



# **MAHARASHTRA NATURAL GAS LIMITED**

**(MNGL)**

**LAYING AND CONSTRUCTION OF U/G STEEL PIPELINE  
NETWORK AND ASSOCIATED WORKS FROM LNG-LCNG  
STATION ZODGE TO MALEGAON, GONDE TO IGATPURI  
AND GAIL'S SV 7 TO CGS DODI IN NASHIK GA OF MNGL.**

**UNDER OPEN DOMESTIC**

**COMPETITIVE BIDDING**

**(THROUGH E-TENDERING MODE)**

**Bid Document No.: MNGL/CP/2023-24/58  
dated 20.07.2023**

**VOLUME III OF III**

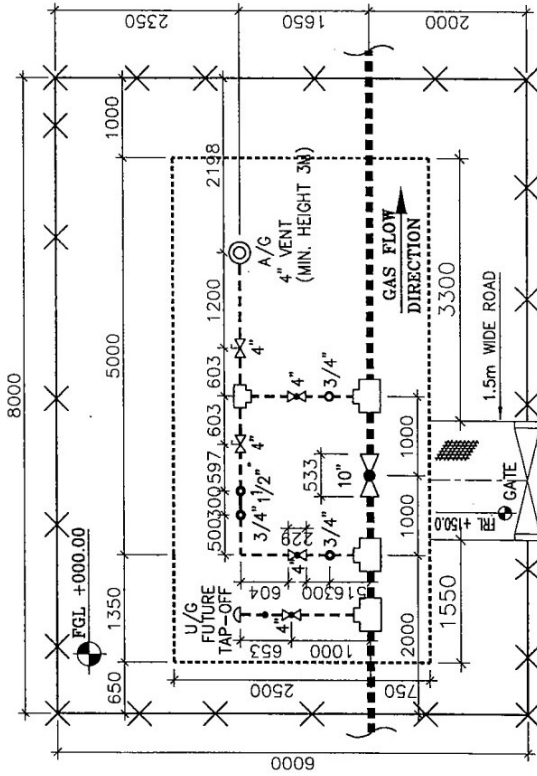
## **A) GENERAL PIPELINE & MECHANICAL DRAWINGS**

- |  |                       |
|--|-----------------------|
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| 6. Typical Detail of Marker                | - MNGL/PIng./Steel/06 |

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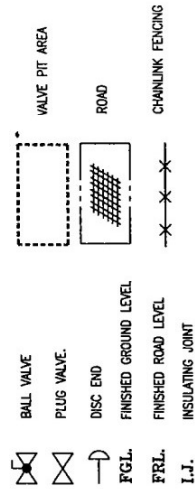
- |  |                       |
|--|-----------------------|
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| 2. Magnesium Ribbon Anode for Grounding                          | - MNGL/PIng./Steel/16 |
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20. Valve Chamber Details	
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23. Typical drawing of isolation/tap-off valve assembly	- MNGL/PIng./Steel/40



TYPE-II  
SV STATION WITH A/G VENT AND TAP-OFF  
TYP. PLOT PLAN WITH PLOT SIZE (8.0M x 6.0M)

LEGEND:

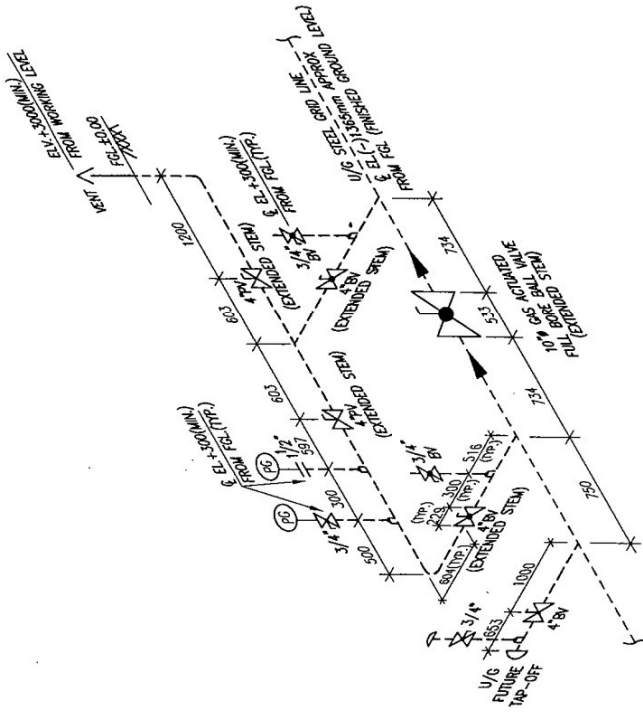


BILL OF MATERIAL

S.No.	DESCRIPTION	QTY.
1	10" BALL VALVE (EXTENDED STEM) WITH ACTUATOR	- 01 NOS.
2	4" BALL VALVE (EXTENDED STEM)	- 02 NOS.
3	4" PLUG VALVE (EXTENDED STEM)	- 02 NOS.
4	4" BALL VALVE	- 01 NOS.
5	3/4" BALL VALVE	- 04 NOS.
6	BARRER TEE 10"x10"x4"	- 03 NOS.
7	TEE 4"x4"x4"	- 01 NOS.
8	ELBOW (1.5D) 4"	- 01 NOS.

NOTES:

1. ALL DIMENSIONS ARE IN MM, UNLESS OTHERWISE MENTIONED.
2. FINISHED GROUND LEVEL +0.00 CORRESPONDS TO THE TOP OF THE NEAREST EXISTING ROAD LEVEL.
3. LOCATION OF GATE SHOWN ABOVE ARE OF INDICATIVE ONLY, HOWEVER FIRM LOCATION OF GATE SHALL BE DECIDED AS PER SITE CONDITION.



TYPICAL ISOMETRIC DETAIL OF  
SECTIONALISING VALVE (TYPE-II)

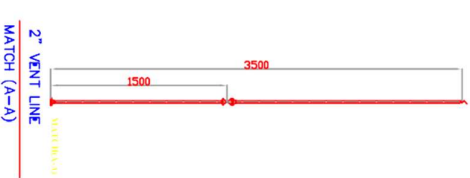
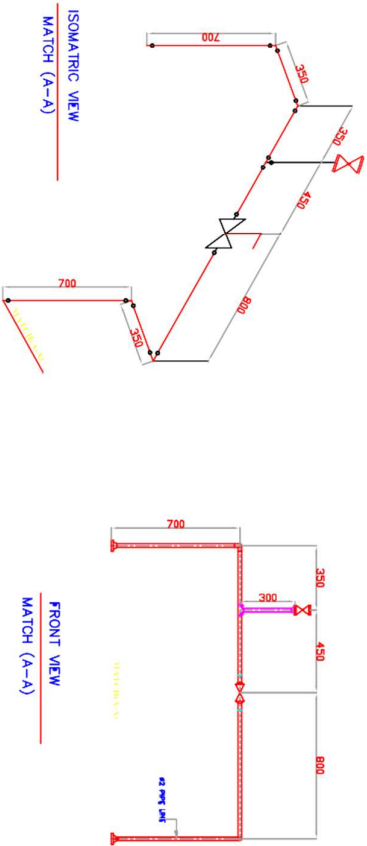
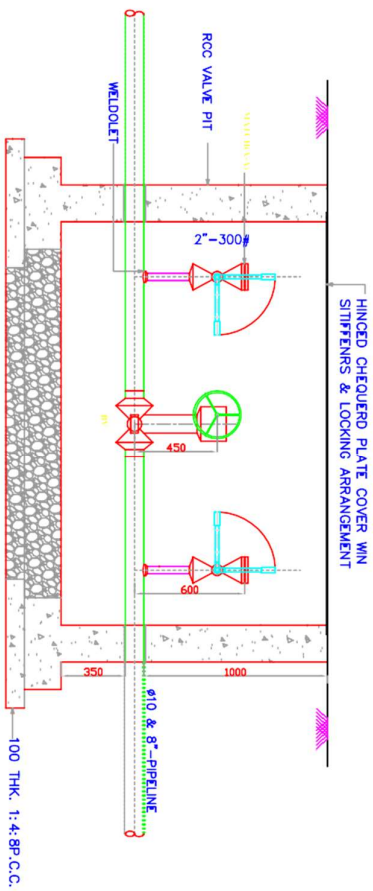
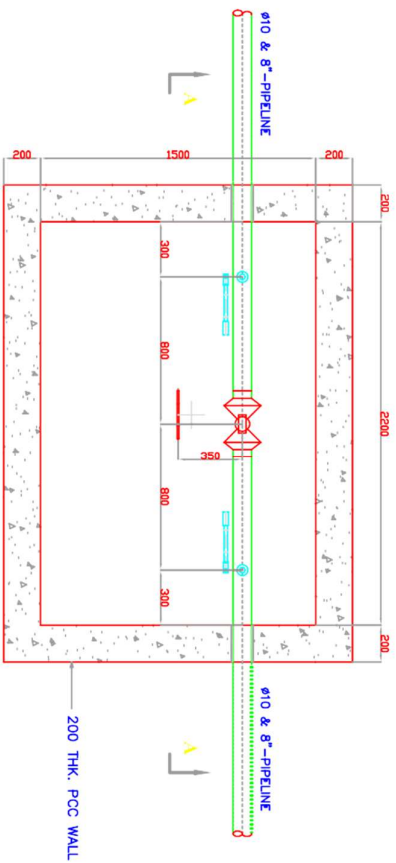


महाराष्ट्र नैचुरल गॅस लिमिटेड  
MAHARASTRA NATURAL GAS LTD

DRG No. MNG-L/Plng./Steel/02

CNG & CITY GAS DISTRIBUTION IN PUNE	REV	DATE	BY	REASON
TYPICAL DETAIL OF SV STATION (TYPE-II)	1	02/01/2018	DRG	REVISED
SCALE: 1:100	2	02/01/2018	DRG	REVISED
DRG. NO.	3	02/01/2018	DRG	REVISED
SHEET 1 OF 1	4	02/01/2018	DRG	REVISED
REV	5	02/01/2018	DRG	REVISED
INST	6	02/01/2018	DRG	REVISED
CONCURRED BY	7	02/01/2018	DRG	REVISED
SEC	8	02/01/2018	DRG	REVISED





## GENERAL NOTES

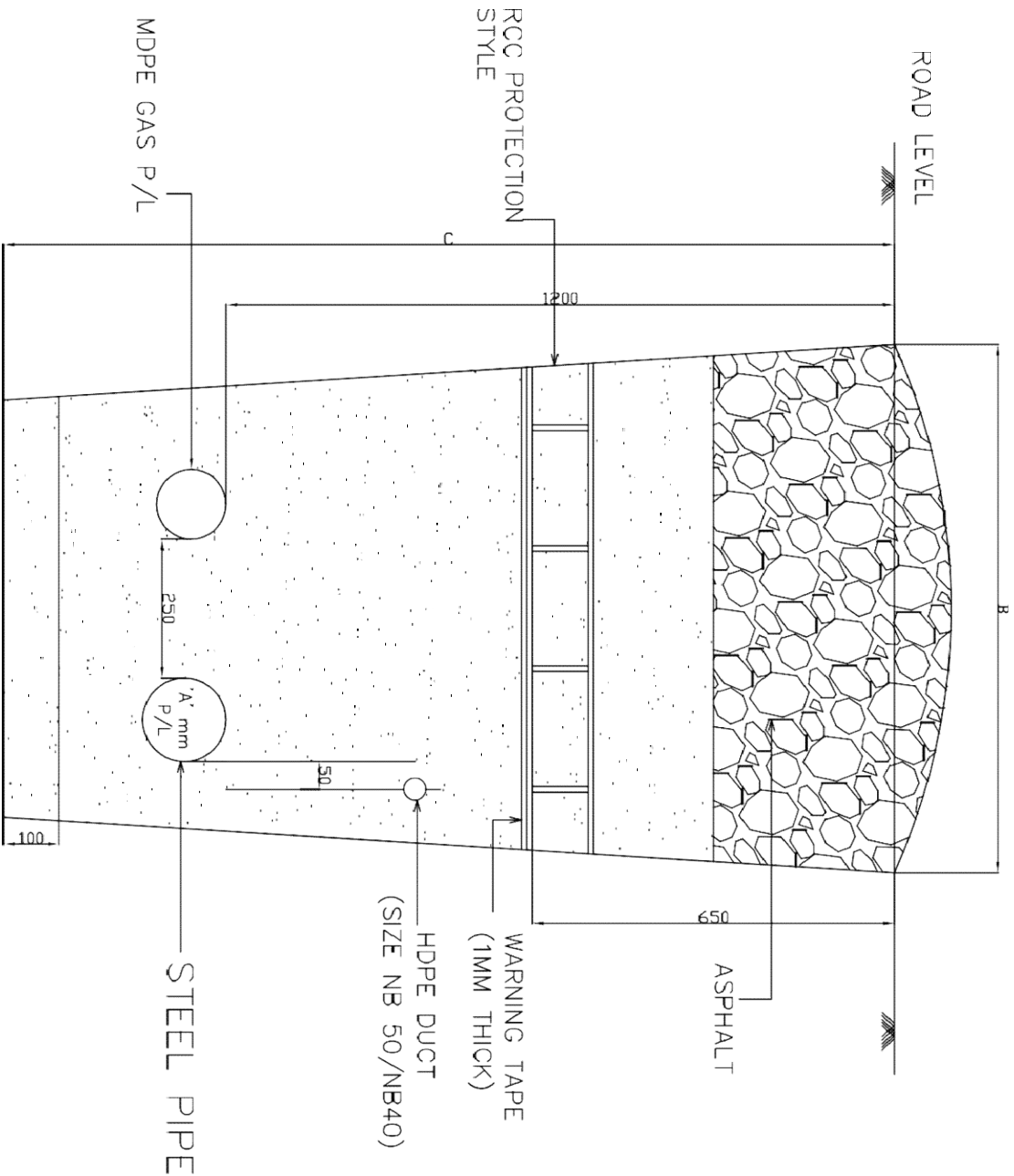
1. ALL DIMENSIONS IN MM, & ALL LEVELS ARE IN METERS.
2. VALVE PIT DIMENSION ARE TENTATIVE WILL BE DECIDED DURING DETAILING

## LEGEND

- NEW PIPIT (FIELD GROUND)
- NEW PIPE (FIELD GROUND)
- BUTT WELD BALL VALVE (B.V.)
- FLANGED PLUG VALVE (P.V.)
- FLANGED BALL VALVE
- ONE SIDE B.W. & ONE SIDE F.G. BALL VALVE
- ONE SIDE B.W. & ONE SIDE F.G. PLUG VALVE
- BOTTOM OF PIPE
- TOP OF PIPE

REFERENCE TO DRAWING/ EXPLANATIONS

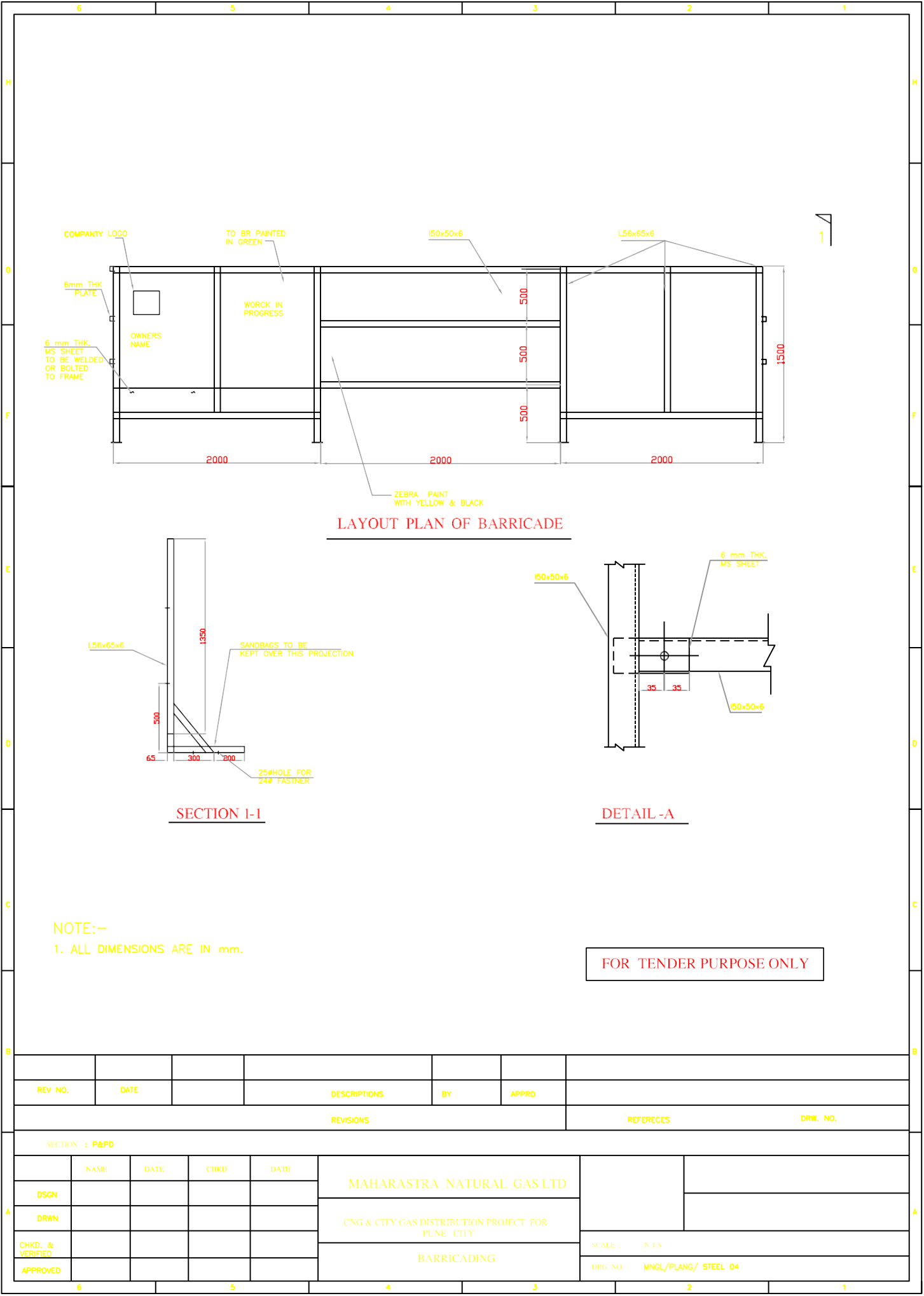
NO.	DESCRIPTION	NO.	DESCRIPTION
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	



