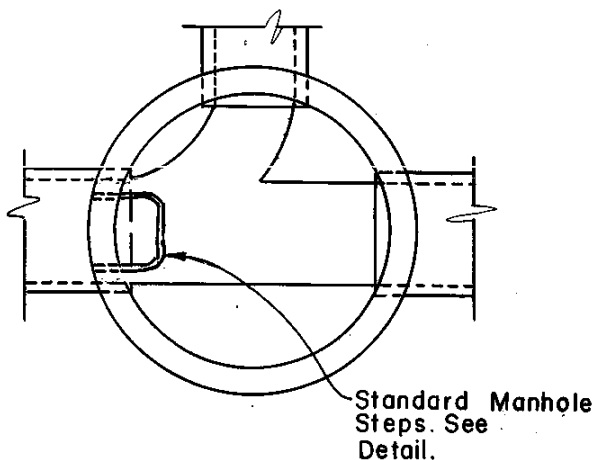
NOTES:

1. Precast Reinf. Conc. Manhole shall be furnished in accordance with A.S.T.M. Designation C478.
2. Manhole bottom shall be Precast Concrete with brick invert and shall be reinforced with # 4 at 12" eachway.
3. Where A (cover) is 6'-9" or less use Shallow Manhole.
4. For 5' and 6' diameter manholes use transition section to reduce to 4' diameter after full 4' length above base section.
5. Manhole base and first riser to be monolithic. Joint shall be a minimum of 9" above pipe crown.
6. Apply Dampproofing To exterior surfaces. (See Section 07100 of Std. Spec.)

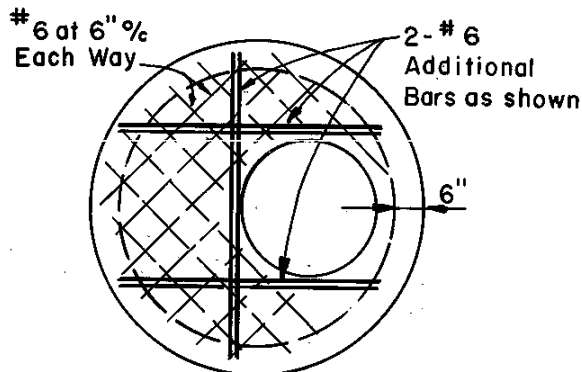


SECTIONAL ELEVATION
STANDARD PRECAST MANHOLE

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED: <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS STANDARD PRECAST MANHOLE	REVISED
	DATE: 6/5/04		5/6/88
			10 / 95



SECTION A-A

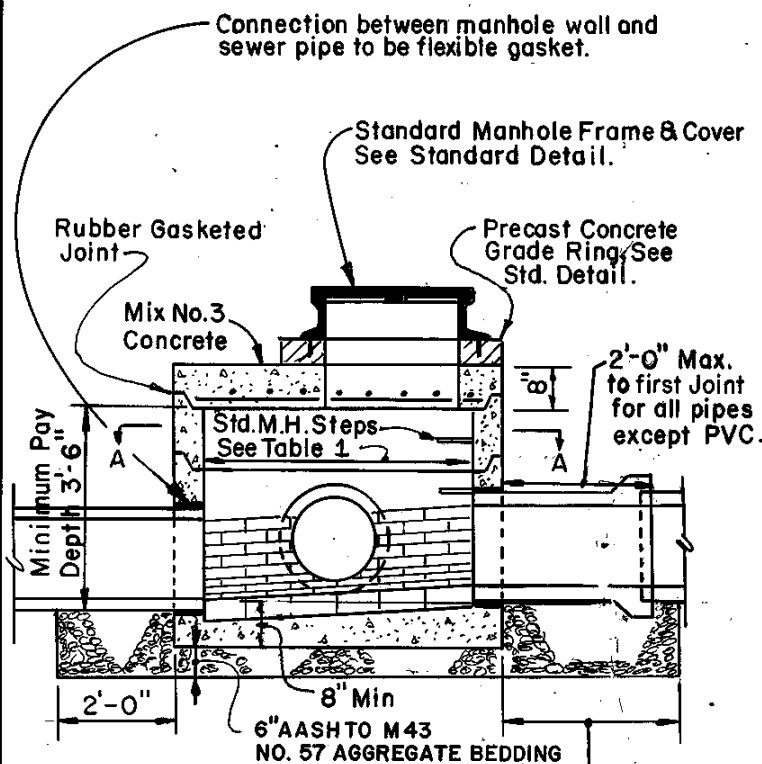


**TOP SLAB REINFORCING
SHALLOW PRECAST MANHOLE**

PIPE SIZE	REQUIRED M.H. DIA.
8" - 24"	4'-0"
27" - 36"	5'-0"
42" - 72"	6'-0"

NOTES:

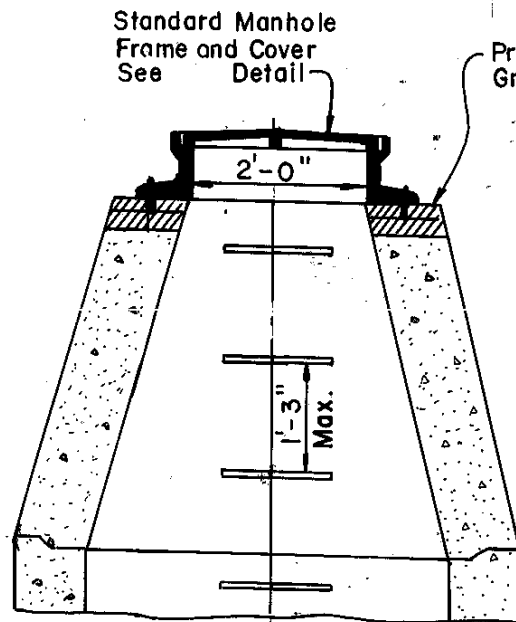
1. Precast Reinf. Conc. Manhole shall be furnished in accordance with A.S.T.M. Designation C478.
2. Manhole bottom shall be Precast Concrete with brick invert and shall be reinforced with # 4 at 12" eachway.
3. Where cover is more than 6'-9" use Standard Manhole.
4. If grade of pipe entering manhole exceeds 10%, pipe shall be rigidly connected to manhole, and 2' length of pipe section provided.
5. For 5' and 6' diameter manholes use transition section to reduce to 4' dia. after full 4' length above base section.
6. Apply Dampproofing To exterior surfaces. (See Section 07100 of Std. Spec.)



**SECTIONAL ELEVATION
STANDARD PRECAST MANHOLE**

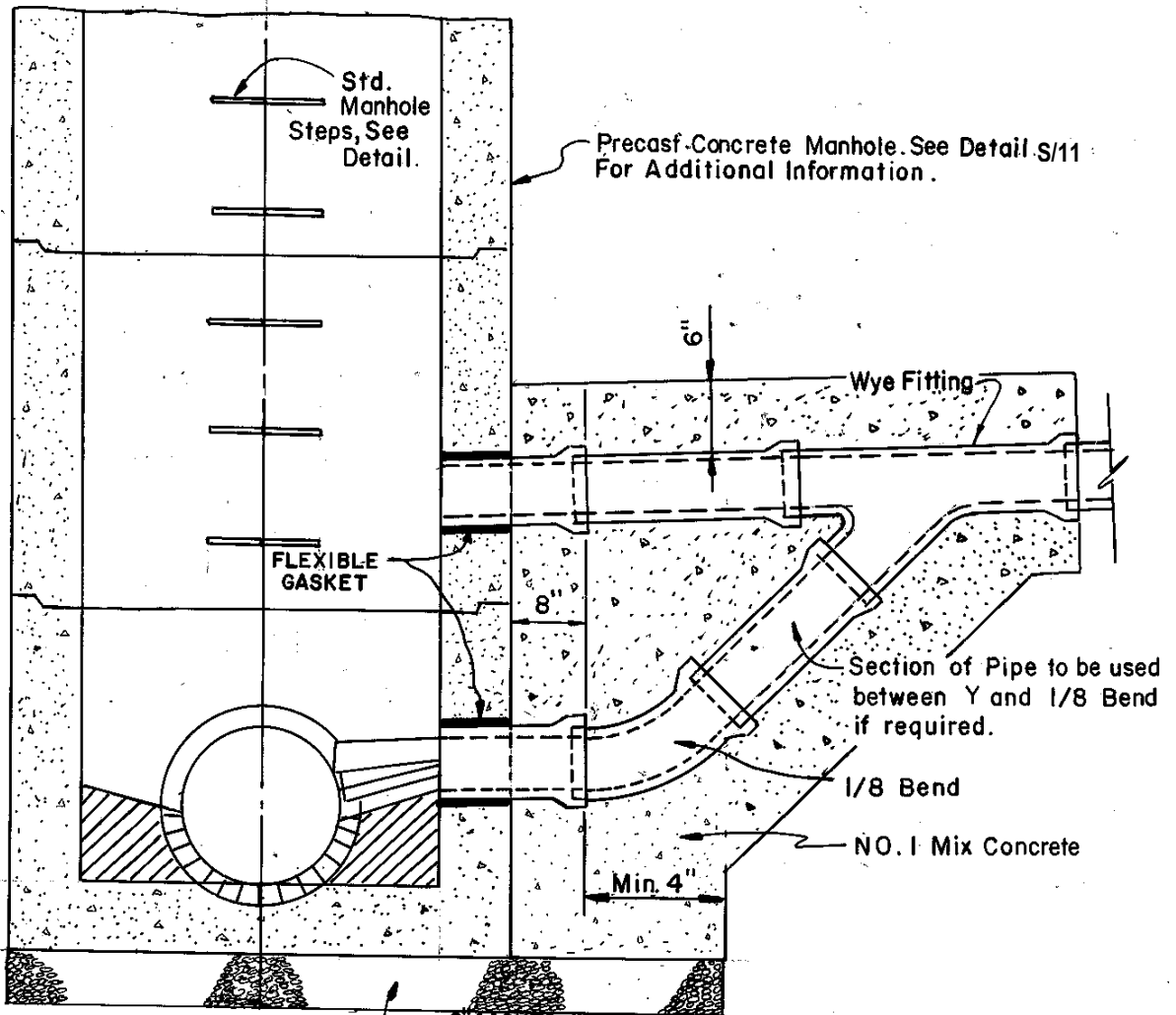
2'-0", or 1'-0" beyond first joint if "short" is used.

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED: <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS SHALLOW PRECAST MANHOLE	REVISED	
	<i>[Signature]</i> DESIGN ENGINEER		5/6/88	
	DATE: 6/5/84		10 / 95	S
				12



DROP CONNECTIONS		
SIZE OF SEWER	TYPE A	
	MAX. DROP	MIN. DROP
8"	3'-9"	2'-0"
10"	4'-0"	2'-0"
12"	6'-0"	2'-6"
15"	6'-0"	2'-6"

NOTE:
 For 15" Sewers with Drop Connections use Special "Y" with 12" Branch.
 Connections between Manhole Wall and Sewer Pipes to be Flexible Gasket.



6" AASHTO M43
 No. 57 AGGREGATE BEDDING

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS

APPROVED: *R. Swile*
 CHIEF ENGINEER

J. Scarborough
 DESIGN ENGINEER

DATE: 6/5/84

STANDARD SANITARY SEWER DETAILS
 DROP MANHOLE
 TYPE "A"

