

GENERAL NOTES

1. Total area of property: 5.36 Acres
2. Present zoning: R-1, P.U.D.
3. Temporary facilities: Light, Power, Water, and Toilet Facilities shall be provided by the General Contractor.
4. All existing underground utilities and services that are to remain shall be protected throughout construction.
5. Protection: Each contractor shall protect his excavations: All excavations shall be kept free of water and barricades maintained.
6. Clean-up: General Contractor shall remove all debris from site and maintain the street building broom clean. Tools, equipment, and scaffolding not in active use shall be removed from the site.
7. Topsoil, sod, and debris shall be removed from areas of new construction.
8. Excavate to produce an undisturbed soil bearing surface at required levels. Remove all soft spots in subgrade and fill with compacted granular fill.
9. Fill soils shall not contain organic material, vegetation, rubbish, cinders or frozen materials. Horizontal fills may be clay or granular fill. Remove all unacceptable or excess excavated material from site.
10. Clayey material: Deposit fill in 8" lifts, break down oversized lumps and mix to secure a uniform moisture content and compaction. After each lift has been spread and sprinkled, if required, roll or tamp that lift uniformly over its entire area. Compact clayey fill to not less than 95% of maximum density at optimum moisture as determined by compaction tests.*
11. Granular Material: Deposit fill in 1' lifts and compact as specified for clayey materials. Puddling of granular material will not be permitted. Compact granular fill to not less than 95% of maximum density as determined by compaction tests.*
12. Any material excavated beneath sewer pipe entering or leaving manholes shall be replaced with concrete.
13. All manhole rings and adjusting rings shall be set in mortar.
14. Precast manhole shall be waterproofed outside.
15. All concrete manholes to have rubber gasket on all pipe openings.
16. Under slabs on grade, construct a leveling course over leveled and compacted subgrade. Use sand, stone screenings, or pea gravel compacted with hand or mechanical tampers. Continue compaction until no further reduction in leveling course is apparent as tamper is advanced.
17. All top, flowline, and invert elevations shown have been established from the grading plan and/or topographic survey. The General Contractor shall verify all elevations upon grading completion to insure continuity with proposed and existing utilities.
18. All construction and materials required shall conform to the City of O'Fallon standards.
19. All storm and sanitary sewer and watermain trench backfills shall be water jetted. Compacted granular fill will be used under paved areas.

* TO BE PERFORMED BY SOILS ENGINEER.

PLANS FOR CONSTRUCTION OF

ROYAL OAKS

PHASE 4A

SHEET INDEX

TITLE SHEET	1
FLAT PLAN	2
GRADING PLAN	3
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SANITARY AND STORM SEWER PROFILES	5
DRAINAGE AREA PLAN	6
MISCELLANEOUS DETAILS	7
SANITARY SEWER DETAILS	8
WATERMAIN DETAILS	9

UTILITIES

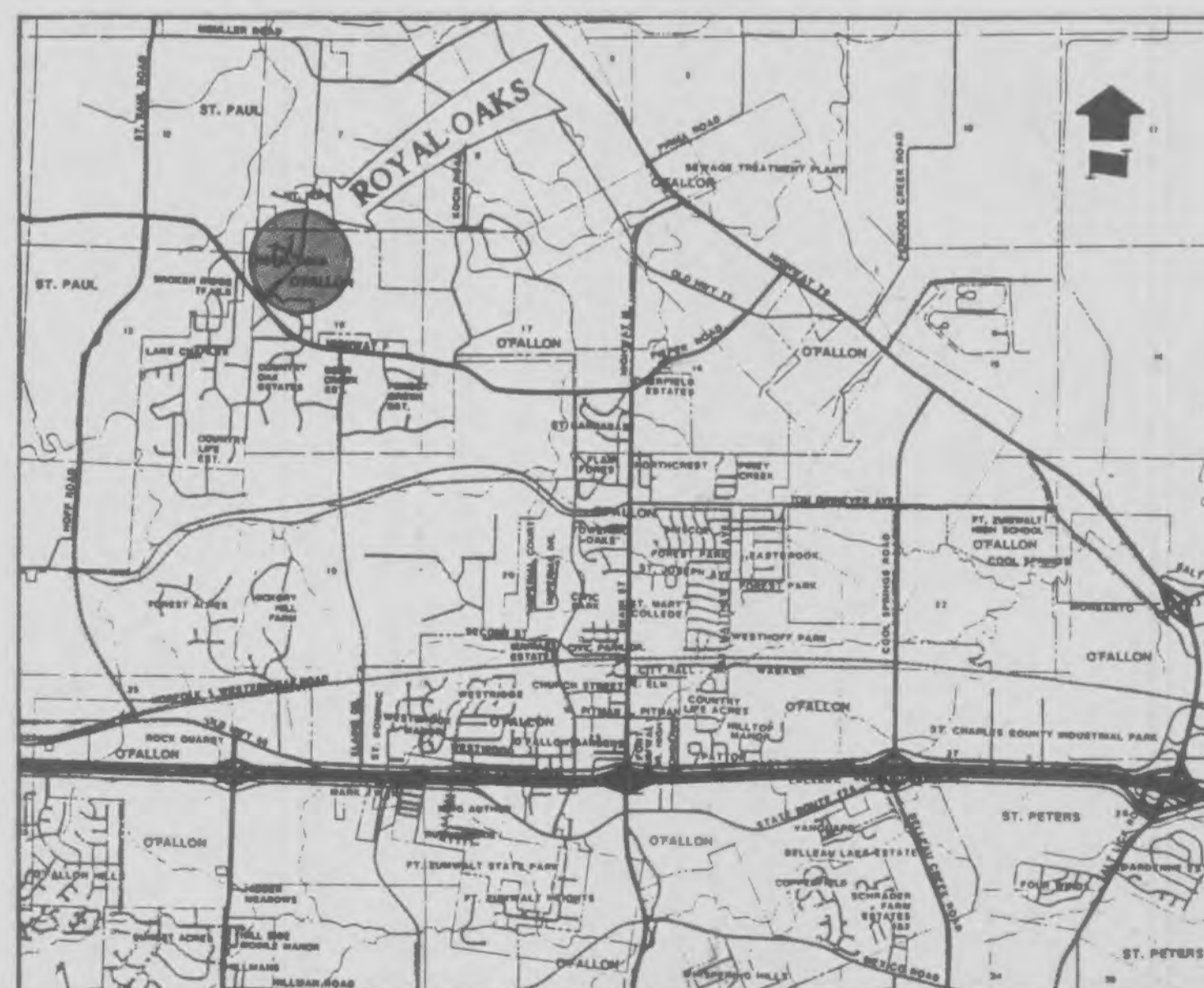
Union Electric	1-800-344-7483
GTE Telephone	327-3600
MMEI (O'Fallon Water & Sewer)	281-2858
Continental Cablevision	625-1611

BENCHMARKS

Top N. rim of MH #3A (From Royal Oaks Add'n. Plat 1 plans)
@ front of Lot #162 of Royal Oaks Add'n. Plat #3A.
Elevation: 544.96

Top NE. cor. curb inlet @ SW. cor. of the intersection of
Royal Oaks Drive and Crestwood Lane.
Elevation: 549.07

Chiseled "□" @ N. edge of driveway @ its intersection with
the W. edge of the sidewalk @ Lot #414 of Royal Oaks Add'n.
Plat 1.
Elevation: 558.17



LOCATION MAP

GBA

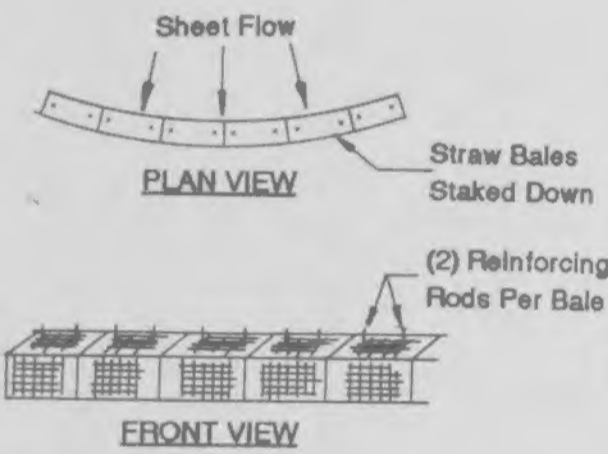
GEORGE BUTLER ASSOCIATES, INC.
Engineers / Architects / Landscape Architects / Planners
Kansas City, Mo. / Lenexa, Ka. / O'Fallon, Mo. / Ames, Ia. / Oklahoma City, Ok.

As-BUILT 5/23/94
Rev. as per City of O'Fallon comments-J.G.-7/19/93

ST. PAUL ESTATES
P.B. 20 / PG. 108-109
ST. Charles County, Mo.
Zoned R-1E

GBA GEORGE BUTLER ASSOCIATES, INC. Engineers / Architects / Landscape Architects / Planners Kansas City, Mo. / Lenexa, Ka. / O'Fallon, Mo. / Ames, Ia. / Oklahoma City, Ok.		DATE: JUNE 1993
DESIGN BY: GRH		PROJECT NO: 6803
DRAWN BY: JG		SHEET NO: 3
PROJECT NO: 6803		TOTAL SHEETS: 9
GRADING PLAN		
REVISIONS		BY DATE
Min cover note of Road & Lots 104-107 & 124		JG 7/19/93

- GENERAL NOTES**
- All filled and graded areas shall be seeded with grass within 45 days following completion of filling or grading.
 - Due to extensive grading necessitated by the site topography few, if any, existing trees can be retained. Therefore, not later than 2 years following completion of grading fifteen (15) trees per acre shall be planted. These hardwood trees shall be not less than (2) inches in diameter and not less than (8) feet in height.
15 trees/acre X 1.4 acres = 21 trees
 - No slope shall be more than 3:1.
 - APPROXIMATE ROUGH GRADING QUANTITIES:
CUT - 11,195 C.Y. FILL - 24,029 C.Y.
 - Use Borrow Area, as shown on sheet 3, as needed from street Sta. 10+00 to Sta. 15+00.



SILTATION CONTROL NOTE
Siltation Control shall be Bales of Straw placed end to end and anchored to ground with 4ft long reinforcing rods.
Note: Siltation control is to be placed in all areas where a potential exists for silt to leave the construction site.
Note: Straw Bale Erosion Control to be used until vegetation is established.

STRAW BALE DETAIL

SILTATION CONTROL DETAIL
N.T.S.

STRUCTURE	SIA	DISTANCE	STREET
EP #1	8+80	25' RT	FAWN OAKS DRIVE
MH #2	8+56.67	17' RT	FAWN OAKS DRIVE
AI #3	-	-	-
CI #4	8+05.25	17' RT	FAWN OAKS DRIVE
CI #5	2+94.77	17' RT	CRESTWOOD DRIVE
DCI #6	6+90.75	17' RT	FAWN OAKS DRIVE
DCI #7	6+90.75	17' RT	FAWN OAKS DRIVE

SANITARY MANHOLES			
LINE "A"			
EX MH #16	-	-	-
MH #100	14+76.67	25' RT	FAWN OAKS DRIVE
MH #101	11+32.67	25' RT	FAWN OAKS DRIVE
MH #102	9+94.67	25' RT	FAWN OAKS DRIVE
MH #103	7+16.70	26.35' RT	FAWN OAKS DRIVE
MH #104	3+16.39	21' RT	FAWN OAKS DRIVE
MH #105	2+18.24	18' RT	FAWN OAKS DRIVE
MH #106	1+94.36	89' LT	FAWN OAKS DRIVE
LINE "B"			
MH #103	3+23.43	31.55' RT	CRESTWOOD DRIVE
MH #107	1+48.54	17' RT	CRESTWOOD DRIVE

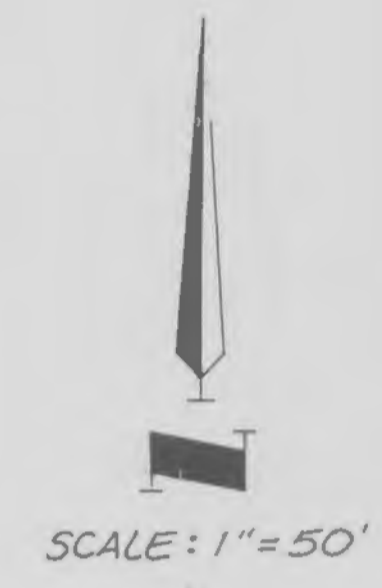
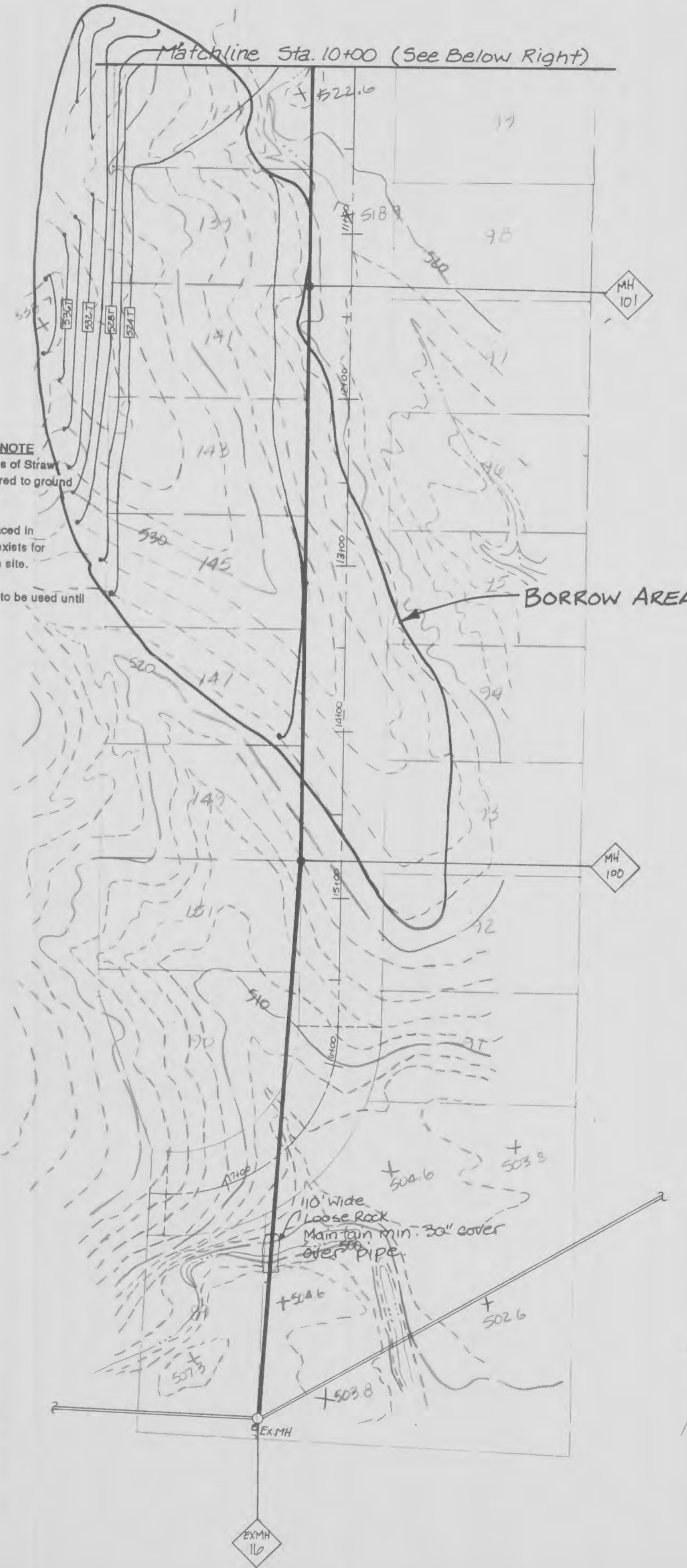
STORM WATER DETENTION

PHASES CONSTRUCTED:

PHASE 2	10.38 Ac.	
PHASE 3A	2.11 Ac.	
PHASE 3B	4.87 Ac.	
PHASE 3D	1.79 Ac.	
PHASE 4A (PROPOSED)	19.15 Ac. X (3.26-2.31) X 1800 = 32,766 c.f.	
	5.36 Ac. X (3.26-2.31) X 1800 = 9,166 c.f.	
	24.51 Ac. X (3.26-2.31) X 1800 = 41,932 c.f.	
REQ. SEDIMENT STORAGE	24.51 Ac. X 150 c.f.	= 3,677 c.f.
REQ. DETENTION STORAGE		45,609 c.f.