'A' mm	B mm	C mm
10" NB	950 mm	1650 mm
06" MB	800 mm	1450 mm
04" NB	750 mm	1400 mm

ALL DIMENSIONS ARE IN MM

DRG. NO.- MNGL /PLANG /STEEL/ 03



LAYOUT PLAN OF BARRICADE

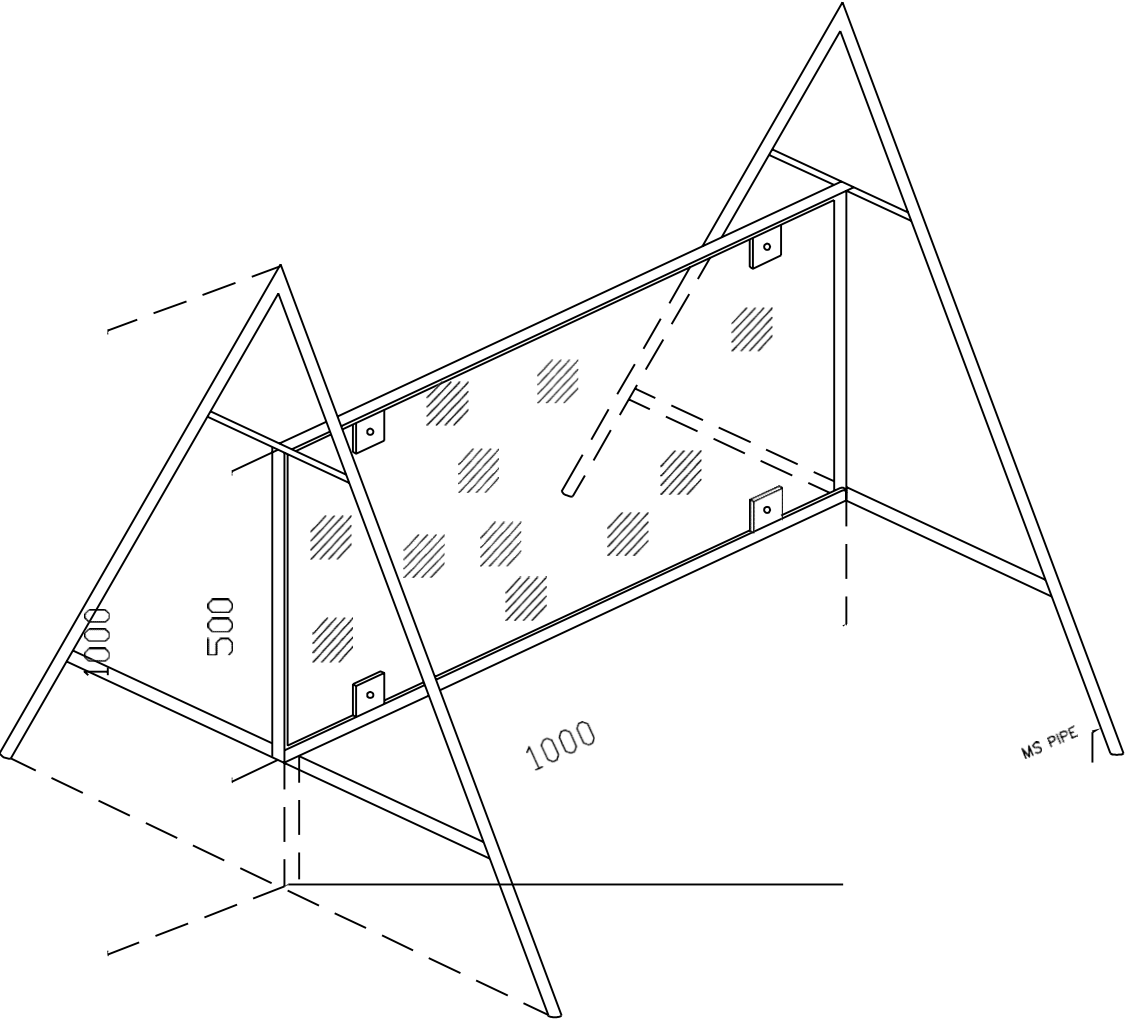
SECTION I-I

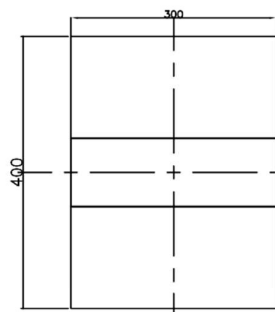
DETAIL -A

NOTE:-  
1. ALL DIMENSIONS ARE IN mm.

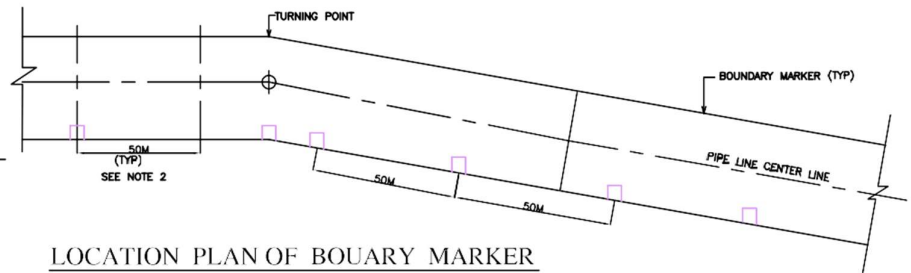
FOR TENDER PURPOSE ONLY

REV NO.	DATE		DESCRIPTIONS	BY	APPRD	
REVISIONS					REFERECS	DRW. NO.
SECTION : P&PD						
	NAME	DATE	CHKD	DATE	MAHARAstra NATURAL GAS LTD	
DSGN						
DRWN						
CHKD. & VERIFIED					CNG & CITY GAS DISTRIBUTION PROJECT FOR PUNE CITY	
APPROVED					BARRICADING	
					SCALE : 1 : 1	
					DRG. NO. MNGL/PLANG/ STEEL 04	

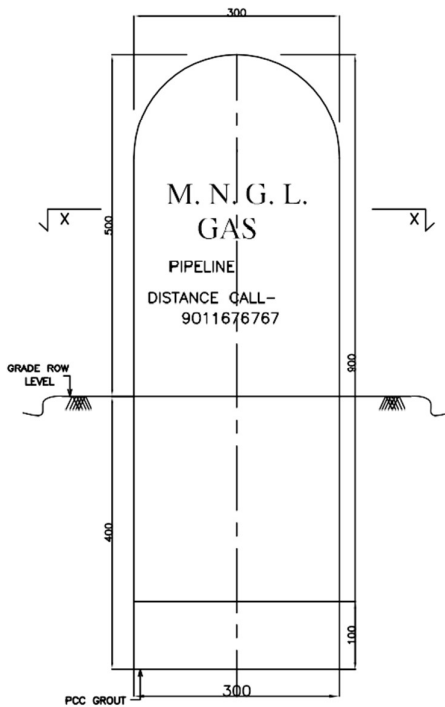
5	1	24	3	3	42	15																																																		
G							G																																																	
F							F																																																	
E							E																																																	
D							D																																																	
C	<div><div>IN RED</div><div>CAUTION</div><div>IN BLACK</div><div>WORK IN PROGRESS</div><div>LATING OF HITH PRESSURE PIPELINE</div><div>CLIENT : CLIENT'S NAME</div><div>CONTRACTOR : CONTRACTOR'S NAME</div><div>EMERGENCY PHONE NOS :</div></div>						C																																																	
B	<div>NOTES: -</div> <div>1. ALL DIMENSIONS ARE IN mm</div> <div>FOR TENDER PURPOSE ONLY</div>						B																																																	
A	<table><tr><td>REV NO.</td><td>DATE</td><td>ZONE</td><td>DESCRIPTIONS</td><td>BY</td><td>APPRD</td><td></td></tr><tr><td colspan="3">REVISIONS</td><td colspan="3">R:-:RNCCES</td><td>DRG NO.</td></tr><tr><td></td><td>NAME</td><td>SIG.</td><td>DATE</td><td colspan="2">MAHARASTRA NATURAL GAS LTD.</td><td></td></tr><tr><td>DSGN</td><td></td><td></td><td></td><td colspan="2">CNG &amp; CITY GAS DISTRIBUTION IN PUNE</td><td></td></tr><tr><td>DRWN</td><td></td><td></td><td></td><td colspan="2">CAUTION BOARD</td><td></td></tr><tr><td>CHD. &amp; VERIFIED</td><td></td><td></td><td></td><td colspan="2">SCA F :- NTS</td><td></td></tr><tr><td>APPROVED</td><td></td><td></td><td></td><td colspan="2">DRG. NO. M N G L / PLANG STEEL/05</td><td></td></tr></table>						REV NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD		REVISIONS			R:-:RNCCES			DRG NO.		NAME	SIG.	DATE	MAHARASTRA NATURAL GAS LTD.			DSGN				CNG & CITY GAS DISTRIBUTION IN PUNE			DRWN				CAUTION BOARD			CHD. & VERIFIED				SCA F :- NTS			APPROVED				DRG. NO. M N G L / PLANG STEEL/05			A
REV NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD																																																			
REVISIONS			R:-:RNCCES			DRG NO.																																																		
	NAME	SIG.	DATE	MAHARASTRA NATURAL GAS LTD.																																																				
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DRWN				CAUTION BOARD																																																				
CHD. & VERIFIED				SCA F :- NTS																																																				
APPROVED				DRG. NO. M N G L / PLANG STEEL/05																																																				
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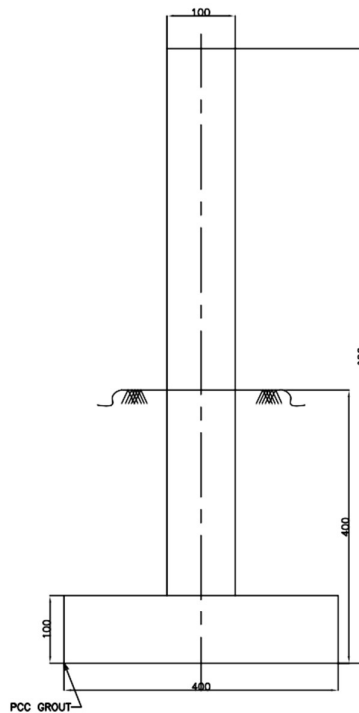
PLAN



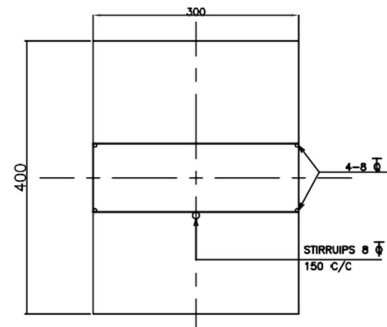
LOCATION PLAN OF BOUARY MARKER



ELEVATION



SIDE VIWE

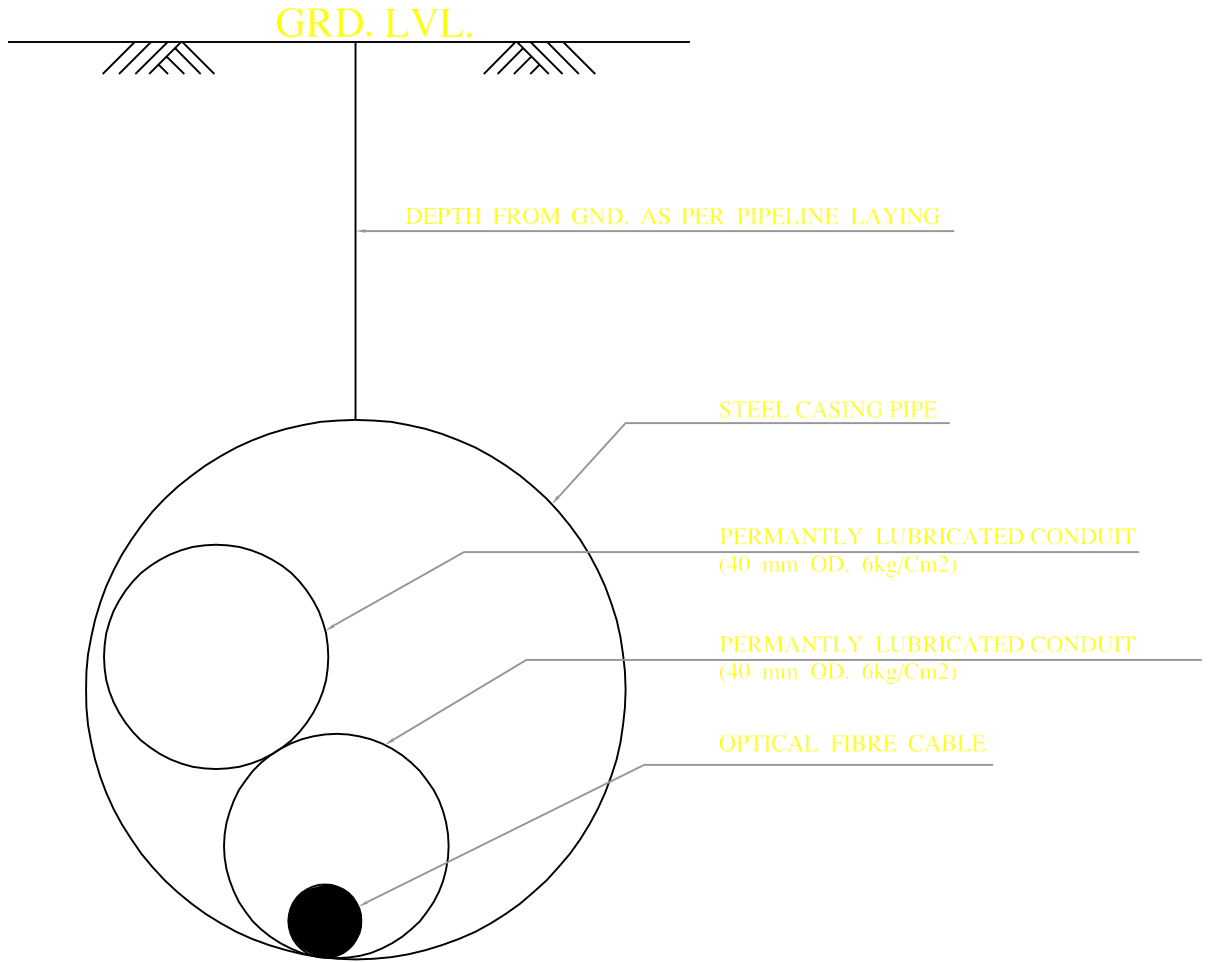


SECTION X-X

## NOTES:-

1. ALL DIMENSIONS ARE MM UNLESS OTHARWISE SPECIFIED.
2. MARKERS SHALL BE INSTALLED IN EVERY 50M INTERVAL AS PER INSTRUCTION OF EIC
3. ALL BOUNDARY MARKERS SHALL BE PRECAST AND INSCRIPTIONS SHALL BE ENGAVED CENTRALLY IN THE MOLULD ON ONE FACE .
4. LETTERS SHALL BE 60 HIGH AND 5 DEEP.
5. INSCRIPTIONS SHALL THE PIPELINE.
6. CONCRETE FOR BOUNDARY MARKERS SHALL BE 20.
7. ABOVE GROUND PART OF BOUNDARY MARKERS BE PAINTED YELLOW WITH MINIMUM THREE COATS OF APPROVED QUALITY  
PAINT INSCRIPTIONS SHALL BE PAINTED BLACK.(35MICRONS COAT)

REV NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD	REFRENCES	DRG. NO.
REVISIONS						DRG. NO.	
MAHARASTRA NACHURAL GAS LTD						DRG. NO.	
CNG & CITY GAS DISTRIBUTION IN PUNE						SCALE : N.T.S	
ROUTE BOUNDARY MARKER						DRG. NO. M N G L / PLAN / STEEL /06	
DSGN							
DRWN							