REVISED

11-9-84

5/6/85

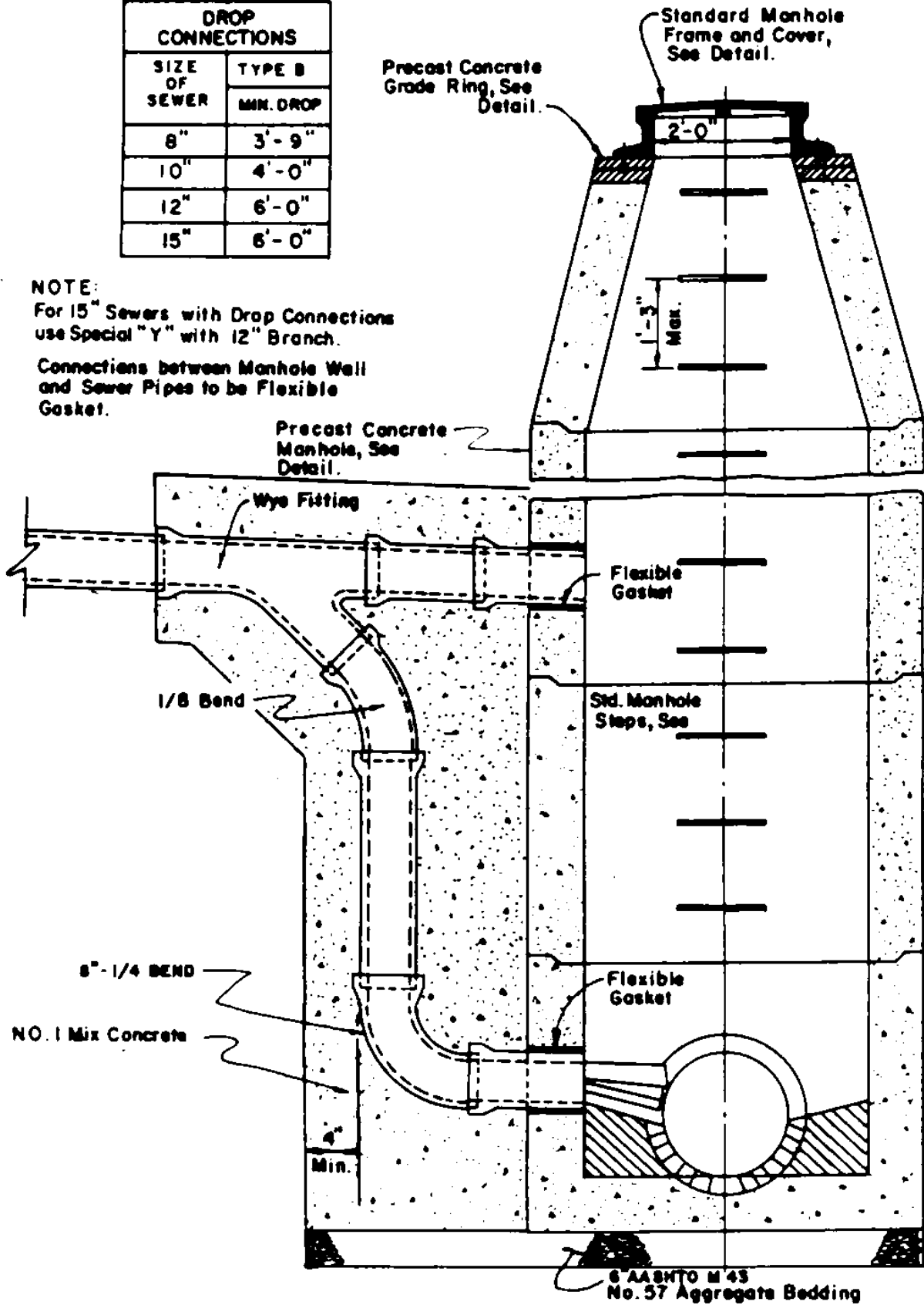
10 / 95

S/13

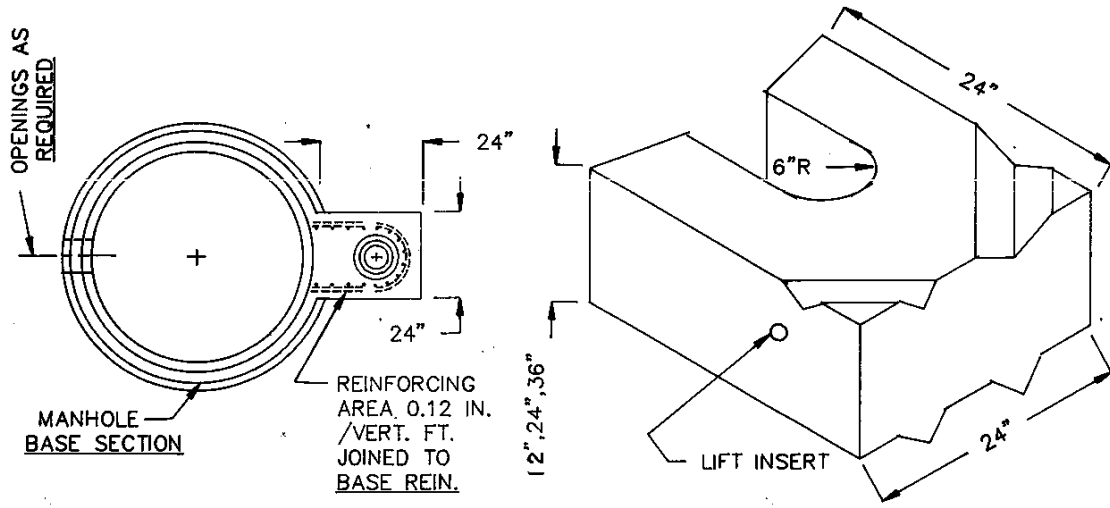
DROP CONNECTIONS	
SIZE OF SEWER	TYPE B
	MIN. DROP
8"	3'-9"
10"	4'-0"
12"	6'-0"
15"	6'-0"

NOTE:
For 15" Sewers with Drop Connections use Special "Y" with 12" Branch.

Connections between Manhole Well and Sewer Pipes to be Flexible Gasket.

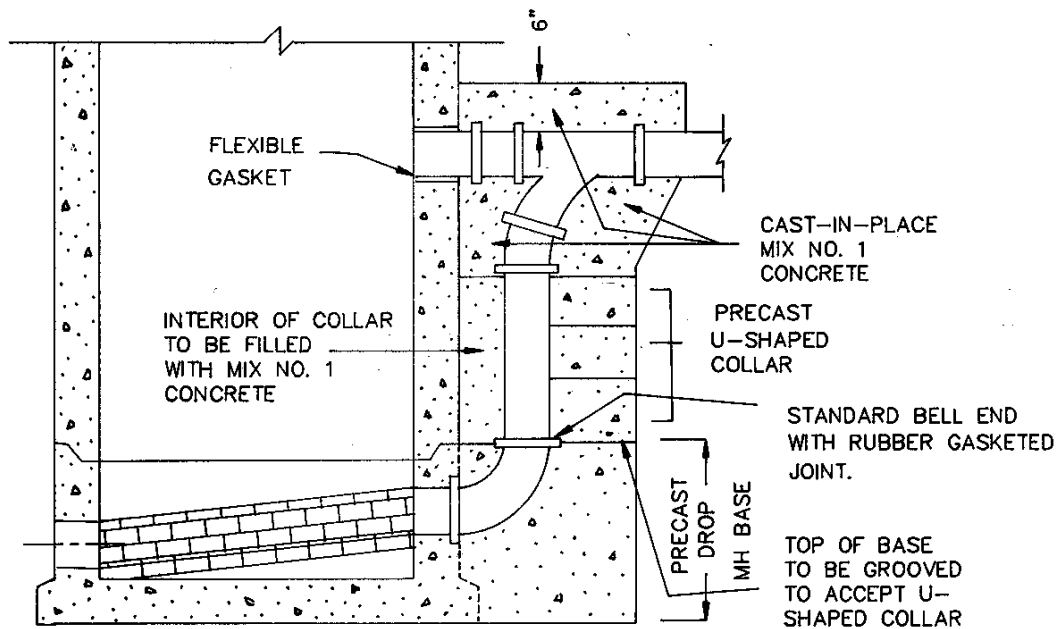


ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED: <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS DROP MANHOLE TYPE "B"	REVISED	S 14
	<i>[Signature]</i> DESIGN ENGINEER		11-9-84	
	DATE: 6/5/06		5/6/89	
			10 / 89	



PLAN
MANHOLE BASE

U-SHAPED COLLAR

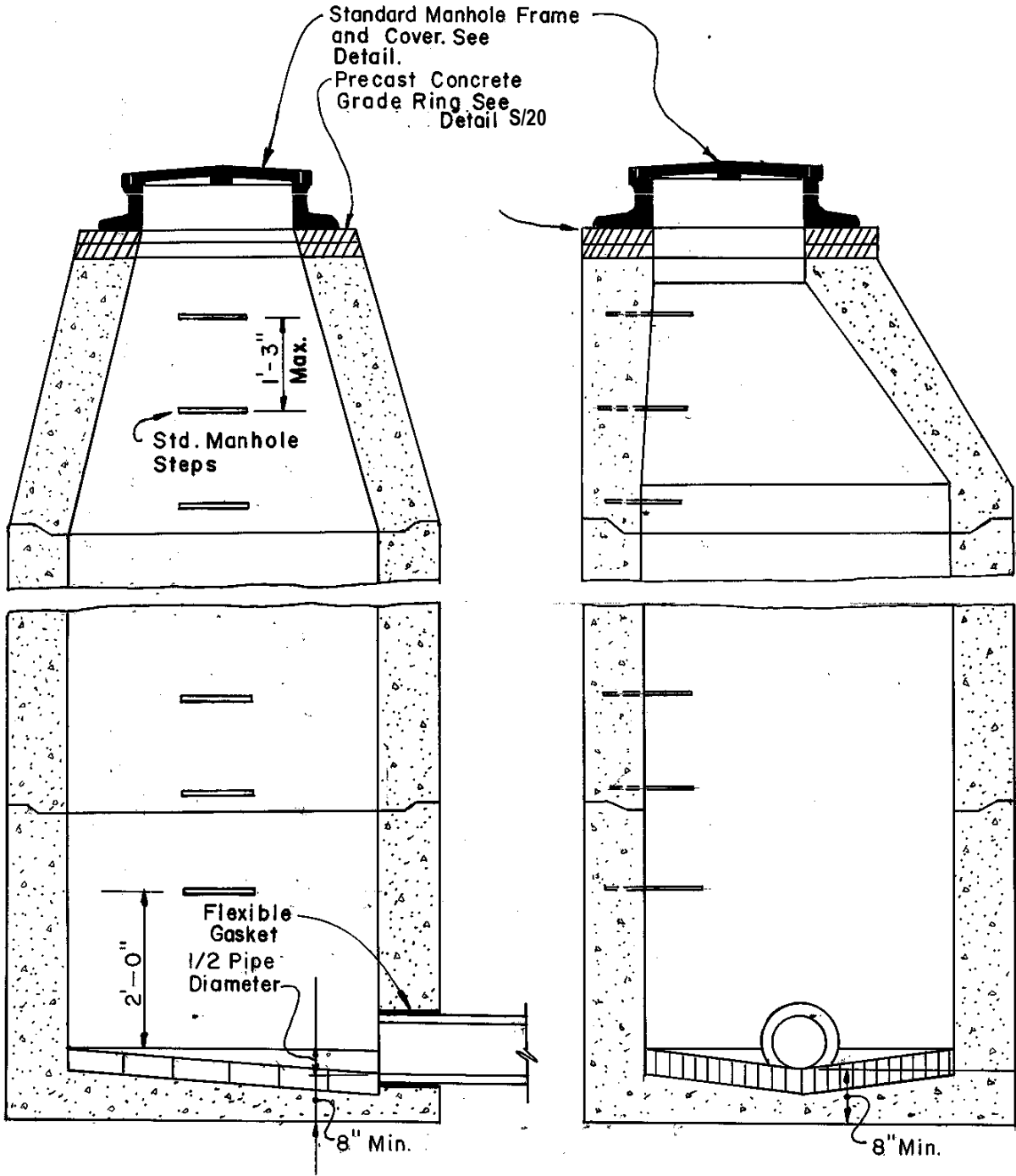


ELEVATION

NOTE: IF BASE SECTION IS NOT CAST AS ONE UNIT THE METHOD OF JOINING THE SECTIONS MUST BE APPROVED BY THE ENGINEER PRIOR TO USE.

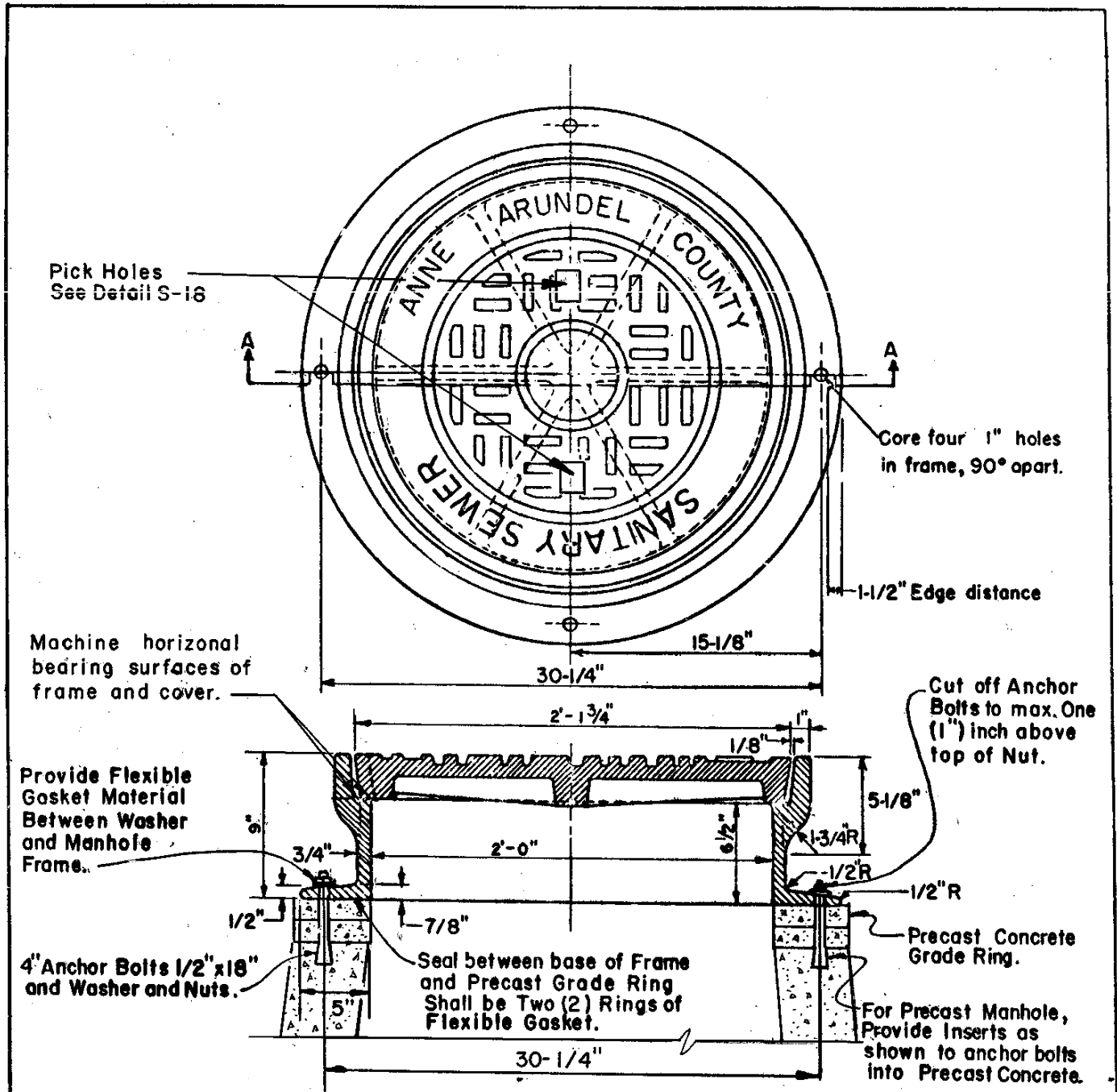
NOTE: SEE DROP MANHOLE TYPE "B" DETAIL AND STANDARD PRECAST MANHOLE DETAIL FOR STEPS, BEDDING, INVERTS REINFORCING, ETC.

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS ALTERNATE DROP MANHOLE PRECAST BASE AND COLLARS	REVISED <i>[Signature]</i> 10 / 99
	DESIGN ENGINEER <i>[Signature]</i>		
	DATE: 5/6/88		
			S 15



NOTE:
Use Standard Precast Manhole
or Shallow Precast Manhole,
as Appropriate.

