



**CENTRAL UP GAS LIMITED
(CITY GAS PROJECT IN KANPUR &
BAREILLY)**

TENDER FOR

**Engaging Contractors for CS Pipeline Laying and
Other associated works in Kanpur, Unnao,
Bareilly and Jhansi**

E-TENDER No. 55334

TENDER NO. CUGL/C&P/TEN2324/40

**TECHNICAL VOLUME
VOLUME II OF II – PART-2**

OPEN DOMESTIC COMPETITIVE BIDDING

BIDDING (THROUGH E-TENDERING MODE)

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Rev. D M Y
SUBJECT

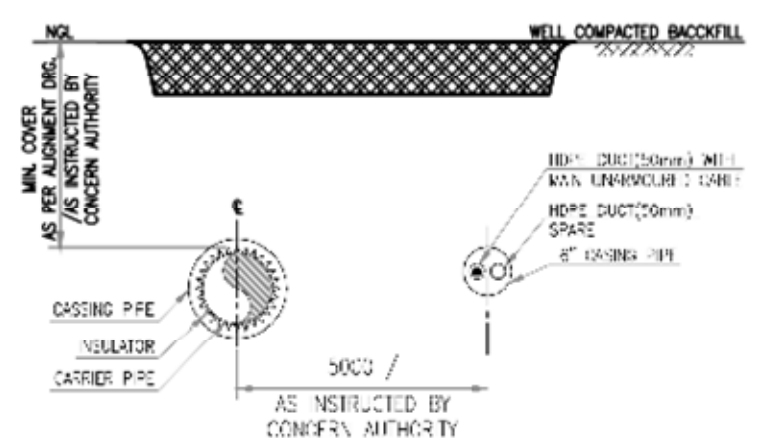
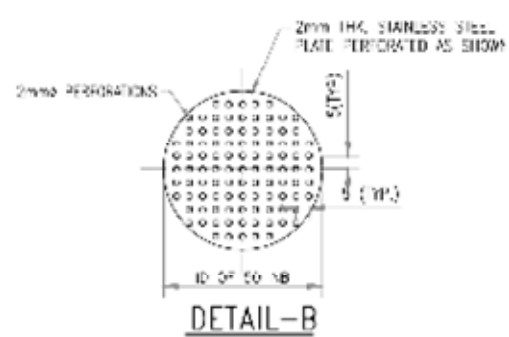
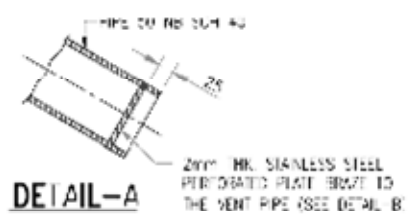
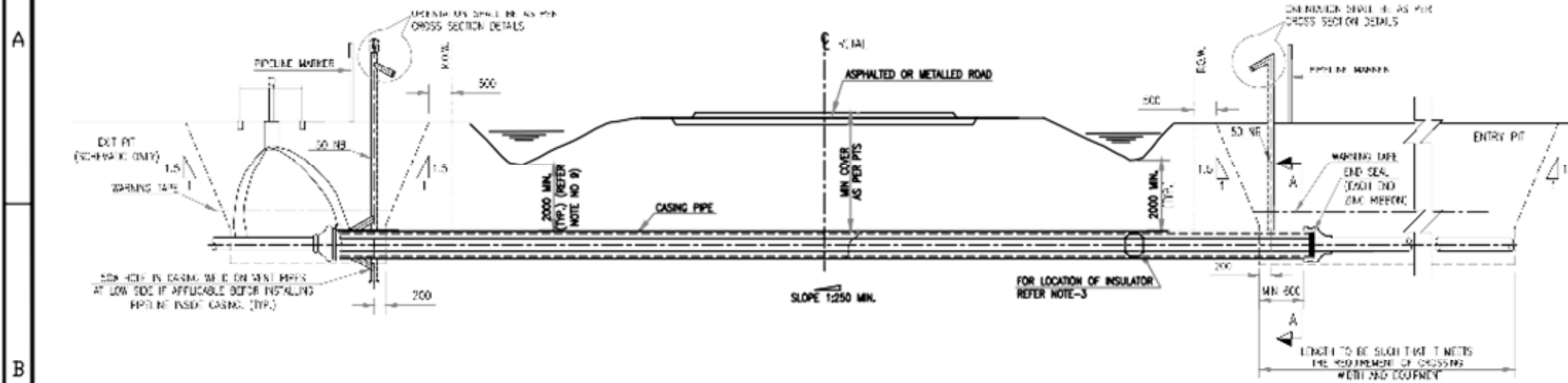
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TYPICAL TRENCH DETAILS