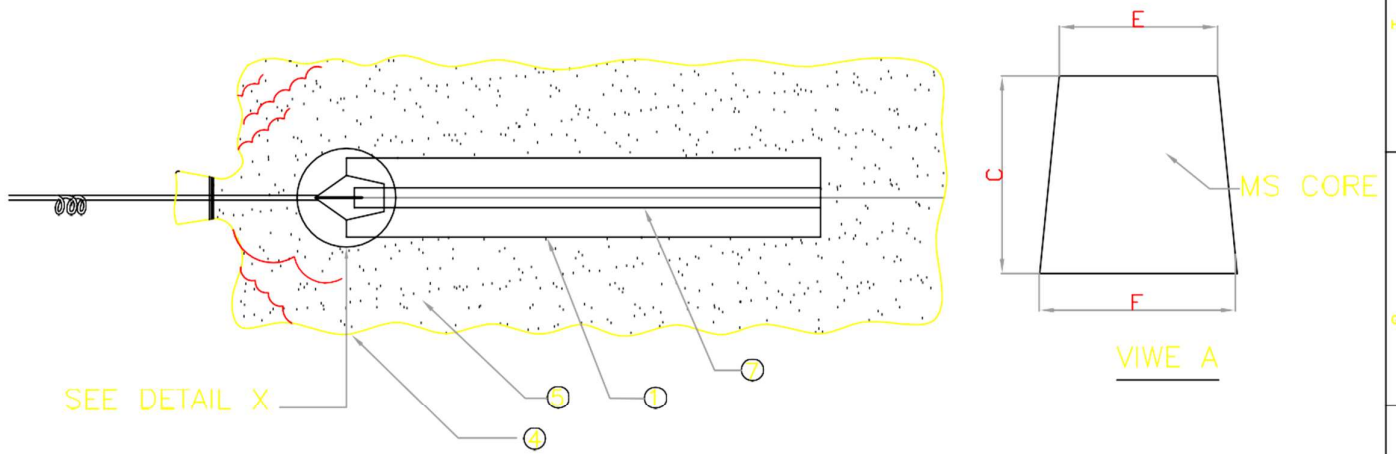


### NOTE :-

1. OPTICAL FIBER SHALL BE LAID ON RIGHT SIDE OF THE PIPELINE IN THE DIRECTION OF GAS FLOW.
2. OFC SHALL BE LAID AS PER THE SPECIFICATION NO. MEC/S/05/E5/T/001 REV-0

REV NO.	DATE		DESCRIPTIONS	BY	APPRD		
REVISIONS						REFERECES	DRW. NO.
SECTION : P&PD							
	NAME	DATE	CHKD	DATE	OPTICAL FIBER CABLE LAYING (CASSED CROSSING) 2 Nos. HDPE DUCT		
DSGN							
DRWN							
CHKD& VERIFIED							
APPROVED					SCALE : N.T.S DRG. NO. MNGL/PLANG/ STEEL 11		
6	5	4	3	2	1		





### PER-PACKED ZINC ANODE

### CHEMICAL COPOISTON OF ANODE (% WEIGHT)

CHEMICAL	TYPE- I	TYPE- II
Al	: 0.1% - 0.5 %	0.005% MAX
Cd	: 0.25% -0.07%	0.003% MAX
Cu	: 0.005% MAX	0.002% MAX
Fe	: 0.005% MAX	0.0014% MAX
Pb	: 0.006% MAX	0.003% MAX
OTHERS	: 0.1% MAX	—
Zn	: REMAINDER	REMAIDER

### NOTES:-

1. ANODE COMPOSITION, NET WEIGHT GROSS WIGHTE DIMENSIONS SHALL BE FURNISHED BY CONTRACTOR
2. ANODE TAIL CABLE SHALL BE HIGH CONDUCTIVITY, STRANDED, COPPER CONDUCTOR, 600/1100 V GRADE XLPE INSULATED, PVC SHATHED & UNARMoured.

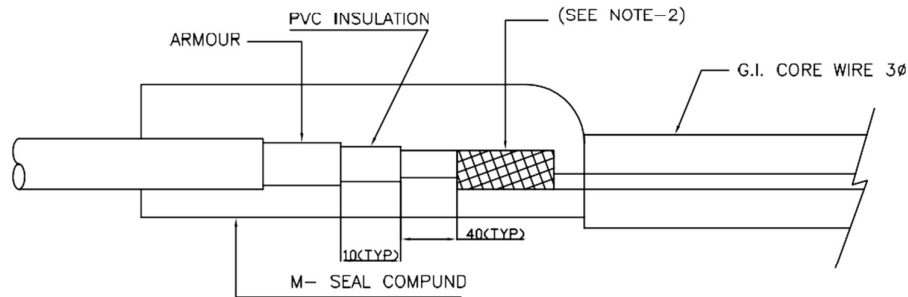
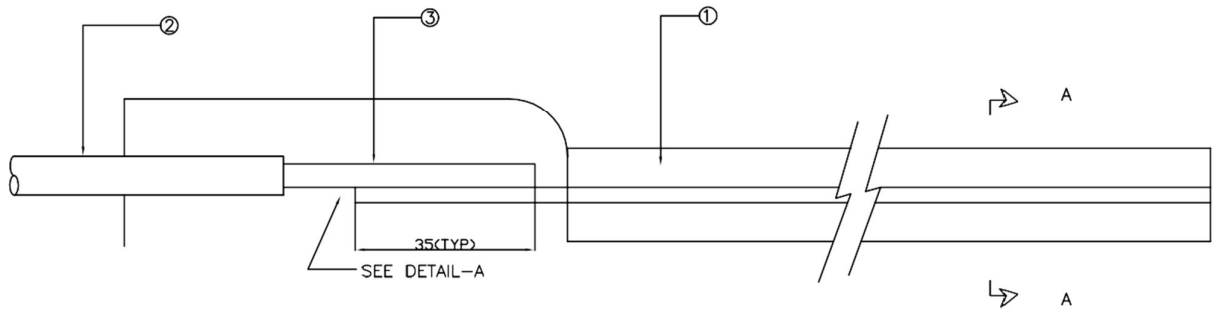
7	2.5 THICK X 15 WIDE GI CORE STRIP (PART OF ZINC ANODE)	
6	SILVER SOLDER	AS REQD.
5	BACKFILL MATERIAL	AS REQD.
4	COTTON BAG	1
3	M- SEAL COMPOUND	AS REQD.
2	ANODE TAIL CABLE PE INSULATED, PVC SHATHED, UNARMoured 6 mm2 SINGLE CORE COPPER, 600/1100 V,	AS REQD.
1	ZINC ANODE, WEIGHT 17 lbs (7.7kg)	1
ITEM	DESCRIPTION	QTY.
BILL OF MATERIALS		

REV NO.	DATE	DESCRIPTIONS	BY	APPRD	REVISES	REFEERECES	DRW. NO.

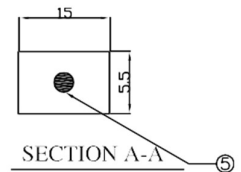
SECTION : P&PD

NAME	DATE	CHKD	DATE	PREPACKAGED ZINC ANODE		SCALE :	1/2" = 1'
DSGN						DRG NO	MNGL/PLANG/ STEEL 14
DRWN						APPROVED	





DETAIL - A



NOTES:-

1. ALL DIMENSIONS ARE IN mm.
2. CABLE CONNECTION WITH G.I. CORE WILL BE SILVER SOLDERED AT SITE.

CHEMICAL COMPOSITION OF ANODE

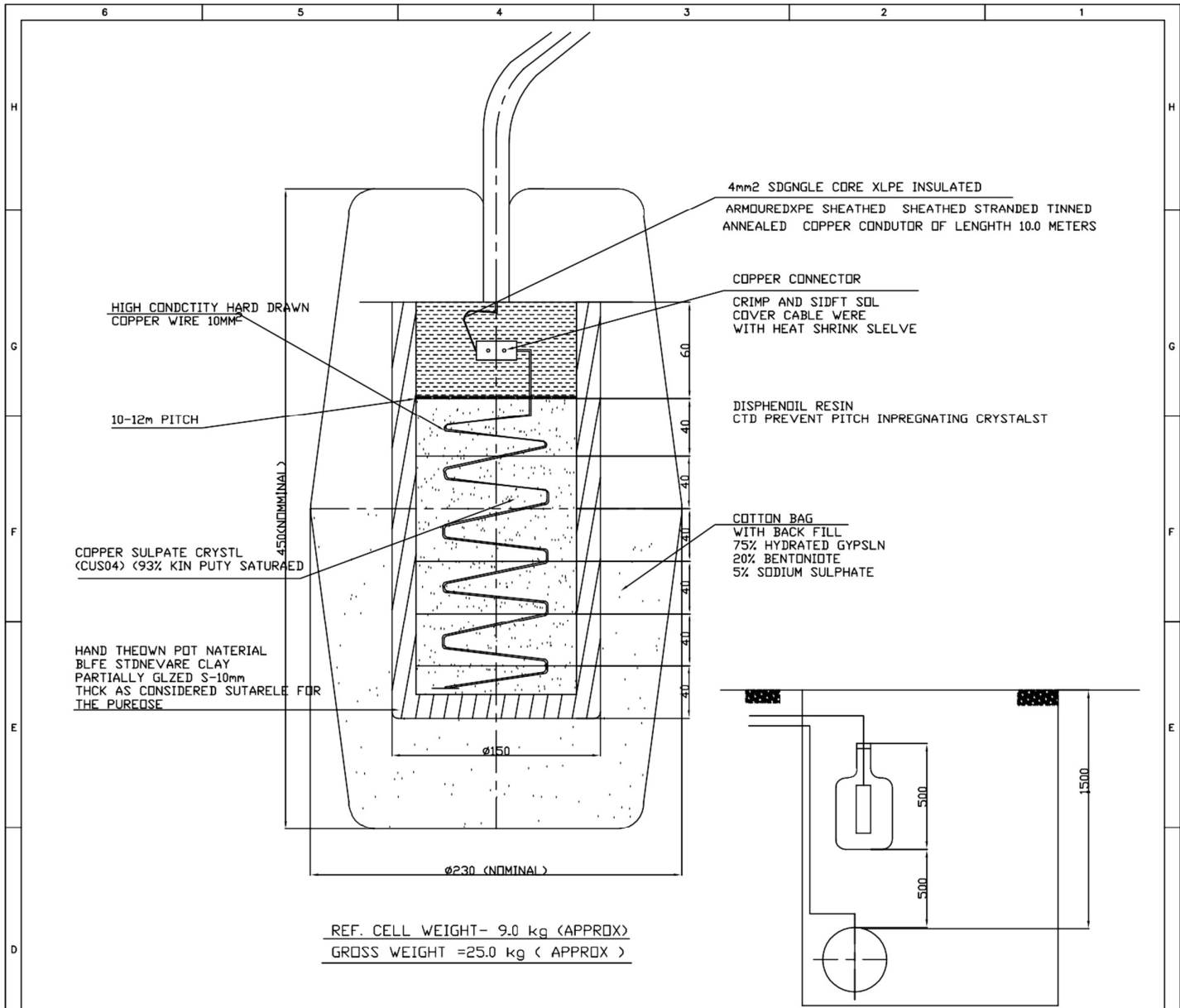
Al : 0.10% MAX.  
Mn : 0.2% MAX.  
Cu : 0.02% MAX.  
Fe : 0.03% MAX  
Ni: 0.001% MAX  
OTHER METALLIC ELMENTS:  
ETCH 0.05% MAX.  
TOTAL : 0.3MAX  
Mg ;REMAINDER

WEIGHT : 0.39 kg PER LINER METER

5.	SHEATHED GI ARMoured 3Ø GI CORE WIRE (PART OF MAGNSIUM ANODE)	1
4	SILVER SOLDER	AS REQD
3	M- SEAL COMPOUND	AS REQD
2	ANODE LEAD CABLE 25mm2 COVPPER XLPE INSULATED PVC SHATHED GI ARMoured COMPLETE WITH LUG	10m
1	MAGNESIUM ANDE, WEIGHT 0.39kg	1
ITEM NO.	DESCRIPTION	QTY.

REV NO.	DATE	DESCRIPTIONS	BY	APPRD	REVISED	DRW. NO.
REVISIONS						
SECTION : P&PD						
NAME	DATE	CHKD	DATE	MAGNESIUM RIBBON ANODE FOR GROUNDING		
DSGN						
DRWN						
APPROVED				SCALE : N.T.S. DRG NO : MNGI/PLANG/ STEEL 16		



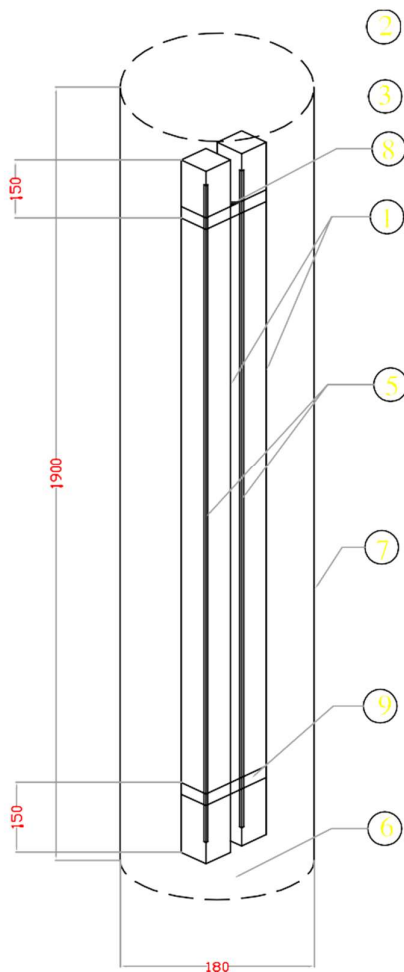


REFERENCE : ELECTRODE  
INSTALLATION.

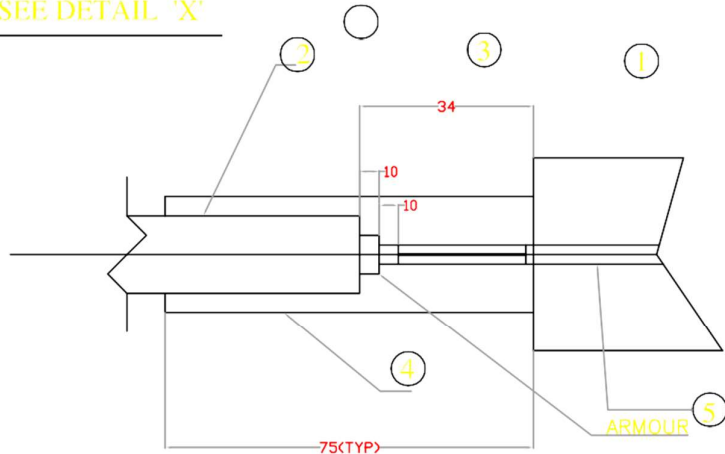
# NOTE :-

1. THE DEVERALL DIMENSION ARE FOR GUIDDACE ONLY
2. ALL DIMENSION ARE IN MM.
3. REFERENCE CELL SHALL BE BACK FILLED WITH BACK FILL MATERIAL SPECIFIED.
4. REFERENCE CELL SHALL BE INSTALLED APPEDXIMELY AT 500 mm (MAX) ABOVE THE TOP LEVEL OF THE PIPE LINE ALONG WITH COTTON
5. BACK FILL REFERENCE ELCTIRDDE SHALL BE SDAKEN IN 20 LITERS OF CLEAN FRESH WATER FOR 24 HRS PRIIR TO INSTALLATION
6. REFERENCE CELL CABLE SHALL BE ROUTED ALONG THE TOP OF THE CARRIER PIPE LINE BY SECUIRLY STRAPPING IT WITH ADHESIVE TYPE AT APPROXIMATELY 3 mt INTERVALS.
7. CALLIBRATION OF REERENCE CELL w<r<t STANDARD CUL/CUSO<sub>4</sub> CELL TO BE MADE PRIOR TO INSTALLATION

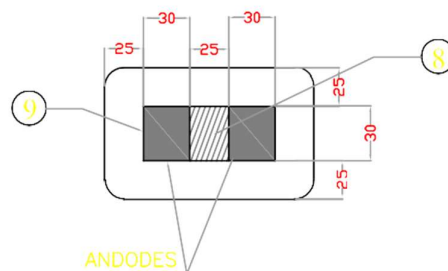
REV NO.	DATE	DESCRIPTIONS	BY	APPRD	REFERECE	DRW. NO.
REVISIONS						
SECTION : P&PD						
NAME	DATE	CHKD	DATE	PREPACKAGED PERMAENT REF. ELECTRODE (Cu/CuSO <sub>4</sub> TYPE) & INSTALLATION DETAILS		
DSGN						
DRWN						
APPROVED				SCALE : N.T.S		
				DRG NO. MNG/PLANG/ STEEL 20		



SEE DETAIL 'X'



DETAIL 'X'



### NOTES :-

1. ALL DIMENSIONS ARE IN mm.
2. ZINC GROUNDING CELLS SHALL BE INSTALLED VERTICALLY SUCH THAT THE TOP OF THE CELL IS APPROX AT THE SAME ELEV. AS PIPE BOTTOM.
3. ALL CABLE LEADS FOR ZINC GROUNDING CELL SHALL BE AS SHORT AND DIRECT AS POSSIBLE.
4. GROUNDING CELL CABLE ARMOUR SHALL NOT HAVE ELECT. CONNECTION TO ANODE.