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS TERMINAL MANHOLE	REVISED 5/6/88	S 16
	DESIGN ENGINEER <i>[Signature]</i>		10 / 95	
	DATE: 6/5/84		[Blank]	
	[Blank]		[Blank]	



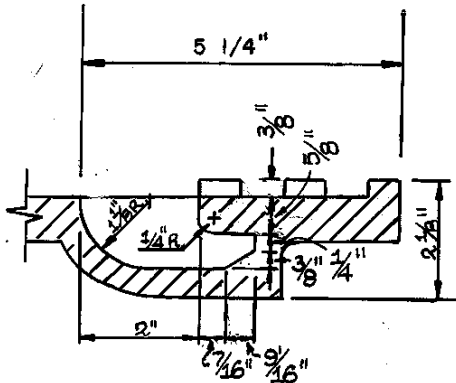
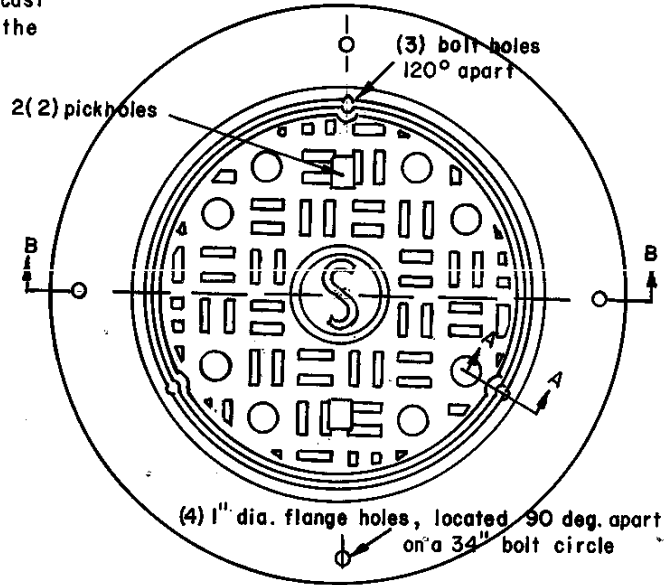
SECTION A - A

Note:

1. Anchor bolts shall only be used in off road locations. In Roadways a Concrete Collar in accordance with the Standard Detail S-19 shall be used.
2. Pattern to be made of core type. Provide rapping plates on pattern.
3. Average weight of frame - 280 lbs.
Average weight of cover - 150 lbs.
Average total weight - 430 lbs.
4. Material - Cast Iron, ASTM A-48, Class 35.
5. Component parts of the assembly shall be interchangeable.

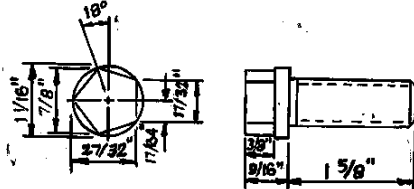
ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED:  CHIEF ENGINEER DESIGN ENGINEER DATE: 12/19/95	STANDARD SANITARY SEWER DETAILS STANDARD HEAVY TRAFFIC MANHOLE FRAME AND COVER	REVISED S 17
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1. Watertight frames and covers shall be used in all non-paved right of ways and as directed.
2. In unpaved right of ways, the top of the precast manhole (bottom of frame) shall be above the 100 year flood plain or a minimum of 12 inches above proposed ground elevation, whichever is higher.
3. The frame & cover shall be painted with two (2) coats of safety yellow industrial enamel in non-paved right of ways.



Section Through Pick-Hole

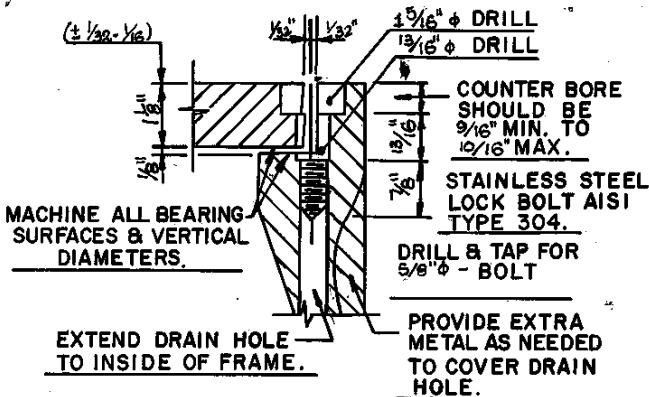
Note: Width of Pick-Hole equals 1 5/8"



Lock Bolt

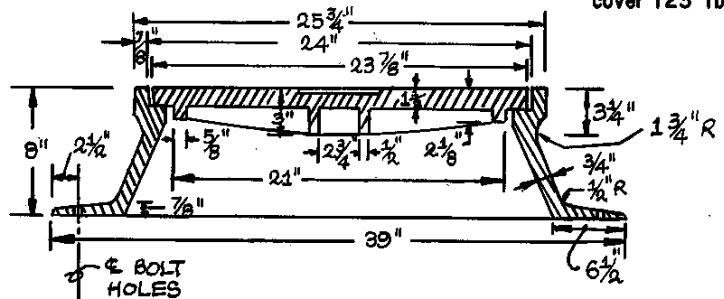
Provide three (3) pentagon head, shouldered Stainless Steel lock bolt for each assembly.
Per detail above.
Material: AISI Type 304 S.S.

(DRILL WITH TEMPLATE ONLY)



SECTION A-A

Approx. Wts. - frame 298 lbs.
cover 123 lbs.



SEC. B-B

Waterproof Gasket - 3/16" thick by 3/4" wide neoprene, cemented to bearing surface of frame with 3M Super Weather Strip Adhesive Part 8001.

Note:

Anchor Bolts shall only be used in off road locations. In Roadways a concrete collar in accordance with the Standard Detail S-19 shall be used.

Material - Cast Iron
ASTM A-48
Class 35

Component parts of the assembly shall be interchangeable.

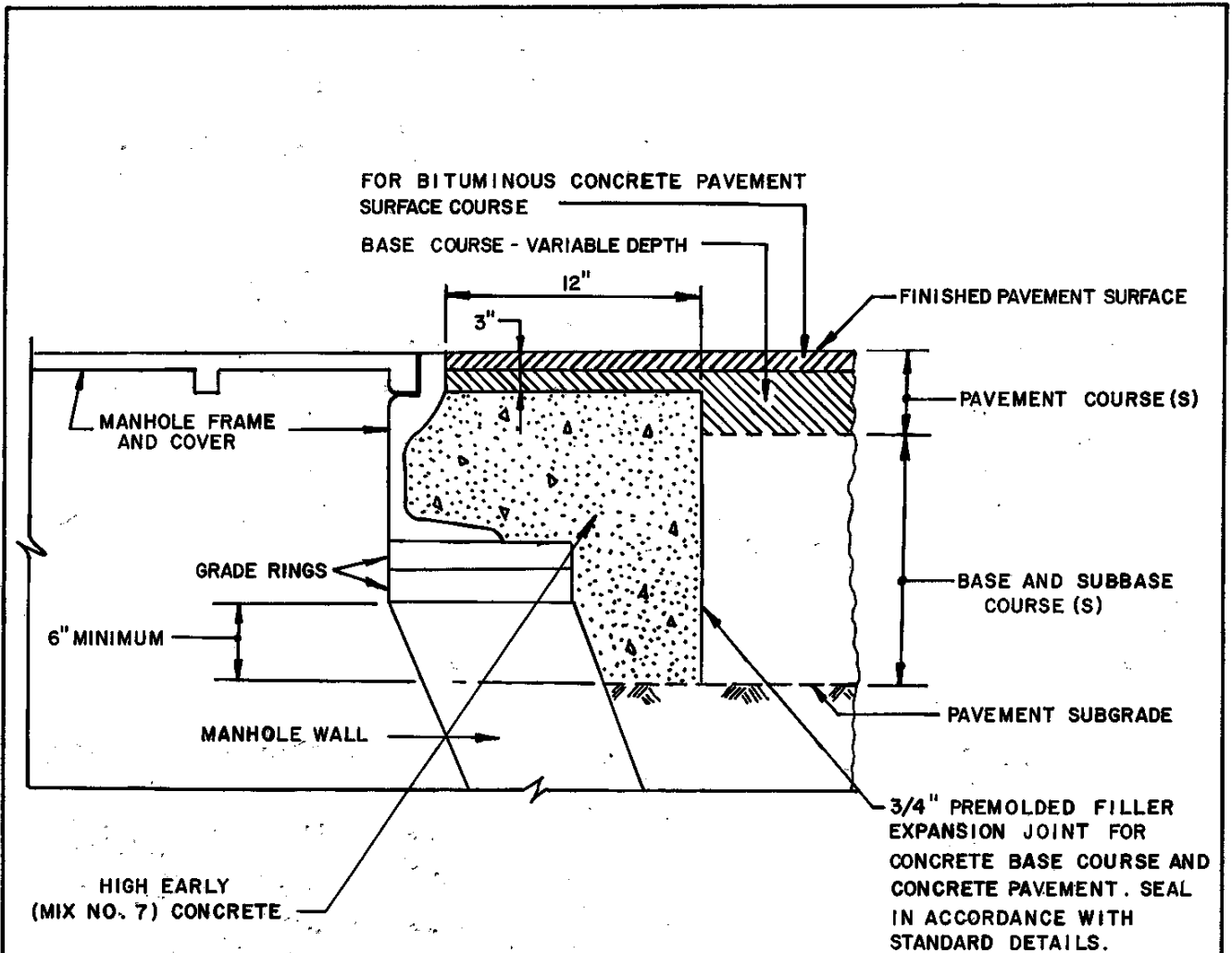
ANNE ARUNDEL
COUNTY
DEPARTMENT
OF
PUBLIC WORKS

APPROVED: *[Signature]*
CHIEF ENGINEER
[Signature]
DESIGN ENGINEER
DATE: 5/6/88

STANDARD SANITARY SEWER DETAILS
STANDARD WATERTIGHT
FRAME & COVER

REVISED
5/3/91
1-9-92
10 / 93

S
18





HIGH EARLY
(MIX NO. 7) CONCRETE

3/4" PREMOLDED FILLER
EXPANSION JOINT FOR
CONCRETE BASE COURSE AND
CONCRETE PAVEMENT. SEAL
IN ACCORDANCE WITH
STANDARD DETAILS.

NOTES:

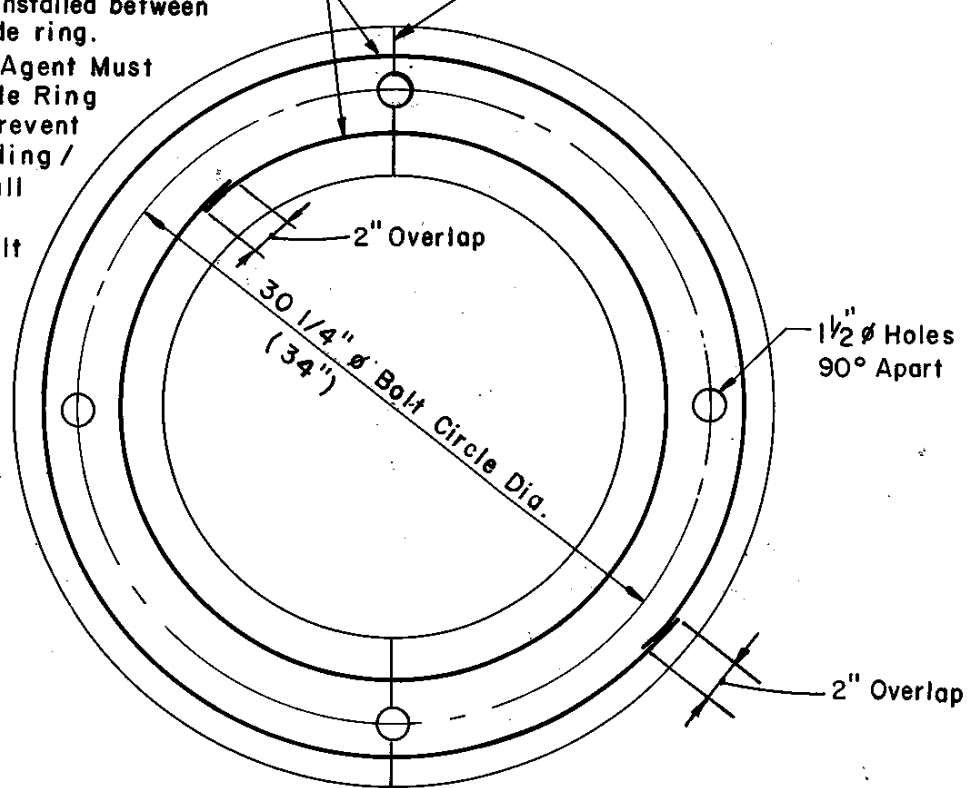
1. MANHOLE FRAME SHALL BE TACK COATED WITH RS-1 OR CRS-1 IMMEDIATELY PRIOR TO PAVING.
2. ADJUSTMENT OF MANHOLE FRAME TO FINAL GRADE AND CROSS SLOPE SHALL BE MADE PRIOR TO CONSTRUCTION OF BITUMINOUS CONCRETE BASE AND SURFACE COURSES OR CONCRETE BASE COURSE OR PAVEMENT.
3. WHERE EXISTING MANHOLE FRAMES AND COVERS ARE ADJUSTED TO NEW GRADES, THE EDGES OF EACH PAVING COURSE SHALL BE TACK COATED WITH RS-1 OR CRS-1 IMMEDIATELY PRIOR TO CONSTRUCTION OF EACH NEW PAVING COURSE OR PLACEMENT OF EACH COURSE OF PATCH PAVING.
4. COVER AND TOP OF FRAME TO BE CLEAN AND FREE OF ASPHALT AFTER PAVING OPERATION IS COMPLETE.
5. BONDING / CURING AGENT MUST BE USED FOR GRADE RING INSTALLATION TO PREVENT INFILTRATION. BONDING / CURING AGENT SHOULD BE COLORED WITH GREEN PIGMENT SO IT WILL BE READILY IDENTIFIABLE.

