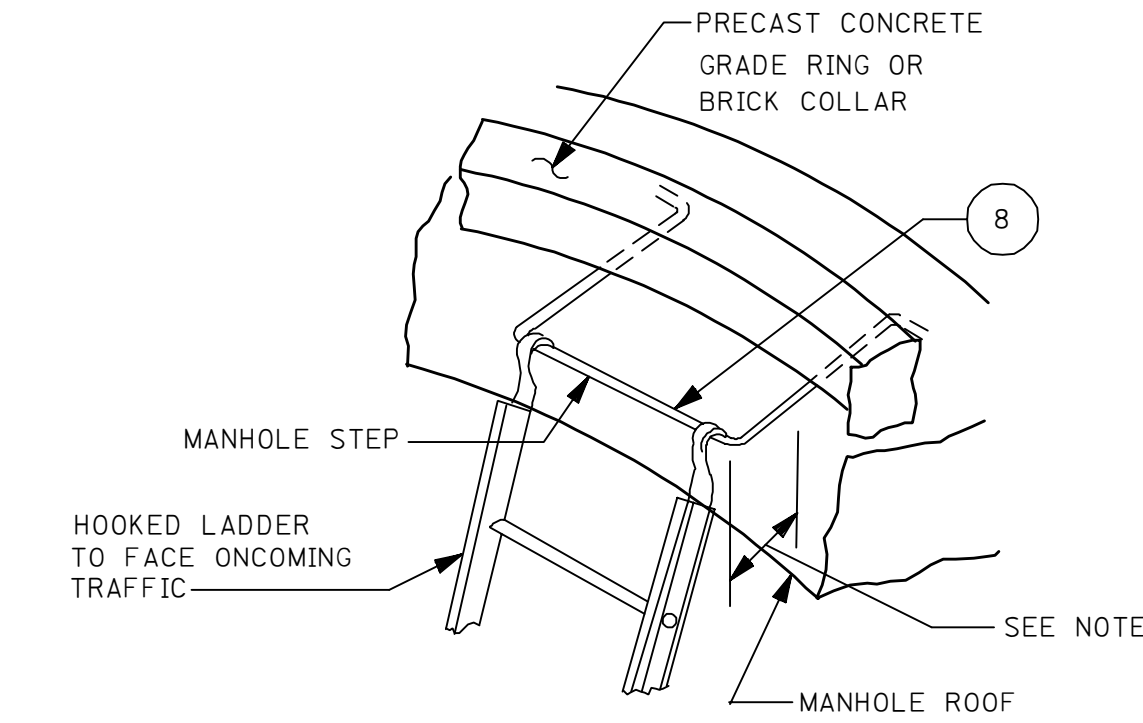
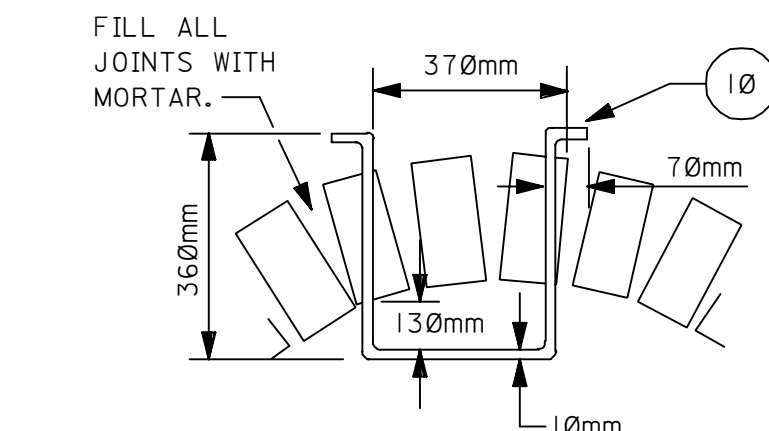




NOTE:  
EXTEND STEP 130mm INTO MANHOLE OPENING

LOCATING MANHOLE STEP IN GRADE RING OR BRICK COLLAR



NOTE:  
10mm ( 3/8 ") ROUND STEEL BAR  
STEPS SHALL BE SET SO THAT LEGS EXTEND  
THROUGH BRICKWORK OR GRADE RINGS.