DETENTION PROVIDED:

PHASE 2	58,912 c.f. (El. 531)
PHASE 3B	20,100 c.f.
	79,012 c.f.

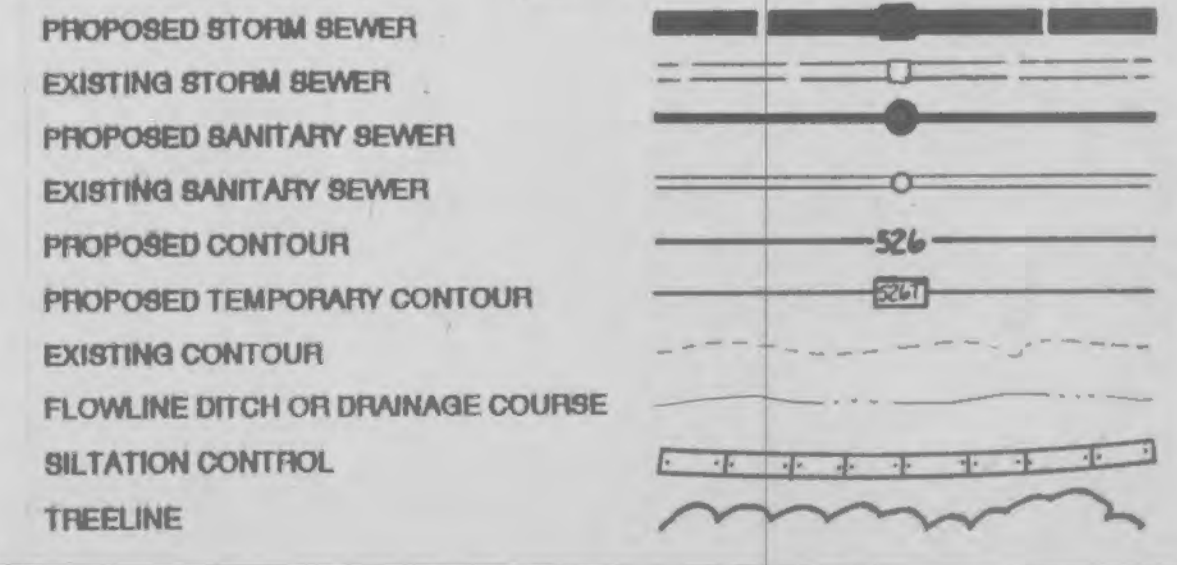


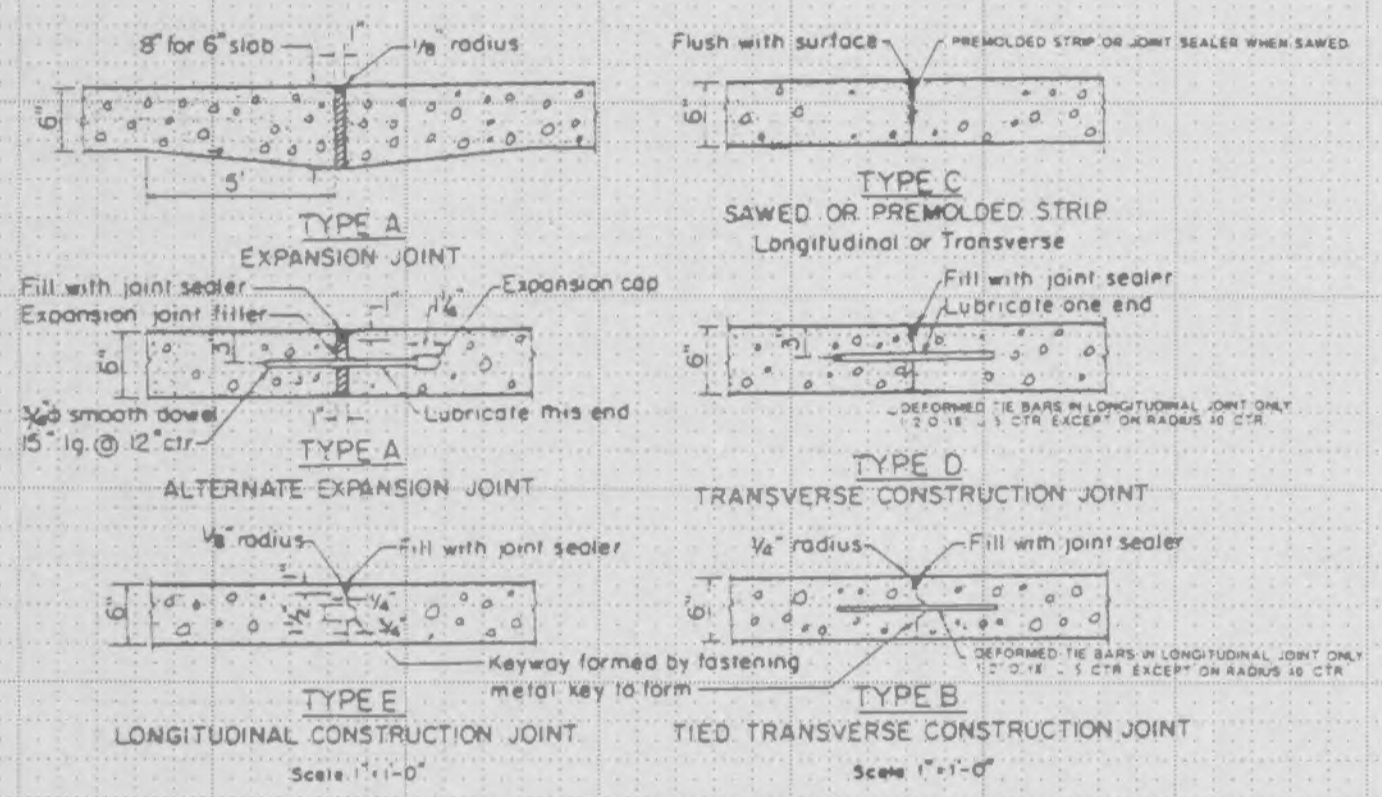
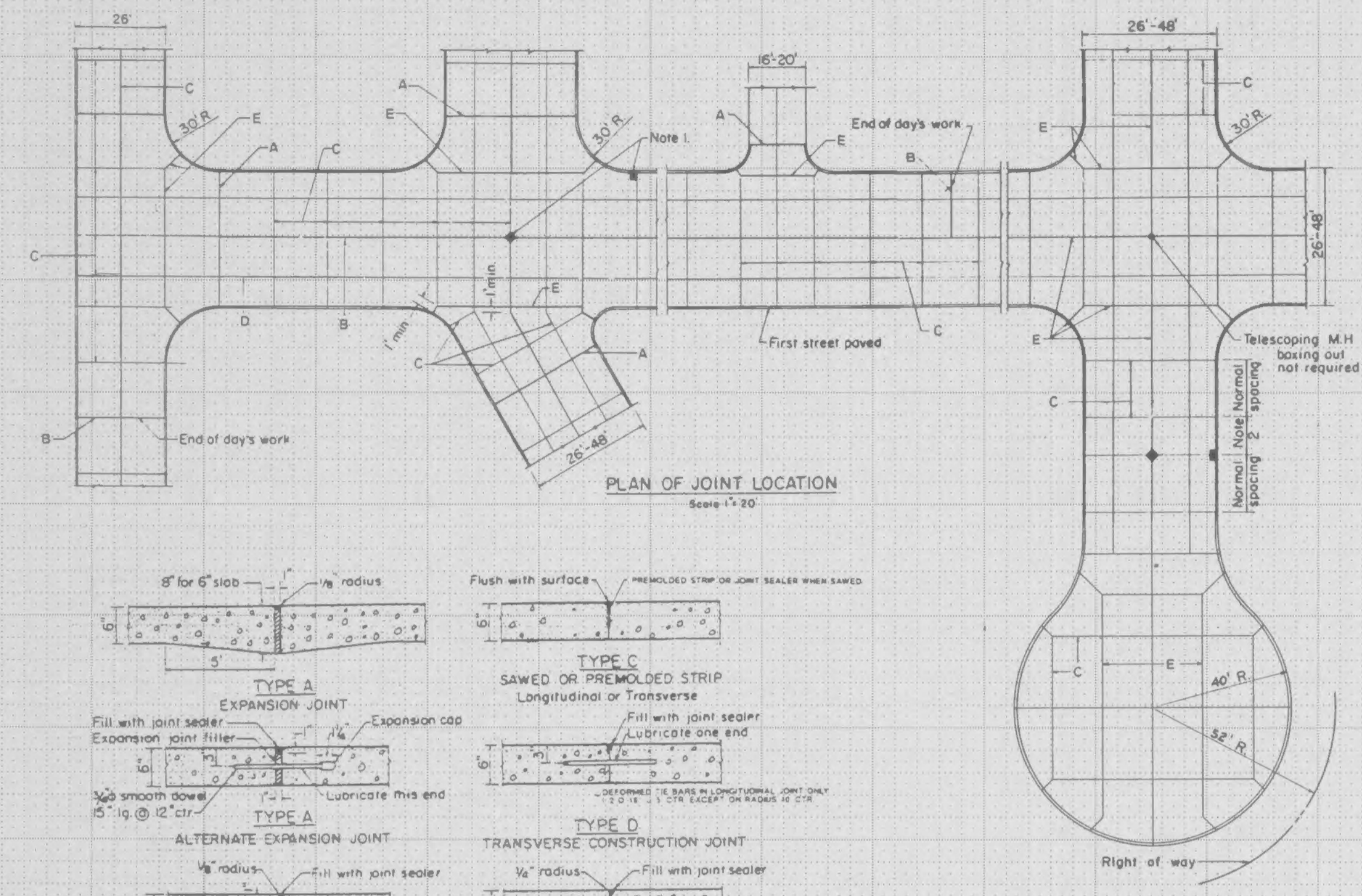
LOT #	FINISH FLOOR
103	542.5
104	545.5
105	547.5
106	551.0
107	552.5
108	553.5
109	554.5
110	555.0
111	555.0
112	555.0
113	555.0
116	554.0
118	553.0
120	550.0
122	546.5
124	546.0
125	542.0
127	546.0
128	544.0

NIF
Kellerman, Etal.
878/887
Zoned P.U.D.

AS-BUILT 5/23/94
By J.G.

LEGEND





1 Back of curb expansion joint

All catch basins shall be separated from the pavement and curb by boxing out around basin as shown above. Expansion joint material shall extend completely through curb and slab. Movable castings within the pavement limits shall be boxed in like manner except when telescoping type castings are used.

2. When a joint falls within 5 ft. of or contacts basin, manholes, or other structures, shorten one or more panels either side of opening to permit joint to fall on round structures and at or between corners of rectangular structures.

3. All transverse joints must extend through curbs and must be continuous across pavement, except tied transverse construction joints. Expansion joints will not be required except as shown on the plans.