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED:  CHIEF ENGINEER  DESIGN ENGINEER DATE: 5/6/88	STANDARD SANITARY SEWER DETAILS CONCRETE COLLAR FOR MANHOLE FRAME AND COVER	REVISED 8/1/90 10 / 98	S 19
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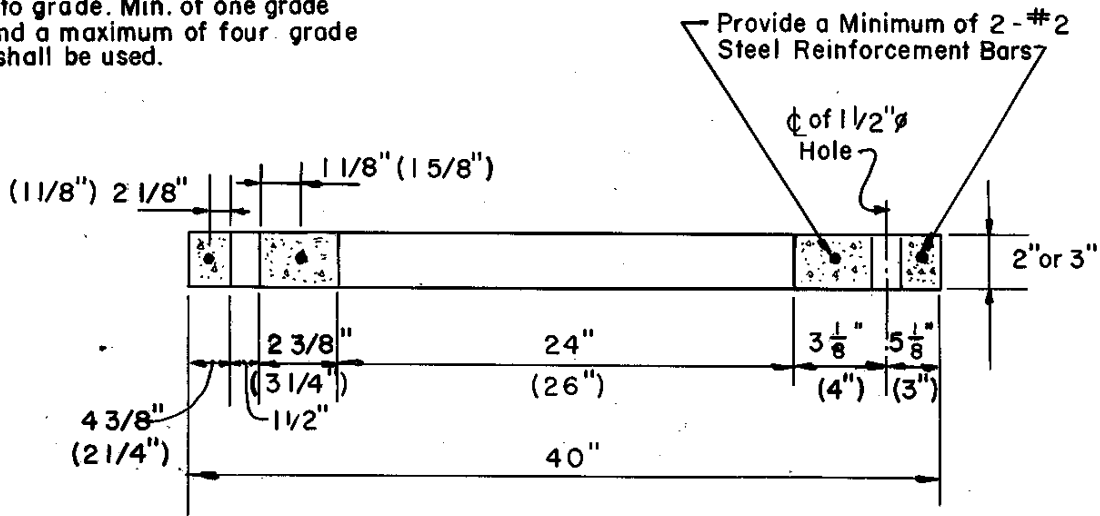
Flexible Gasket two complete revolutions. One inside and one outside the bolt hole pattern; overlap joint, opposite on each strip. Gasket to be installed between Frame and top grade ring.

Bonding / Curing Agent Must Be Used For Grade Ring Installation To Prevent Infiltration. Bonding / Curing Agent Shall Be Colored With Green Pigment So It Will Be Readily Identifiable.

Split Grade Ring for 2" Thick.
Solid Grade Ring for 3" Thick.



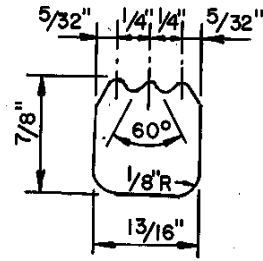
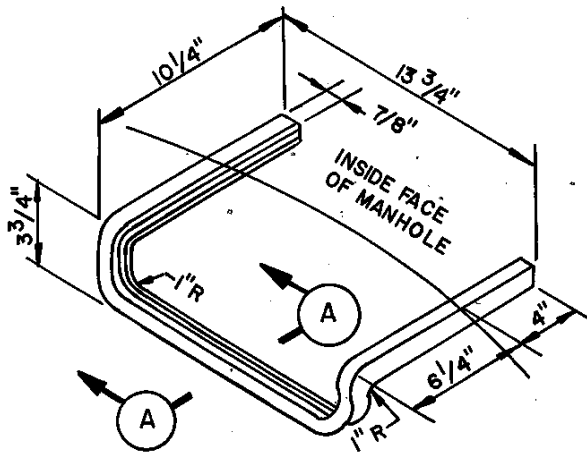
Precast Concrete Grade Rings shall be used to adjust MH Frame and Cover to grade. Min. of one grade ring and a maximum of four grade rings shall be used.



NOTES:

1. Precast Conc. f'c=5000 PS at 28 Days.
2. Reinforcement shall conform to A.S.T.M. C- 478.
3. Each Grade Ring shall be flat and True within 1/4"
4. Gasket shall be extruded rope, type B, 3/4 inch minimum diameter, butyl base conforming to AASHTO M-198.
5. Dimensions in parenthesis for use with watertight Frame & Covers.

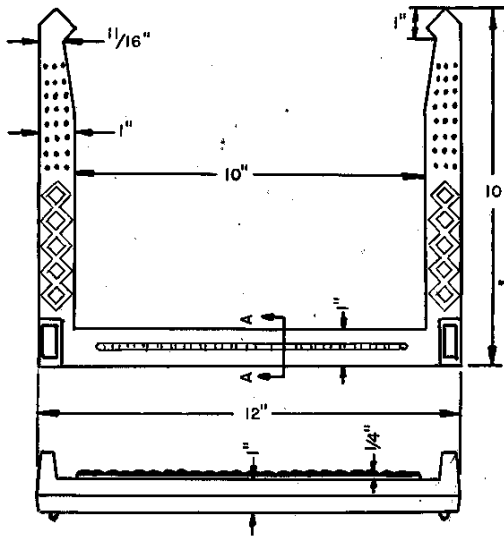
ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED <i>Ronald C. Brown</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS ADJUSTMENT GRADE RING	REVISED	S 20
	DESIGN ENGINEER <i>[Signature]</i>		_____	
	DATE 12/7/95		_____	
	_____		_____	
	_____		_____	



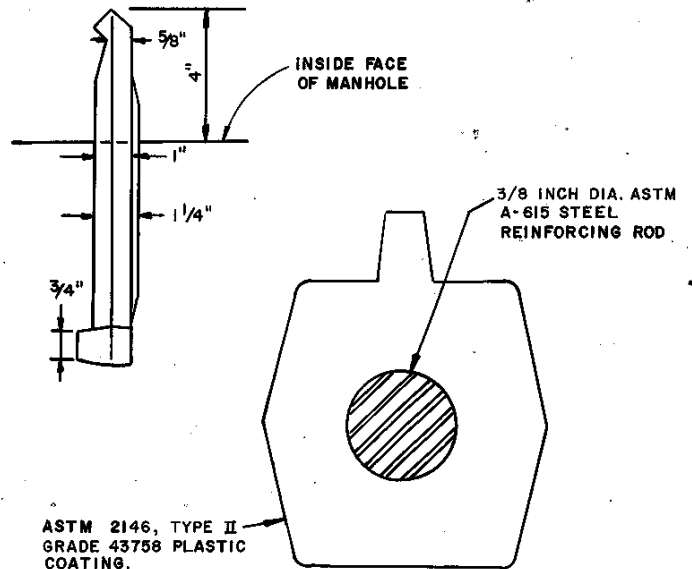
SECTION A-A

NOTE: STEPS TO BE FABRICATED OF ALUMINUM ALLOY 6061-T6 OR TYPE 304 STAINLESS STEEL. PORTIONS OF STEPS TO BE EMBEDDED IN WALLS OF MANHOLES OR CHAMBERS TO BE DIPPED IN HEAVY BODIED BITUMINOUS PAINT.

ALUMINUM OR STAINLESS STEEL



PLASTIC COATED STEEL



SECTION A-A

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS

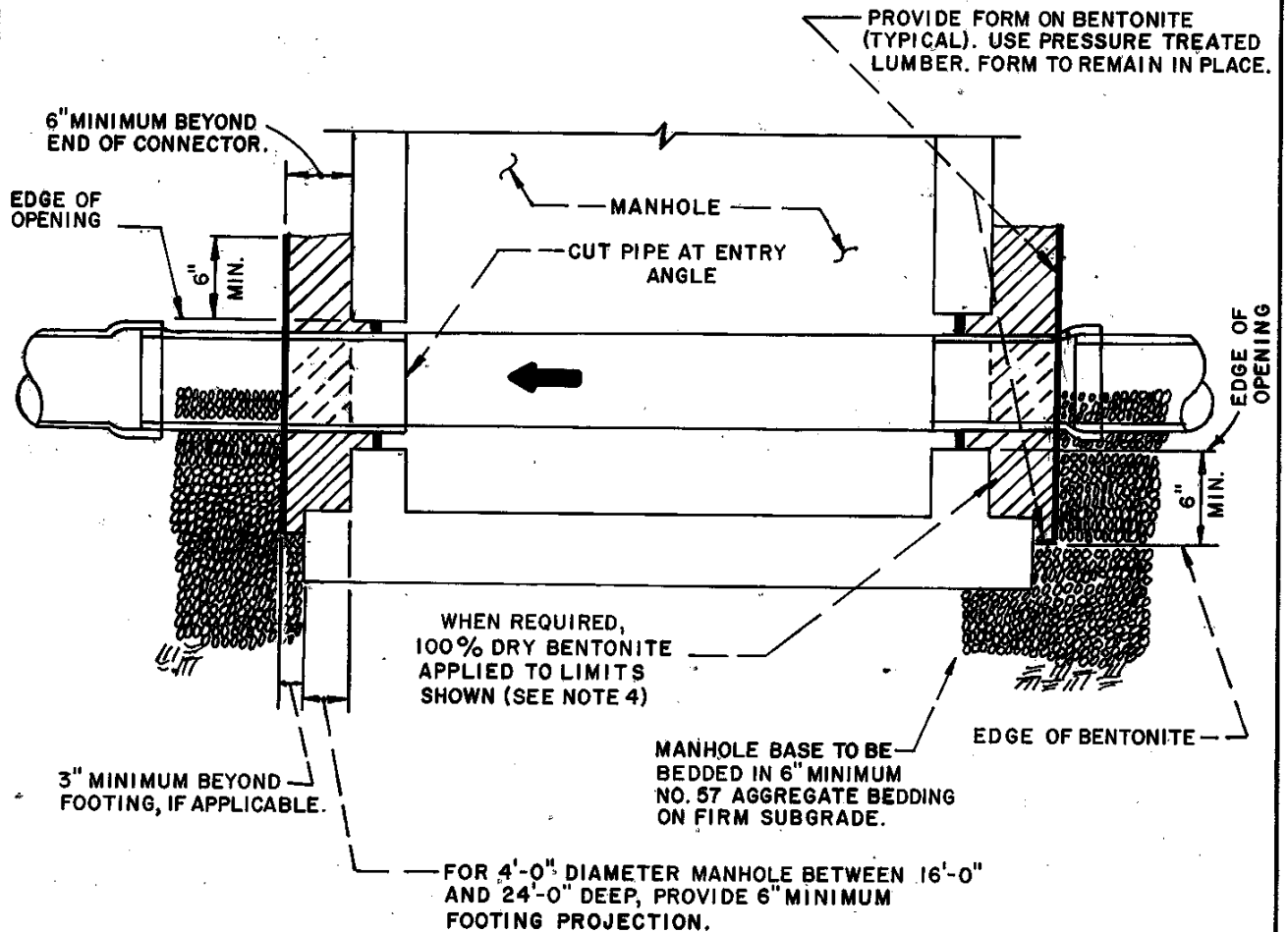
APPROVED: *[Signature]* CHIEF ENGINEER
[Signature] DESIGN ENGINEER
 DATE: 5/6/88




STANDARD SANITARY SEWER DETAIL
 STANDARD MANHOLE STEPS

REVISED 10 / 95
 S 21

NOTE:

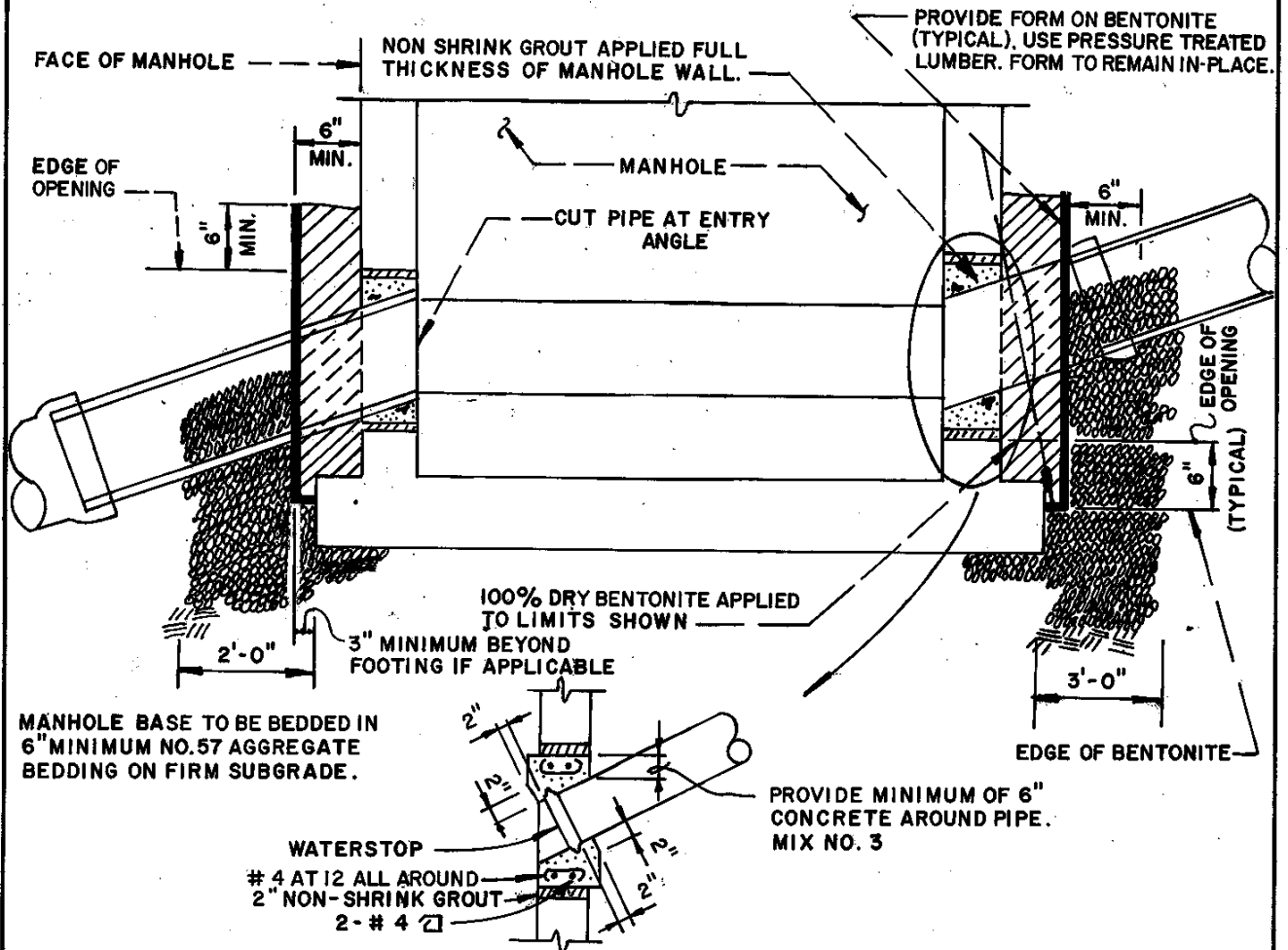
- (1) THIS DETAIL IS TO BE USED FOR SEWER PIPE TO MANHOLE CONNECTION WHEN MANHOLE DEPTH IS LESS THAN 24'-0". MANHOLE DEPTH IS DEFINED AS TOP OF PRECAST CONE SECTION TO INVERT OF LOWEST PIPE ENTERING MANHOLE.
- (2) PROVIDE SPECIAL DESIGN FOR MANHOLE DEPTH GREATER THAN 24'-0".
- (3) PROVIDE FLEXIBLE GASKET FOR PIPE TO MANHOLE CONNECTION WHEN GRADE OF PIPE ENTERING MANHOLE DOES NOT EXCEED 10%. FOR STEEPER PIPE GRADES PROVIDE GROUTED PIPE CONNECTION BETWEEN PIPE AND MANHOLE AS SHOWN IN DETAIL FOR PIPE TO MANHOLE CONNECTION FOR STEEP GRADES.
- (4) PROVIDE BENTONITE CLAY COLLAR WHERE FLEXIBLE CONNECTOR INCORPORATES METAL CLAMPS EXPOSED TO SOIL.



ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED:  CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS FLEXIBLE PIPE TO MANHOLE CONNECTION	REVISED 10 / 95 
	 DESIGN ENGINEER		S. 22
	DATE: 5/6/88		

NOTES:

- (1) THIS DETAIL IS TO BE USED FOR SEWER PIPE TO MANHOLE CONNECTION WHEN GRADE OF SEWER PIPE ENTERING OR LEAVING MANHOLE IS GREATER THAN 10% OR FOR PIPELINES ENTERING MANHOLE AT A SKEWED ANGLE, AND MAXIMUM SIZE OF SEWER PIPE IS 15" FOR SEWER PIPE TO MANHOLE CONNECTION WHEN GRADE IS LESS THEN 10%. SEE OTHER DETAILS.
- (2) FOR PIPE LARGER THAN 15" AND FOR MANHOLE DEPTH GREATER THAN 24'-0" PROVIDE SPECIAL DESIGN. MANHOLE DEPTH IS DEFINED AS TOP OF PRECAST CONE SECTION TO INVERT OF LOWEST PIPE ENTERING MANHOLE.
- (3) PROVIDE OVERSIZED HOLE IN MANHOLE OF SUFFICIENT SIZE TO ACCOMMODATE SEWER PIPE AND WATERSTOP. ENLARGEMENT OF HOLE IN THE FIELD WILL NOT BE PERMITTED.
- (4) PLACE WATERSTOP ON PIPE AND POSITION ASSEMBLY ON ABOUT CENTER OF MANHOLE WALL.
- (5) CLOSE MANHOLE WALL OPENING AROUND PIPE AND WATERSTOP AS DETAILED.
- (6) FOR DETAILS NOT SHOWN, SEE OTHER STANDARD DETAILS.

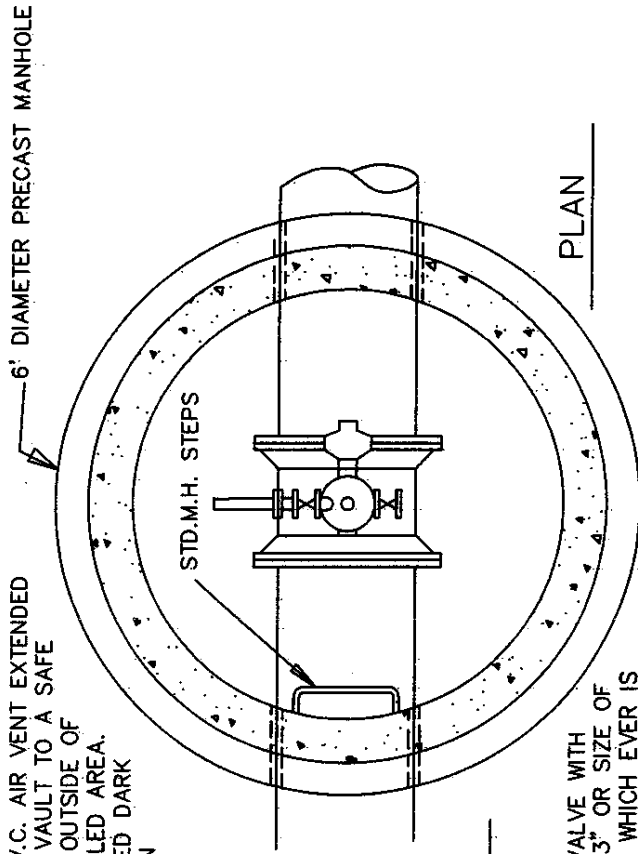


ANNE ARUNDEL
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DEPARTMENT
OF
PUBLIC WORKS

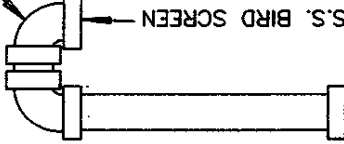
APPROVED: *Ray Wile*
CHIEF ENGINEER
Jack S. Carter
DESIGN ENGINEER
DATE: 5/6/88

STANDARD SANITARY SEWER DETAILS
WATERSTOP PIPE TO MANHOLE
CONNECTION FOR STEEP GRADES

REVISED	<i>pk</i>	S 23
10 / 95		



4" P.V.C. AIR VENT EXTENDED FROM VAULT TO A SAFE AREA OUTSIDE OF TRAVELED AREA. PAINTED DARK BROWN

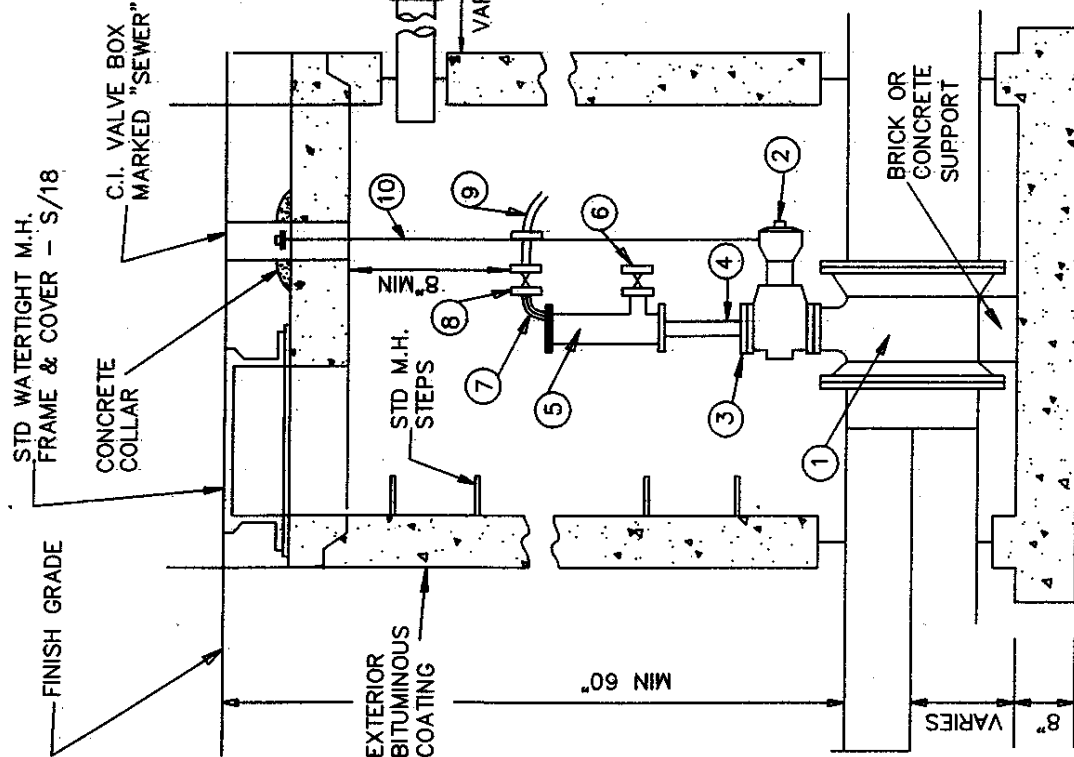


LEGEND

- ① D.I.P. TEE
- ② FLANGED PLUG VALVE WITH ACTUATOR (MIN. 3" OR SIZE OF AIR VALVE INLET WHICH EVER IS LARGER).
- ③ BLIND FLANGE WITH TAP.
- ④ S.S. SCHEDULE 80 NIPPLE.
- ⑤ AIR RELEASE OR AIR VACUUM VALVE. SIZE AS NOTED ON PLAN.
- ⑥ 1" BRONZE NRS GATE BLOW OFF VALVE
- ⑦ ELBOW
- ⑧ 1/2" BRONZE NRS GATE SHUT OFF VALVE
- ⑨ BACK FLUSHING HOSE WITH QUICK DISCONNECT COUPLING (MIN. 6' LENGTH)
- ⑩ EXTENSION STEM PER STD W/11. PROVIDE WALL MOUNTED SUPPORT BRACKETS.

NOTES

- 1. ALL FITTINGS SHALL BE DUCTILE IRON OR STAINLESS STEEL UNLESS INDICATED OTHERWISE.
- 2. ALL FASTENERS SHALL BE STAINLESS STEEL. TAP AND PIPE NIPPLES SHALL BE SAME SIZE AS AIR VALVE.
- 3. FOR LARGE VALVES 4" AND GREATER AND DOUBLE BODY ASSEMBLIES SPECIAL DETAILS MUST BE PREPARED AND CLEARANCES IN VAULTS MUST BE CALCULATED SEPARATELY.
- 4. PROVIDE TWO COATS AMINE CURED EPOXY ON INTERIOR CONCRETE VAULT SURFACES.
- 5. WHEN GRAVITY SANITARY SEWER IS IN CLOSE PROXIMITY AND LOWER THAN THE VAULT. A 4" FLOOR DRAIN SHALL BE PLACED IN THE VAULT AND DRAINED BY GRAVITY TO THE SANITARY SEWER.



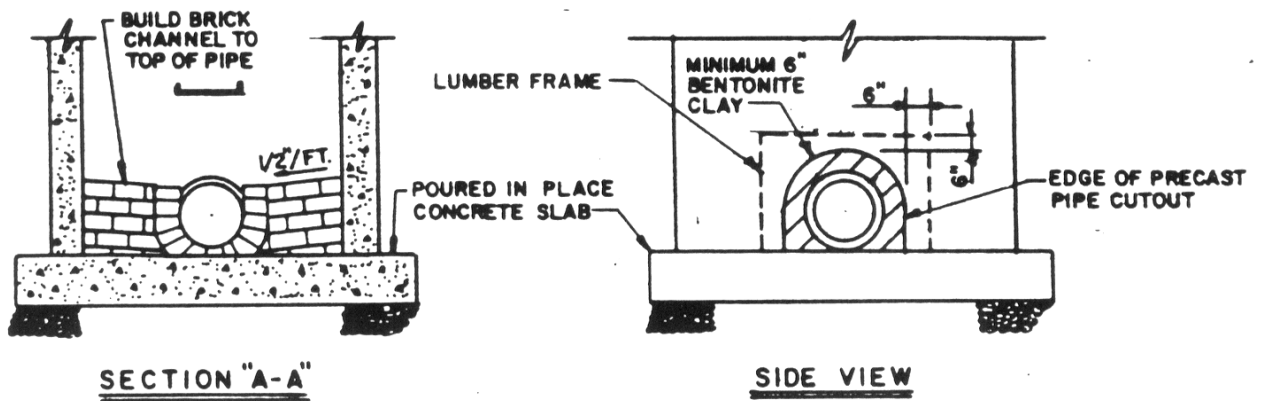
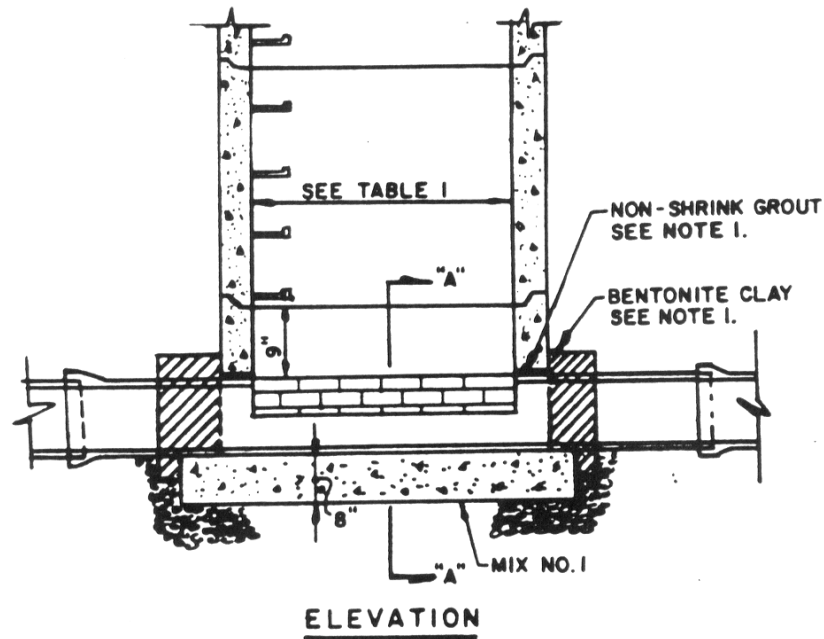
REVISED

STANDARD SANITARY SEWER DETAILS
AIR RELEASE AND VACUUM VALVE IN MANHOLE

APPROVED *Arnold Bone* 5/12/99
CIVIL ENGINEER
DESIGN ENGINEER *Arnold Bone* 5/12/99
DATE

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS

TABLE I	
PIPE SIZE	REQUIRED M.H. DIA.
8" - 24"	4'-0"
27" - 36"	5'-0"
42" - 72"	6'-0"