MANHOLE STEPS

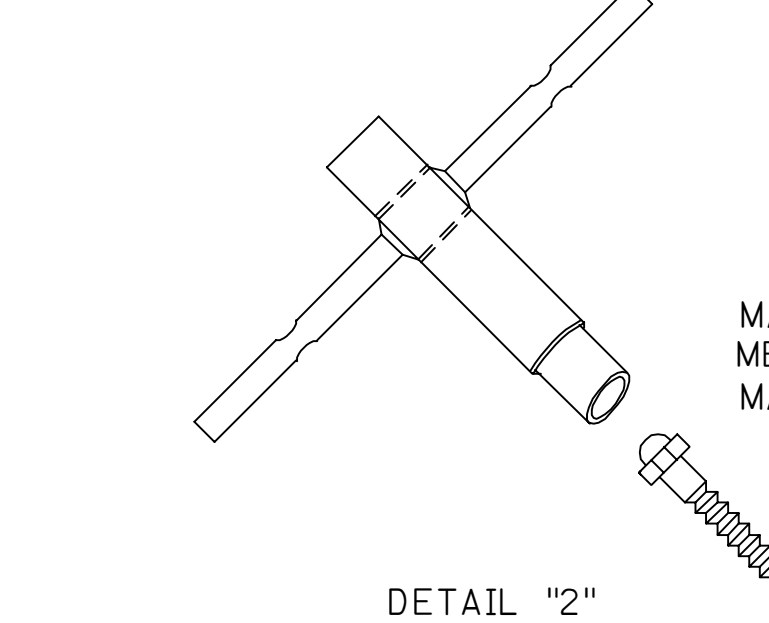
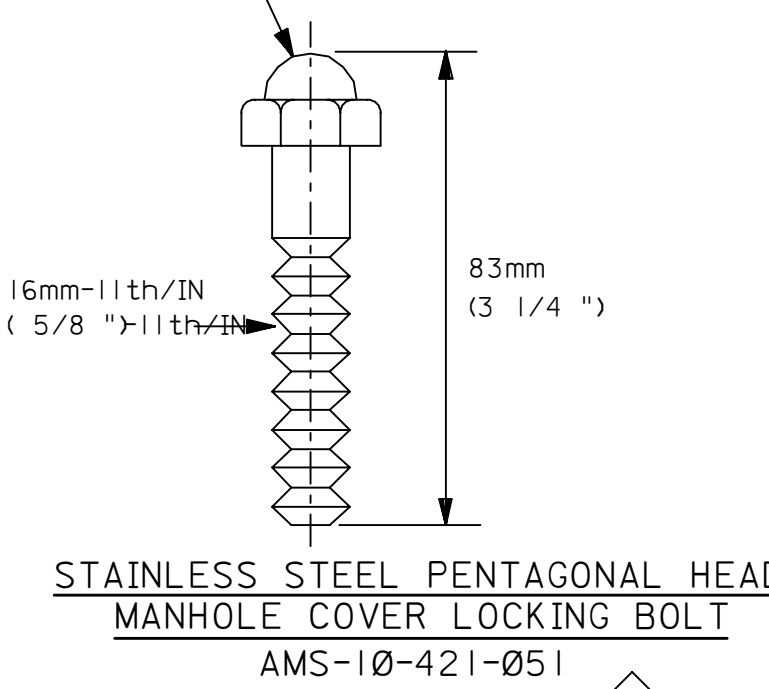
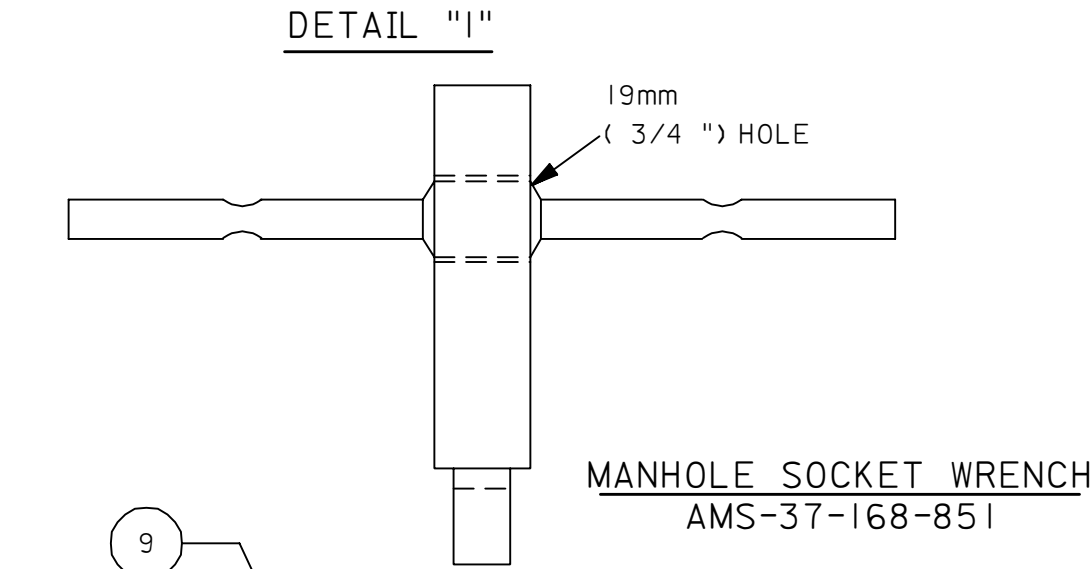
INSTALLATION OF LADDERS AND STEPS

GALVANIZED STEEL MANHOLE LADDERS SHALL BE PLACED IN ALL NEWLY CONSTRUCTED MANHOLES HAVING A HEADROOM EXCEEDING SEVEN FEET. THE LENGTH OF LADDER WILL BE IN ACCORDANCE WITH THE LIST GIVEN BELOW. PLACEMENT OF LADDERS SHALL IN NO WAY ELIMINATE THE NEED FOR PERMANENT MANHOLE STEPS IN THE NECK.