4. Maximum transverse joint spacing shall be in accordance with the following table:

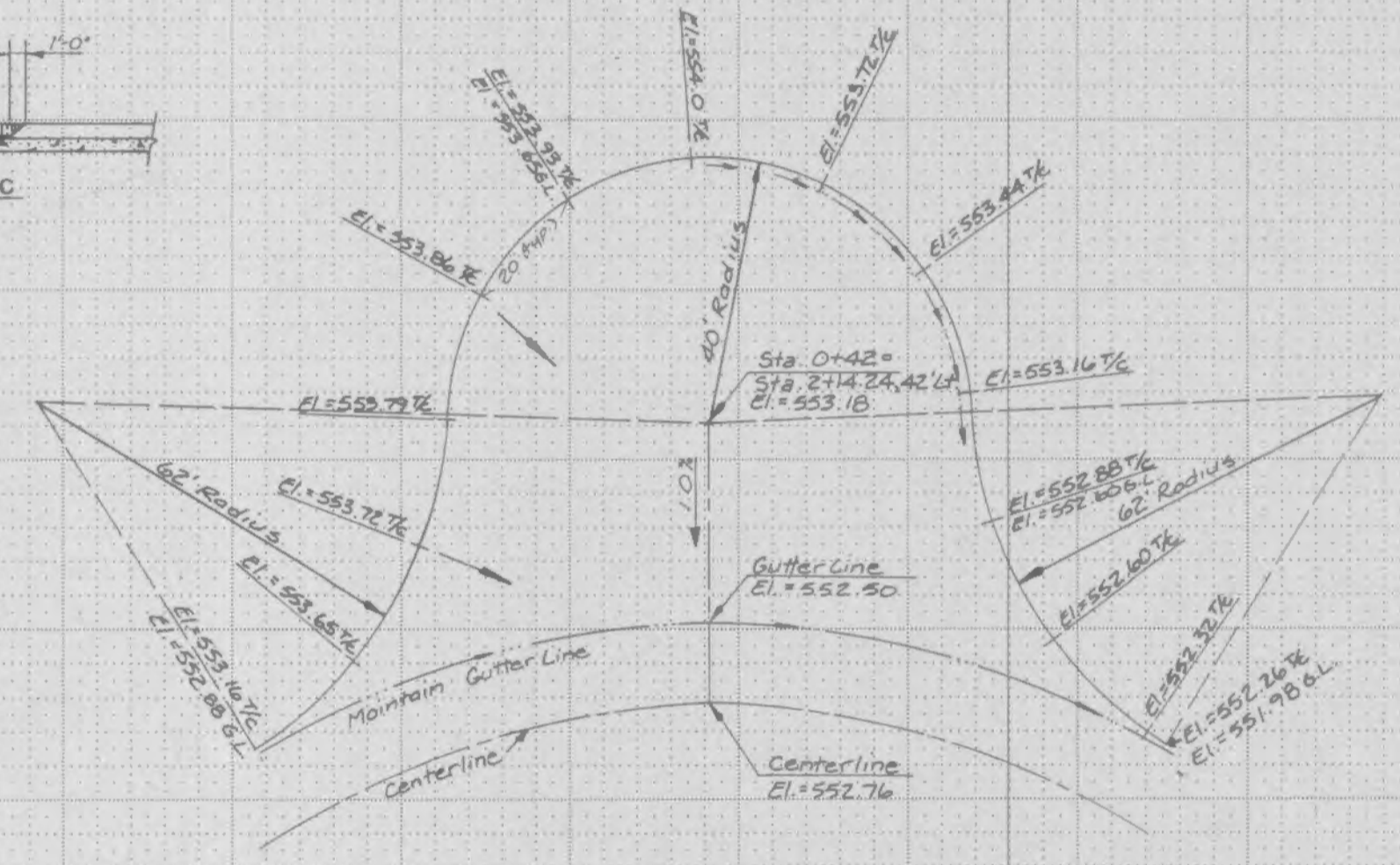
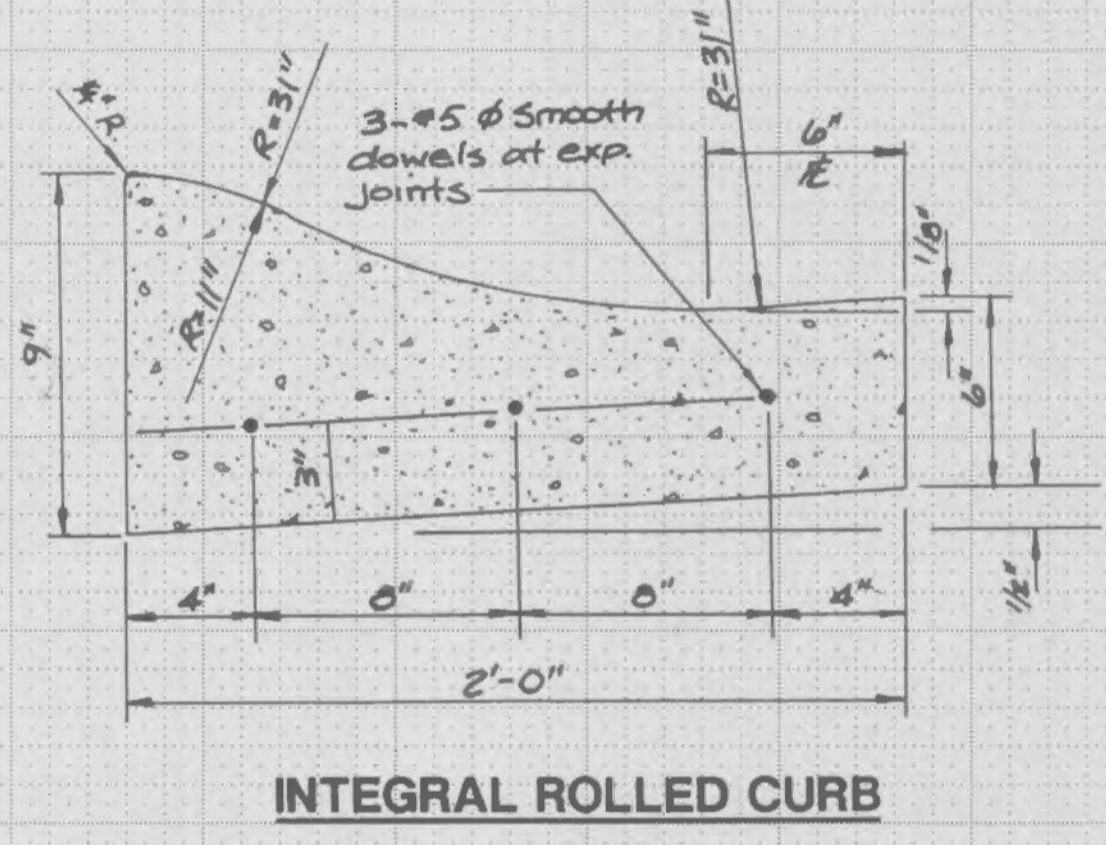
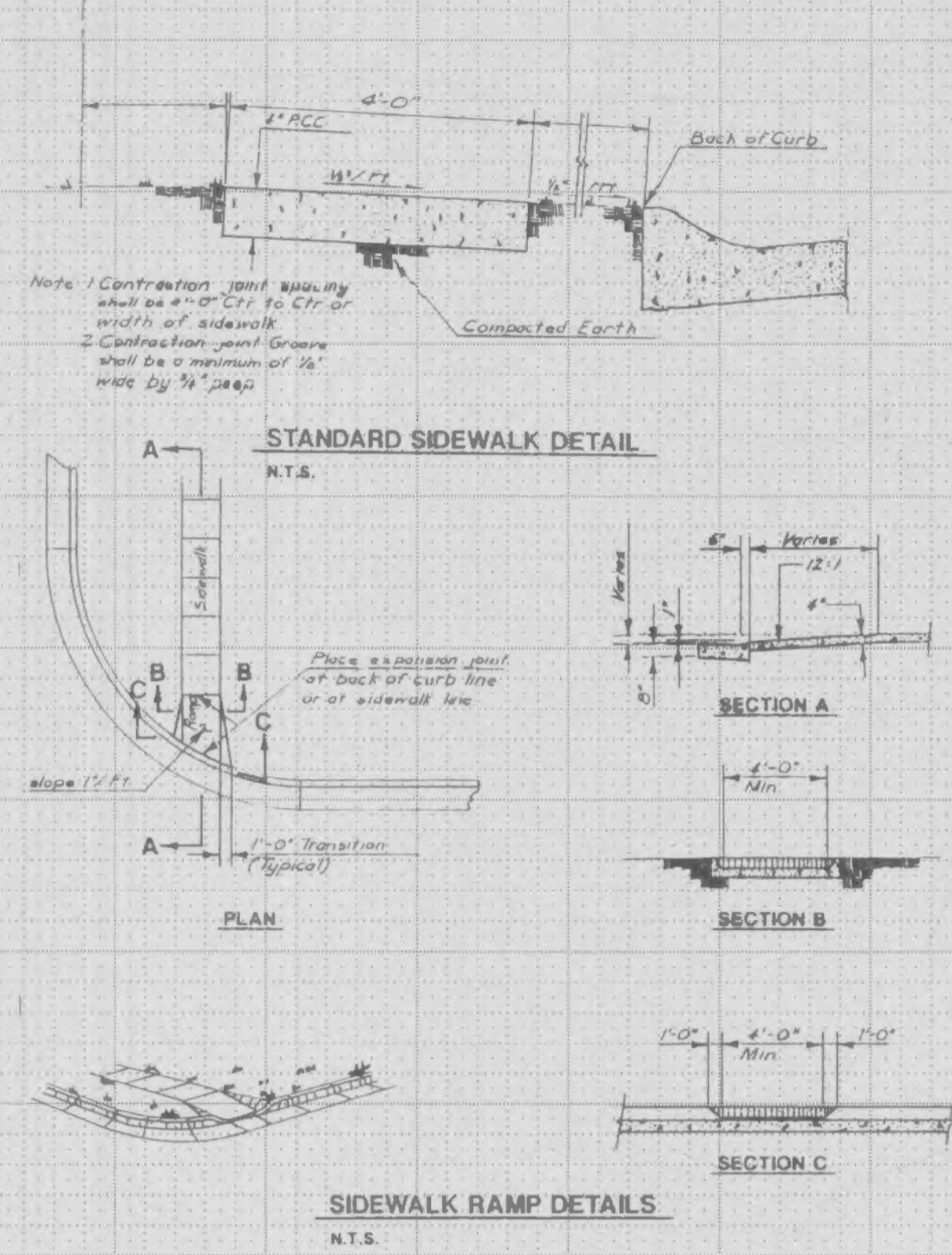
Max. spacing in ft.	Type of Coarse Agg.	Max. spacing in ft.	Type of Coarse Agg.
25	Crushed Granite	15	Siliceous gravel
20	Crushed Limestone	15	Gravel smaller than 3/4 in.
20	Calcareous gravel	15	Slag

5. All soft and yielding material and other portions of the subgrade which will not compact readily when rolled or tamped shall be removed as directed and replaced with suitable material placed and compacted. The subgrade shall be thoroughly compacted with suitable equipment so as to have uniform density at moisture content of not less than standard optimum (AASHTO T98).

All sewer trenches and structure excavations shall be backfilled to natural or finished grade as soon as conditions permit. All backfill shall be compacted with mechanical tampers in layers of not over 6 in. loose material. In order to prevent differential heave the backfill material shall be the same material as that of the subgrade adjacent to the trench.