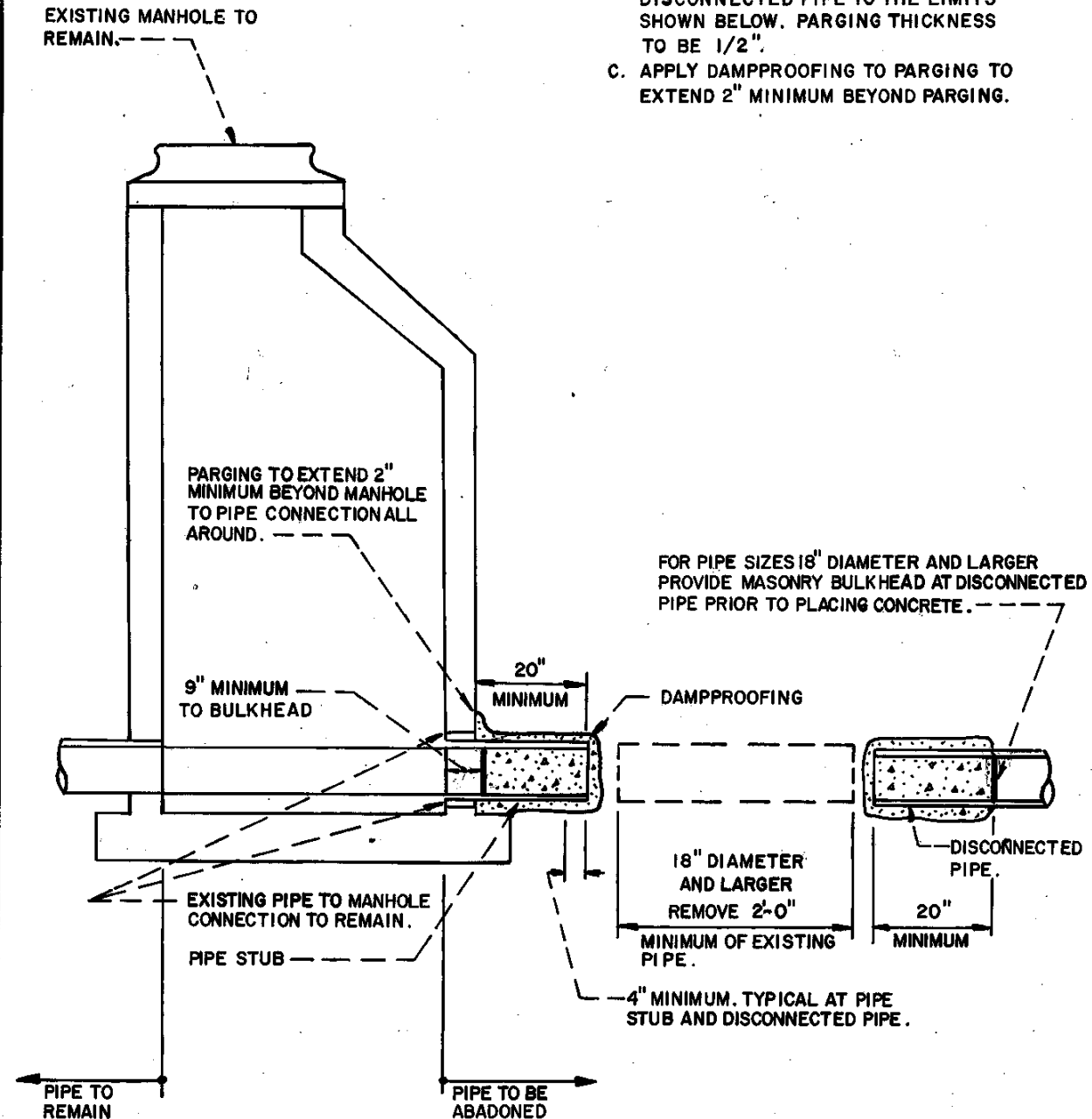
NOTES:

1. SPACE BETWEEN PIPE AND MANHOLE WALLS TO BE FILLED WITH NON-SHRINK GROUT AND COVERED WITH MINIMUM 6" BENTONITE CLAY. LUMBER FRAME TO BE PROVIDED TO ENSURE 6" BENTONITE OVERLAP ONTO PRECAST MANHOLE UNIT, AND REMAIN IN PLACE. SEE "FLEXIBLE PIPE TO M.H. CONNECTION" FOR BEATONITE DETAILS.
2. OUTSIDE EDGE OF MANHOLE TO BE NOT LESS THAN 2'-0" FROM ANY EXISTING PIPE JOINT.
3. PRECAST REINFORCED CONCRETE MANHOLE SHALL BE FURNISHED IN ACCORDANCE WITH A. S. T. M. DESIGNATION C 478.
4. WHERE COVER OVER EXISTING PIPE IS 6'-9" OR LESS USE SHALLOW MANHOLE.

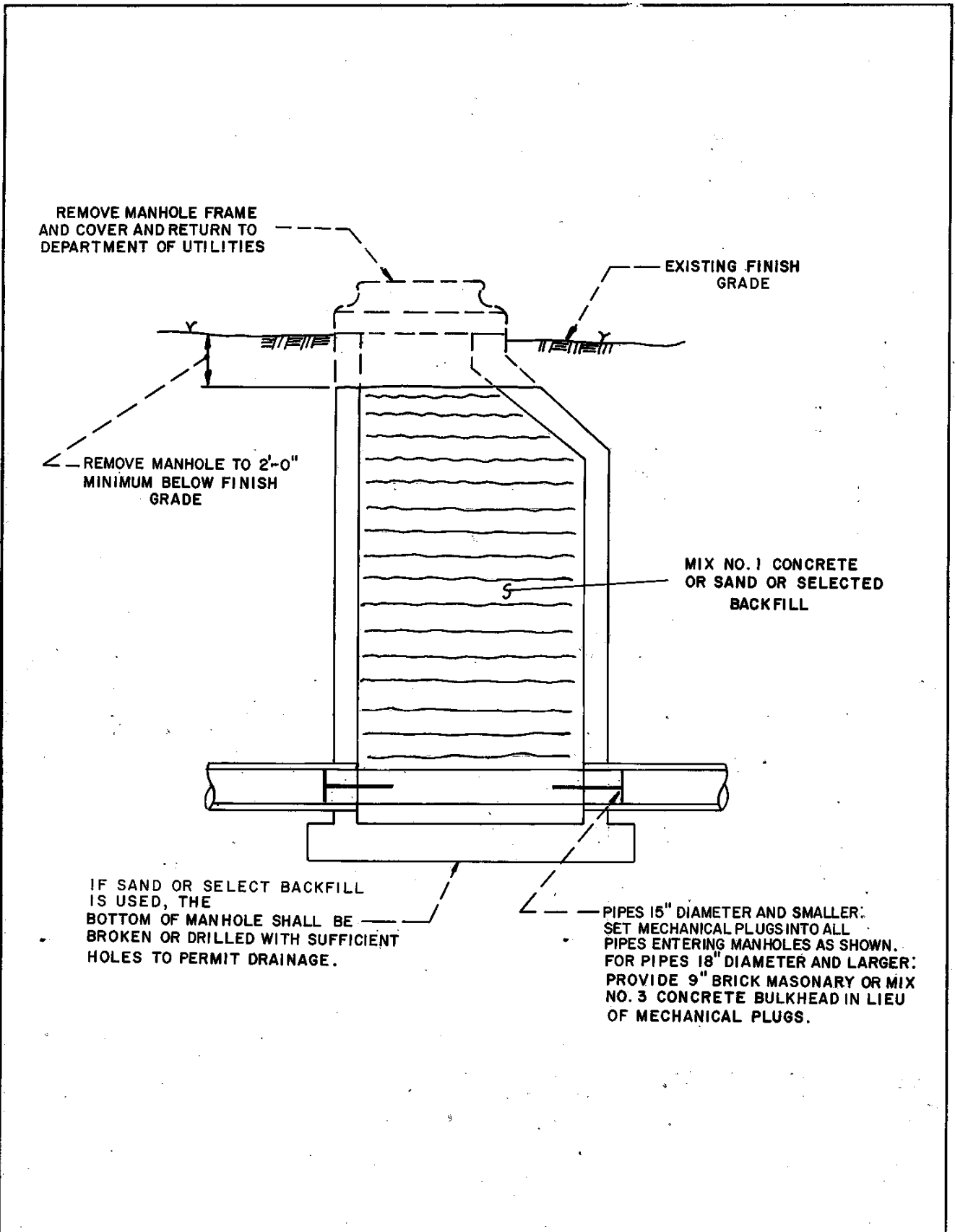
ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED:	STANDARD SANITARY SEWER DETAILS NEW MANHOLE OVER EXISTING PIPE	REVISED
	<i>D. Bruce White</i>		5/6/88
	DATE: 4/22/85		10 / 95
			S 25

NOTE

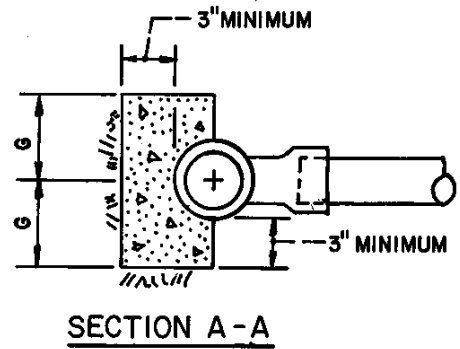
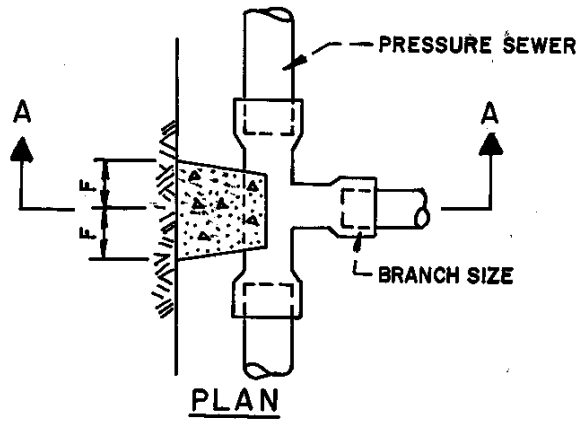
1. 15" DIAMETER PIPE AND SMALLER TO BE ABANDONED: CONSTRUCT 9" BRICK MASONRY OR MIX NO. 3 CONCRETE PLUGS INTO PIPE STUB.
2. 18" DIAMETER PIPE AND LARGER:
 - A. BULKHEAD PIPE STUB AT MANHOLE AND DISCONNECTED PIPE TO THE LIMITS SHOWN BELOW.
 - B. PARGE BULKHEADED PIPE STUB AND DISCONNECTED PIPE TO THE LIMITS SHOWN BELOW. PARGING THICKNESS TO BE 1/2".
 - C. APPLY DAMPPROOFING TO PARGING TO EXTEND 2" MINIMUM BEYOND PARGING.



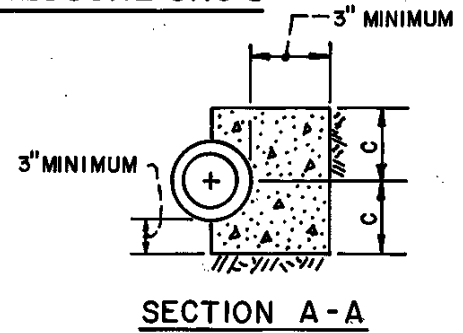
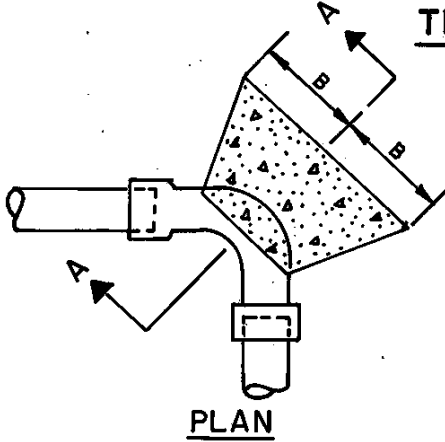
ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED: <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS ABANDONMENT OF PIPE AT MANHOLE	REVISED 10 / 95	<i>[Signature]</i> S 26
	DESIGN ENGINEER DATE: 5/6/88		_____	
	_____		_____	
	_____		_____	



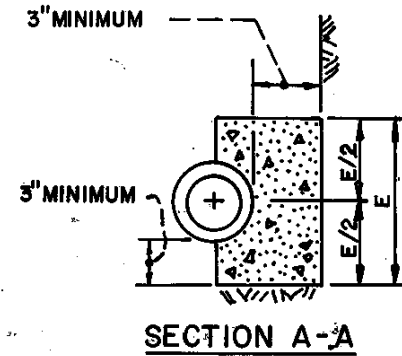
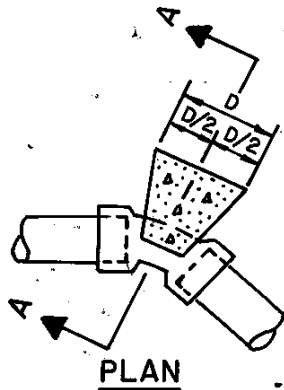
ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS COMPLETE MANHOLE ABANDONMENT	REVISED 10 / 95 <i>[Signature]</i>
	DESIGN ENGINEER DATE: 5/6/88		S 27



TEES, INCLUDING PRESSURE SHC'S



90° HORIZONTAL BENDS



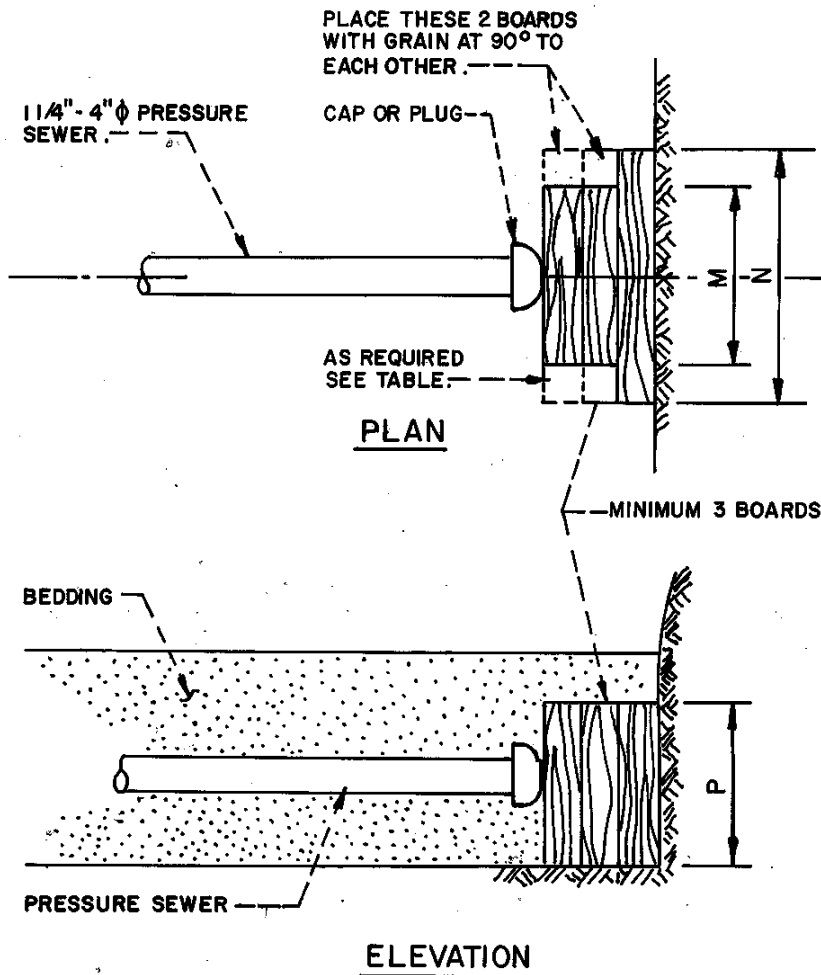
1 1/4°, 22 1/2°, 45° HORIZONTAL & LOWER VERTICAL BENDS

PIPE SIZE	B	C	D	E	F	G
1 1/4" & 1 1/2"	4"	4"	5"	5"	3"	3"
2"	5"	5"	7"	7"	5"	5"
2 1/2"	5"	5"	7"	7"	5"	5"
3"	6"	6"	9"	9"	6"	6"
4"	13"	6"	12"	12"	8"	6"

NOTES :

1. USE MIX NO.1 CONCRETE .
2. CARRY ALL BEARING SURFACES TO UNDISTURBED GROUND OR FIRM SUBGRADE .
3. BUTTRESS SIZED FOR 160 psi .
4. DO NOT ENCASE JOINTS .