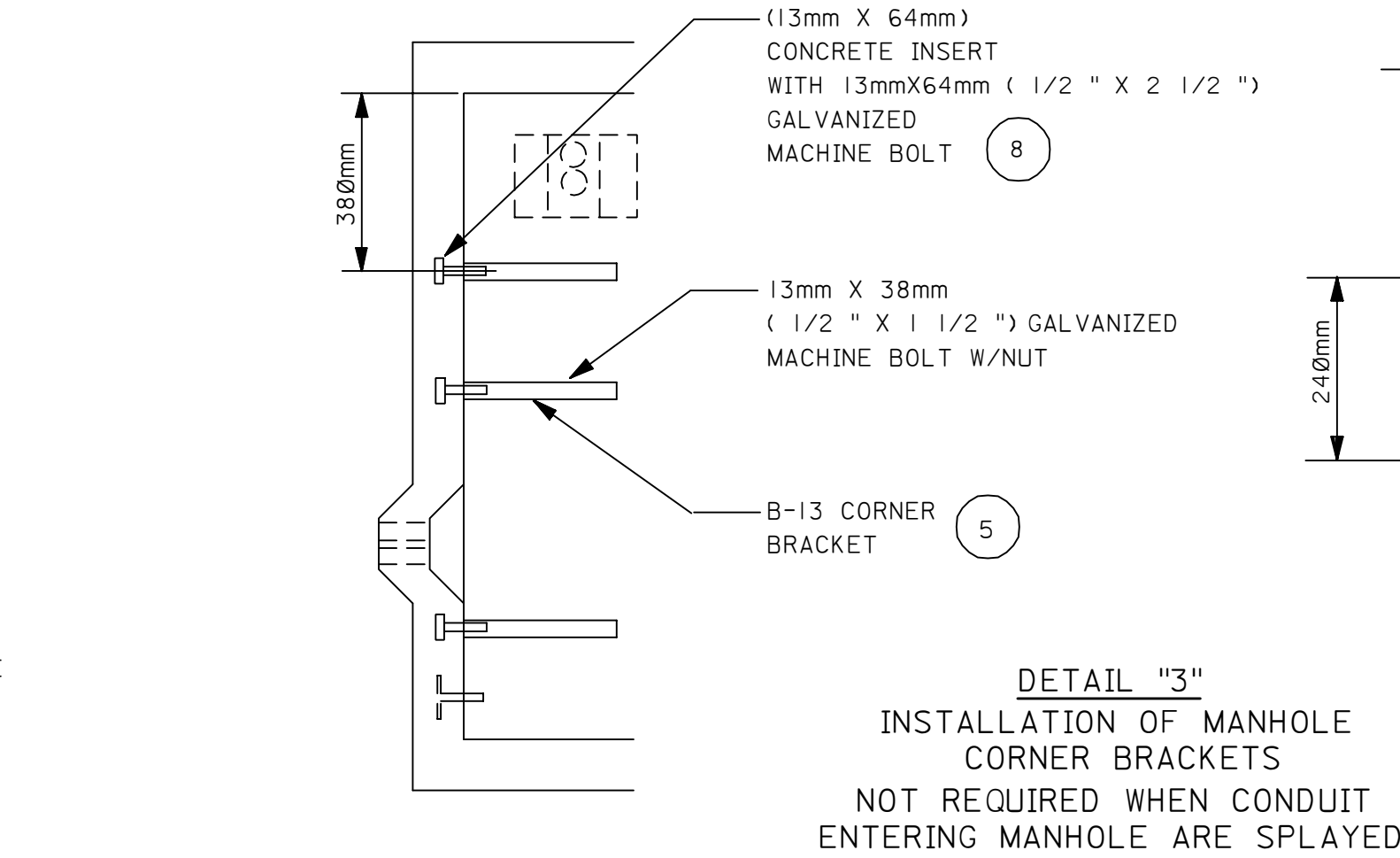
LADDERS WITH HOOKED ENDS ARE USED IN THE DEEPER MANHOLES TO PROVIDE GREATER SECURITY FOR THE LADDER. A MANHOLE STEP SHALL BE SET IN THE ROOF OPENING OF ALL MANHOLES HAVING HEADROOM DEPTHS GREATER THAN 2700mm (9 FEET) TO PROVIDE A SUPPORT FOR THE LADDER.

| MANHOLE HEADROOM                   | LADDER LENGTH   |
|------------------------------------|-----------------|
| 2300mm TO 2700mm (7 1/2 ' TO 9')   | 3000mm (10')    |
| 2900mm TO 3300mm (9 1/2 ' TO 11')  | *3600mm (* 12') |
| 3450mm TO 3900mm (11 1/2 ' TO 13') | *4200mm (* 14') |
| 4050mm TO 4500mm (13 1/2 ' TO 15') | *4800mm (* 16') |
| 4650mm TO 5200mm (15 1/2 ' TO 17') | *5500mm (* 18') |