### ZINC ANODE COMPOSITION (% WEIGHT)

ALUMINIUM	0.005% MAX
MAGNESIUM	0.003% MAX
COPPER	0.002% MAX
IRON	0.0014% MAX
LEAD	0.003% MAX
OTHERS	—

ZINC REMAINDER

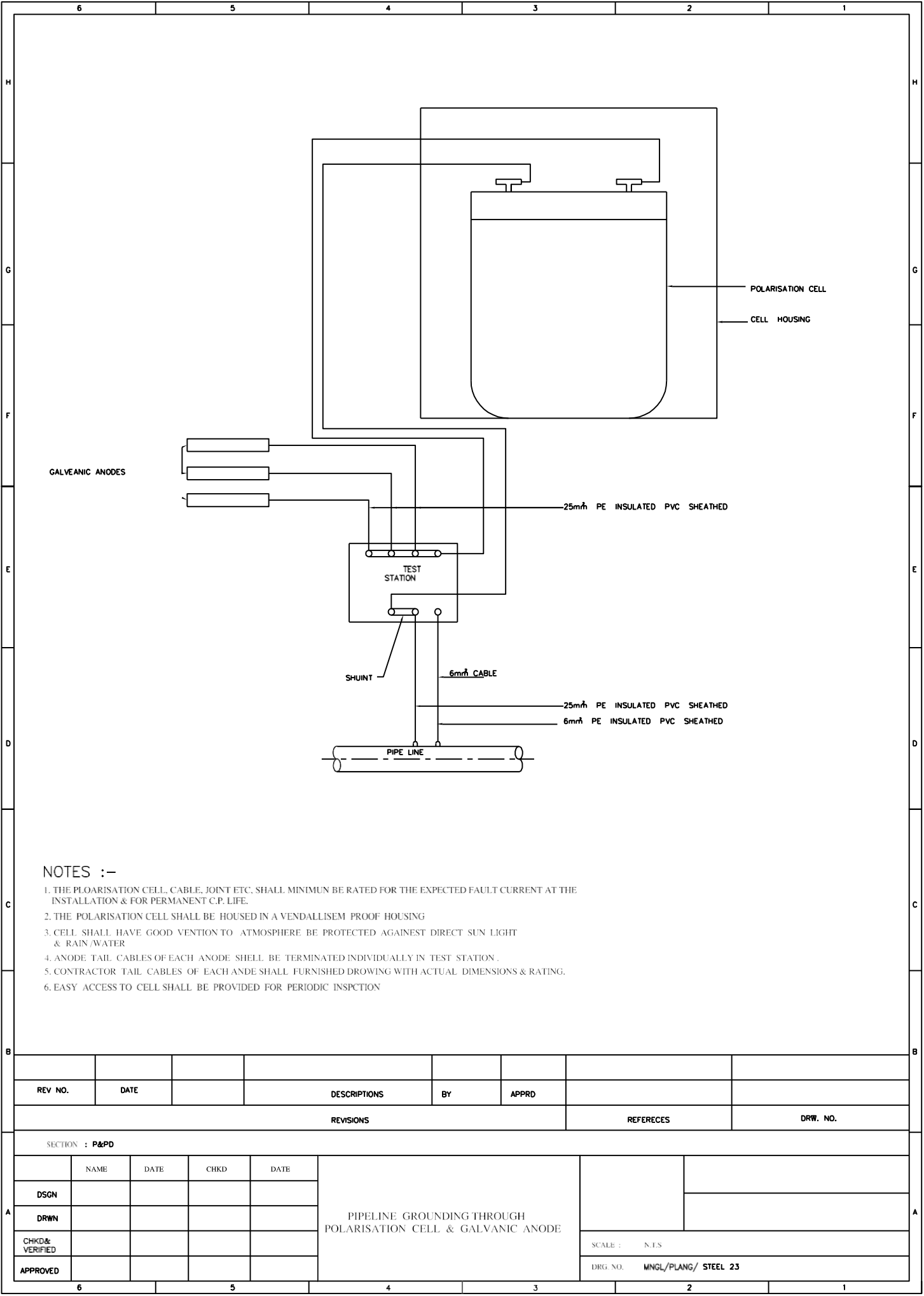
ZINC ALLOY CONFORMING TO ASTM-B-418-G7

### BACKFILL COMPOSITION

GYPSUM	75%
BENTONITE	20%
SODIUM SULPHATE	5%

1	IAP- SIRAP	AS REQD.
2	ARMOUR GROUNDING CABLE (ARMOUR)	2 NOS.
3	CABLE END TIE	10%
4	BLACK FILL WRT.	AS REQD.
5	ARM GROUNDING STEEL CORE	AS REQD.
6	HEAT SHRINK SLEEVE	2 NOS.
7	SILVER BRAZED CONNECTION	2 NOS.
8	ARMOUR CABLE (20MM DIA TO DIA 100/250) SI ALLOY ARMOURED 600/1000 V.	2 NOS.
9	ZINC ANODE 34X30X1525	ANODE
ITEM NO.	DESCRIPTION	QTY.
BILL OF MATERIALS		

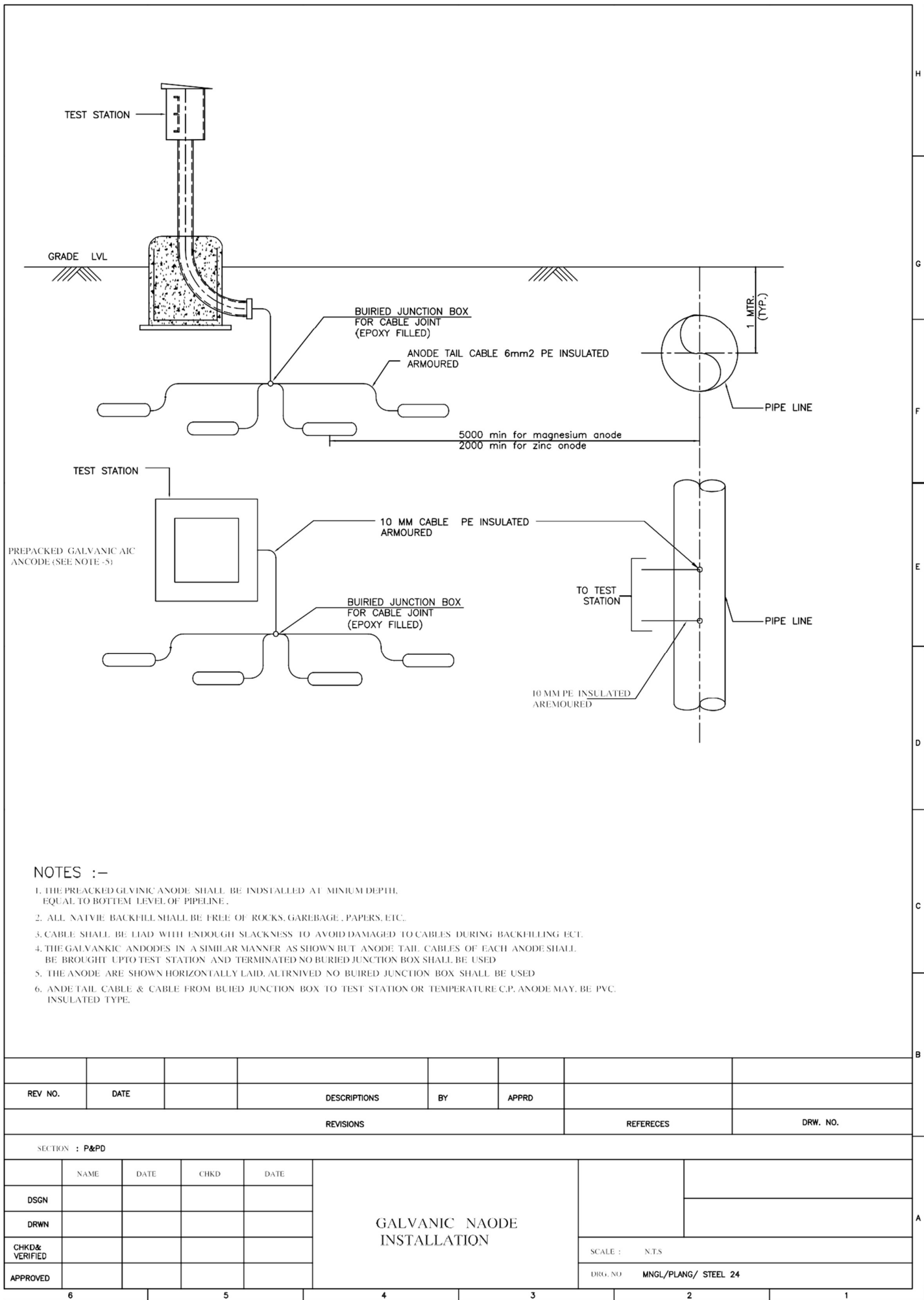
REV NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD	REV NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD
REVISIONS						REFERENCE			DRW. NO.		
SECTION : P&PD											
DSGN	NAME	DATE	CHRD	DATE	DETAILS OF ZINC GROUNDING CELL			SCALE : 1:1 Dwg NO : MNG/PLANG/ STEEL/21			
DRWN											
APPROVED											



NOTES :-

- 1. THE POLARISATION CELL, CABLE, JOINT ETC., SHALL MINIMUM BE RATED FOR THE EXPECTED FAULT CURRENT AT THE INSTALLATION & FOR PERMANENT C.P. LIFE.
- 2. THE POLARISATION CELL SHALL BE HOUSED IN A VANDAL-PROOF HOUSING
- 3. CELL SHALL HAVE GOOD VENTILATION TO ATMOSPHERE BE PROTECTED AGAINST DIRECT SUN LIGHT & RAIN/WATER
- 4. ANODE TAIL CABLES OF EACH ANODE SHALL BE TERMINATED INDIVIDUALLY IN TEST STATION .
- 5. CONTRACTOR TAIL CABLES OF EACH ANODE SHALL FURNISH DRAWING WITH ACTUAL DIMENSIONS & RATING.
- 6. EASY ACCESS TO CELL SHALL BE PROVIDED FOR PERIODIC INSPECTION

REV NO.	DATE		DESCRIPTIONS		BY	APPRD			
REVISIONS							REFERECES	DRW. NO.	
SECTION : P&PD									
	NAME	DATE	CHKD	DATE	PIPELINE GROUNDING THROUGH POLARISATION CELL & GALVANIC ANODE				
DSGN									
DRWN									
CHKD& VERIFIED								SCALE : N.T.S	
APPROVED								DRG. NO. MNGL/PLANG/ STEEL 23	

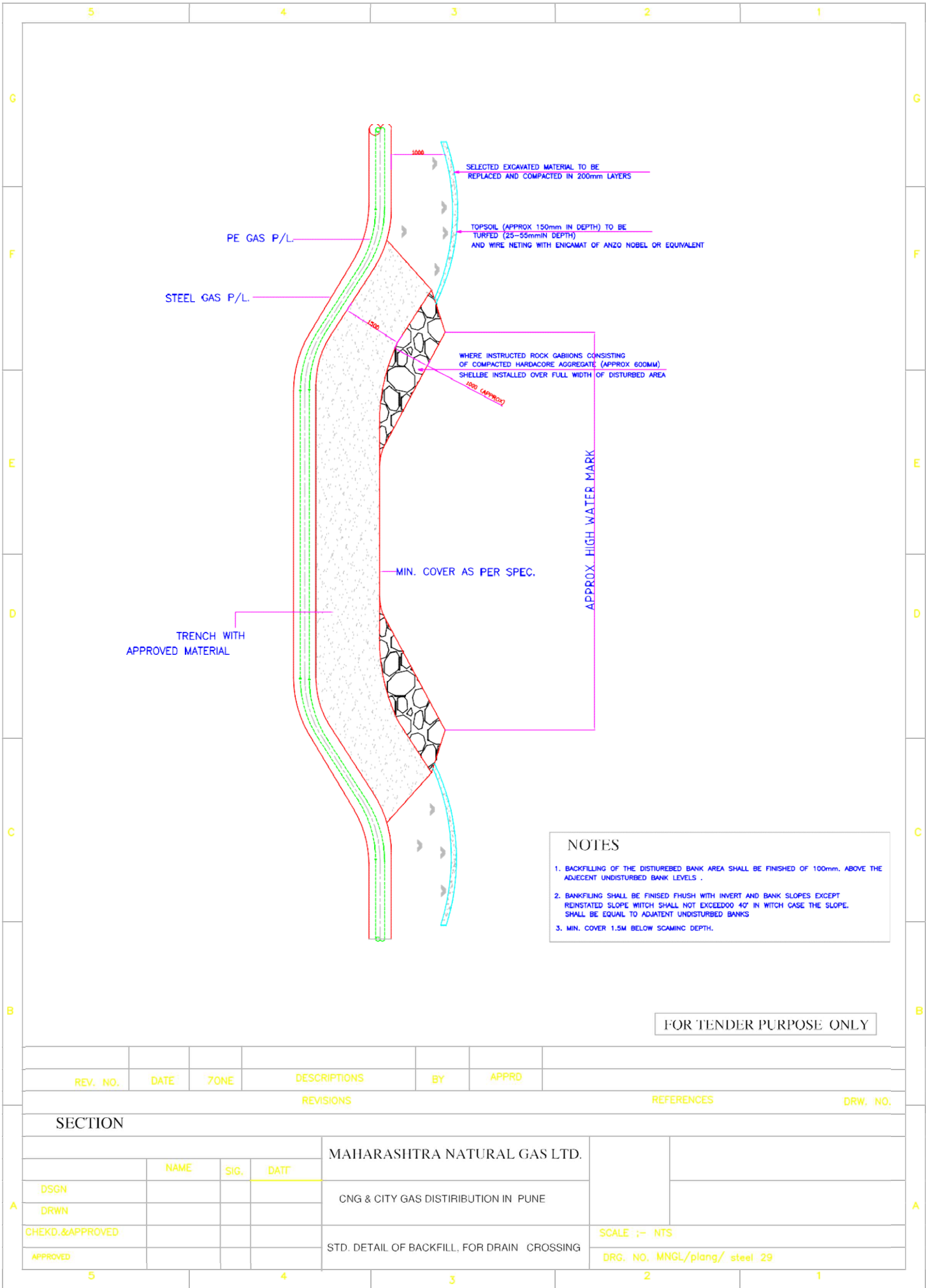


## NOTES

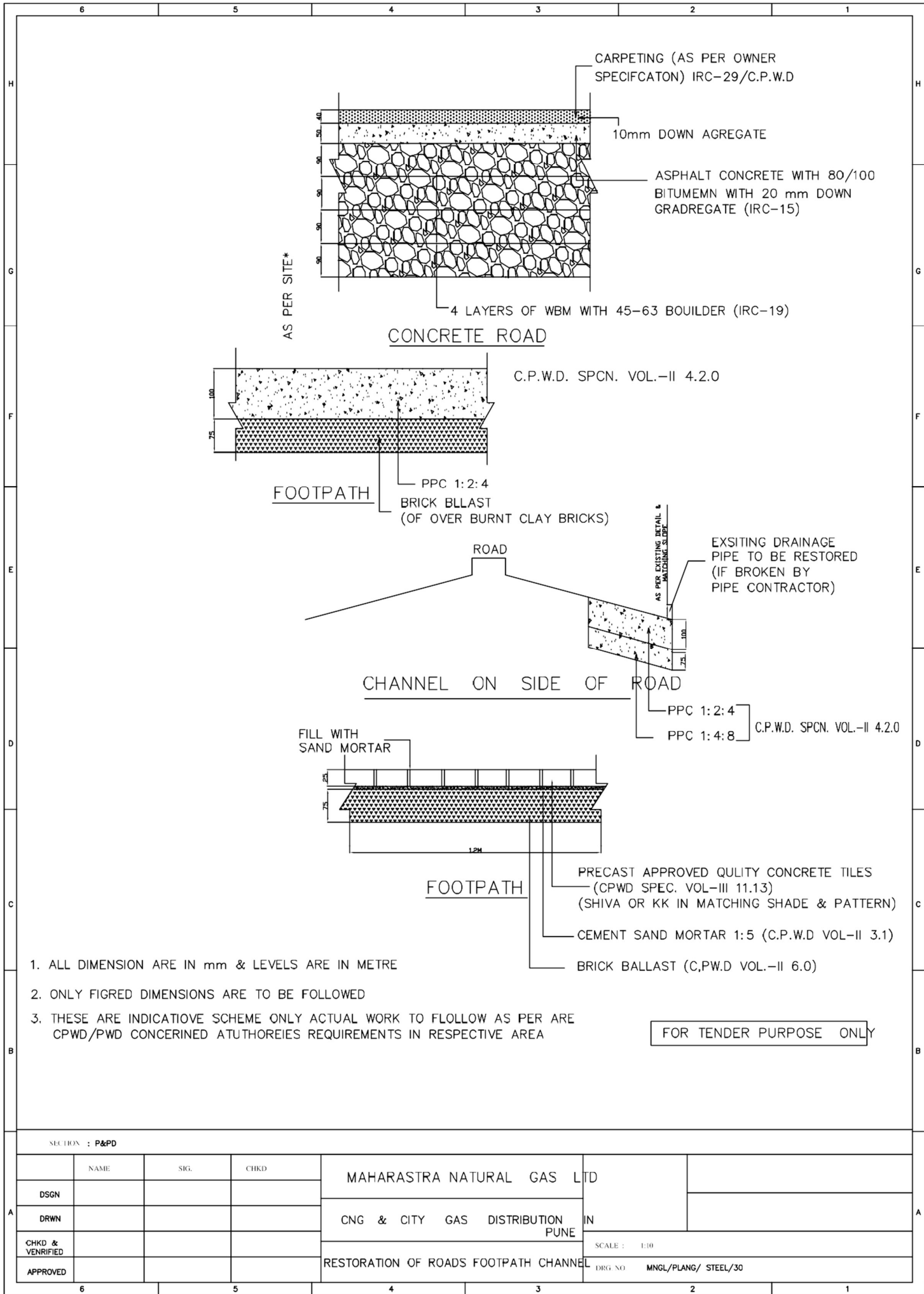
- TEST STATION SHALL HAVE WEATHRPROOF ENCLOSURE HAVING DEGREE OF PROTECTION IP-55,DEFINED IN AS DEFINED IP AS DEFINED INIEC-529(1989)/IS:2147 (1962) THE SHUTTER AND THE BOX HINGED TYPE WITH CONCEALED LOCK AND SHALL HAVE DOOR GASKET
- THE HINGES SHALL BE WELDED TO THE SHUTTER AND THE BOX SUITABLY.
- THE MS ANGLES SHALL BE WELDED TO THE SIDES THE ANGLES SHALL HAVE TAPPED HOLES FOR FIXIG TERMINAL PLATE.
- THE INNER SURFACE OF THE TEST STATION SHALL BE PAPPED WITH LAED OXIDE TAPPED FOR FIXING PRIMER GRADE.
- THE OUTSIDE OF TEST STATION SHALL BE PANTED WITH TWO COATS OF ZINC RED EPOXY PRIMER AND THREE COATS OF GREY COLOUIRED EXPOXY PAINT COMPLETE WITH CABLE PIPE & FDN PLATE.
- THE NAME PLATE SHALL BE OF ANODOISED OF ALUMINIUM WITH BLACK BACKGROUND AND WHITE LETTERS (SIZE 3mm) THE NAME PLATE SHALL BE FIXED TO INNER SIDE OF SHUER BY ARLADITE OR EQUIVALENT
- THE NAME PLATE OF EACH TEST STATION SHALL CARRY THE FOLLOWING INFORMATION.
  - TEST STACTION CONNECTION SCHEME TYPE
  - RELEVANT TEST STACTION CONNECTION SCHEME DIAGRAM
  - TEST STATION NO.
  - CHAINAGE IN KM
  - DISTANCE FROM PIPE IN m
  - DISTANCE OF GAS FLOW
- WHEN ERECTED THE TEST STAION SHALL BE IN UPRIGHT POSITION.
- TEST STACTION SHALL BE SO ERCTED AS TO SERVE ALSO AS PIPELINE MARKER. AND ANODE GRAUNDBED MARKER ,THEIR SHUTTER SHALL BE TO THE LINE OF AXIS OF
- THE NUMBER OF ALL TEST STATION SHALL BE WRITTEN WITH BLACK PAINT USING 40mm STENCIL BLOCK ON THE OUTER SIDE OF THE SHUTTER IN A UNIFORM MANNER AN-ARROW SHOWING DIRECTION OF OF FLOW OF GAS SHALL BE MARKED TO UNDERLINE THE TEST STECHTION NUMBER ON SHUTTER PIPELINE AND FACING IT.
- HEIGHT OF THE STATION ABOVE GROUND LEVEL SHOWN IN THE DRAWING IS TYPICAL.
- ALL CABLES COMMING TO TEST STACTION SHALL BE LABELLED ON BOTH ENDS WHITH INDENTIFICATION NUMBERS
- TOTAL NUMBER OF TEST STATIONS AND THEIR TYPE ARE MENNTIONED IN CONSOLIDATED B.O.M.
- TEST BETWEEN BRASS TERMINALS AND BODY AT 2kv FOR ONE MINUTE
- ALL DIMENSION ARE APPROXIMATE AND CAN VARY SLIGHTLY.
- THE ENTRY SHALL BE SEALED WITH BITUIMEN COMPOUND AFTER CABLE LAYING TO PREVENT WATER ENTRY.
- ALL DIMENSION ARE IN MM.