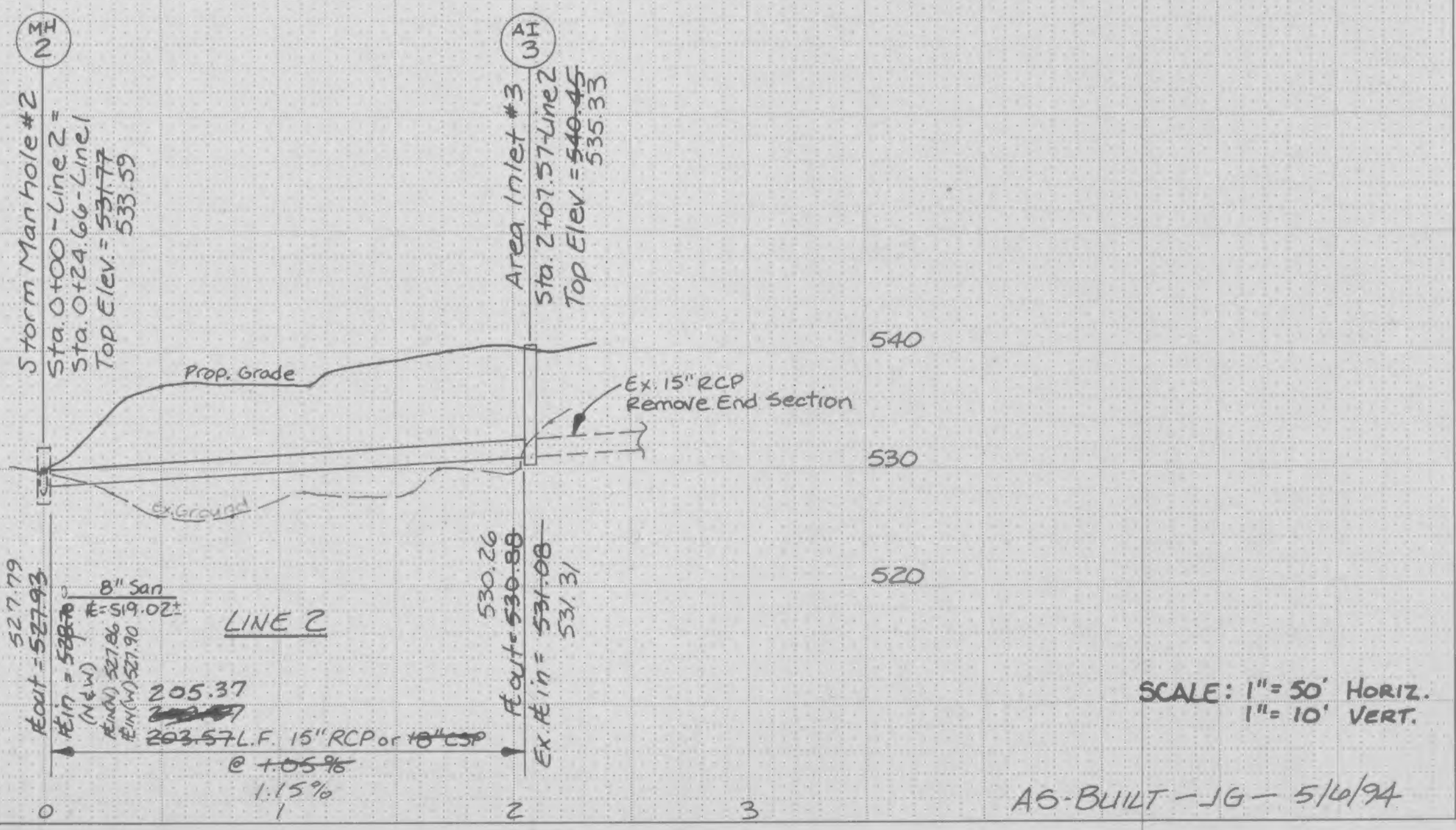
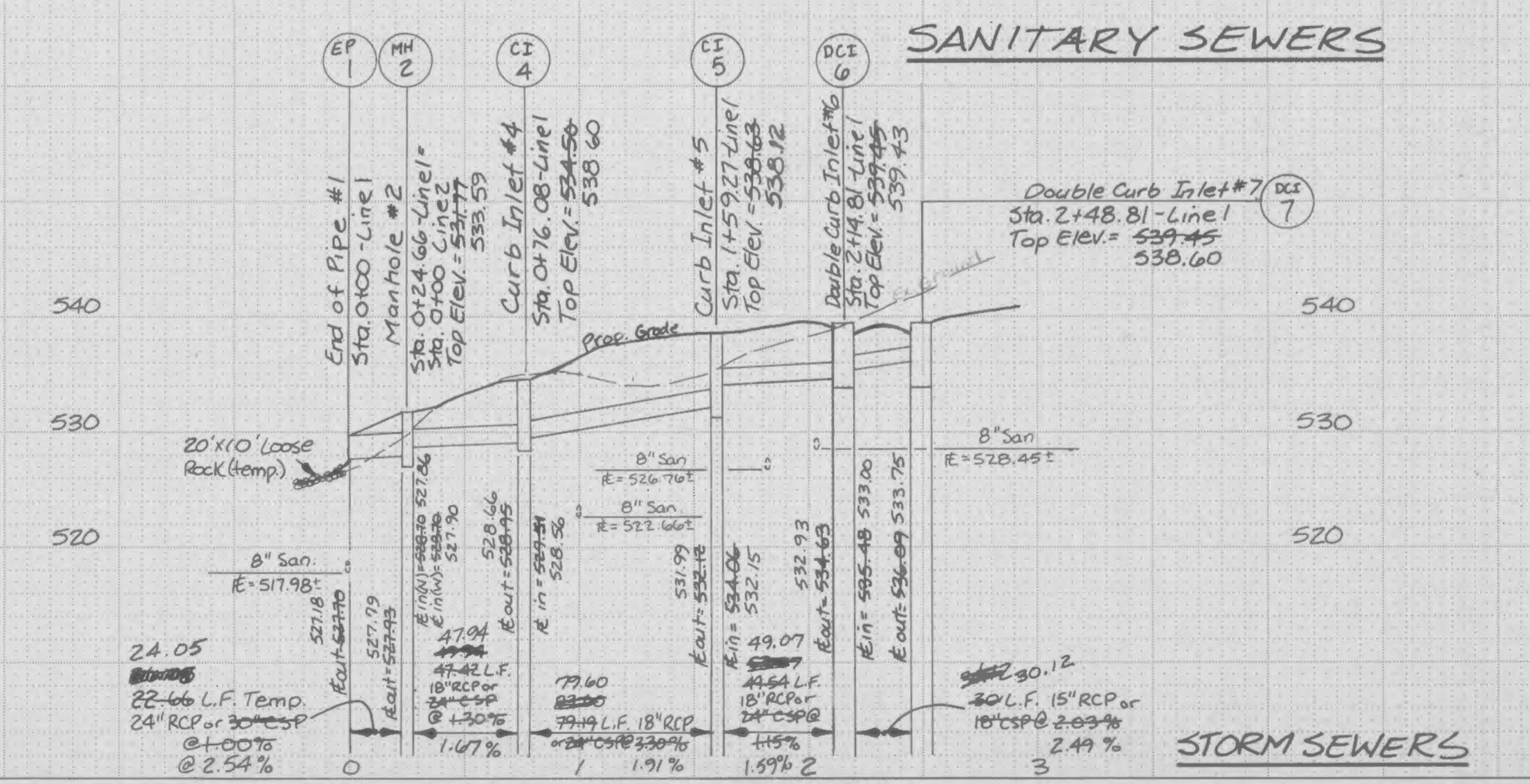
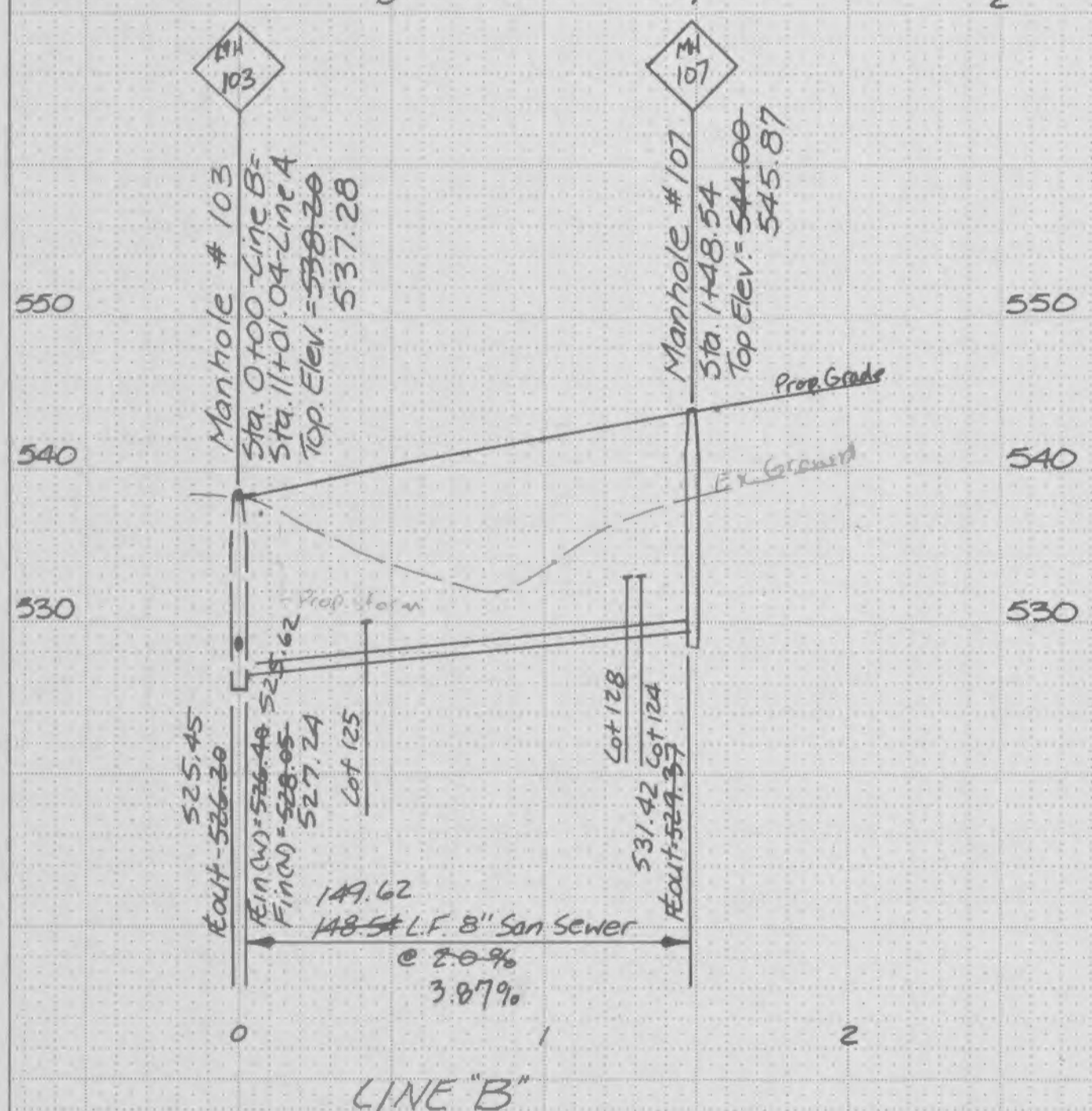
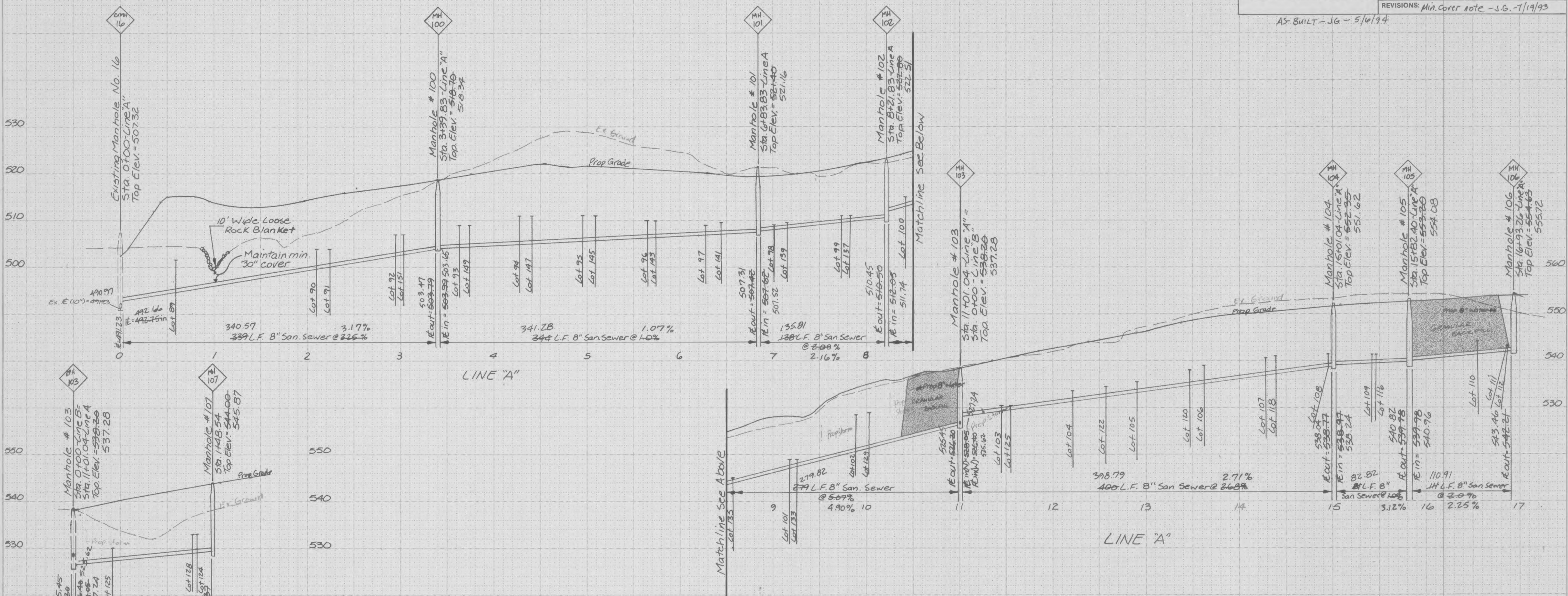
6. The minimum cement content shall not be less than 6.0 sacks (94 lb. per sack) per cu. yd. of concrete. The maximum size aggregate shall not exceed 1/4 of the slab thickness. The maximum slump shall not exceed 2 in. All concrete shall be air entrained in accordance with the following table:

Max. size of Coarse Aggregate, inches	Air Content, per cent by volume
1-1/2, 2	5 ± 1
3/4, 1	6 ± 1
3/8, 1/2	7-1/2 ± 1



GBA GEORGE BUTLER ASSOCIATES, INC. Engineers / Architects / Landscape Architects / Planners	PROJECT	SHEET NO.	TOTAL SHEETS
	SANITARY & STORM SEWER PROFILES	5	9
	PROJECT NO.: 6803	DATE: JUNE 1993	
	REVISIONS: Min. cover note - J.G. - 7/19/93		

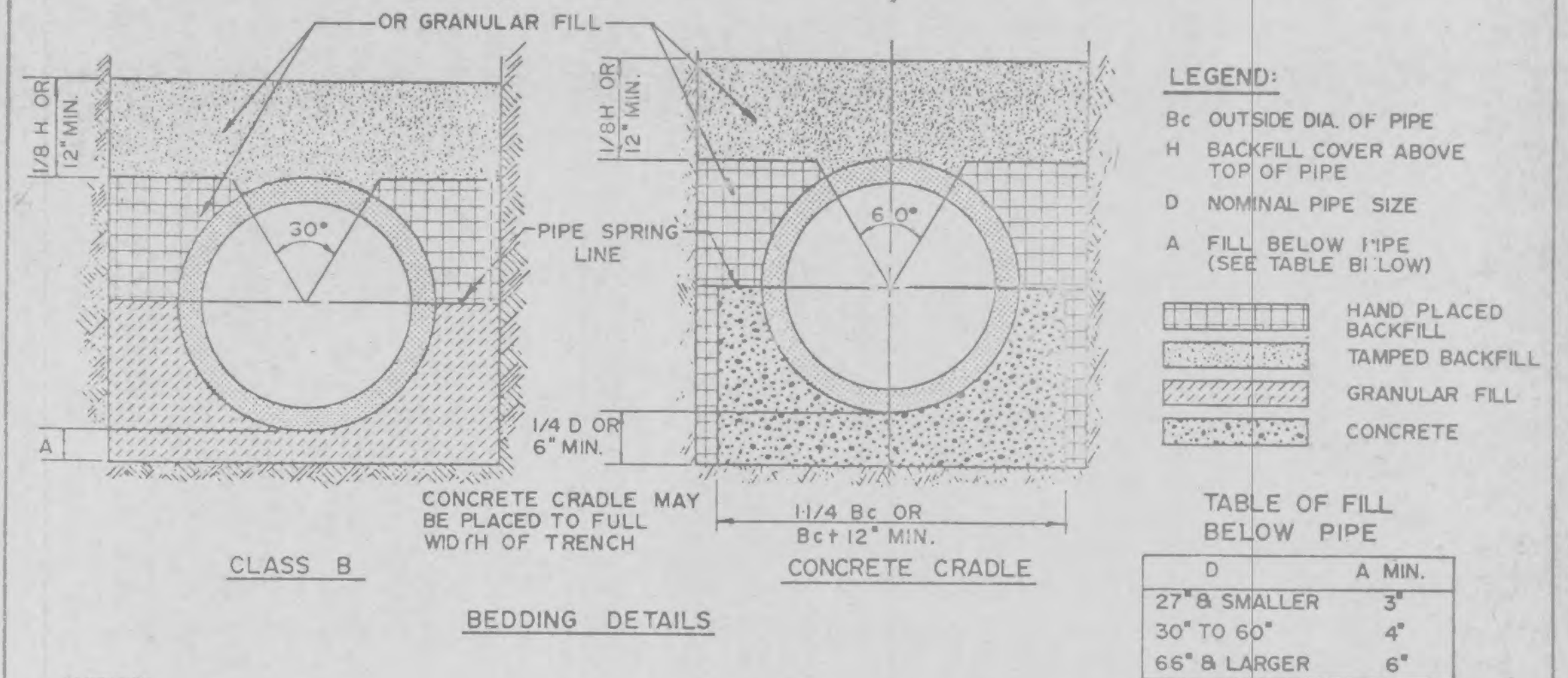
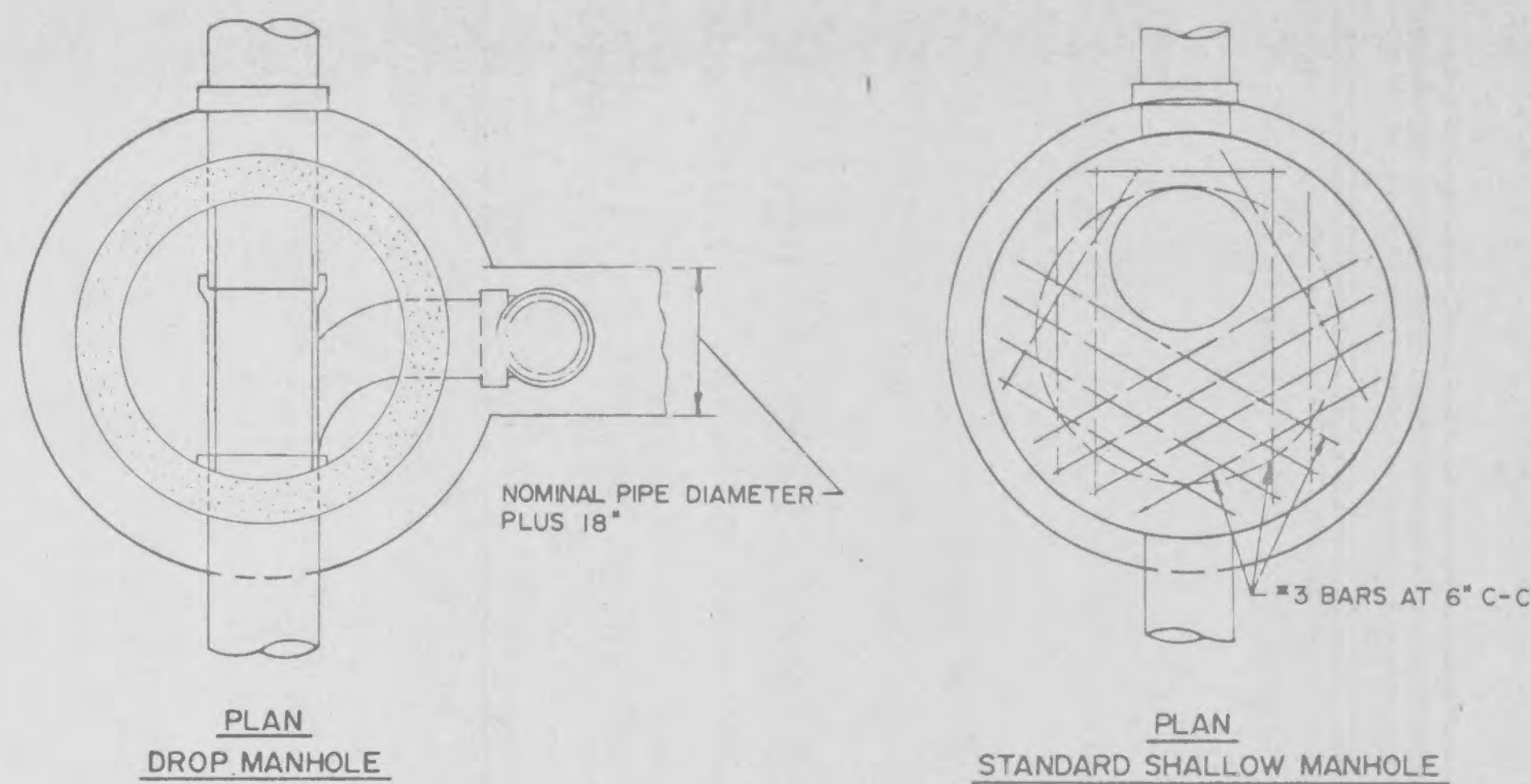
A5-BUILT-JG-5/10/94