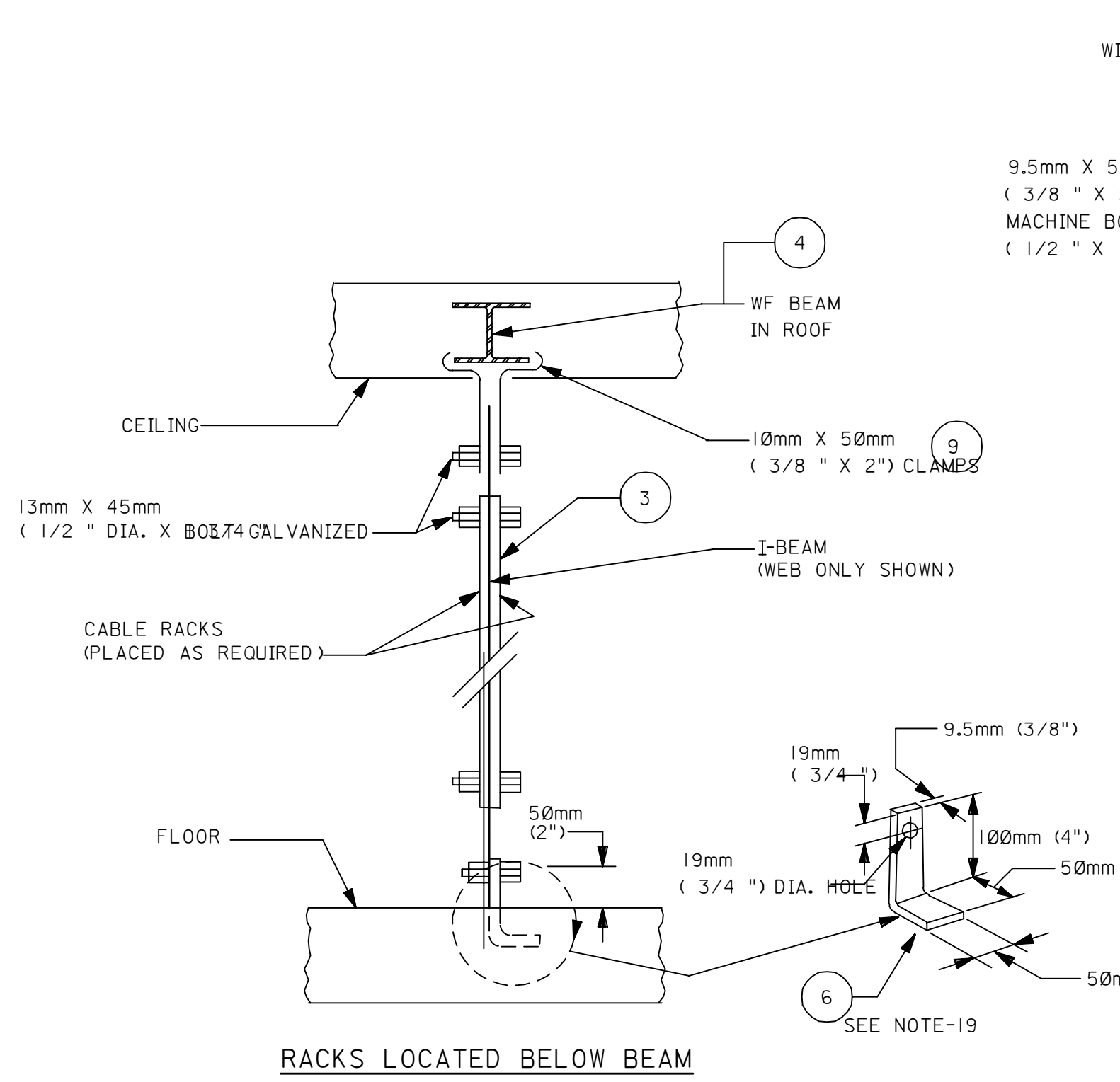
\* HOOK ENDS SHALL BE PROVIDED FOR THESE LENGTHS.



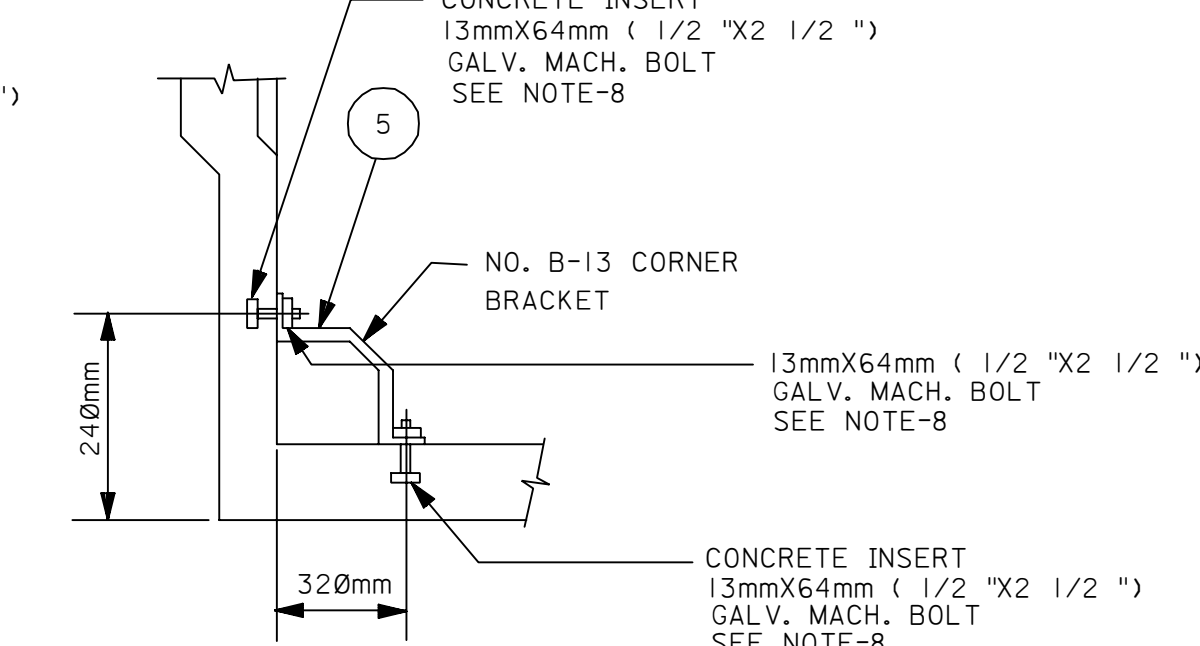
DETAIL "2"