30	VARIABLE RESISTANCE 0-0.1 OHM.	01
29	100 MM ØM.S. SCH.40 90° ELBLOW R=50	01
28	BILDING WIRE MS,	AS REQD.
27	PCC MIX 1:5:10	0.064m3
26	PCC MIX M20	0.324m3
25	ROD, 8Ø MS	28m
24	STIFFENER PLATE 8 THK	04
23	FONDATION BLOT M12	04
22	RUBBER BUSH MATCHING WITH PIPE	01
21	FOUNDATION PLATE 6THKX400X400MS PLATE	02
20	NEOPRENE RUBBER GASKET 6THK,	01SET
19	MS PIPE 100Ø IS: 1239 P,T ( 1990)- HAVY GRADYE	01
18	COUPLING PLATE 5THKX180X130 MS PLATE , 100ØHOLE AT CENTRE	01
17	LATCH FOR SHUTTER	01
16	BRASS SCREW M6XM16	04
15	ANGLE 5THK,X 50 X 50 X30	04
14	SHUNT , 0.1 OHM, 0.5 A, 50 mV	01
13	COPPER LINK 2.5 THK .X 12 X LENGTH AS REQD.	01
12	BRASS WASHER	AS REQD
11	BRASS NUT,M6	AS REQD
10	BRASS STUD, M6 X 50	AS REQD
9	TEMINAL PLATE,6THKX160X200PHLNOLICLAM SHT	01
8	HINGE FOR SHUTTER	02
7	CASTLE LOCK WITH ONE KEY PER TEST STATION	01
6	NAME PLATE 0.9THKX 120 X 160 X ANODOISED ALUMINUM	01
5	SHUTTER 3mm THK MS SHT	01
4	TOP 475X350X3mm THK MS SHT	01
3	SIDE PLATE 300X420X300X3mm THK MS SHT	01
2	REAR PLATE 425X420X3mm THK. MS SHT	01
1	BOTTOM PLATE 250X175X3mmTHK, MS 100Ø HOLE AT CENTER	01
ITEM	DESCRIPTION	QTY
BILL OF MATERIALS		

REV NO.	DATE	ZONE	DESCRIPTIONS	BY	APPRD		
REVISIONS						REFERECES	DRW. NO.
SECTION : P&PD							
DSGN	NAME	DATE	CHRD	DATE	<div>DETAILS OF TEST STATION</div> <div>POLARISATION CELL</div>		
DRWN							
APPROVED					SCALE : N.E.S DRW NO : MNGL/PLANG/ STEEL/ 27		





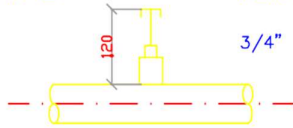


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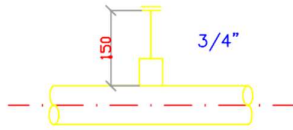
# VENT

# DRAIN

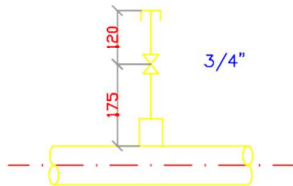
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V1P



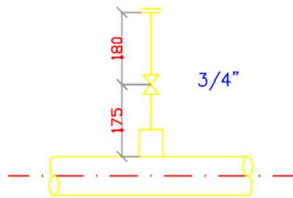
V2



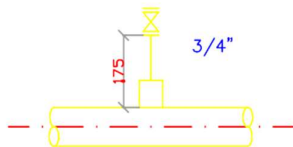
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V3P



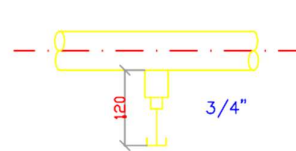
V4



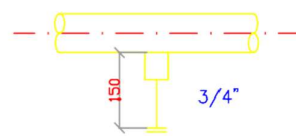
V5



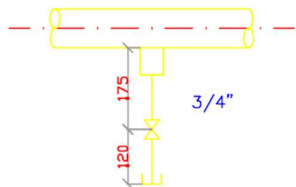
D1  
D1P



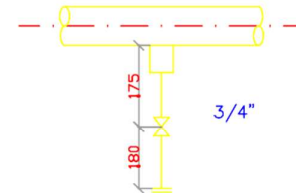
D2



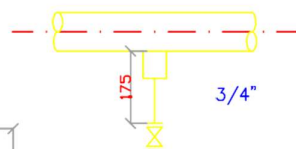
D3  
D3P



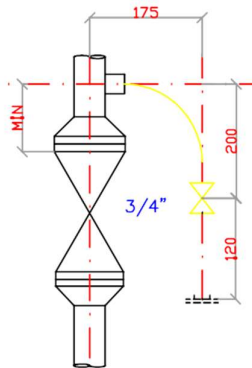
D4



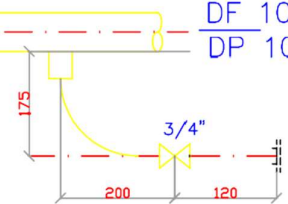
D5



DC 9  
DF 9  
DP 9



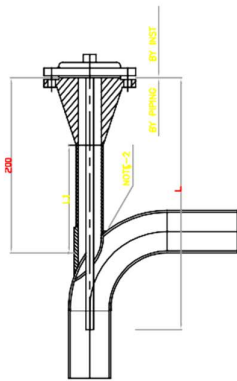
DC 10  
DF 10  
DP 10



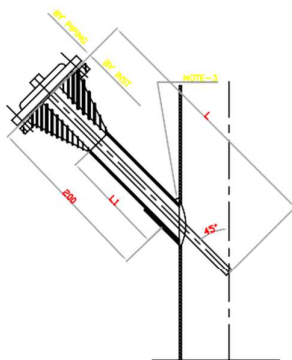
## NOTES

1. DIMENSIONS ARE VALID FOR 75mm (MAX) THICKNESS INSULATION FOR HIGHER INSULATION THICKNESS INCREASE DIMENSION AS REQUIRED.
2. VENTS & DRAINS SHALL BE PROVIDED WITH GATE GLOBE OR PLUG VALVE WITH HALF COUPLING OR STUB IN WITH CAP OR FLANGE BLIND FLANGE AS PER PIPING SPECIFICATIONS
3. VENTS/DRAINS CAN BE PROVIDED ON FLAT SIDE OF ECCENTRIC REDUCERS ON SIZES 4" & ABOVE
4. LEGND V=VENT, D=DRAIN, C=CAP, F=FLANGE, P=PLUG
5. PLUGGED END OF VELVE OR FITTING AHALL BE THREADED

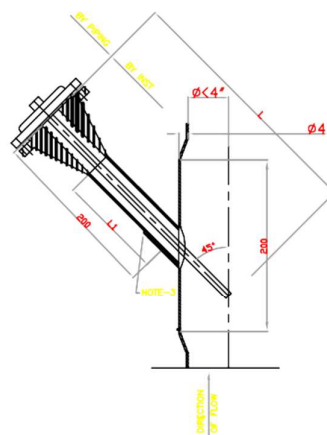
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REVISIONS						REFERENCE			DRW. NO.		
SECTION : P&PD											
DSGN	NAME	DATE	CHRD	DATE	VENT & DRAIN FOR LINE 2" & ABOVE			SCALE : N/E/S DIRA NO : MNG/PLANG/ STEEL/31			
DRWN	NAME	DATE	CHRD	DATE							
APPROVED											



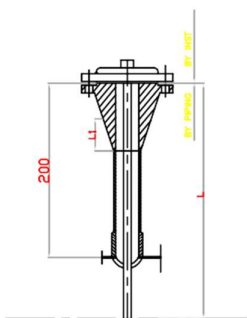
TYPE TW-6



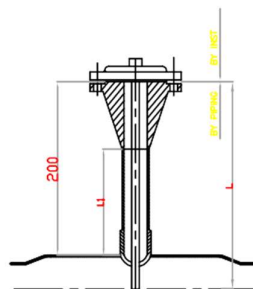
TYPE TW-7



TYPE TW-9



TYPE TW-8



TYPE TW-10

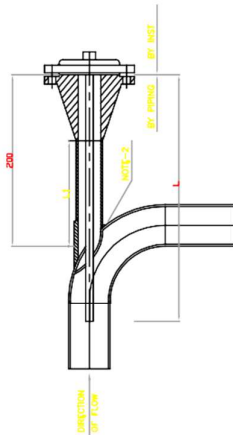
LINE DIA	1.5" FLANGED WELD
4"	200
6"	300
8"	300
10"	300
12"	300
14"	300
16"	400
18"	400
20" & LARGER	500
VESSELS	AS REQUIRED

6. ELABOLW MIN. 4" OR LARGER
7. VERTICAL LINE 4" OR LARGER
8. HORIZONTAL LINE 4" OR LARGER
9. VERTICAL LINE LESS THAN 4"
10. HORIZONTAL LINE DIA LESS THAN 4"

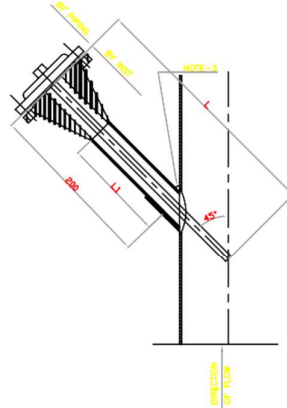
NOTES:

1. BOLTS, NUTS AND GASKETS BY PIPING.
2. MIN. CLERANCE FOR REMOVAL BY PIPING.
3. COUPLING TO SPECIAL LENGTH.

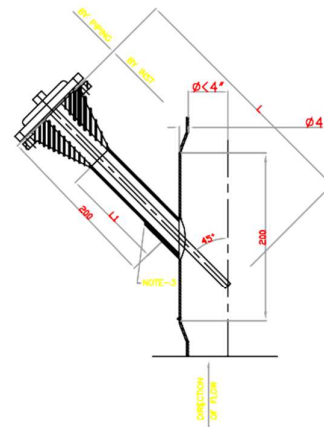
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REVISIONS						
SECTION : P&PD						
DSGN	NAME	DATE	CHRD	DATE	WELLS INSTALLATION	
DRWN					1 1/2" DIA TAPS	
APPROVED					SCALE :	N.T.S
					DRG. NO.	MNGL/PLANG/ STEEL 32



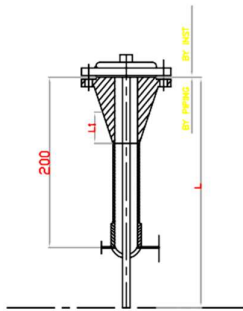
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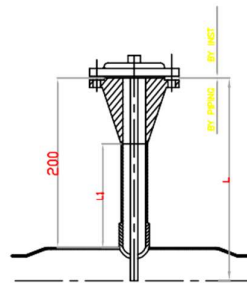
TYPE TW-7



TYPE TW-5



TYPE TW-8



TYPE TW-10

LINE DIA 1.5" FLANGED WELD

LINE DIA	1.5" FLANGED WELD
4"	200
6"	300
8"	300
10"	300
12"	300
14"	300
16"	400
18"	400
20" & LARGER	500
VESSELS	AS REQUIRED

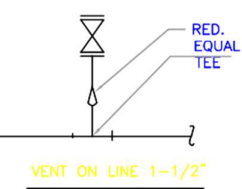
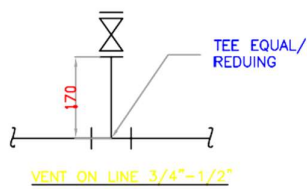
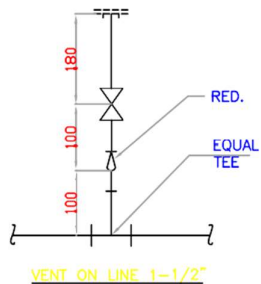
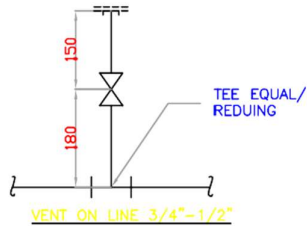
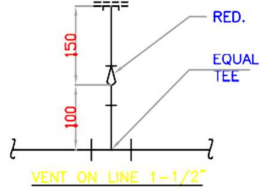
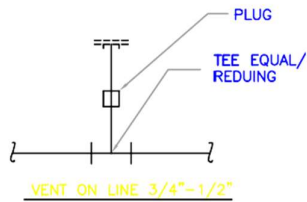
6. ELABOLW MIN. 4"Ø OR LARGER
7. VERTICAL LINE 4"Ø OR LARGER
8. HORIZONTAL LINE 4"Ø OR LARGER
9. VERTICAL LINE LESS THAN 4"
10. HORIZONTAL LINE DIA LESS THAN 4"

NOTES:

1. BOLTS, NUTS AND GASCKETS BY PIPING.
2. MIN. CLERANCE FOR REMOVAL BY PIPING.
3. COUPLING TO SPECIAL LENGTH.

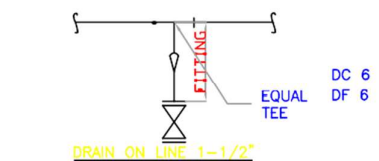
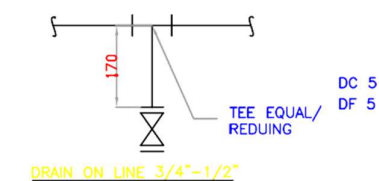
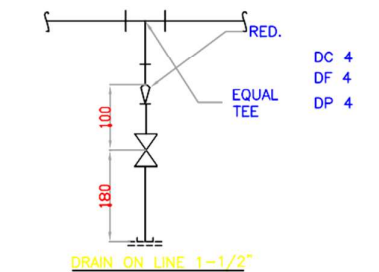
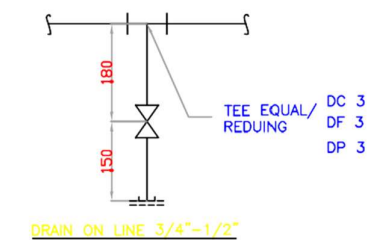
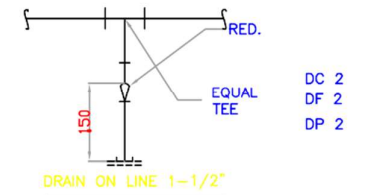
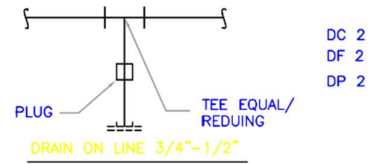
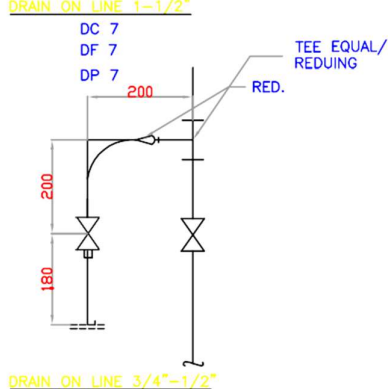
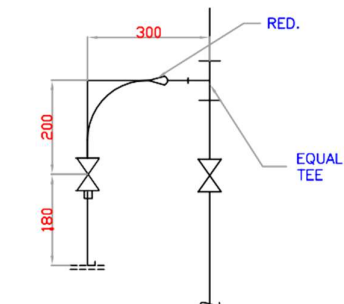
REV. NO.	DATE	DESCRIPTIONS	BY	APPRD	REFERECES	DRW. NO.