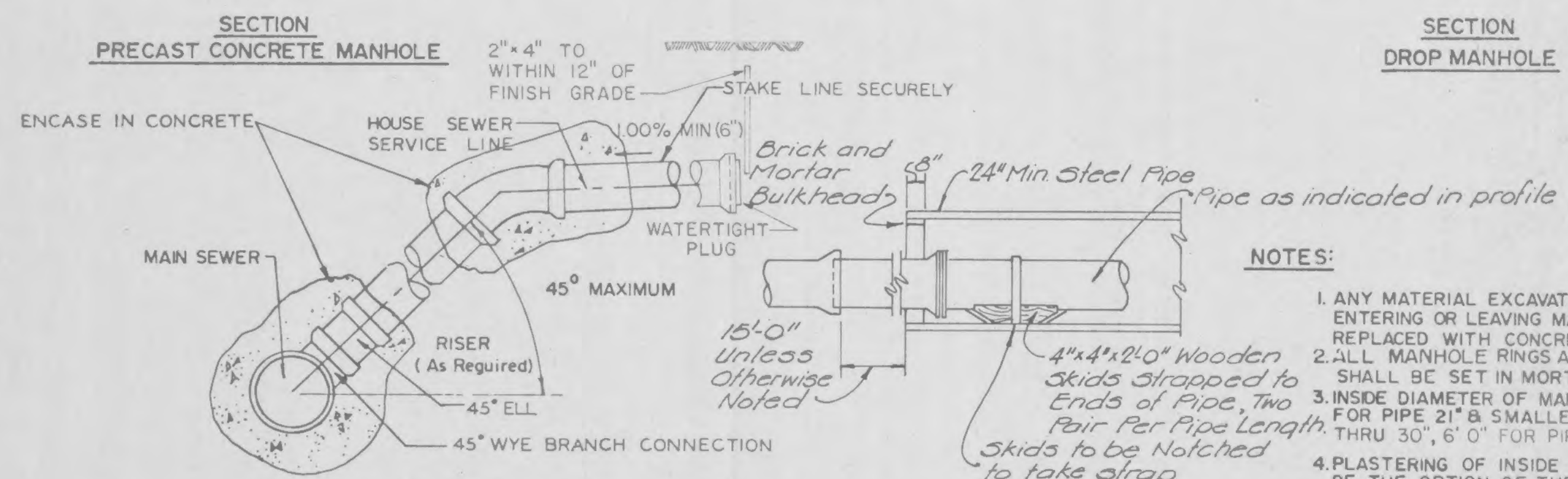
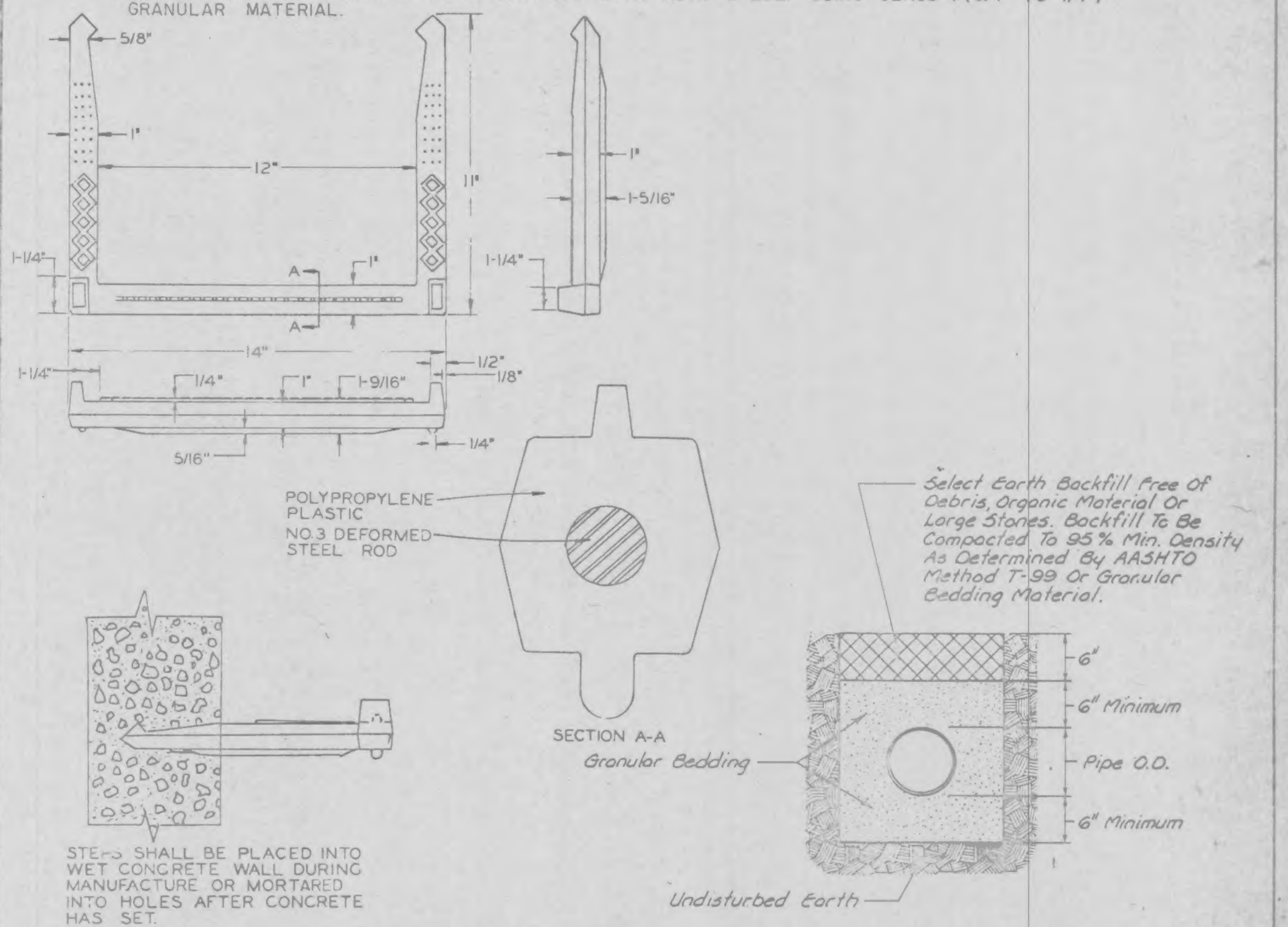
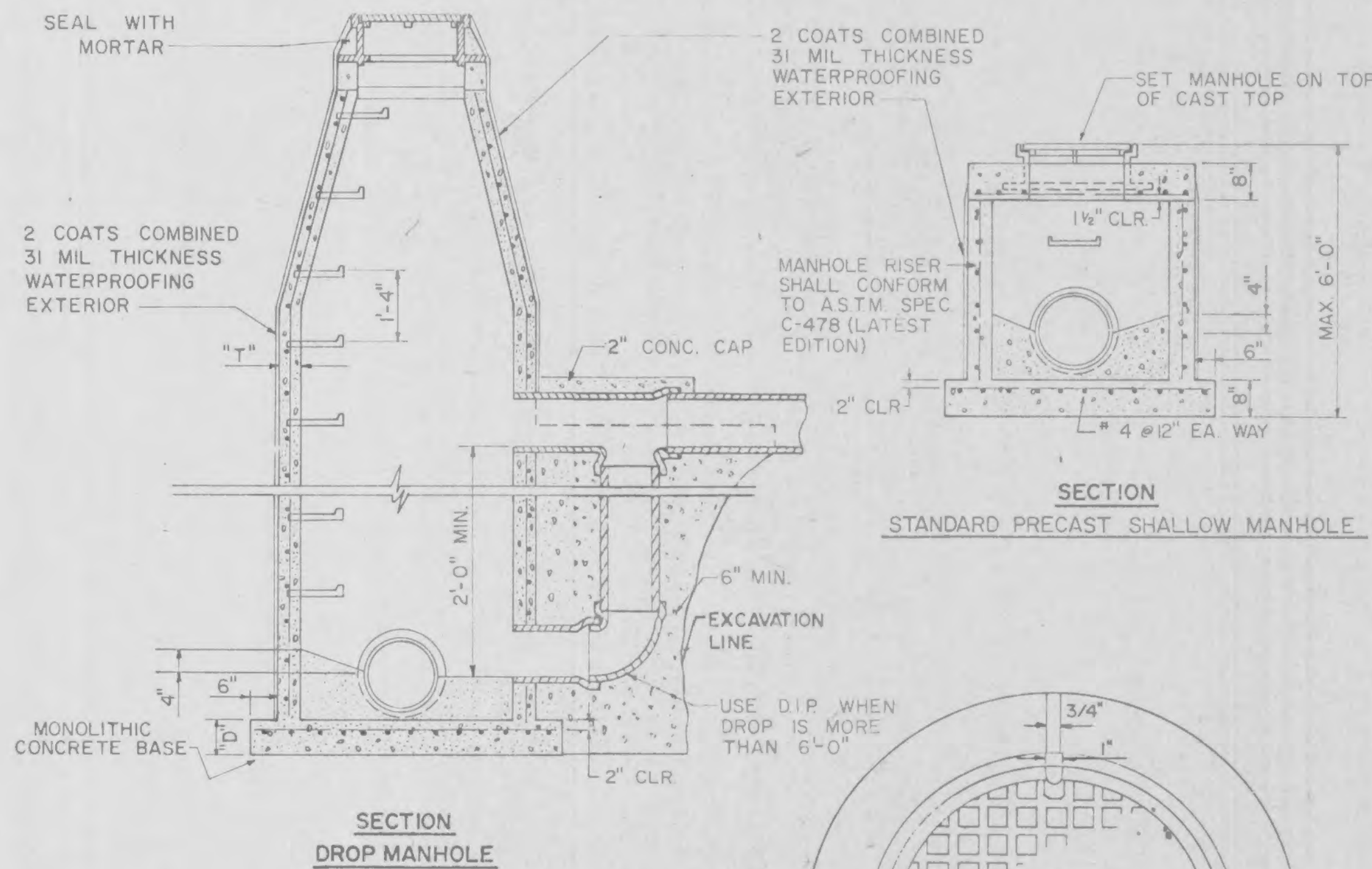
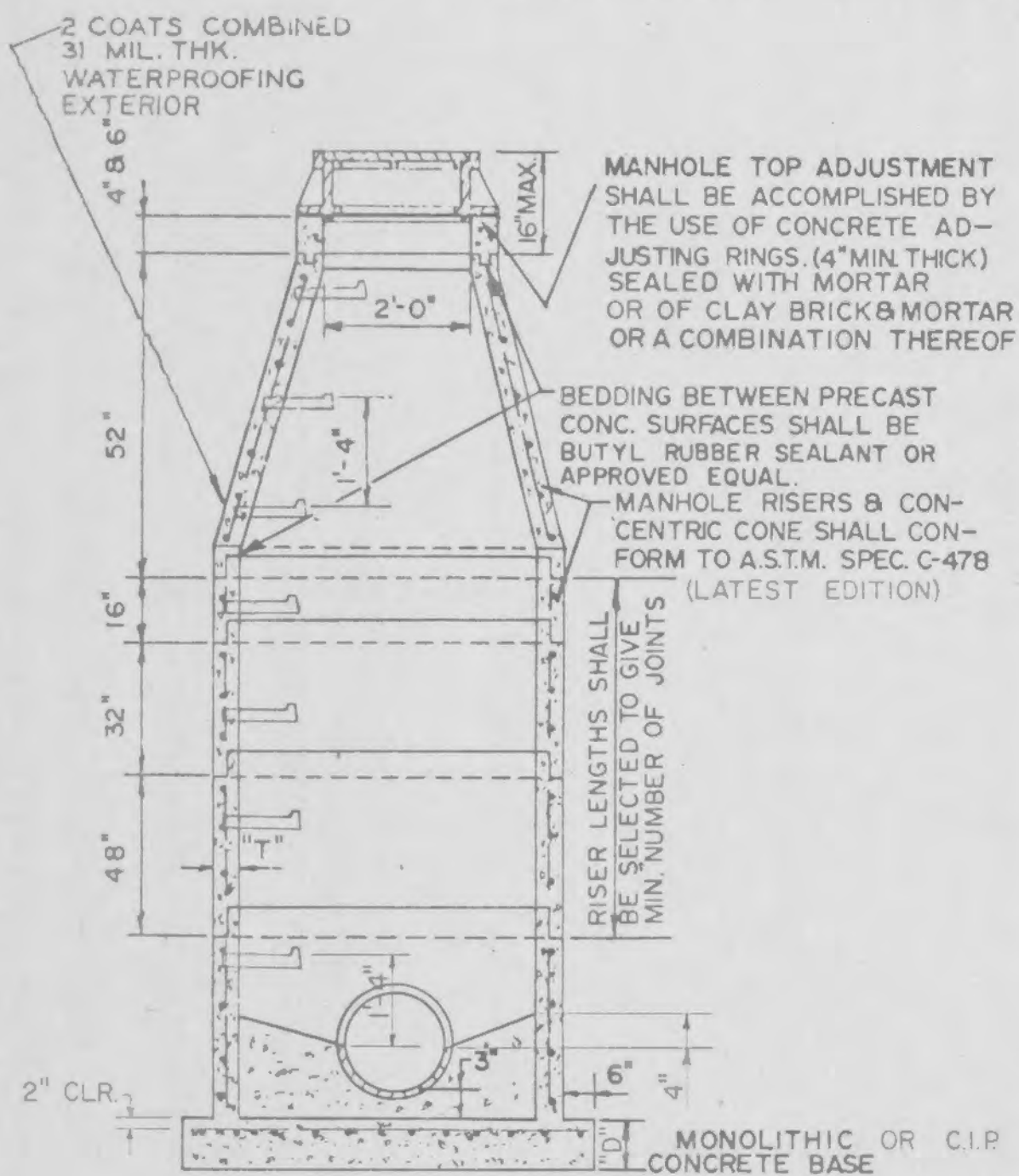
SCALE: 1" = 50' HORIZ.
1" = 10' VERT.