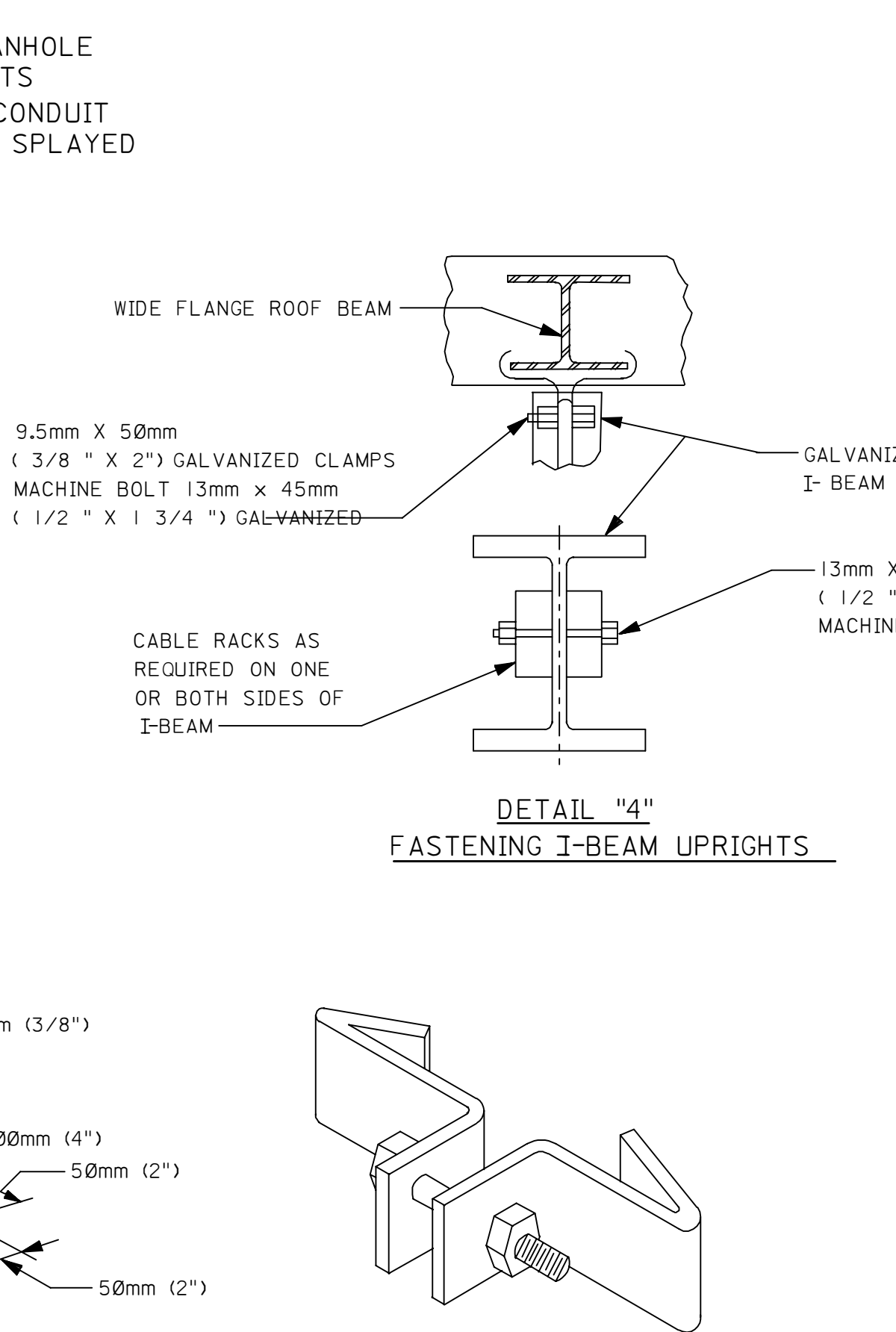
DETAIL "3"  
INSTALLATION OF MANHOLE  
CORNER BRACKETS  
NOT REQUIRED WHEN CONDUIT  
ENTERING MANHOLE ARE SPLAYED