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED: <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS PRESSURE SEWER BLOCKING DETAILS	REVISED: <i>[Signature]</i> 10 / 95
	DESIGN ENGINEER: <i>[Signature]</i>		S 28
	DATE: 5/6/88		

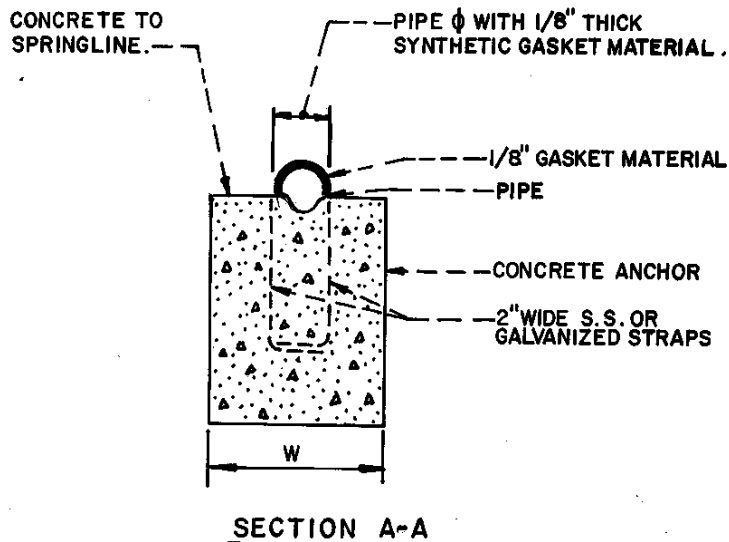
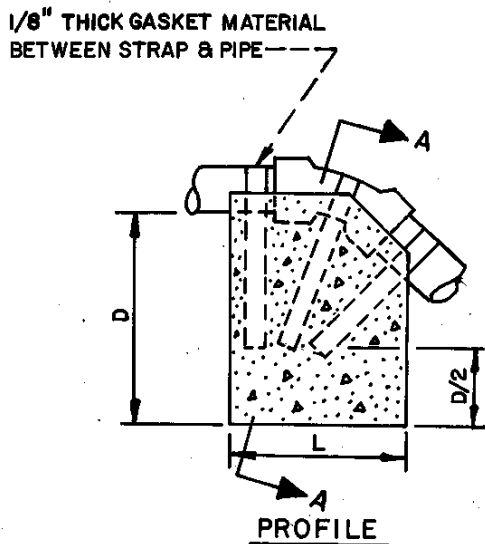


NOTES:

1. CARRY ALL BEARING SURFACES TO UNDISTURBED EARTH OR FIRM SUBGRADE.
2. BUTTRESS SIZED FOR 160 psi
3. NOMINAL THICKNESS OF ALL BOARDS IS 2"
4. ALL BOARDS TO BE PRESSURE TREATED (CCA) YELLOW PINE.

PIPE SIZE	M	N	P
1 1/4"	6"	6"	8"
1 1/2"	6"	6"	8"
2"	6"	8"	8"
2 1/2"	8"	8"	10"
3"	12"	18"	12"
4"	12"	18"	12"

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED: <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS LOW PRESSURE SEWER & HOUSE CONNECTION BLOCKING DETAILS FOR CAPS & PLUGS	REVISED
	DESIGN ENGINEER DATE: 5/6/88		10 / 98 <i>[Signature]</i>
			S
			29



BEND		SIZE IN INCHES			
		1 1/4, 1 1/2	2, 2 1/2	3	4
11 1/4°	L	12	15	18	18
	W	10	12	15	18
	D	10	15	15	18
22 1/2°	L	15	20	20	24
	W	15	20	20	24
	D	12	12	18	20
45°	L	20	24	24	30
	W	20	20	24	30
	D	12	20	24	26

NOTES:

1. GALVANIZED OR STAINLESS STEEL STRAPS SHALL BE 20 GAGE AND 2" WIDE.
2. STRAPS SHALL BE EMBEDDED IN CONCRETE A DISTANCE OF D/2.
3. 1/8" THICK SYNTHETIC GASKET MATERIAL SHALL BE PLACED BETWEEN STRAP AND PIPE.
4. PAINT EXPOSED GALV. STRAPS W/2 COATS OF BITUMINOUS PAINT.
5. USE MIX NO. 1 CONCRETE.
6. CARRY ALL BEARING SURFACE TO UNDISTURBED EARTH OR FIRM SUBGRADE.
7. CONCRETE ANCHORAGE DIMENSIONS ARE BASED ON TOTAL PRESSURE OF 150 psi.

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED	STANDARD SANITARY SEWER DETAILS ANCHORING PRESSURE SEWERS (UPPER VERTICAL BENDS)	REVISER
	CHIEF ENGINEER		10 / 9
	DESIGN ENGINEER		
	DATE: 5/6/88		30

MINIMUM HOLDING TIME IN SECONDS REQUIRED FOR PRESSURE TO DROP 1 PSIG

LENGTH OF MAIN LINE IN FEET 6" DIAMETER

LENGTH OF 4" LATERAL IN FEET		25	50	75	100	125	150	175	200	225	250	275	300	400	500
	25	60	60	60	60	60	64	74	84	94	103	113	123	163	168
	50	60	60	60	60	60	68	78	88	98	108	118	128	166	167
	75	60	60	60	60	63	73	83	92	102	112	122	132	164	165
	100	60	60	60	60	67	77	87	97	107	117	127	136	162	163
	125	60	60	60	62	72	81	91	101	111	121	131	141	160	162
	150	60	60	60	66	76	86	96	106	116	125	135	145	159	161
	175	60	60	61	70	80	90	100	110	120	130	140	150	157	159
	200	60	60	65	75	85	95	105	114	124	134	144	153	156	158
	225	60	60	69	79	89	99	109	119	129	139	149	151	154	157
	250	60	64	74	84	94	103	113	123	133	143	149	150	153	156
	275	60	68	78	88	98	108	118	128	138	146	147	149	152	155
	300	63	73	83	92	102	112	122	132	142	145	146	147	151	154
	350	72	81	91	101	111	121	131	140	141	143	144	145	149	152
	400	80	90	100	110	120	130	136	138	139	141	142	143	147	150
450	89	99	109	119	129	132	134	136	138	139	141	142	145	149	
500	98	108	118	126	129	131	133	135	136	138	139	140	144	147	

MINIMUM HOLDING TIME IN SECONDS REQUIRED FOR PRESSURE TO DROP 1 PSIG

LENGTH OF MAIN LINE IN FEET 8" DIAMETER

LENGTH OF 4" LATERAL IN FEET		25	50	75	100	125	150	175	200	225	250	275	300	400	500
	25	60	60	60	75	92	110	128	145	163	180	198	216	223	224
	50	60	60	62	79	97	114	132	150	167	185	202	218	220	221
	75	60	60	66	84	101	119	136	154	172	189	207	214	217	219
	100	60	60	70	88	106	123	141	158	175	194	209	211	214	216
	125	60	60	75	92	110	128	145	163	180	198	206	207	211	214
	150	60	62	79	97	114	132	150	167	185	201	202	204	209	212
	175	60	66	84	101	119	136	154	172	189	197	199	201	206	210
	200	60	70	88	106	123	141	158	176	192	194	197	199	204	208
	225	60	75	92	110	128	145	163	180	189	192	194	196	202	206
	250	62	79	97	114	132	150	167	183	186	189	191	193	200	204
	275	66	84	101	119	136	154	172	181	184	187	189	191	198	202
	300	70	88	106	123	141	158	174	178	181	174	187	189	196	200
	350	79	97	114	132	150	166	170	174	177	180	183	185	192	197
	400	88	106	123	141	157	162	166	170	174	175	179	181	189	194
450	97	116	132	148	154	159	163	167	170	173	176	178	186	191	
500	106	123	140	146	151	156	160	164	167	170	173	175	183	189	

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED: <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS AIR TEST REQUIREMENTS 6" & 8" SEWERS WITH 4" LATERALS	REVISED: <i>[Signature]</i> 10 / 95
	DATE: 5/6/88		S 31

MINIMUM HOLDING TIME IN SECONDS REQUIRED FOR PRESSURE TO DROP 1 PSIG

LENGTH OF MAIN LINE IN FEET 10" DIAMETER

LENGTH OF 4" LATERAL IN FEET	25	50	75	100	125	150	175	200	225	250	275	300	400	500	
	25	60	60	87	114	142	169	197	224	252	277	277	278	279	280
	50	60	64	91	119	146	174	201	229	256	271	272	273	275	277
	75	60	68	96	123	151	178	206	233	261	265	267	268	272	274
	100	60	73	100	128	155	183	210	238	258	260	262	264	268	271
	125	60	77	105	132	160	187	214	242	253	255	257	259	264	268
	150	60	81	109	136	164	191	219	244	248	251	253	255	261	265
	175	60	86	113	141	168	196	223	239	243	246	249	251	258	262
	200	63	90	118	145	173	200	228	235	239	242	245	248	255	260
	225	67	95	122	150	177	205	226	231	235	239	242	244	252	257
	250	72	99	127	154	182	209	222	227	231	235	238	241	249	255
	275	76	103	131	158	186	211	218	223	228	231	235	238	247	253
	300	80	108	135	163	190	208	214	220	224	228	232	235	244	250
	350	89	117	144	172	194	201	208	213	218	222	226	229	239	246
	400	98	125	153	179	188	196	202	208	213	217	221	224	235	242
450	107	134	162	174	183	191	197	203	208	212	216	220	230	238	
500	116	143	160	170	179	186	193	198	203	208	212	215	226	235	

MINIMUM HOLDING TIME IN SECONDS REQUIRED FOR PRESSURE TO DROP 1 PSIG

LENGTH OF MAIN LINE IN FEET 12" DIAMETER

LENGTH OF 4" LATERAL IN FEET	25	50	75	100	125	150	175	200	225	250	275	300	400	500	
	25	60	84	123	163	202	242	282	321	332	333	334	334	336	336
	50	60	88	128	167	207	246	286	323	324	326	327	328	331	333
	75	60	92	132	172	211	251	290	316	317	319	321	323	327	329
	100	60	97	136	176	216	255	295	308	311	313	316	317	323	326
	125	62	101	141	180	220	260	297	301	304	308	310	312	319	323
	150	66	106	145	185	224	264	290	295	299	302	305	308	315	319
	175	70	110	150	189	229	268	283	289	293	297	300	303	311	316
	200	75	114	154	194	233	271	277	283	288	292	296	299	308	313
	225	79	119	158	198	238	265	272	278	283	288	291	295	304	310
	250	84	123	163	202	242	259	267	273	278	283	287	291	301	308
	275	88	128	167	207	244	254	262	269	274	279	283	287	298	305
	300	92	132	172	211	239	249	257	264	270	275	279	283	295	302
	350	101	141	180	218	231	241	249	256	262	268	272	276	289	297
	400	110	150	189	210	223	233	242	249	255	261	266	270	283	292
450	119	158	189	204	216	227	235	243	249	255	260	264	278	288	
500	128	166	184	198	210	221	229	237	243	249	254	259	273	283	

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED: <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS AIR TEST REQUIREMENTS 10" & 12" SEWERS WITH 4" LATERALS	REVISED <i>[Signature]</i> 10 / 85
	DATE: 5/6/88		S 32

MINIMUM HOLDING TIME IN SECONDS REQUIRED FOR PRESSURE TO DROP 1 PSIG

LENGTH OF MAIN LINE IN FEET 15" DIAMETER

LENGTH OF 4" LATERAL IN FEET


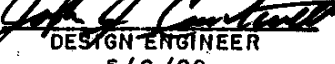

	25	50	75	100	125	150	175	200	225	250	275	300	400	500
25	66	128	190	252	314	376	414	415	416	417	418	418	420	421
50	71	133	194	256	318	380	403	406	408	409	411	412	415	417
75	75	137	199	261	323	385	393	397	400	402	404	406	410	413
100	80	141	203	265	327	378	384	388	392	395	397	400	406	409
125	84	146	208	270	331	369	375	380	385	388	391	394	401	406
150	88	150	212	274	336	360	367	373	378	382	385	388	397	402
175	93	155	216	278	340	351	359	366	371	376	380	383	392	398
200	97	159	221	283	332	343	352	359	365	370	374	378	388	395
225	102	163	225	287	324	336	345	353	359	365	369	373	384	392
250	106	168	230	292	317	329	339	347	353	359	364	368	380	388
275	110	172	234	293	310	323	333	341	348	354	359	364	377	385
300	115	177	238	287	303	316	327	336	343	349	354	359	373	382
350	124	185	247	275	292	305	316	325	333	340	346	351	366	376
400	132	194	242	264	281	295	306	316	324	332	338	343	359	370
450	141	203	233	255	272	286	298	308	316	324	330	336	353	365
500	150	199	225	247	264	278	290	300	309	316	323	329	347	359