SECTION : P&PD					
DSGN	NAME	DATE	CHKD	DATE	<p>WELLS INSTALLATION</p> <p>1 1/2" DIA TAPS</p> <p>SCALE : N.T.S.</p> <p>DRG. NO : MNGL/PLANG/ STEEL 32</p>
DRWN					
APPROVED					



#### NOTES:-

1. DIMENSIONS ARE VALID FOR 50mm (MAX) THICKNESS INSULATION FOR HIGHER INSULATION THICKNESS IN CASE DIMENSIONS AS PREQUIRED.
2. VENTS & DRANS SHALL BE PROVIDED WITH GATE GLOBE OR PLUG VALVE
3. LEGEND V=VENT D=DRAIN C=CAP F=LANGE R=REDUCER
4. PLUGGED END OF VELVE OR FITING SHALL BE THREADED



DC 8  
DF 8  
DP 8

DC 2  
DF 2  
DP 2

DC 2  
DF 2  
DP 2

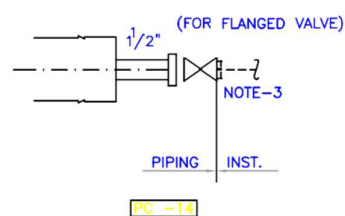
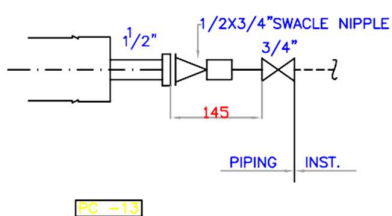
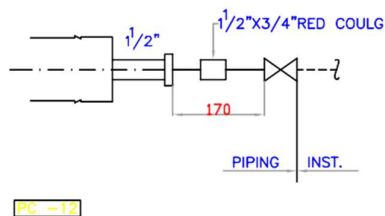
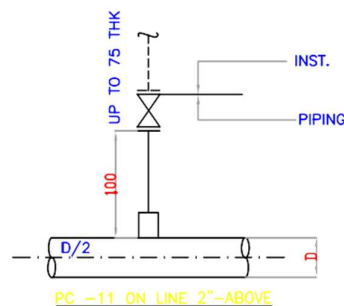
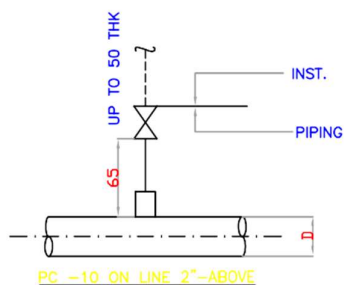
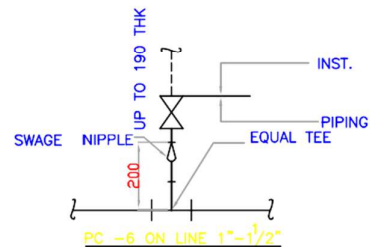
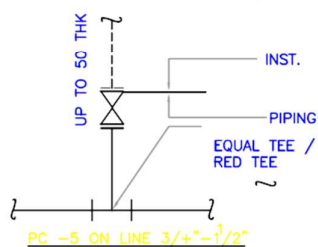
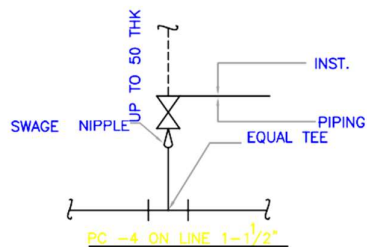
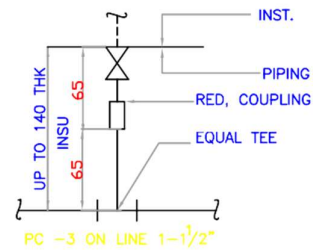
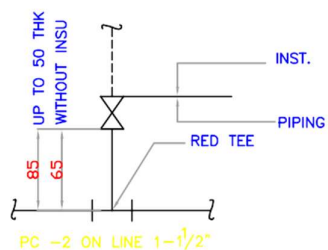
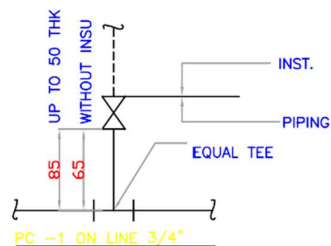
DC 3  
DF 3  
DP 3

DC 4  
DF 4  
DP 4

DC 5  
DF 5

DC 6  
DF 6

REV NO.	DATE	DESCRIPTIONS	BY	APPRD	REVISIONS	REFERECES	DRW. NO.			
SHEET NO : P&PD										
DSGN					WELLS INSTALLATION ON LINES 1 1/2" DIA TAPS					
DRWN										
APPROVED				SCALE : N.T.S						
				MNG/PLANG/ STEEL 33						



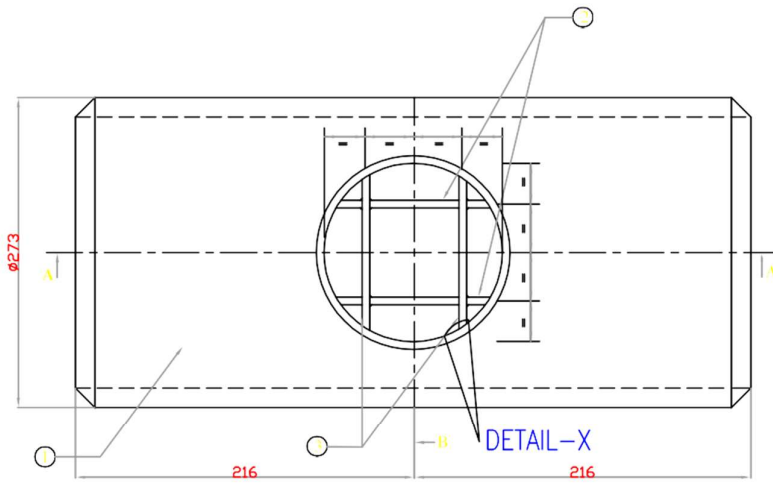
PC -15 WITH 2 VALVE

## ON VESSELS/COLUMNS

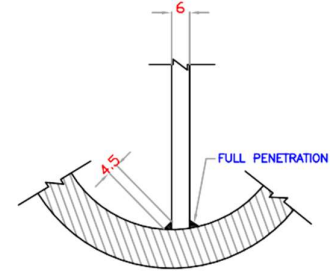
### NOTES: -

1. THE INDICATED DIMENSIONS ARE IN MINIMUM WHICH ALSO COVER INSULATION TO THE EXTENT SHOWN ABOVE IN HIGHER THICKNESS OF INSULATION THAN INDICATED THE DIFFERENCE SHALL BE ADDED IN THE DIMENSIONS SHOWN
2. PRESSURE TAPPING SHALL BE PROVIDED THE DIFFERENCE SHALL BE ADDED IN THE DIMENSION SHOWN ABOVE ACCORDINGLY TEE, HALF COUPLING OR STUB - IN AS PER PIPING SPECIFICATION
3. IN CASE OF FLGD VALVES BOLTING & GASKET ON BOTH SIDE OF VALVE BE IN PIPING SCOPE.
4. IN CASE OF TAPPING PROVID OTHER THAN INDICATED IN THIS STD FOR LAYOUT REASONS DETAILS DIMENSIONS WILL BE CALLED OUT.

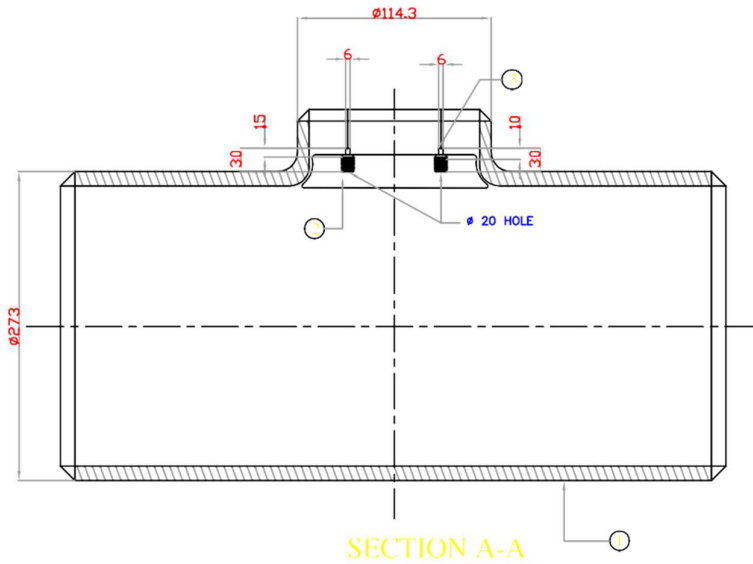
REV NO.	DATE	DESCRIPTIONS	BY	APPRD	REVISIONS	REFERENCE	DRW. NO.
SHEET NO. : P&PD							
DSGN					PRESSURE TAPPING		
DRWN							
APPROVED					SCALE : N.T.S		
					MATERIAL : MNGU/PLANG/ STEEL 34		



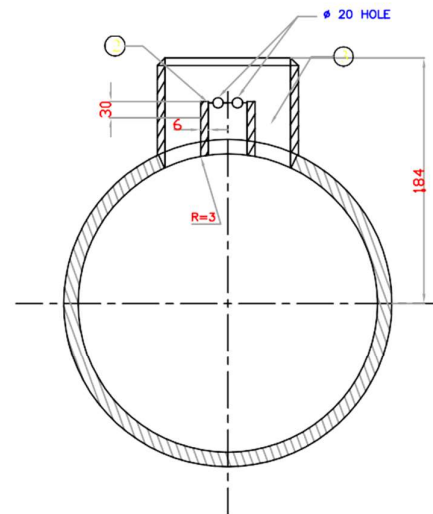
PLAN



DETAIL-X



SECTION A-A



SECTION B-B

QUANTITY – AS per SOR

NOTES :-

1. THE BARRED TEE IS INTENDED TO BE SUITABLE FOR SCRAPER PIGS AND USE LINE IN LINE FOR BIDIREDTIONAL GAS FLOW
2. THE GUDE BARS SHALL BE EXTENDED NTC SO THAT THY GET FLUSHED WITH THE INSIDE DAMATER OF THE SAME.
3. THE CNTROUR OF THE GUADE BARS SHALL BE THAT THEY GO ANDNG THE INTERNAL SHAPE OF THE BRANCH
4. THE CONNNECTIONG PLATE SHALL BE WELDED WITH THE STAGHT OF THE BRANCH
5. RED THIS DROING TOGETHER WITH MNGL TECHNCL SPECIFCATOIN NO. MNGL SHEET /TS/19FOR BARRED TEES
6. THE BARRED TEE IS INTENDED TO BE SUITABLE FOR UNDER INSTALLATION.
7. BUTT-WELD ENDS SHALL BE BELVELS IN ACCRDNCE WITH MSS-SP-75 / B 16.25 AND SHOLD MATCH WITH RUN AND BRANCH PIPES WILL THICNESS AS IDONNACATED PIPE DATELS

ITEM NO.	DESCRIPTION	QTY.	MATERIAL
1	RED TEE B.W. END PER ASME 16.9 SIZE 10"x10"x4"	1	A 234 WP Sch,StdKsch thk(mm)
2	GUDE BAR	2	ASTMA-36/ASTMA-516Gr.70
3	CONNECTING PLATE	2	ASTMA-36/ASTMA-516Gr.70

**DESIGN DA-A**

1. SERVICE : NATURAL GAS

2. DESIGN PRESSURE : 19 KG/cm

3. DESIGN TEMP. : 0 TO 65°C

4. CORROSION ALLOWANCE : 1.5mm

5. HYDRO-TEST PRESSURE : 28.5 Kg/cm

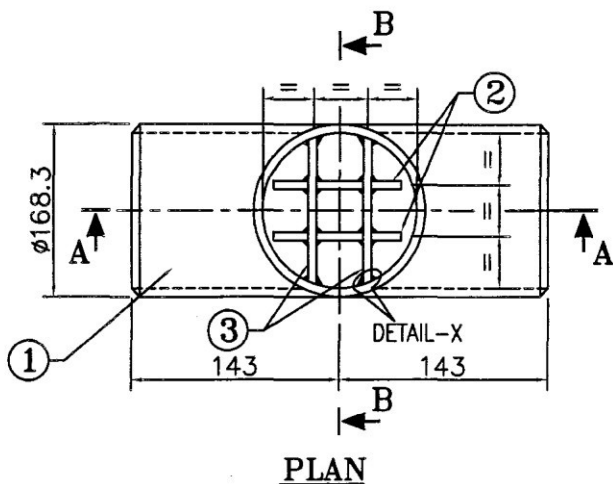
**CONNECTING PIPE DETAILS:**

1. RUN PIPE : #10"(273) X WT 6.4mm.

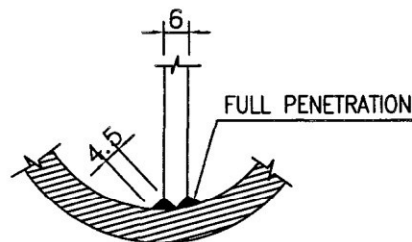
2. BRANCH PIPE : #4(114.3) XWT ,6mm API 5L Gr.B

REV. NO.	DATE	DESCRIPTIONS	BY	APPRD	REVISED	DRW. NO.
REVISIONS						
REFERENCES						
DRAW. NO.						
SECTION : P&PD						
NAME	DATE	CHRD	DATE	MAHARASTRA NATURAL GAS LTD		
DSGN				CNG & CITY GAS DISTRIBUTION PROJECT FOR PUNE CITY		
DRWN				BARRAED TEES		
APPROVED				SCALE : N.E.S		
				DRG NO : MNGL/PLANG/ STEEL 37		

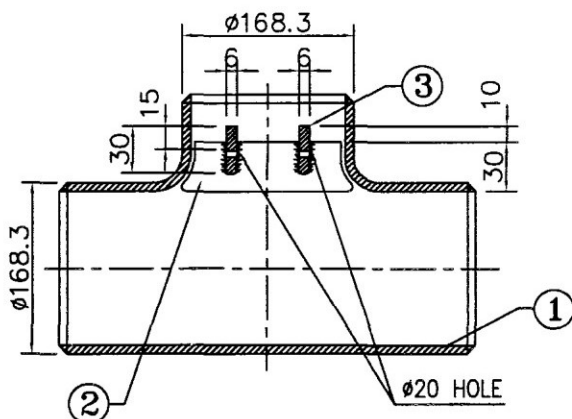




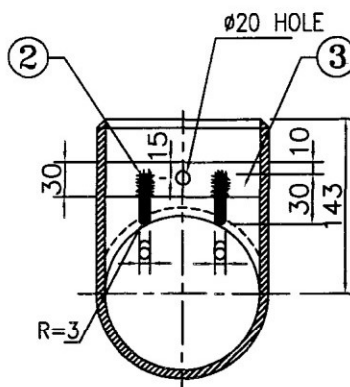
PLAN



DETAIL-X



SECTION A-A



SECTION B-B

QUANTITY - As per SOR

NOTES:-

1. THE BARRED TEE IS INTENDED TO BE SUITABLE FOR SCRAPER PIGS AND USE IN LINE FOR BIRDIRECTIONAL GAS FLOW.
2. THE GUIDE BARS SHALL BE EXTENDED INTO THE RUN SO THAT THEY GET FLUSHED WITH THE INSIDE DIAMETER OF THE SAME.
3. THE CONTOUR OF THE GUIDE BARS SHALL BE SUCH THAT THEY GO ALONG THE INTERNAL SHAPE OF THE BRANCH.
4. THE CONNECTING PLATE SHALL BE WELDED WITH THE STRAIGHT PORTION OF THE BRANCH.
5. READ THIS DRAWING TOGETHER WITH MNGT TECHNICAL SPECIFICATION NO. MNGT/Steel/TS/19
6. THE BARRED TEE IS INTENDED TO BE SUITABLE FOR UNDER GROUND INSTALLATION.
7. BUTT-WELD ENDS SHALL BE BEVELED IN ACCORDANCE WITH MSS-SP-75 / B 16.25 AND SHOULD MATCH WITH RUN PIPE AND BRANCH PIPE'S WALL THICKNESS AS INDICATED IN CONNECTING PIPE DETAILS.