A6-BUILT-JG-5/10/94

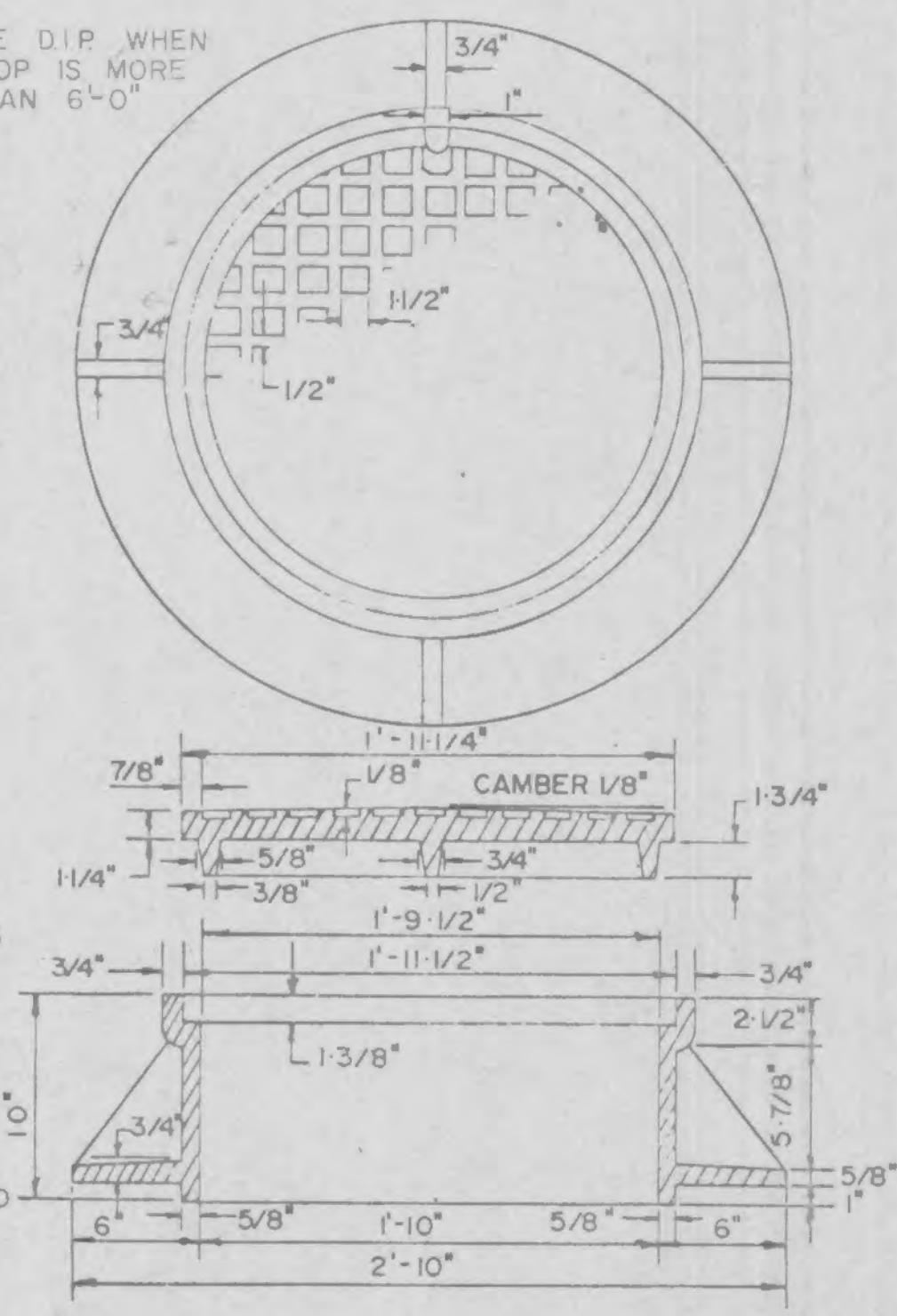
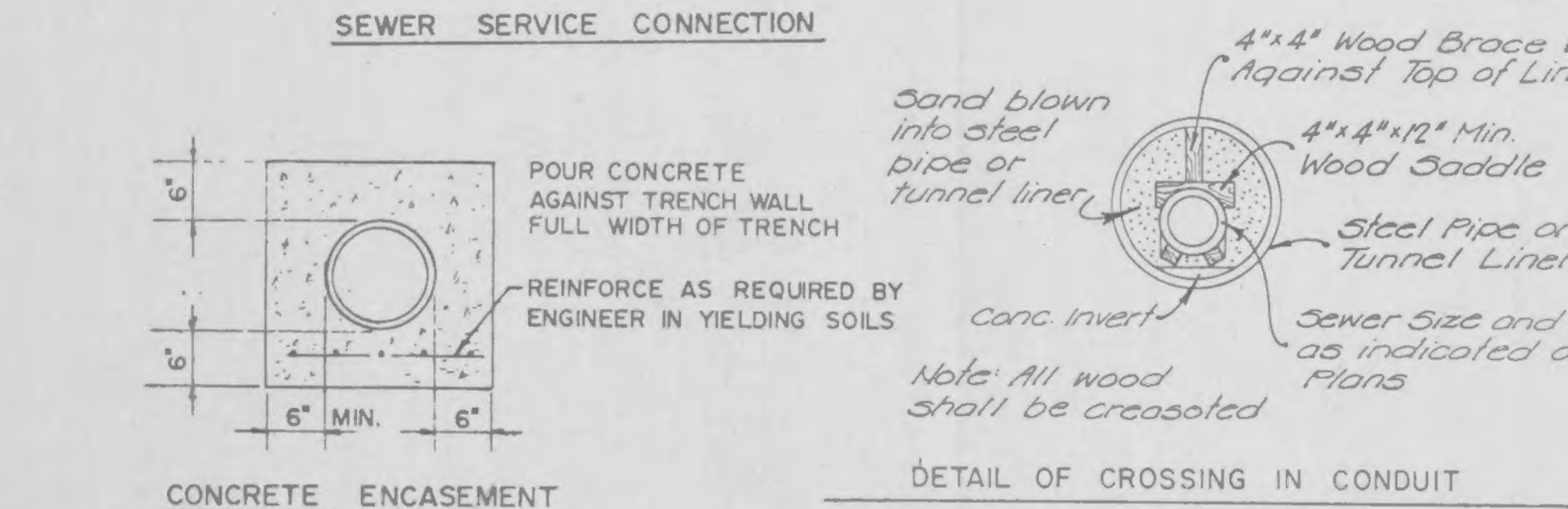
WALL THICKNESS		MANHOLE BASE THICKNESS	
DIA. M.H.	"+" DIM. PRE CAST	DEPTH (FEET)	"D" DIM.
48"	5"	0-20	8" w/ 4 BARS @ 12" CTRS. EACH WAY
60"	6"	20-30	8" w/ 4 BARS @ 9" CTRS. EACH WAY
72"	7"	30-40	10" w/ 5 BARS @ 10" CTRS. EACH WAY



- LEGEND:**
- Bc OUTSIDE DIA. OF PIPE
 - H BACKFILL COVER ABOVE TOP OF PIPE
 - D NOMINAL PIPE SIZE
 - A FILL BELOW PIPE (SEE TABLE BELOW)
 - HAND PLACED BACKFILL
 - TAMPED BACKFILL
 - GRANULAR FILL
 - CONCRETE
- TABLE OF FILL BELOW PIPE**
- | D | A MIN. |
|---------------|--------|
| 27" & SMALLER | 3" |
| 30" TO 60" | 4" |
| 66" & LARGER | 6" |
- NOTES:**
- GRANULAR FILL TO BE CRUSHED STONE OR PEA GRAVEL WITH NOT LESS 95% PASSING 1/2" AND NOT LESS THAN 95% TO BE RETAINED ON A #4, TO BE PLACED IN NOT MORE THAN 6" LAYERS AND COMPACTED BY SLICING WITH A SHOVEL. (1/2" & #4 REFERS TO SIEVE SIZE.)
 - TAMPED BACKFILL SHALL BE FINELY DIVIDED JOB EXCAVATED MATERIAL FREE FROM DEBRIS, ORGANIC MATERIAL AND STONES, COMPACTED TO 95% MAXIMUM DENSITY AS DETERMINED BY AASHO STANDARD METHOD T-99. GRANULAR FILL MAY BE SUBSTITUTED FOR TAMPED BACKFILL TO TOP OF THE PIPE.
 - HAND PLACED BACKFILL SHALL BE FINELY DIVIDED MATERIAL FREE FROM DEBRIS AND STONES.
 - ALL BEDDING DETAILS APPLY TO BUILDING SEWER SERVICE LINES AS WELL AS OTHER SEWERS.
 - CONCRETE CRADLE SHALL BE USED WHEN TRENCH WIDTH EXCEEDS 24" PLUS THE PIPE DIAMETER.
 - PVC PIPE SHALL BE BEDDED IN ACCORDANCE WITH ASTM D 2321 USING CLASS I (3/4" TO 1/4") GRANULAR MATERIAL.



- NOTES:**
- ANY MATERIAL EXCAVATED BENEATH PIPE ENTERING OR LEAVING MANHOLES SHALL BE REPLACED WITH CONCRETE.
 - ALL MANHOLE RINGS AND ADJUSTING RINGS SHALL BE SET IN MORTAR.
 - INSIDE DIAMETER OF MANHOLES TO BE 4'-0" FOR PIPE 21" & SMALLER, 5'-0" FOR PIPE 24" THRU 30", 6'-0" FOR PIPE OVER 30"
 - PLASTERING OF INSIDE OF MANHOLES SHALL BE THE OPTION OF THE CONTRACTOR.
 - ALL SEWERS EXTENDING FROM MANHOLES SHALL BE SUPPORTED WITH CONCRETE TO FIRST JOINT.
 - CONTRACTOR SHALL BE PAID FOR 6" CONCRETE ENCASEMENT AROUND PIPE AS SHOWN IN DETAIL.
 - LAMP LINES BEFORE AND AFTER INSTALLATION OF CONCRETE ENCASEMENT.
 - PRECAST MANHOLE SHALL BE WATERPROOFED OUTSIDE.
 - ALL CONC. MANHOLES TO HAVE RUBBER GASKET ON ALL PIPE OPENINGS.



MANHOLE STEP
Bell against M.H. Wall
Install water-tight stopper
It on Profile Sheet

MANHOLE STUBOUT

STANDARD MANHOLE RING AND COVER
CLAY & BAILEY - NO 2008
NEENAH - R-1736
DEETER - 1315
OR EQUAL

GBA
GEORGE BUTLER ASSOCIATES
CONSULTING ENGINEERS ARCHITECTS
LANDSCAPE ARCHITECTS PLANNERS

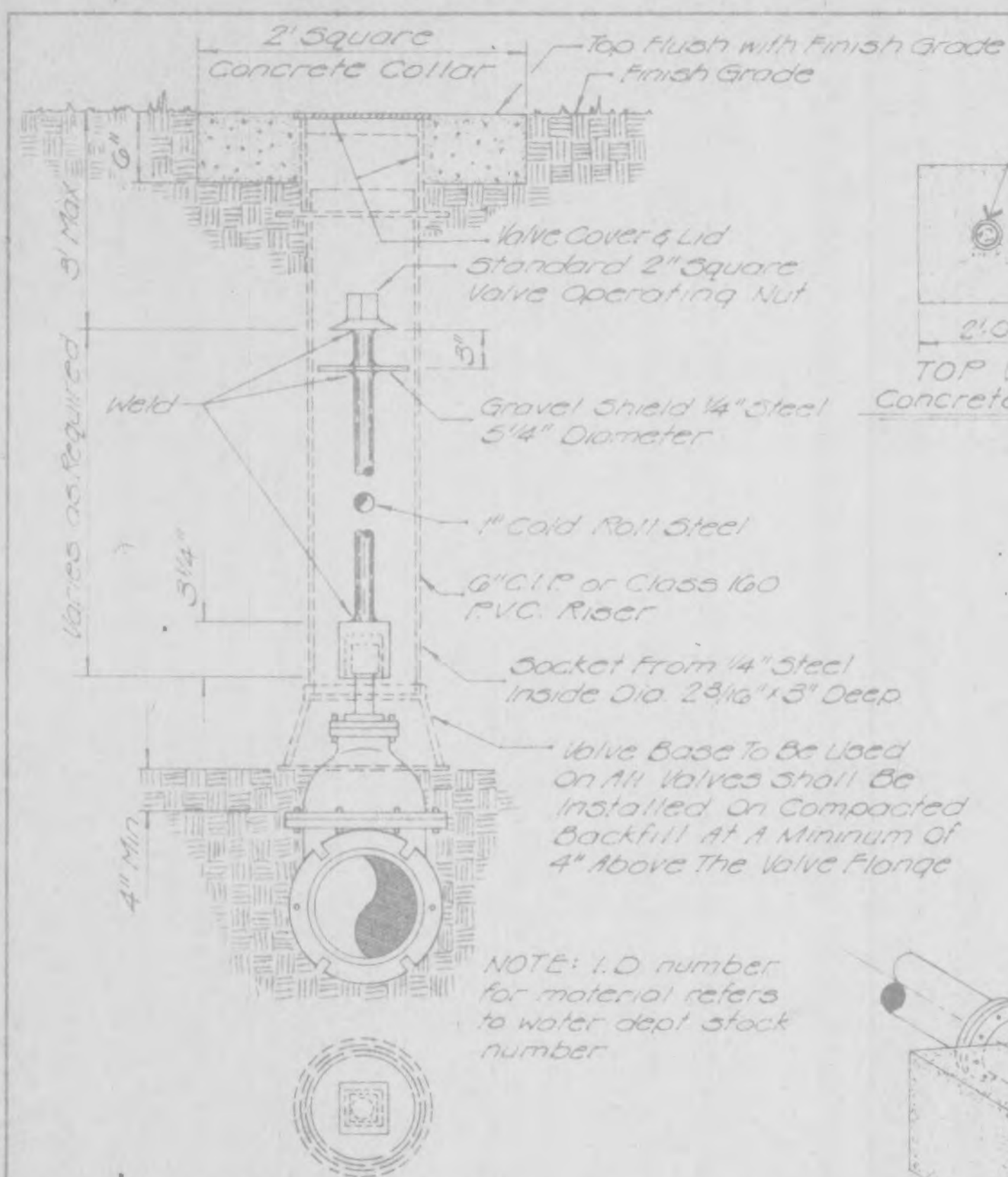
OFFICES:
SUITE 300, 4140 MAINWAY OFFICE CENTER
4210 JOHNSON DRIVE, WARREN, MISSOURI 64090
1100 CITY CENTER SQUARE
1100 MAIN / KANSAS CITY / MISSOURI 64105
SUITE 124, 1815 WEST PLAZA
6100 CORPORATE DRIVE, KANSAS CITY, MISSOURI 64120