RACKS LOCATED BELOW BEAM

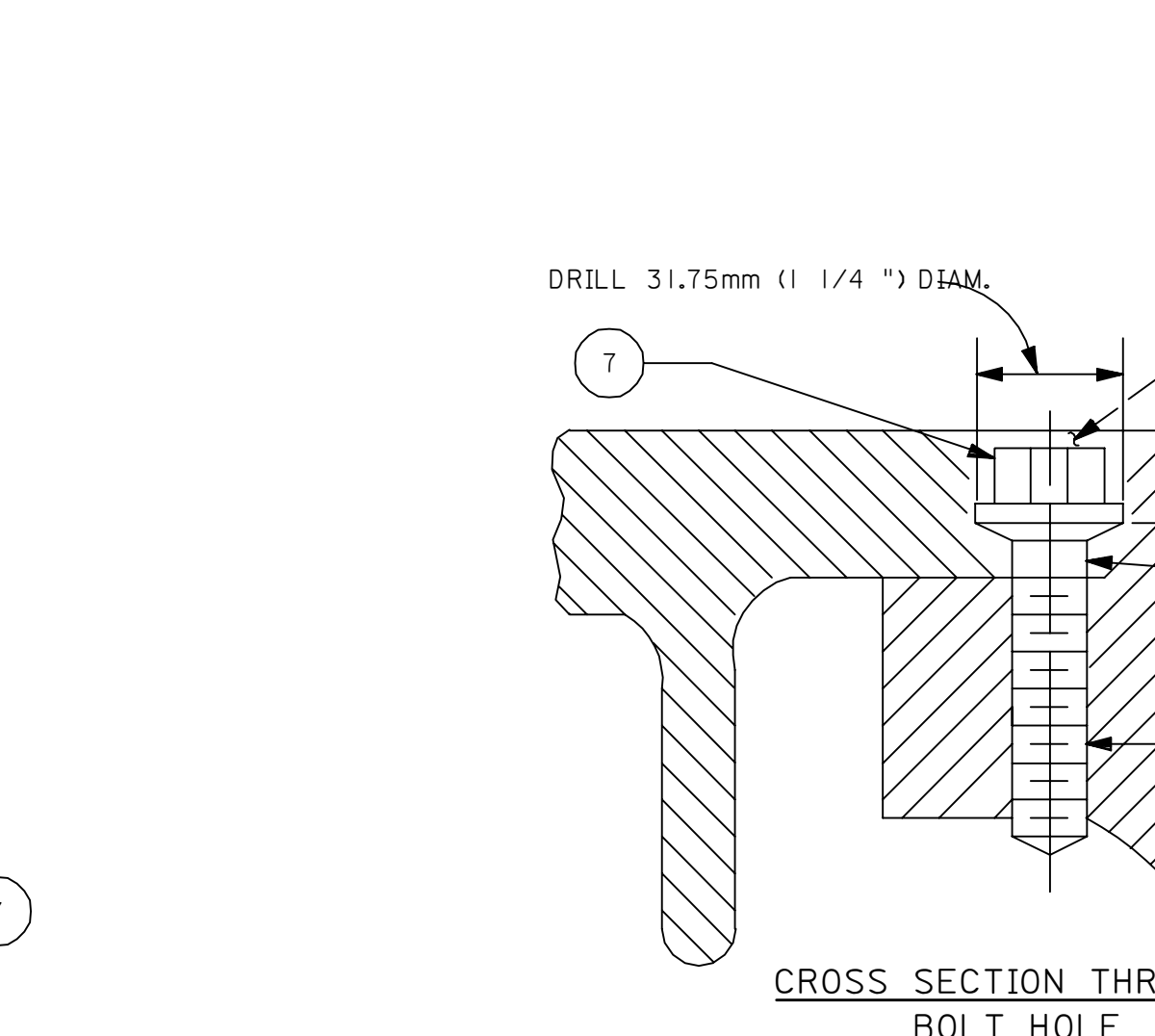


DETAIL "4"  
FASTENING I-BEAM UPRIGHTS



I-BEAM SUPPORT CLAMPS

FOR ATTACHING DUCT SUPPORT HANGERS TO I-BEAMS FITS AROUND THE I-BEAM FASTENS SECURELY BY TIGHTENING BOLT. DUCT SUPPORT HANGER THREADS 19mm ( 3/4 ") 10 NC OR 15.9mm ( 5/8 ") 11 NC INTO THE CLAMP. MUST BE PLACED PRIOR TO POURING ROOF.



CROSS SECTION THROUGH  
BOLT HOLE

- (a) DRILL 7.2mm ( 9/32 ") PILOT HOLES EITHER BETWEEN HOOK HOLES AT C AND D, OR TO ONE SIDE OF HOOK HOLES. DRILL THESE HOLES TO INTERSECT COVER AND FRAME, AND TO PASS THROUGH FRAME SEAT.
- (b) DRILL THESE HOLES TO 13.5mm ( 17/32 ") THROUGH COVER AND FRAME SEAT. (SEE THE FOLLOWING ILLUSTRATION.
- (c) ENLARGE UPPER PORTION OF HOLES TO 20.64mm ( 13/16 ") , FOR A DEPTH SUFFICIENT TO CLEAR THE MANHOLE COVER.
- (d) TAP 13.5mm ( 17/32 ") HOLES FOR 15.88mm ( 5/8 ") 11 U.N.C. - 2B.
- (e) DRILL A 31.75mm ( 1 1/4 ") DIAMETER HOLE TO DEPTH OF 19mm ( 3/4 ")