DESIGN DATA

1. SERVICE : NATURAL GAS
2. DESIGN PRESSURE : 19 Kg/cm<sup>2</sup>
3. DESIGN TEMP. : 0 TO 65°C
4. COEESION ALLOWANCE : 0.5mm
5. HYDRO-TEST PRESSURE : 28.5 Kg/cm<sup>2</sup>

CONNECTING PIPE DETAILS

1. RUN PIPE : 6" (168.3) x WT 6.4 mm, API 5L GR. B
2. BRANCH PIPE : 6" (168.3) x WT 6.4 mm, API 5L GR. B

REV NO	DATE	ZONE	DESCRIPTIONS	BY	APPROD	REFERENCES	DRG. NO.
			REVISIONS				



महाराष्ट्र नैचुरल गॅस लिमिटेड  
MAHARASTRA NATURAL GAS LTD

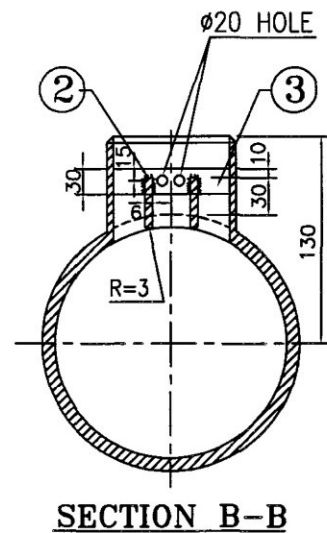
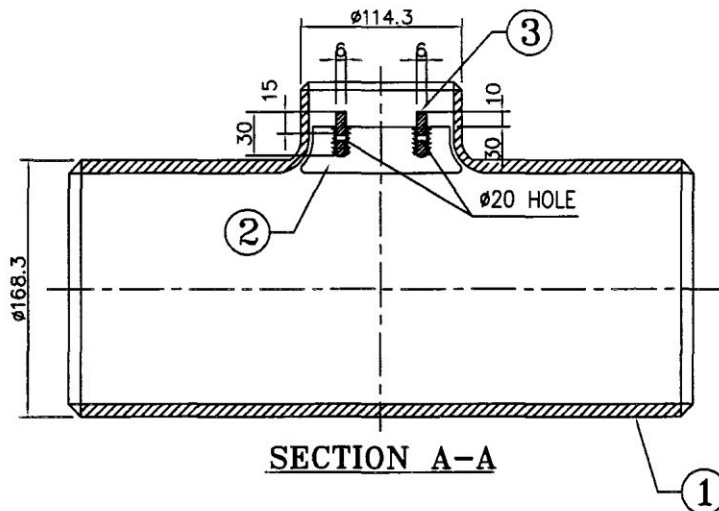
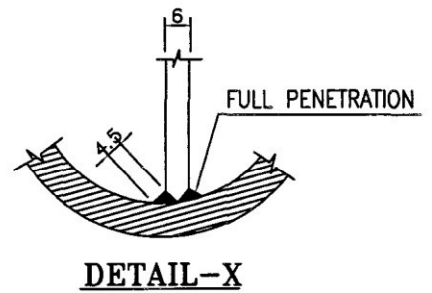
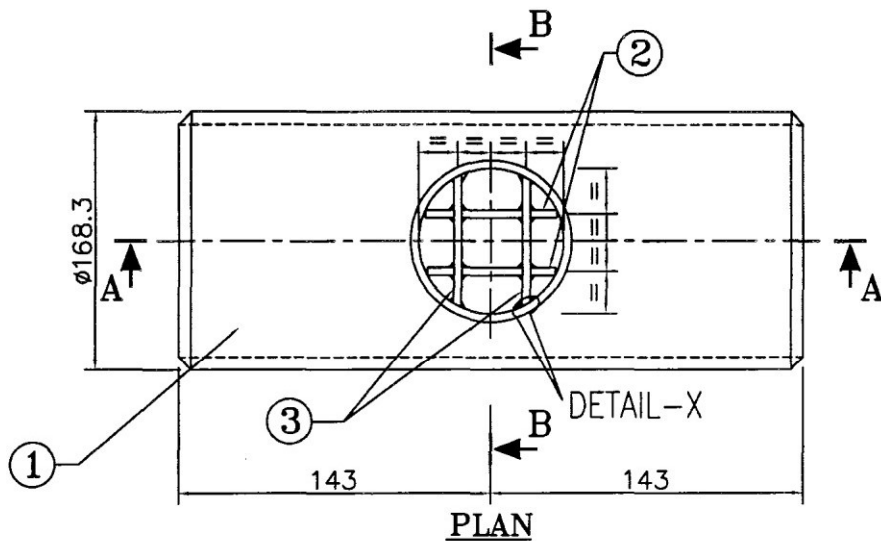
CNG & CITY GAS DISTRIBUTION  
PROJECT FOR PUNE CITY

BARRED TEES

SCALE : NTS

DRG.NO. MNGT/Plng./Steel/38





QUANTITY - As per SOR

**NOTES:-**

1. THE BARRED TEE IS INTENDED TO BE SUITABLE FOR SCRAPER PIGS AND USE IN LINE FOR BIRDIRECTIONAL GAS FLOW.
2. THE GUIDE BARS SHALL BE EXTENDED INTO THE RUN SO THAT THEY GET FLUSHED WITH THE INSIDE DIAMETER OF THE SAME.
3. THE CONTOUR OF THE GUIDE BARS SHALL BE SUCH THAT THEY GO ALONG THE INTERNAL SHAPE OF THE BRANCH.
4. THE CONNECTING PLATE SHALL BE WELDED WITH THE STRAIGHT PORTION OF THE BRANCH.
5. READ THIS DRAWING TOGETHER WITH MNGE'S TECHNICAL SPECIFICATION NO *MNGE/Steel/TS/19* FOR BARRED TEES
6. THE BARRED TEE IS INTENDED TO BE SUITABLE FOR UNDER GROUND INSTALLATION.
7. BUTT-WELD ENDS SHALL BE BEVELED IN ACCORDANCE WITH MSS-SP-75 / B 16.25 AND SHOULD MATCH WITH RUN PIPE AND BRANCH PIPE'S WALL THICKNESS AS INDICATED IN CONNECTING PIPE DETAILS.

ITEM NO.	DESCRIPTION	QTY.	MATERIAL
1	RED. TEE B.W. END AS PER ASME16.9 SIZE 6"x6"x4"	1	A 234 WPB, Sch.Std X Sch. XS Thk.(Min.)
2	GUIDE BAR	2	ASTMA - 36 / ASTMA - 516 Gr. 70
3	CONNECTING PLATE	2	ASTMA - 36 / ASTMA - 516 Gr. 70

**DESIGN DATA**

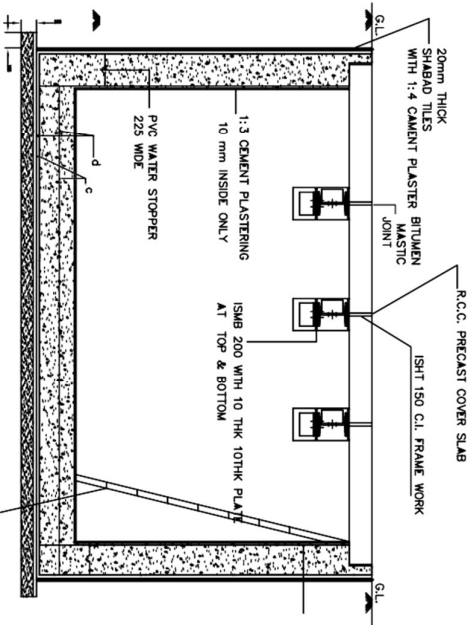
1. SERVICE : NATURAL GAS
2. DESIGN PRESSURE : 19 Kg/cm<sup>2</sup>
3. DESIGN TEMP. : 0 TO 65°C
4. CORROSION ALLOWANCE : 1.5mm
5. HYDRO-TEST PRESSURE : 28.5 Kg/cm<sup>2</sup>

**CONNECTING PIPE DETAILS**

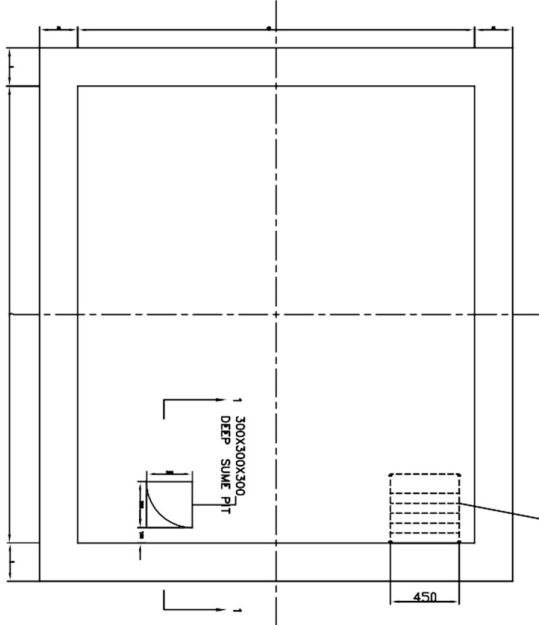
1. RUN PIPE : #6"(168.3) x WT 6.4 mm.  
API 5L Gr. B
2. BRANCH PIPE : #4"(114.3) x WT 6.4 mm.  
API 5L Gr. B

REV NO	DATE	ZONE	DESCRIPTIONS	BY	APPRO	REFERENCES	DRG. NO.
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		<b>महाराष्ट्र नैचुरल गॅस लिमिटेड</b> <b>MAHARASTRA NATURAL GAS LTD</b>			<b>CNG &amp; CITY GAS DISTRIBUTION</b> <b>PROJECT FOR PUNE CITY</b>
		<b>BARRED TEES</b>			
SCALE : NTS DRG.NO <i>MNGE/Ping/Steel/739</i>					



SECTION - "AA'

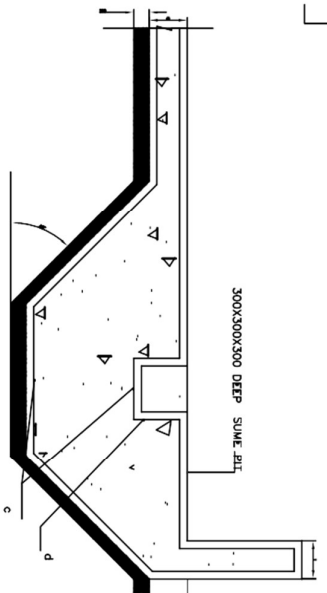


PLAN VIEW

DETAILS OF CHAMBER I									
VALVE PIT									
NO.	RAINFORCEMENT DETAIL								
	L	B	H	T	ø	b	c	d	REMARKS
01	3000	2600	2200	250	10Y@150CRS	0Y@300CRS	10Y@150CRS	10Y@150CRS	
02	2600	2300	2200	250	10Y@150CRS	0Y@300CRS	10Y@150CRS	10Y@150CRS	
03	2800	2000	2200	250	10Y@150CRS	0Y@300CRS	10Y@150CRS	10Y@150CRS	
04	1300	1000	2200	150	10Y@150CRS	0Y@150CRS	10Y@150CRS	10Y@150CRS	
05	2100	2000	2200	150	10Y@150CRS	0Y@300CRS	10Y@150CRS	10Y@150CRS	
06	2800	2500	2200	250	10Y@150CRS	0Y@300CRS	10Y@150CRS	10Y@150CRS	
07	2000	1720	2200	250	10Y@150CRS	0Y@300CRS	10Y@150CRS	10Y@150CRS	

NOTES

- 01. ALL DIMENSIONS ARE IN MM
- 02. GRADE OF C CONCRETE SHALL BE M25
- 03. Y INDICATES COLD TWIST DEFORMED RODS CONFORMING IS 1786
- 04. PROVIDE 25mm CLAYER COVER TO MAIN REINFORCEMENT UNLESS OTHERWISE SPECIFIED
- 05. SRC OF SOL IS ASSUMED AS 15/SOM
- 06. WATER TABLE IS ASSUMED AT 1M BELOW GRADE LEVEL
- 07. FOR COVER SLAB DETAILS REFER DGC NO. 50046-12-DG-00002
- 08. BOX TYPE WATER PROOFING SHOULD BE DONE TO MAKE THE CHAMBER WATER PROOF
- 09. APPLY BITUMEN MASTIC ON ALL THE JOINTS OF THE COVER FOR MAKING IT LEAKPROOF
- 10. PROVIDE SLOPE FOR THE BASE SLAB TOWARDS THE SUMP PIT
- 11. ENGRAVING TO BE DONE ON COVER SLABS
- I. MAHARASTRA NATURAL GAS LTD
- II. YEAR OF CONSTRUCTION
- III. MANUFACTURERS NAME



SECTION-I-I

MAHARASTRA NATURAL GAS LTD.				TITLE: VALVE CHAMBER DETAIL	
DATE	13.07/04	DATE	13.07/04	DATE	13.07/04
DESIGNED BY		DATE		DATE	
APPROVED BY		DATE		DATE	
DATE		DATE		DATE	
REV		DATE		DATE	
MAHARASTRA NATURAL GAS LTD.				DRAWING NO: 50046-12-DG-00001	
				REV: 1	

G F E D C B A

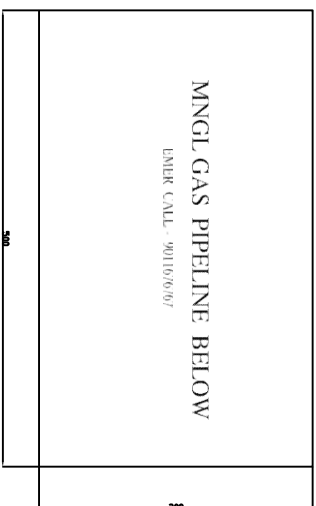
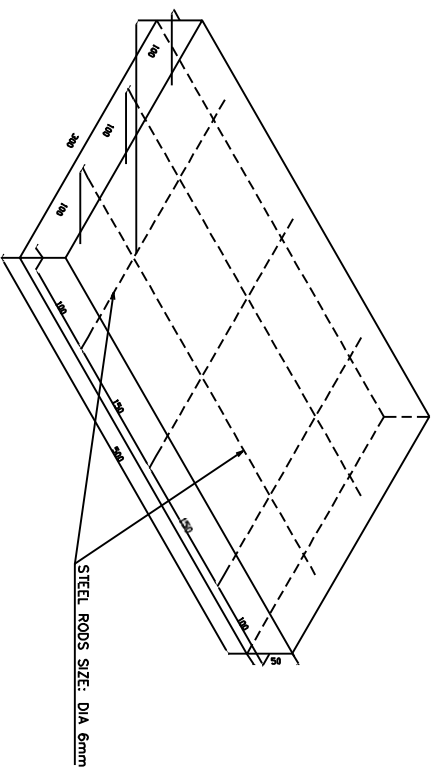
5

4

3

2

1



- NOTES:
1. ALL DIMENSION ARE IN MM UNLESS OTHERWISE SPECIFIER SPECIFIED.
  2. CONCRETE FOR MARKER SHALL BE M-20.

G F E D C B A

5

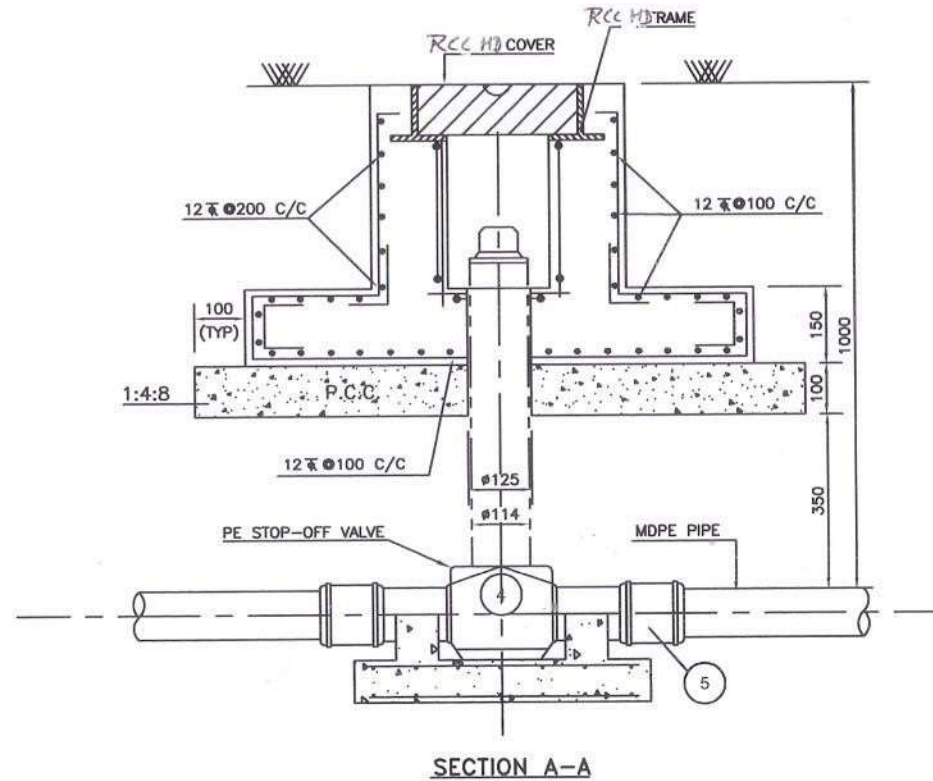
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3

2

1

THIS PRINT IS THE PROPERTY OF MAHARASHTRA NATURAL GAS LTD. IT IS TO BE USED ONLY FOR THE PURPOSE FOR WHICH IT WAS LENT AND MUST NOT BE USED IN ANY WAY DETRIMENTAL TO THE INTEREST OF THIS COMPANY AND IS SUBJECT TO RETURN ON DEMAND.