SANITARY SEWER DETAILS

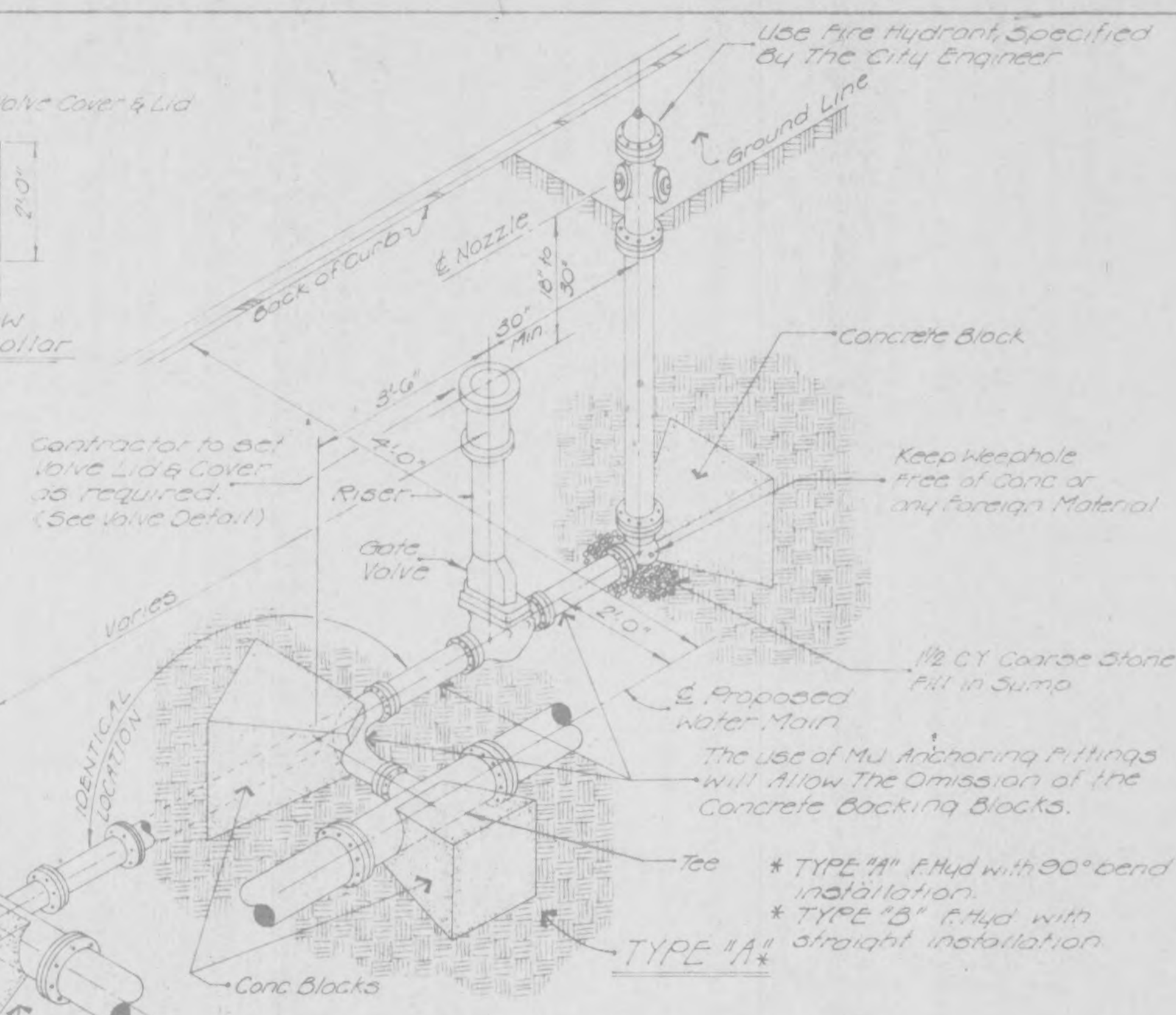
DESIGNED BY GRH DRAWN BY JG CHECKED BY GRH

JOB NO. G803
DATE June 1993
SCALE As Shown
SHEET NO. 8 OF 9

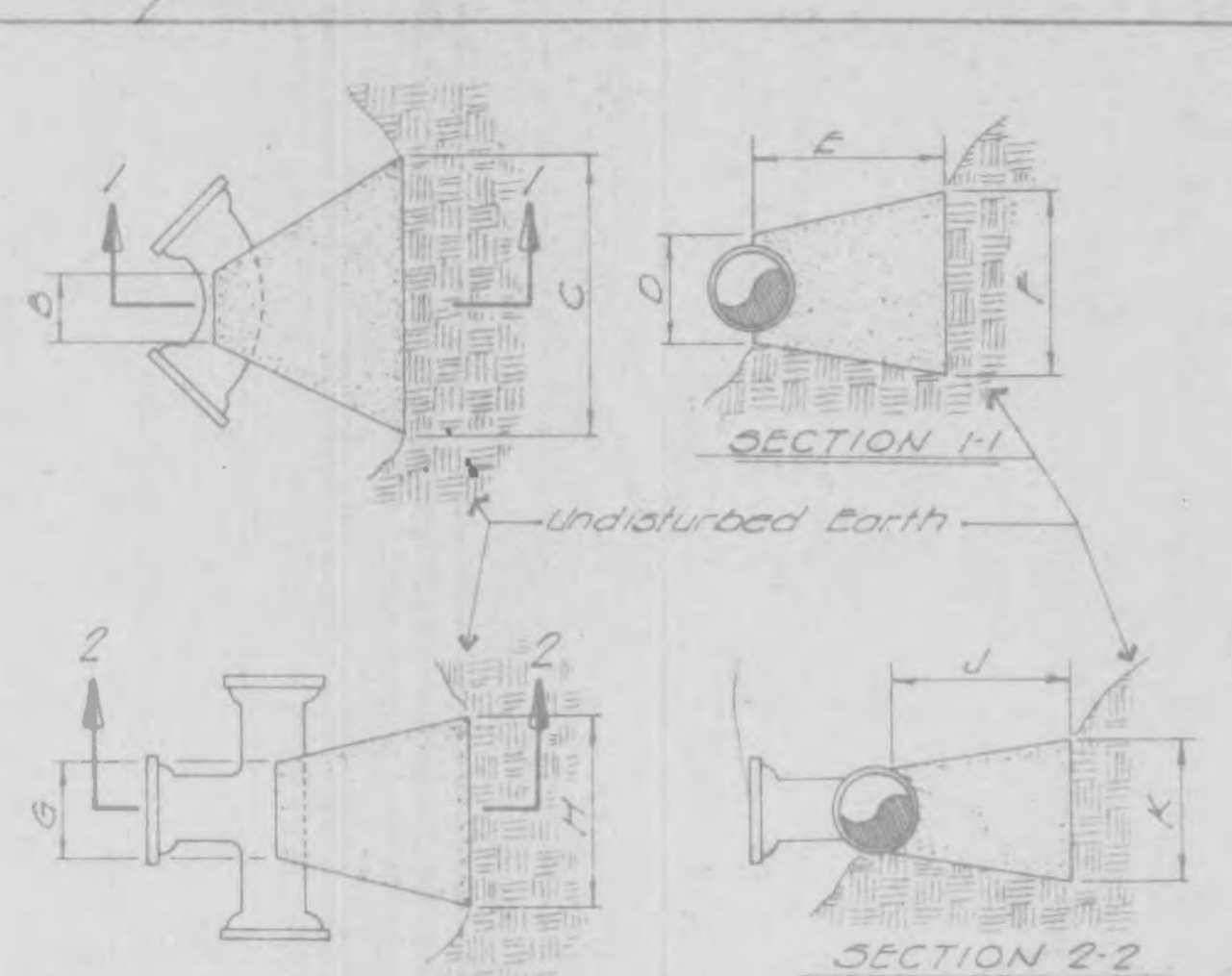
AS-BUILT - J.G. - 5/23/94



WATER VALVE DETAIL



FIRE HYDRANT DETAIL



	B	C	D	E	F
6" x 1 1/4"	8"	15"	12"	24"	10"
6" x 2 1/2"	8"	15"	12"	24"	15"
6" x 4"	8"	30"	12"	24"	14"
6" x 6"	8"	30"	12"	24"	21"
8" x 1 1/4"	8"	20"	12"	24"	10"
8" x 2 1/2"	8"	22"	12"	24"	11"
8" x 4"	8"	30"	12"	24"	24"
8" x 6"	8"	35"	12"	24"	36"
12" x 1 1/4"	8"	30"	12"	24"	15"
12" x 2 1/2"	8"	35"	12"	24"	25"
12" x 4"	8"	40"	12"	24"	40"
12" x 6"	8"	60"	12"	24"	52"

	G	H	J	K
6" x 6" x 6"	12"	24"	24"	8"
6" x 8" x 6"	12"	24"	24"	18"
6" x 8" x 8"	12"	24"	24"	24"
8" x 8" x 8"	12"	24"	24"	18"
12" x 12" x 8"	12"	24"	24"	24"
12" x 12" x 12"	12"	30"	24"	35"

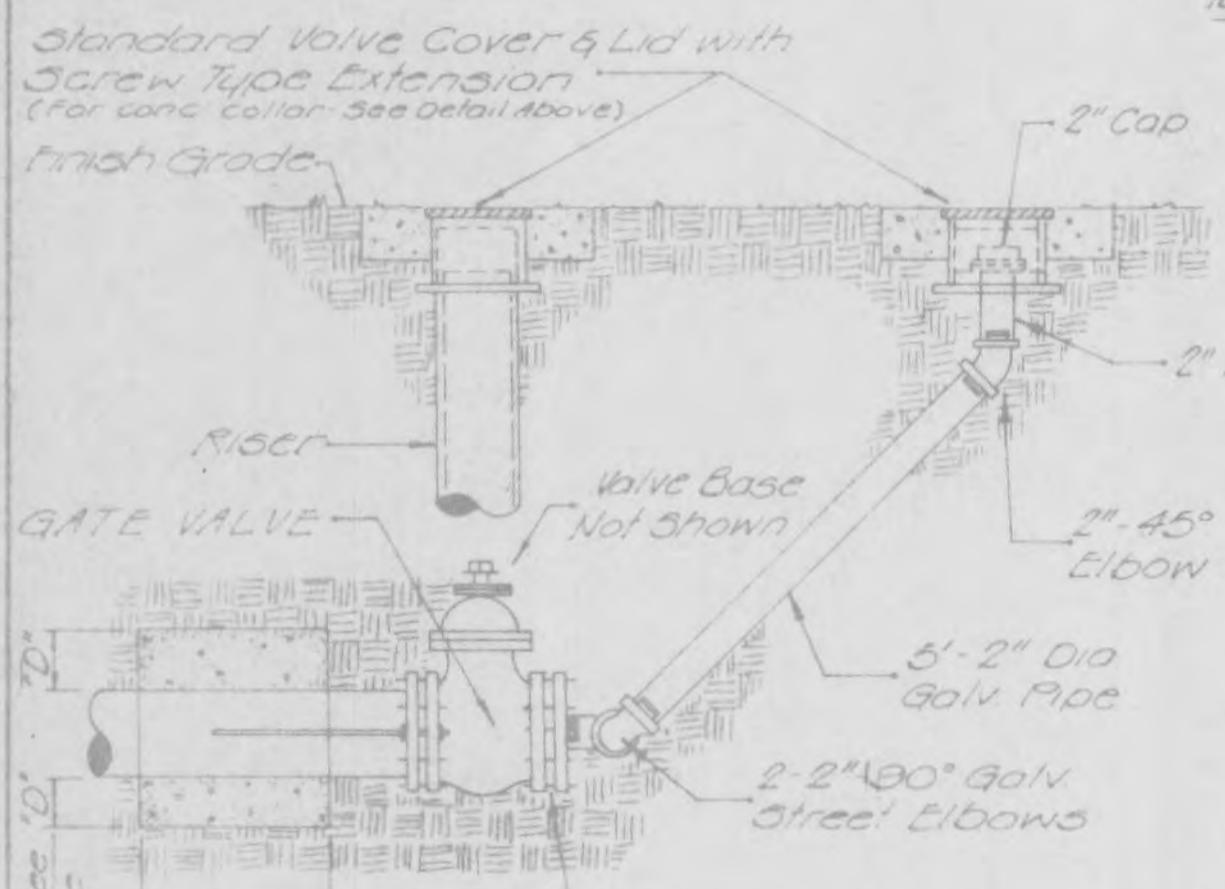
BEND	1 1/4"	2 1/2"	4"	6"
6"	1.7	2.4	3.5	3.5
8"	2.1	3.1	5.0	5.5
12"	3.7	5.9	9.7	17.5

	6"	8"	12"	PLUG
6"	4.0	~	~	4.0
8"	4.0	5.0	~	5.0
12"	4.9	5.5	10.5	10.5

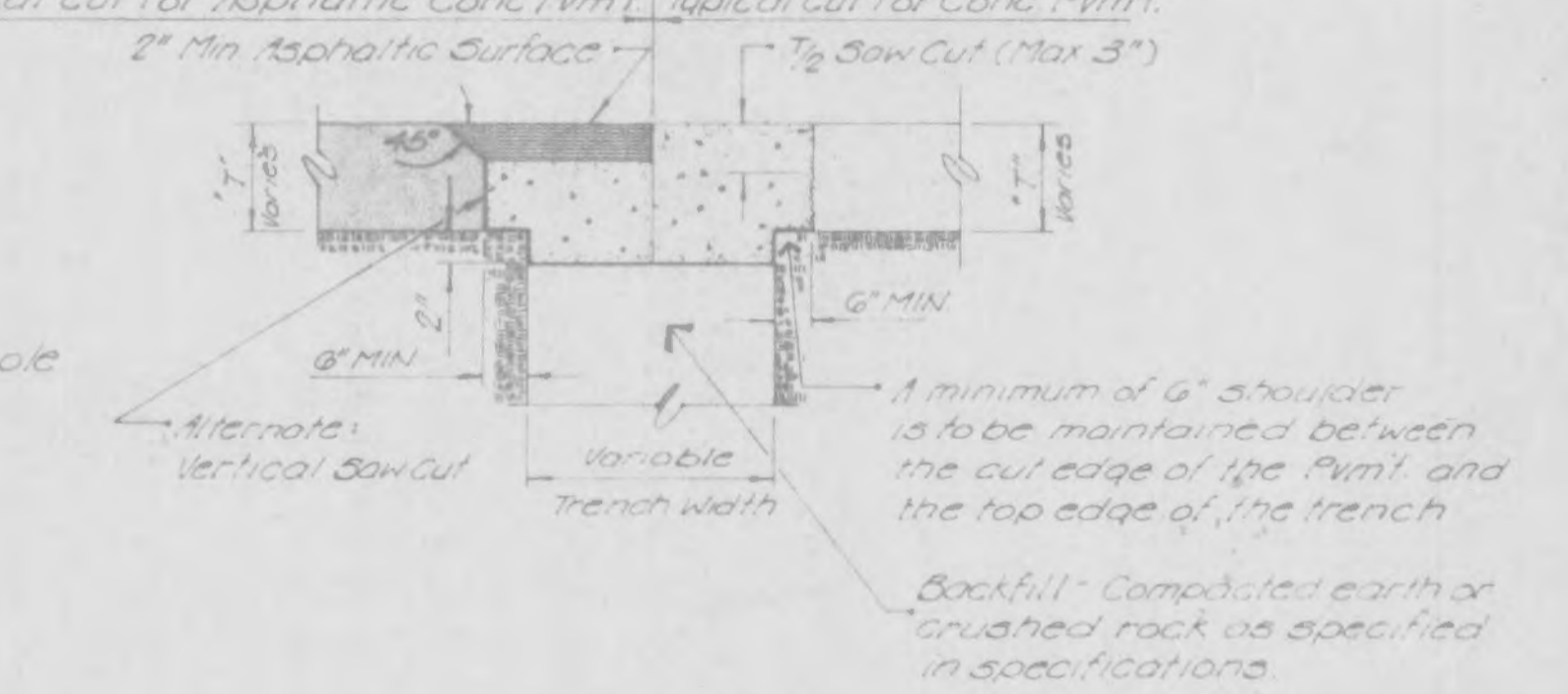
NOTES:
 1. 2" x 4" FITTINGS EQUIVALENT TO 6" FITTINGS
 2. TAPPING SLEEVES TO HAVE BACKING BLOCKS SAME SIZE AS REQUIRED FOR TEES.