MINIMUM HOLDING TIME IN SECONDS REQUIRED FOR PRESSURE TO DROP 1 PSIG

LENGTH OF MAIN LINE IN FEET 18" DIAMETER

LENGTH OF 4" LATERAL IN FEET

	25	50	75	100	125	150	175	200	225	250	275	300	400	500
25	94	183	272	361	450	496	498	499	501	502	502	503	505	506
50	98	187	276	365	454	483	487	489	492	493	495	496	499	502
75	102	191	281	370	459	470	476	480	483	485	488	489	494	497
100	107	196	285	374	450	459	465	470	475	478	481	483	489	493
125	111	200	289	378	438	448	456	462	467	470	474	477	484	489
150	116	205	294	383	427	438	446	453	459	463	467	471	480	485
175	120	209	298	387	416	428	438	445	452	457	461	465	475	481
200	124	213	303	388	406	419	430	438	445	450	455	459	470	478
225	129	218	307	378	397	410	422	431	438	444	449	453	466	474
250	133	222	311	369	388	402	414	424	431	438	443	448	462	470
275	138	227	316	360	380	395	407	417	425	432	438	443	457	467
300	142	231	320	352	372	387	400	411	419	426	433	438	453	463
350	151	240	308	337	358	374	388	399	408	416	422	428	445	457
400	160	249	295	323	345	362	376	388	397	406	413	419	438	450
450	168	246	283	312	333	351	365	378	388	396	404	411	430	444
500	177	237	273	301	323	341	355	368	379	388	396	403	423	438

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED  CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS AIR TEST REQUIREMENTS 15" & 18" SEWERS WITH 4" LATERALS	REVISED 10 / 95
	DESIGN ENGINEER 		
	DATE: 5/6/88		S 33

MINIMUM HOLDING TIME IN SECONDS REQUIRED FOR PRESSURE TO DROP 1 PSIG

LENGTH OF MAIN LINE IN FEET 21" DIAMETER

LENGTH OF 4" LATERAL IN FEET	25	50	75	100	125	150	175	200	225	250	275	300	400	500	
	25	126	247	368	490	577	581	582	584	585	586	587	588	590	591
	50	130	251	373	494	561	567	570	573	576	578	579	581	584	586
	75	135	256	377	498	545	553	559	563	567	569	571	574	579	582
	100	139	260	381	503	531	541	548	553	558	561	564	567	573	578
	125	143	265	386	503	518	529	537	544	549	553	557	560	568	573
	150	148	269	390	488	505	518	527	535	541	546	550	553	563	569
	175	152	273	395	475	493	507	518	526	533	538	543	547	558	565
	200	157	278	399	462	482	497	509	518	526	531	536	541	553	561
	225	161	282	403	450	472	488	500	510	518	524	530	535	548	557
	250	165	287	408	439	462	479	492	502	511	518	524	529	544	553
	275	170	291	397	429	452	470	484	495	504	511	518	523	539	549
	300	174	295	387	420	443	462	476	488	498	505	512	518	535	546
	350	183	304	368	402	427	446	462	474	485	493	501	507	526	538
	400	192	304	352	386	412	432	448	462	473	482	490	497	518	531
450	201	291	338	372	398	419	436	450	462	472	480	488	510	524	
500	209	279	325	360	386	407	425	439	452	462	471	479	502	518	

MINIMUM HOLDING TIME IN SECONDS REQUIRED FOR PRESSURE TO DROP 1 PSIG

LENGTH OF MAIN LINE IN FEET 24" DIAMETER

LENGTH OF 4" LATERAL IN FEET	25	50	75	100	125	150	175	200	225	250	275	300	400	500	
	25	163	321	480	638	662	665	667	669	670	671	672	673	674	676
	50	167	326	484	637	645	650	654	658	660	662	664	665	669	671
	75	172	330	488	617	629	636	642	647	650	653	656	658	663	666
	100	176	334	493	599	613	623	631	637	641	645	648	650	658	662
	125	180	339	497	582	599	611	620	627	632	637	640	643	652	658
	150	185	343	502	567	585	599	609	617	623	629	633	636	647	653
	175	189	348	506	552	573	588	599	608	615	621	626	630	642	649
	200	194	352	506	538	560	577	589	599	607	613	619	623	637	645
	225	198	356	492	525	549	566	580	591	599	606	612	617	632	641
	250	202	361	478	513	538	556	571	582	591	599	605	611	627	637
	275	207	365	465	501	528	547	562	574	584	592	599	605	622	633
	300	211	370	454	491	518	538	554	567	577	585	593	599	617	629
	350	220	375	432	471	499	521	538	552	563	573	581	588	608	621
	400	229	356	413	453	482	505	523	538	550	560	569	577	599	613
450	238	340	397	436	467	491	509	525	538	549	558	566	590	606	
500	244	326	382	422	453	477	497	513	526	538	548	556	582	599	

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED: <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS AIR TEST REQUIREMENTS 21" & 24" SEWERS WITH 4" LATERALS	REVISED: <i>[Signature]</i> 10 / 95
	DESIGN ENGINEER: <i>[Signature]</i>		S / 34
	DATE: 5/6/88		

MINIMUM HOLDING TIME IN SECONDS REQUIRED FOR PRESSURE TO DROP 1 PSIG
FOR SYSTEMS WITH NO LATERALS

LENGTH OF LINE IN FEET	PIPE DIAMETER								
	4"	6"	8"	10"	12"	15"	18"	21"	24"
25	60	60	60	60	60	62	89	121	158
50	60	60	60	60	79	124	178	243	317
75	60	60	60	83	119	186	267	364	475
100	60	60	70	110	158	248	356	485	634
125	60	60	88	138	198	309	446	595	680
150	60	60	106	165	238	371	510		
175	60	69	123	193	277	425			
200	60	79	141	220	317				
225	60	89	158	248	340				
250	60	99	176	275					
275	60	109	194	283					
300	60	119	211						
350	62	139	227						
400	70	158							
450	79	170							
500	88								
550	97								
600	106								
650	113	170	227	283	340	425	510	595	680

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED: <i>[Signature]</i> CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS AIR TEST REQUIREMENTS 4" THRU 24" SEWERS WITHOUT LATERALS	REVISED: <i>[Signature]</i> 10 / 95
	<i>[Signature]</i> DESIGN ENGINEER		S 35
	DATE: 5/6/88		

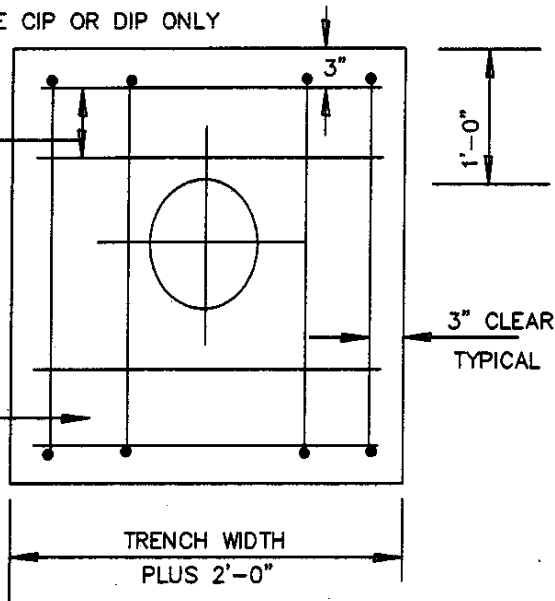
NOTE:

1. WHEN PIPE SLOPE EXCEEDS 20° USE CIP OR DIP ONLY

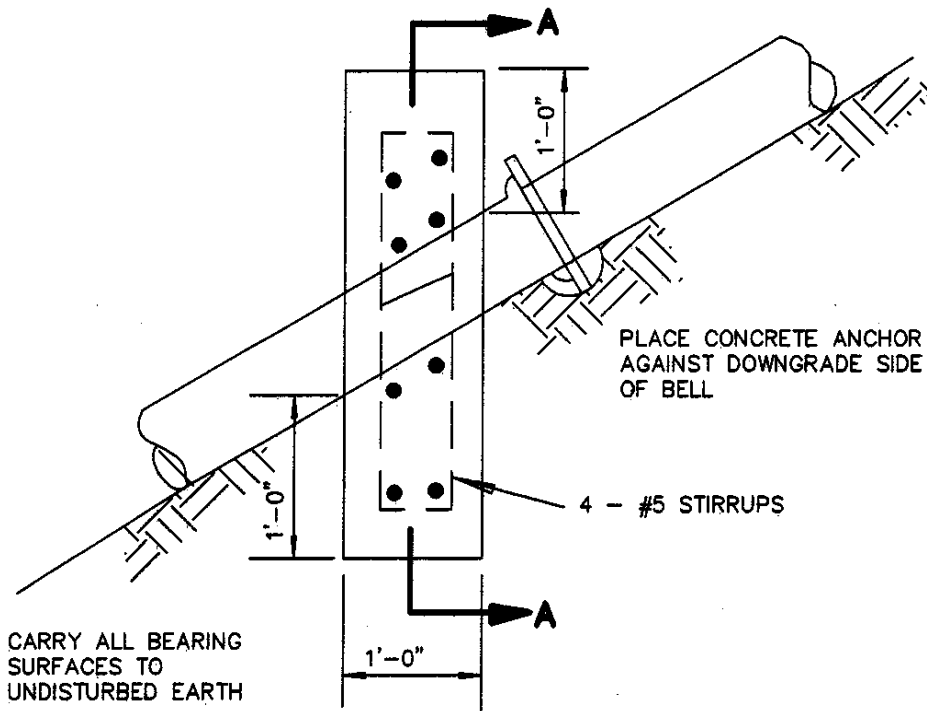
MAX ALLOWABLE SPACING	
SLOPE	SPACING
20° - 34'	35 FEET
35° - 50'	24 FEET
>50°	16 FEET

8 - #5 DEFORMED BARS

MIX NO.3
CONCRETE



SECTION A-A

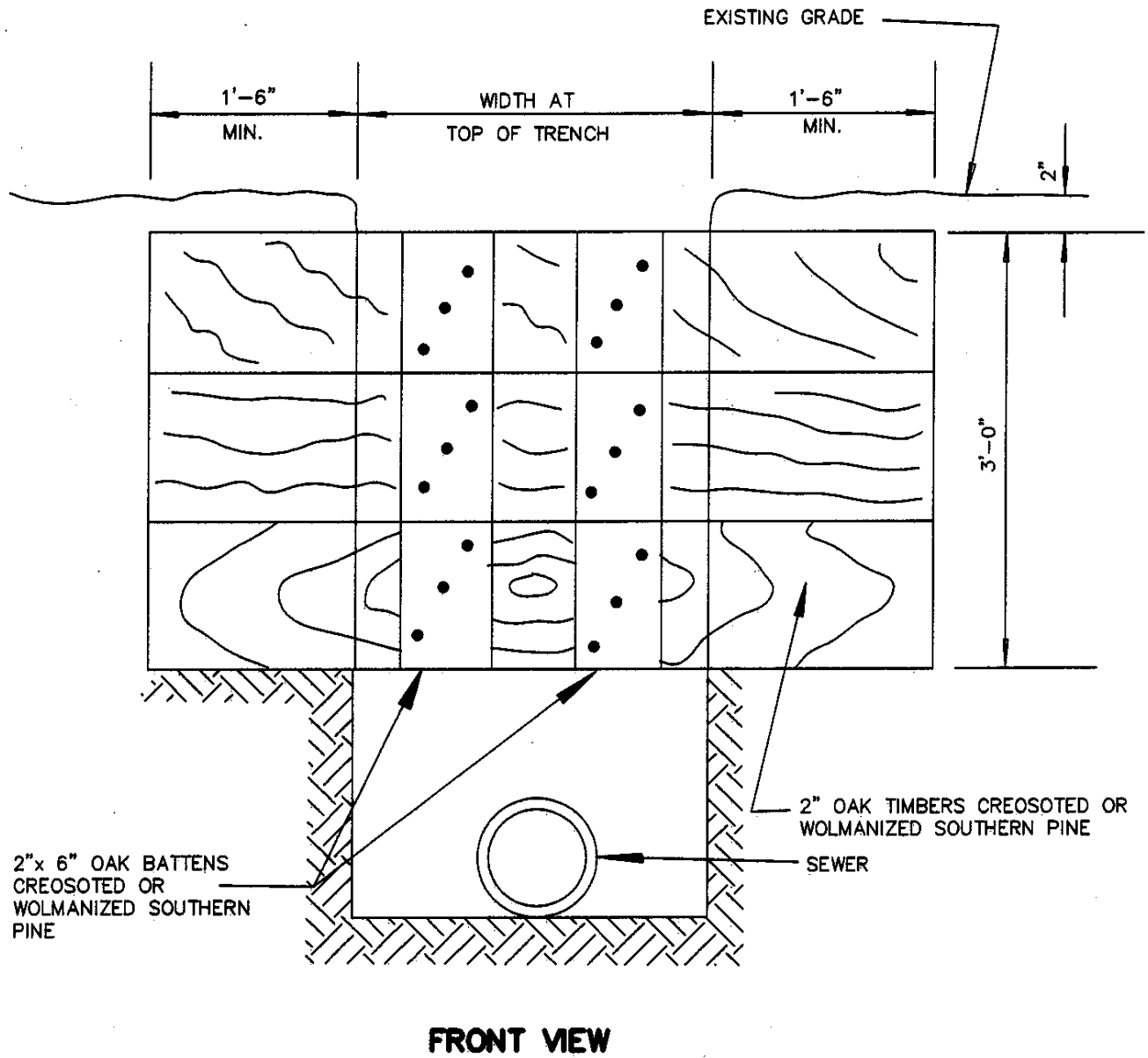


ELEVATION

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED <i>Ronald Brown</i> 5/17/99 CHIEF ENGINEER	STANDARD SANITARY SEWER DETAILS CONCRETE ANCHOR (WHEN PIPE SLOPES EXCEED 20°)	REVISED	S 36
	DESIGNED BY <i>Paul Davis</i> 4/12/99 DESIGN ENGINEER			
DATE:				

NOTES:

1. NAIL BATTENS TO TIMBERS
2. PLACE TRENCH EROSION CHECK ACCORDING TO SPACING AS SHOWN ON PLANS.



ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED <i>Ronald K. Brown</i> 5/17/77 CHIEF ENGINEER DESIGN ENGINEER DATE:	STANDARD SANITARY SEWER DETAILS TRENCH EROSION CHECK (FOR USE IN GRANULAR SOILS)	REVISED _____ _____ _____ _____
			S <hr style="width: 100%;"/> 37