#### NOTES -

1. ALL DIMENSIONS ARE IN MM.
2. THE CONCRETE SHALL HAVE A CHARACTERISTIC STRENGTH OF 20 N/MM<sup>2</sup>
3. THE COVER FOR REINFORCEMENT SHALL BE 50 MM ON OUTER FACES AND 50 MM ON INNER FACE.
4. THE SFRC COVER SHALL HAVE REINFORCED CONCRETE OF GRADE M-35 CONFORMING TO IS:456-1978.
5. DEBRIS BACKFILL TO BE REMOVED & GOOD EARTH TO BE FILLED IN AREA OF 1.5 M x 1.5 M WITH PROPER COMPACTION AND CONSOLIDATION BY WATER.
6. GASKET OF RUBBER OR ANY OTHER EQUIVALENT MATERIAL OF MATCHING DIMENSIONS SHALL BE SUPPLIED & USED BY THE CONTRACTOR TO PREVENT INGRESS OF WATER INTO THE VALVE PIT.
7. 75mm THICK PCC(1:2:4) OF DIMENSION 300mm X 300mm FOR VALVE OF SIZES FROM 63mm TO 125mm SHOULD BE PROVIDED FOR SUPPORTING THE PE STOP OFF VALVE AT THE BASE.
8. RUBBER SHEET OF MIN. 6mm THICK SHOULD BE PROVIDED BETWEEN BASE OF THE VALVE AND PCC TOP SURFACE.

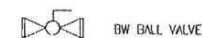
#### MAHARASHTRA NATURAL GAS LIMITED

DRAWN BY PLNG	DATE: 06/05/04	TITLE - RCC PIT FOR PE STOP-OFF VALVE(Ø63 TO 125 mm)	
CHECKED BY	DATE:	DRAWING NO: MNG/ENG/CIVIL/10A	REV. 0
APPRD. BY	DATE:		

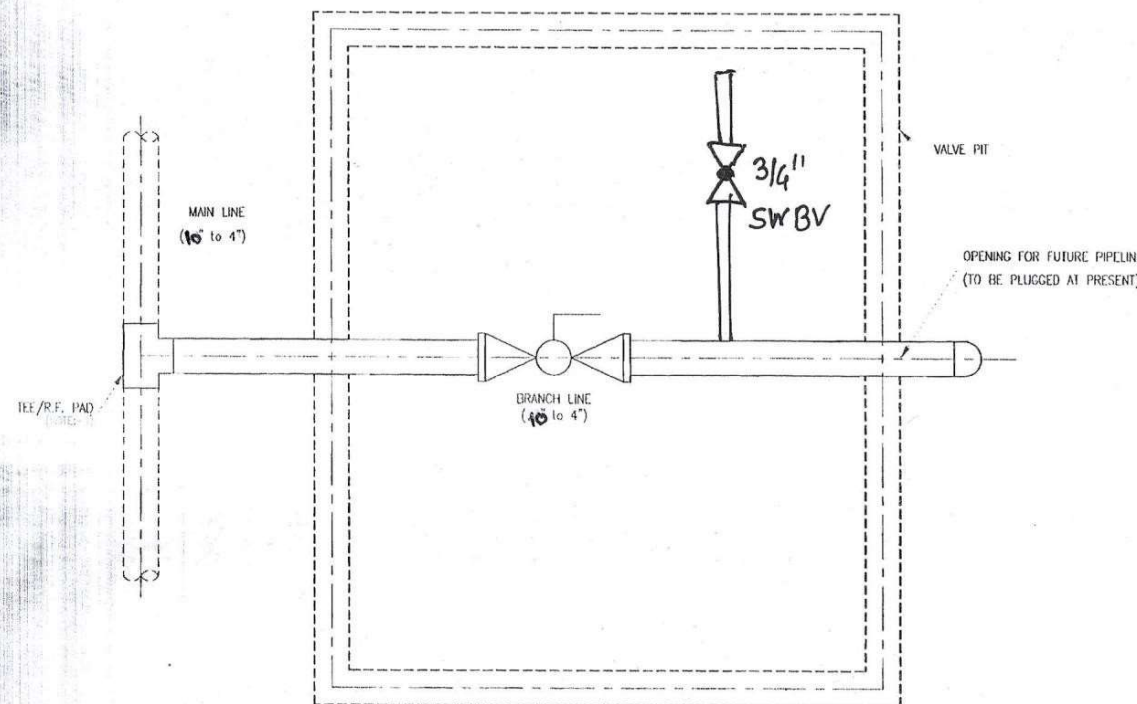
# NOTES

1. TOP OF THE PIPE SHALL BE AT MINIMUM 1.2M D.P.H.L.
2. APPROXIMATE SIZE OF THE PIT WILL BE 2Mx2M & 2Mx1.5M. IT DEPENDS ON THE SITE CONDITION.
3. BRANCHING CONNECTIONS (TEE/ R.F. PAD) SHALL DEPEND UPON THE MAIN LINE & BRANCH LINE.

# LEGEND



2W BALL VALVE



PLAN

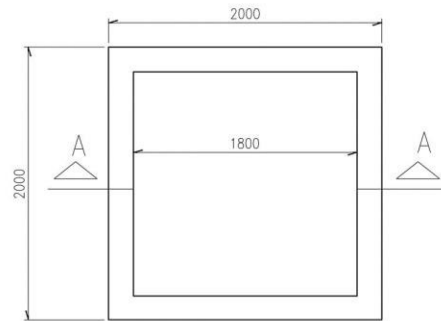
STATUS

TITLE: GENERAL ARRANGEMENT DRAWING FOR FUTURE TAP-OFF POINTS

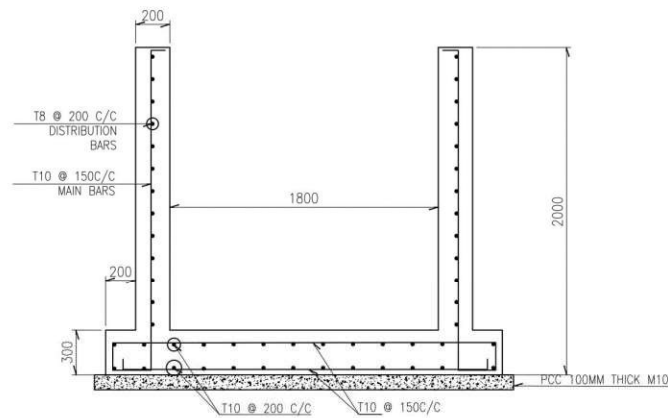
CLIENT: MINGL. PUNE

PROJECT: CGD PUNE

MINGL/Ping/Steel/40



TYP PLAN OF CHAMBER



SECTION A-A

# LEGENDS:

CL	----	CENTRE LINE
OGL	----	ORIGINAL GROUND LEVEL
NGL	----	NATURAL GROUND LEVEL
EL	----	ELEVATION
FFL	----	FINISHED FLOOR LEVEL
TYP.	----	TYPICAL
LVL.	----	LEVEL
THK.	----	THICK / THICKNESS
DET.	----	DETAIL
RCC	----	REINFORCED CEMENT CONCRETE
PCC	----	PLAIN CEMENT CONCRETE

# NOTES:

- 1) IF DOUBT ASK, DO NOT SCALE THE DRAWING.
- 2) BEARING CAPACITY = 400 KN/SQM IS CONSIDERED FOR DESIGN
- 3) GRADE OF MATERIAL:-  
CONCRETE:- M25 WITH 20MM DOWN GRADED AGGREGATES.  
STEEL:- FE500 DEFORMED BARS AS PER IS-1786.

# ENGINEERING REFERENCE

# CONSTRUCTION REFERENCE

# HOLD

--NIL--

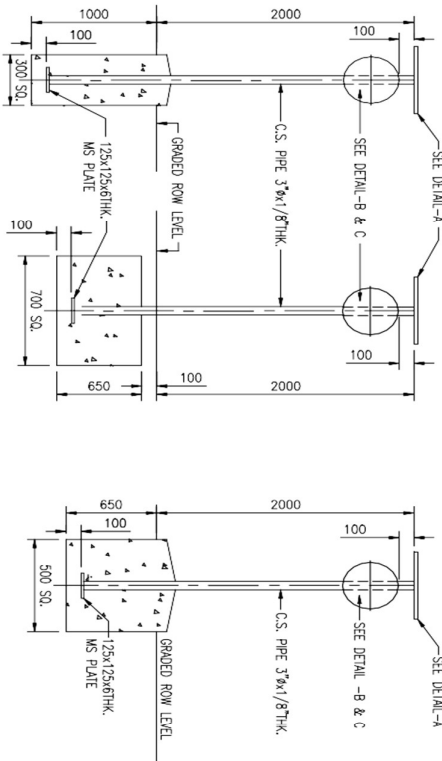
# REVISION STATUS

DO NOT SCALE

FOR RO ISSUE ONLY			ISSUE	REVISIONS			DRN	CLEARED					APPD	DATE	FILE NAME: 333399999	MAHARASHTRA NATURAL GAS LTD.	CHAMBER RC DETAILS		
DEPT	SIGNATURE	DATE						CHEM	CIVIL	ELEC	IS/C	MECH					SCALE: NTS		
CIVIL																	OFFICE - DISC:		DATE (RO ISSUE)
																	DRN: SKL		DATE (CURRENT ISSUE)
																	CHD: AM	DWG NO: ECS-2019-MNGL-DK-02-RC-07	ISSUE RO



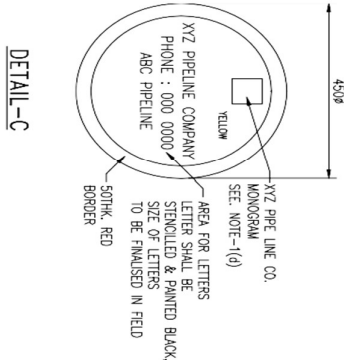
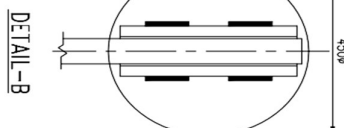
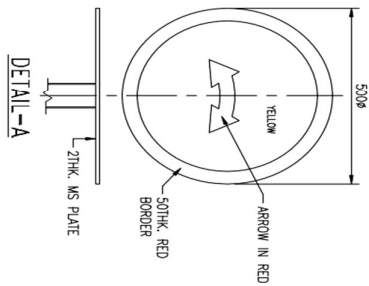
Steel Markers Drawing



TYPE-I  
FOR NORMAL SOIL

TYPE-II  
FOR DRIFTING  
SAND SOIL

TYPE-III  
FOR ROCKY AREAS



DETAIL-A

DETAIL-B

DETAIL-C

NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. SCHEME OF PAINTING & COLOURING:
  - (a) UNDERGROUND STEEL STRUCTURE (EXCEPT THAT EMBEDDED IN CONCRETE) COAT THE EPOXY MIN. 300 MICRON THK.
  - (b) OVERGROUND STEEL STRUCTURE : ONE COAT OF PRIMER & TWO COATS SPECIFIED COLOUR PAINT.
  - (c) FIGURES SHALL BE STENCILED ON BOTH SIDES OF THE POSTS IN BLACK.
  - (d) COLOUR SCHEME FOR XYZ PIPELINE CO. MONOGRAM SHALL BE AS DIRECTED BY OWNER.
  - (e) POST SHALL BE PAINTED WITH 250 WIDE ALTERNATE BANDS OF BLACK AND WHITE PAINT.
  - (f) ALL OTHER ABOVEGROUND STEEL SHALL BE PAINTED YELLOW.
3. LOCATION:
  - (a) DIRECTION MARKER SHALL BE INSTALLED AS PER SPECIFICATIONS AS DIRECTED IN APPROVED DRAWINGS AND AS DIRECTED BY OWNER.
  - (b) TWO NOS. ADDITIONAL DIRECTIONAL MARKERS SHALL BE PROVIDED 200M AWAY FROM CHANGE IN DIRECTION ON EITHER SIDE.
  - (c) OWNER NAME PLATE SHALL FACE THE PIPELINE.
  - (d) DIRECTION MARKER SHALL BE INSTALLED 1000MM TO LEFT OF THE PIPE CENTER LINE/VIEWING TOWARDS THE DIRECTION OF FLOW AND AS INDICATED IN LOCATION SKETCH.
  - (e) THE FOUNDATION SHALL BE MADE OF CONCRETE M20.
  - (f) SIGN PLATE IN REGIONAL LANGUAGE SHALL BE PREPARED BY CONTRACTOR ON SIMILAR LINES AND APPROVED BY THE OWNER.
  - (g) ALL WELDS SHALL BE 4 MM.
  - (h) IN ADDITION TO THIS, OSD AND PNGRB GUIDELINES MUST BE COMPLIED WITH.

TYPICAL DIRECTION MARKER DETAILS

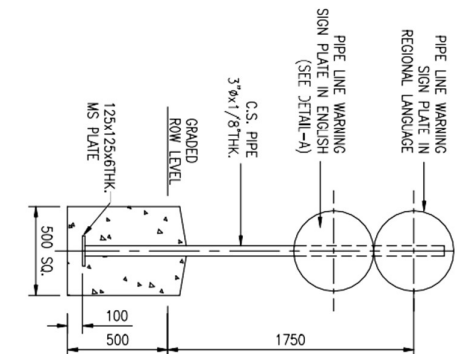
1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. SCHEME OF PAINTING & COLOURING.
  - (a) ABOVEGROUND STEEL STRUCTURE (EXCEPT THAT EMBEDDED IN CONCRETE) COAT 1A: EPOXY MIN. 300 MICRON THK.
  - (b) ABOVEGROUND STEEL STRUCTURE : ONE COAT OF PRIMER & TWO COATS SPECIFIED COLOUR PAINT.
  - (c) FIGURES SHALL BE STENCILED ON BOTH SIDES OF THE POSTS IN BLACK.
  - (d) COLOUR SCHEME FOR XYZ PIPELINE CO. MONOGRAM SHALL BE AS DIRECTED BY OWNER.
  - (e) POST SHALL BE PAINTED WITH 250 WIDE ALTERNATE BANDS OF BLACK AND WHITE PAINT.
3. LOCATION
  - (i) ALL OTHER ABOVEGROUND STEEL SHALL BE PAINTED YELLOW.
4. LOCATION
  - (a) K.M. POST SHALL BE INSTALLED AT EVERY KILOMETERS AS PER REQUIREMENTS OF CONTRACT AND AS DIRECTED BY OWNER.
  - (b) OWNER NAME PLATE SHALL FACE THE PIPELINE.
  - (c) K.M. POST SHALL BE 500MM TO THE LEFT OF THE PIPE CENTRE LINE VIEWING TOWARDS THE DIRECTION OF FLOW AND AS INDICATED IN SKETCH.
5. THE FOUNDATION SHALL BE MADE OF CONCRETE M20.
6. THE HEIGHT OF THE K.M. POST MAY BE VARIED TO SUIT FIELD REQUIREMENTS.
7. IN ADDITION TO THIS, OSD AND PWR&B GUIDELINES MUST BE COMPLIED WITH.



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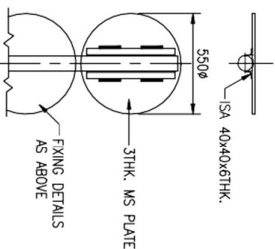


1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. SCHEME OF PAINTING & COLOURING.
- (a) UNDERGROUND STEEL STRUCTURE: EXCEPT THAT EMBEDDED IN CONCRECTED COAL TIE EPOXY MIN. 300 MICRON THK.
- (b) OVERGROUND STEEL STRUCTURE : ONE COAT OF PRIMER & TWO COATS SPECIFIED COLOUR PAINT.
- (c) ALL LETTERS EXCEPT WARNING SHALL BE PAINTED BLACK.
- (d) COLOUR SCHEME FOR XYZ PIPELINE CO. MONOGRAM SHALL BE AS DIRECTED BY OWNER.
- (e) POST SHALL BE PAINTED WITH 250 WIDE ALTERNATE BANDS OF BLACK AND WHITE PAINT.
- (f) ALL OTHER ABOVEGROUND STEEL SHALL BE PAINTED YELLOW.
3. LOCATION
- (a) THE PIPE LINE WARNING SIGN SHALL BE INSTALLED IN ACCORDANCE WITH CONTRACT REQUIREMENTS AND AS DIRECTED BY OWNER IT SHALL BE INSTALLED TO THE LEFT OF THE PIPE CENTER LINE, VIEWING IN THE DIRECTION OF FLOW AT 300MM FROM PIPELINE O.D. AND THE WARNING SIGN PLATE SHALL FACE THE UTILITY BEING CROSSED.
- (b) THE WARNING SIGN PLATE MAY BE MOUNTED ON VENT PIPES OR KM POST WHERE EVER POSSIBLE.
4. THE FOUNDATION SHALL BE MADE OF CONCRETE M20.
5. SIGN PLATE IN REDUNDAL APPROVED SHALL BE PREPARED BY CONTRACTOR ON SIMILAR LINES AND LAID BY THE OWNER.
6. IN ADDITION TO THIS, OSD AND PNGSR GUIDELINES MUST BE COMPLIED WITH.



TYPE-III

FOR ROCKY AREAS



## WARNING SIGN PLATE

TYPICAL PIPE LINE WARNING SIGN DETAILS