METHOD OF INSTALLING  
LOCKING BOLT IN MANHOLE COVERS  
FOR "B" FRAMES AND COVERS

ALL DETAILS ON THIS SHEET REFER TO ACS-T-622-500-204

| MATERIAL LIST   |                                                    | TYPE OF MANHOLE AND AMOUNT OF MATERIAL                    |            |            |            |            |            |            | WIDE RECTANGULAR DIVIDED WALLS                           | AMS STOCK NUMBERS                          |
|-----------------|----------------------------------------------------|-----------------------------------------------------------|------------|------------|------------|------------|------------|------------|----------------------------------------------------------|--------------------------------------------|
| KEY DRAWING No. | ITEM                                               | V                                                         | MODIFIED V | J-3        | J-4        | T          | L          |            |                                                          |                                            |
| 1               | BAR DEFORMED ROUND #4 ( 1/2 ")                     | 114 METRES                                                | 124 METRES | 165 METRES | 165 METRES | 165 METRES | 169 METRES | 107 METRES |                                                          | 12-720-560                                 |
| 2               | BAR DEFORMED ROUND #5 ( 3/4 ")                     | 442 METRES                                                | 541 METRES | 150 METRES | 150 METRES | 150 METRES | 154 METRES | 395 METRES |                                                          | 12-720-565                                 |
| 3               | 76MM 3" - 7.50 LB/FT I-BEAM                        | 3                                                         | 3          | —          | —          | —          | —          | 3          |                                                          | 12-422-409                                 |
| 4               | BEAM WIDE FLANGE                                   | 1                                                         | 1          | —          | —          | —          | 1          | 1          |                                                          | 12-425-751 (8"x8")<br>12-425-772 (10"x10") |
| 5               | SUPPORT, CENTRAL RACKS. 2 PER RACK SEE NOTE-17     | —                                                         | —          | 12         | 8          | 8          | 12         | 32         |                                                          | DIRECT CHARGE                              |
| 6               | SUPPORT, CENTRAL RACKS. 2 PER RACK SEE NOTE-19     | 6                                                         | 6          | —          | —          | —          | —          | 6          |                                                          | 12-413-091                                 |
| 7               | LOCKING BOLT, MACHINE 5/8 " - 3 1/4 " COVER        | 4                                                         | 2          | 2          | 2          | 2          | 2          | 4          |                                                          | 10-421-051                                 |
| 8               | 10MM ( 3/8 ") ROUND HOT GALVANIZED STEEL BAR       | 8'                                                        | 8'         | —          | —          | —          | —          | 8'         |                                                          | 12-337-323                                 |
| 9               | I-BEAM SUPPORT CLAMP SEE NOTE-18                   | 3                                                         | 3          | —          | —          | —          | —          | —          |                                                          | DIRECT CHARGE                              |
| SEE NOTE "8"    | FEAME & COVER TYPE "B"                             | 2                                                         | 2          | 1          | 1          | 1          | 1          | 2          |                                                          | 18-036-510                                 |
|                 | RACKS, CABLE 14 HOLES 600mm LONG                   | 68                                                        | 52         | 22         | 20         | 20         | 20         | 64         |                                                          | 14-239-566                                 |
|                 | SUPPORT, CABLE RACK TYPE "S"                       | 136                                                       | 80         | 32         | 32         | 32         | 36         | 48         |                                                          | 18-065-180                                 |
|                 | BOLT, MACHINE 13mm X 64mm ( 1/2 " X 2 1/2 ")       | 88                                                        | 80         | 50         | 44         | 44         | 54         | 48         |                                                          | 14-489-208                                 |
|                 | BOLT, MACHINE GAL 12.9mm X 45mm ( 1/2 " X 1 3/4 ") | 122                                                       | 104        | 32         | 32         | 32         | 46         | 128        |                                                          | 14-489-253                                 |
|                 | WASHERS ROUND FLAT 13mm ( 1/2 ") BOLT              | 22                                                        | 104        | 32         | 32         | 32         | 46         | 128        |                                                          | 14-654-414                                 |
|                 | INSERTS, CONCRETE 13mm X 51mm ( 1/2 " X 2")        | 94                                                        | 86         | 32         | 32         | 32         | 36         | 48         |                                                          | 09-248-130                                 |
|                 | TERMINATORS, DUCT                                  | DEPENDS ON CONDUIT CONFIGURATION ON CONSTRUCTION DRAWINGS |            |            |            |            |            |            | 2 WAY-15-350-025<br>3 WAY-15-350-030<br>4 WAY 15-350-035 |                                            |
|                 | HOOKS, CABLE RACK 254mm LONG                       | 17                                                        | 13         | 11         | 10         | 10         | 12         | 16         |                                                          | 14-239-605                                 |
|                 | PIPE, SEWER 8" DIA 300CM LONG                      | 1                                                         | 1          | 1          | 1          | 1          | 1          | 1          |                                                          | 01-504-533                                 |
|                 | WIRE, TIE "16 GA 4.5 METRES PER ROLL               | A                                                         | A          | A          | A          | A          | A          | A          |                                                          | 12-830-500                                 |
|                 | BRAID, GROUNDING                                   | 3 ROLLS                                                   | 3 ROLLS    | 2 ROLLS    | 2 ROLLS    | 2 ROLLS    | 2 ROLLS    | 4 ROLLS    |                                                          | 18-012-435                                 |
|                 | CLAMP, GROUND WIRE                                 | 2                                                         | 2          | 2          | 2          | 2          | 2          | 2          |                                                          | 18-020-990                                 |