GENERAL NOTES:

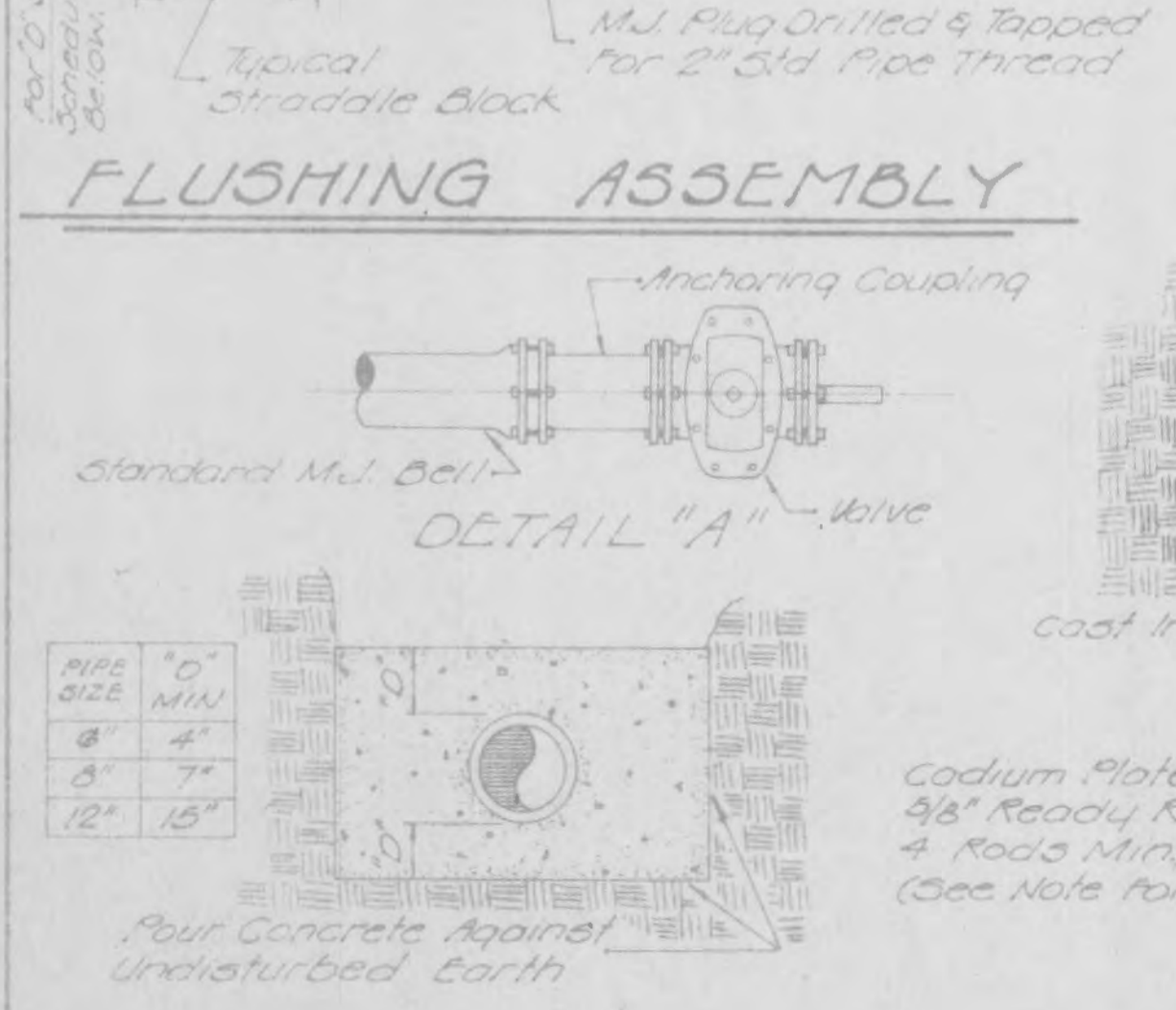
BACKING BLOCKS



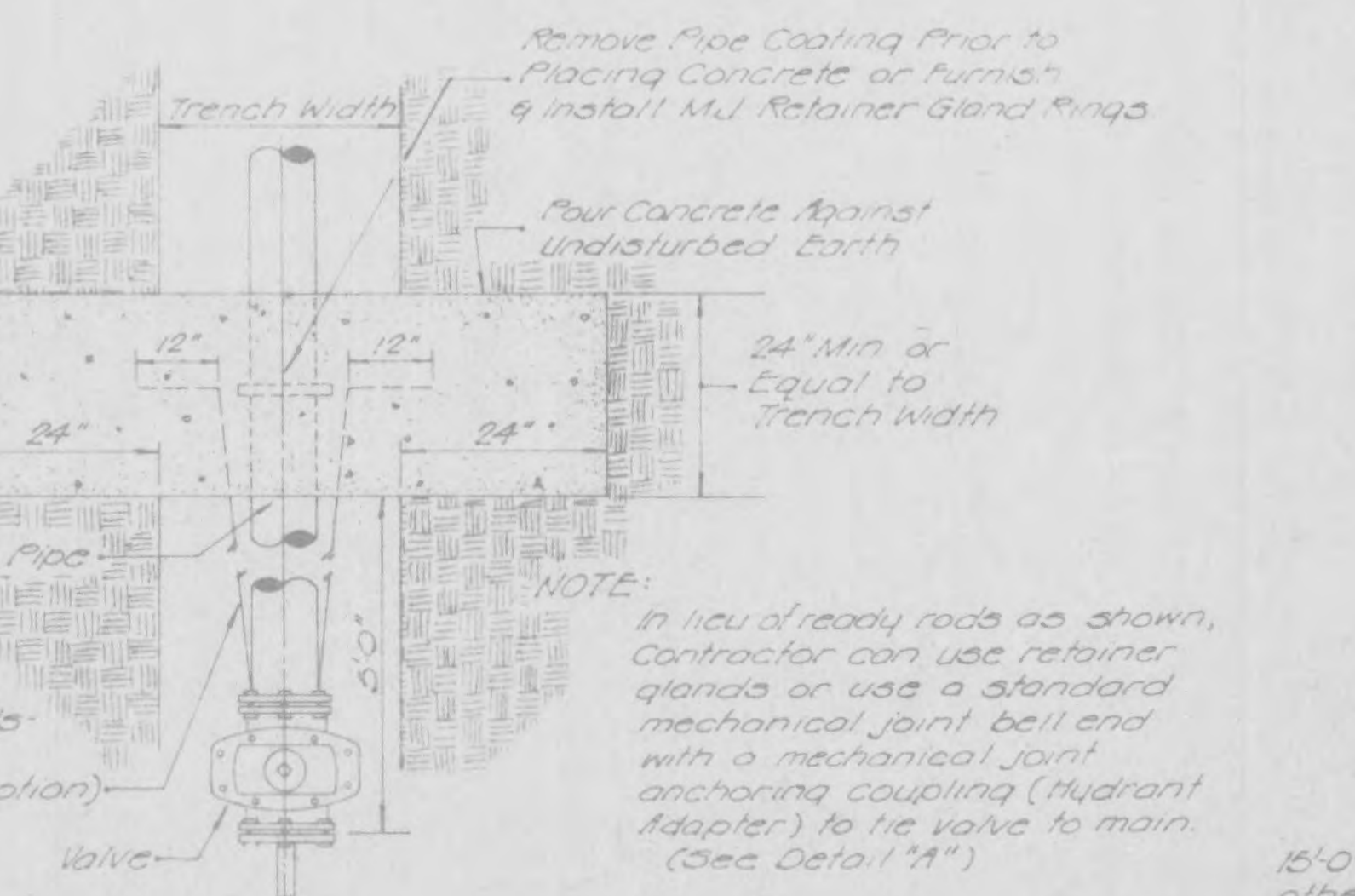
FLUSHING ASSEMBLY



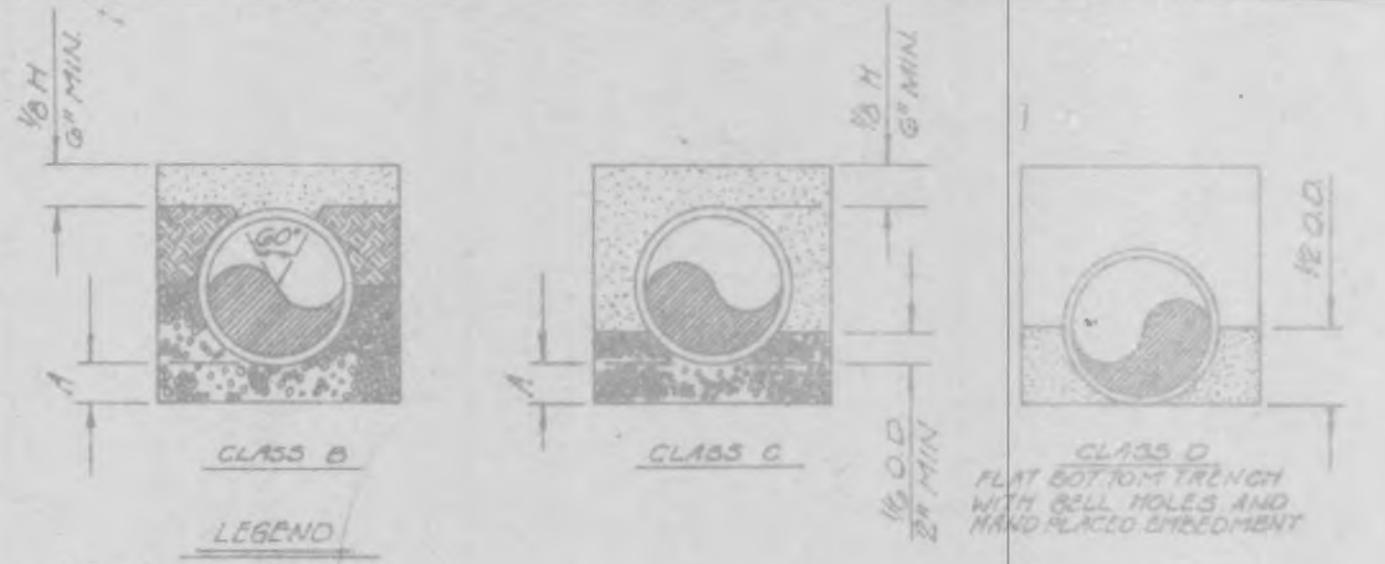
PAVEMENT REPAIR DETAIL



STRADDLE BLOCK DETAIL



TUNNEL LINER DETAIL



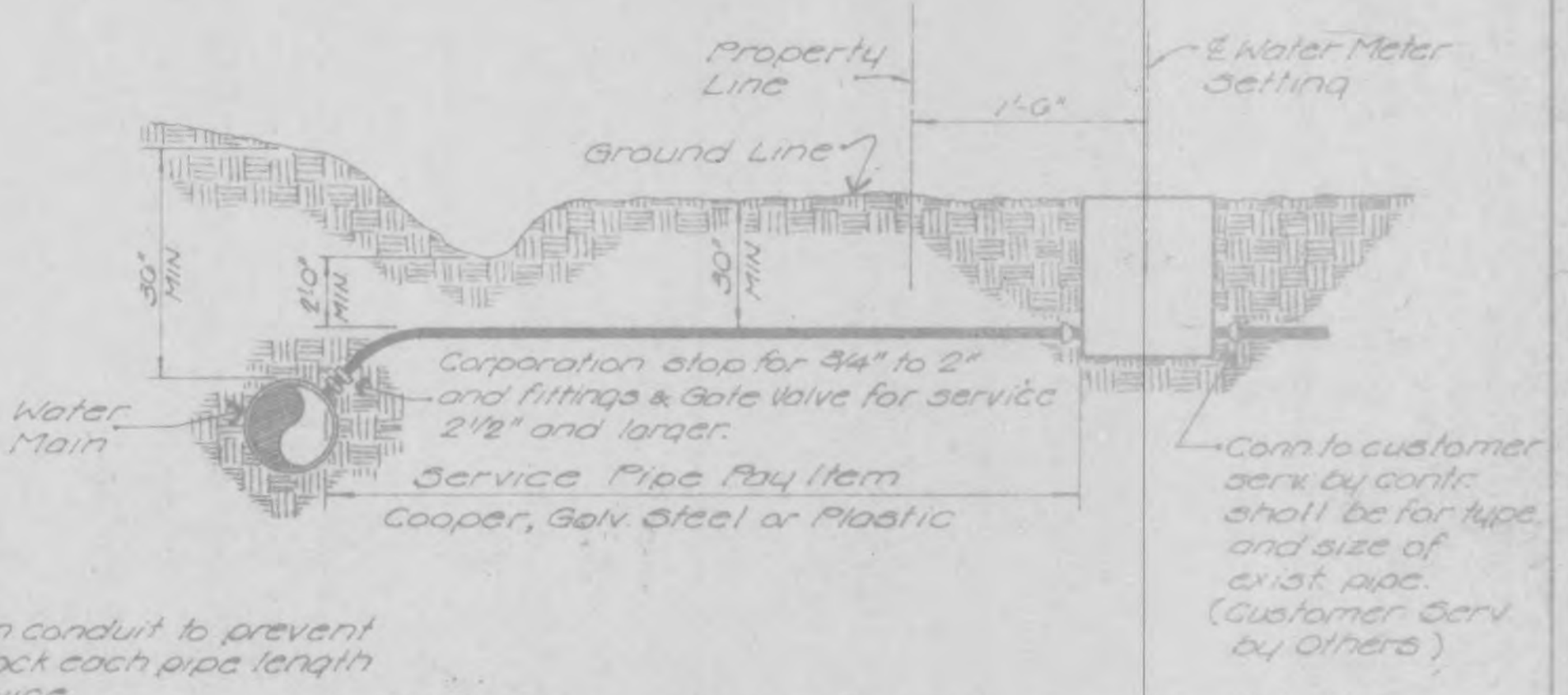
LEGEND:
 I.D. - NOMINAL PIPE SIZE
 O.D. - OUTSIDE DIAMETER OF PIPE
 H - COVER ABOVE TOP OF PIPE
 A - EMBEDMENT BELOW PIPE (SEE TABLE)

	1	2
MIN. SOIL	3"	6"
MIN. ROCK	3"	6"

27" & SMALLER 3" 6"

NOTES:
 Granular Bedding shall be crushed rock or pea gravel with not less than 95% passing 1/2" (95% passing 3/4" for 30" and larger pipe) and not less than 95% retained on a #4; to be placed in not more than 6" layers and compacted by slicing with a shovel or vibrating.
 Compacted Backfill shall be finely divided job excavated material free from debris, organic material and stones, placed in uniform layers not more than 6" thick, compacted to 95% maximum density as determined by A.S.T. D698, or graded aggregate. Granular backfill material may be substituted for all or part of compacted backfill.
 Tamped Backfill shall be finely divided job excavated material free from debris, organic material and stones, placed in uniform layers not more than 8" thick and tamped around conduit pipe. Granular backfill material may be substituted for all or part of tamped backfill.
 Trench Backfill shall be as required in the "Laying and Backfill" Section of the Detailed Specifications.
 Embedment: The type of embedment to be used shall be as specified in the plans and specifications.

WATER MAIN EMBEDMENT



TYPICAL SERVICE ASSEMBLY

GBA
 GEORGE BUTLER ASSOCIATES
 CONSULTING ENGINEERS ARCHITECTS
 LANDSCAPE ARCHITECTS-PLANNERS

OFFICES:
 9476 26th PAVYWAY OFFICE CENTER
 4210 JOHNSON DRIVE / SHAWNEE WICHITA / KANSAS 67308
 1100 CITY CENTER SQUARE
 1100 MAIN / KANSAS CITY / MISSOURI 64108
 9476 134 LAURENCE PLAZA A
 6470 CORPORATE DRIVE / KANSAS CITY / MISSOURI 64120

WATER MAIN DETAILS

DESIGNED BY: [] DRAWN BY: TRYORD CHECKED BY: R.E.H.
 AS-BUILT - J.G. - 5/23/94

JOB NO. 6803
 DATE: JUNE 1993
 SCALE: NOT TO SCALE
 SHEET NO. 9 OF 9