NOTES

- CONSTRUCTION DETAILS FOR "COMMUNICATION SPECIAL MANHOLES" IN NON-HAZARDOUS AREAS ONLY.
- PRIOR TO CONSTRUCTION ALL PERMITS REQUIRED BY ARAMCO GENERAL INSTRUCTION 2.100 SHALL BE OBTAINED AND MADE READILY AVAILABLE.
- ALL UNDERGROUND SUBSTRUCTURES SHALL BE LOCATED AND MARKED IN THE FIELD PRIOR TO STARTING CONSTRUCTION.
- READY MIX CONCRETE OF THE GRADE SPECIFIED IN ARAMCO ENGINEERING STANDARD AES-M-126 SHALL BE USED.
- DEFORMED BARS (RE-BAR) USED IN REINFORCEMENT SHALL BE FREE OF RUST AND CORROSION, AND CONFORM TO ASTM-615.
- NO HEAT SHALL BE APPLIED TO RE-BAR FOR FIELD BENDING.
- IF TWO SHORT SECTIONS OF DEFORMED BARS ARE USED IN LIEU OF ONE LONG SECTION, THE TWO SHORT SECTIONS SHALL OVER LAP 30 TIMES THE BAR DIAMETER, AND BE TIED SECURLY WITH #16 GAUGE SOFT ANNEALED STEEL WIRE.
- THIS DRAWING DETAILS ADDITIONAL EQUIPMENT REQUIRED IN "COMMUNICATION SPECIAL MANHOLES", ARAMCO STANDARD DRAWING AA-0363794 #1 DETAILS REQUIRED EQUIPMENT IN ALL MANHOLES.
- SEE DETAIL "1" FOR RECESS DETAIL SHEET "2.
- WIDE FLANGE BEAMS DESCRIBED IN 12-AMSS-5 SHALL BE USED IN ROOFS OF V, MODIFIED V, AND CENTER RACK MANHOLES AS DESCRIBED IN ACS-T-622-500-202.
- I-BEAMS FOR CENTER RACKS MANHOLES SHOWN IN DETAIL "4" SHEET "1.
- CORNER RACKS SHALL BE USED WHEN CONDUITS ENTER CENTER OF THE END WALLS, CORNER RACKS ARE SHOWN IN DETAIL "3" SHEET "1.
- METHOD AND PLACING OF MANHOLE COVER LOCKING BOLTS IS SHOWN IN DETAIL "2" SHEET "1.
- LADDER REQUIREMENTS ARE SHOWN IN DETAIL "1" SHEET "1.
- MATERIAL REQUIREMENTS ON J-3, J-4, T-L MANHOLES ARE ESTIMATED BASED UPON A HEADROOM OF 1.7 METRES. A HEADROOM GREATER THAN 1.7 METRES REQUIRES THAT THE MATERIAL LIST BE ADJUSTED ACCORDINGLY.
- MATERIAL REQUIREMENTS FOR TYPE V, MODIFIED V AND WIDE RECTANGULAR MANHOLES ARE ESTIMATED BASED UPON A HEADROOM OF 2.7 METRES. IF HEADROOM IS GREATER THAN 2.7 METRES IT IS REQUIRED THAT THE MATERIAL LIST BE ADJUSTED ACCORDINGLY.
- DIRECT CHARGE-CONDUX OR EQUAL SUPPORT CORNER RACK (CONDUX #3837-001) 240mmX304.8mm (9"x12") OR EQUAL.
- I-BEAM SUPPORT CLAMP (CONDUX # 84097-08) FOR WIDE FLANGE BEAM 200mmX200mm (8"x8") (CONDUX 84097-10) FOR WIDE FLANGE 254mmX254mm (10"x10") SEE TABLE-1 SHEET 3 OF 4 FOR SELECTION OF WIDE FLANGE BEAM.
- FASTENING OF I-BEAM UPRIGHT TO FLOOR, REQUIRES THIS ITEM BE MADE FROM ANGLE IRON AS SHOWN IN ITEM #6.

|                                                                                                           |         |             |                      |                           |                 |       |
|-----------------------------------------------------------------------------------------------------------|---------|-------------|----------------------|---------------------------|-----------------|-------|
| 01                                                                                                        | 00      | 14          | 74                   | AA-036374                 | T               | 096   |
| REV. NO.                                                                                                  | DATE    | BY          | DESCRIPTION          | CHK'D                     | CERT.           | APP'D |
| 01                                                                                                        | 5-20-85 | MNL         | REDRAWN FOR CLARITY. |                           |                 |       |
| FOR ARABIAN AMERICAN OIL COMPANY                                                                          |         |             |                      |                           |                 |       |
| DRAWN BY <u>AB.M.S.</u> CHECKED BY <u>AB.M.S.</u> SCALE <u>N.T.S.</u>                                     |         |             |                      |                           |                 |       |
| DATE STARTED _____ DATE COMPLETED <u>25 APR 84</u>                                                        |         |             |                      |                           |                 |       |
| OPR'G DEPT. _____ ENG. DEPT. _____                                                                        |         |             |                      |                           |                 |       |
| FIRE & SAFETY _____                                                                                       |         |             |                      |                           |                 |       |
| THIS DRAWING IS NOT TO BE USED FOR<br>CONSTRUCTION OR FOR ORDERING<br>MATERIAL UNLESS CERTIFIED AND DATED |         |             |                      | CONTR. CERT<br>DATE _____ |                 |       |
| COMMUNICATION SPECIAL MANHOLES                                                                            |         |             |                      |                           |                 |       |
| DETAILS, CONSTRUCTION NOTES                                                                               |         |             |                      |                           |                 |       |
| AND LIST OF MATERIAL                                                                                      |         |             |                      |                           |                 |       |
| METRIC TYPICAL INSTALLATION DRAWING                                                                       |         |             |                      |                           |                 |       |
| TID. SAUDI ARABIA                                                                                         |         |             |                      |                           |                 |       |
| PLANT NO.                                                                                                 | INDEX   | DRAWING NO. |                      |                           | SHEET NO/REV NO |       |
| 990                                                                                                       | T       | AA-036374   |                      |                           | 001             | 01    |