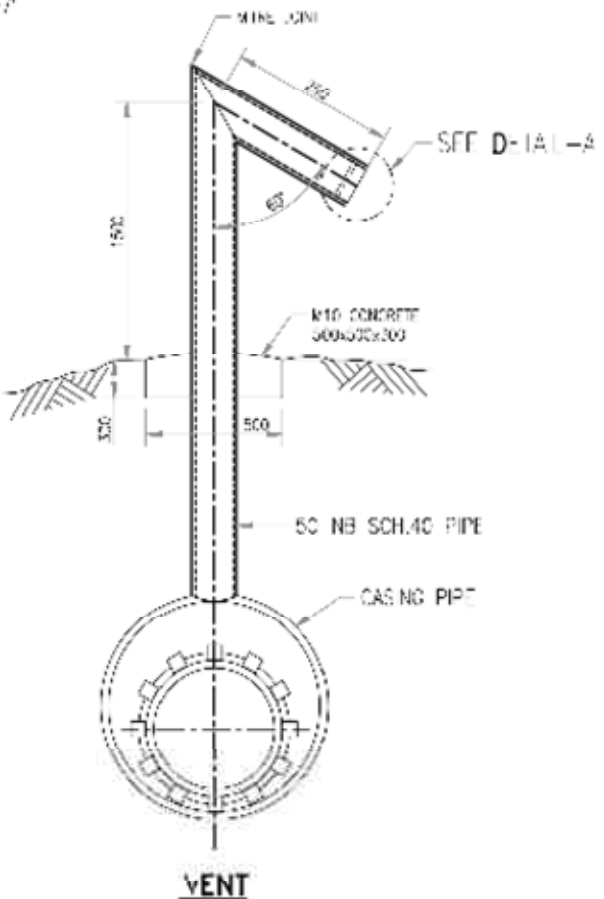
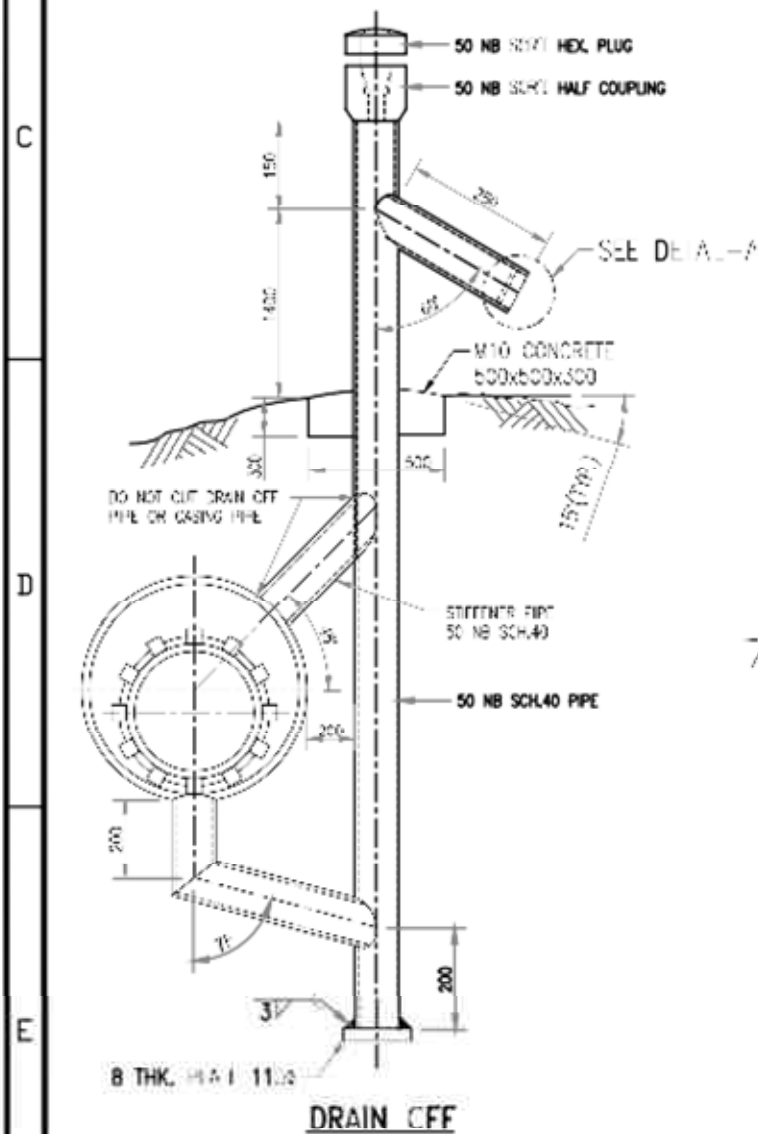
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| Size | Scale | Sheet | | | |
| A3 | NTS | 01 | of | 01 | Rev. |
| Drawing No. | GGNG-D-20707-002 | | | | 0 |

NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE CROSSING WORKS SHALL BE EXECUTED IN ACCORDANCE WITH ARI 11.02 AND THE PRACTICE 11.02 TABLE 11.1.1.1.1.
3. 50mm AWAY FROM BOTH ENDS, TWO NOS. INSULATORS SHALL BE PLACED. IN REMAINING LENGTH MAX. SPACING OF INSULATORS SHALL BE 2000 mm.
4. ELECTRICAL INSULATION BETWEEN THE CASING AND CARRIER PIPE SHALL BE CHECKED WITH A SUITABLE MEGGER.
5. MATERIAL OF THE CASING INSULATORS SHALL BE HDPE. END SEALS SHALL BE HEAT SHRINKABLE TYPE (MAKE BAYCO M OR EQUIVALENT). CONTRACTOR SHOULD TAKE PRIOR APPROVAL FOR MATERIAL OF CONSTRUCTION FOR END SEAL & SHALL SUBMIT MATERIAL CERTIFICATES TO OWNER/ CONSULTANT FOR APPROVAL.
6. 1:25% SLOPE TO BE PROVIDED FOR DRAINING DURING INSTALLATION OF CASING PIPE.
7. CASING PIPE SHOULD EXTEND MIN. 600mm BEYOND THE TOE OF THE SLOPE OR BENEATH GRADE, OR MIN 300mm BEYOND THE TRITHEM OF THE DRAINAGE DITCH, WHICHEVER IS MORE.
8. CONTRACTOR SHALL SUBMIT DETAILED WORK PROCEDURE ALONG WITH SKETCHES AND MATERIAL TEST CERTIFICATES FOR APPROVAL.
9. THE CROSSING SHALL BE CARRIED OUT WITH PIPE SIZE AND MINIMUM THICKNESS GIVEN IN THE PIS & DESIGN BASIS, THE SIZE GIVEN IN THIS SHEET ARE MINIMUM INDICATED ONLY.
17. FILLING OF ANNUAL SPACE BETWEEN CASING AND CARRIER PIPE SHALL BE AS PER PROJECT SPECIFICATION.
18. CROSSING MAY BE CARRIED OUT PRIOR TO MAINLINE ACTIVITIES ADDITIONAL IF REQUIRED FOR APPROACH TO CROSSING PIPELINE. SHIMMING, HYDROTESTING, WORKING AT THE CROSSING TO ADD DRAINAGE OF SOL, SHALL BE PROVIDED BY CONTRACTOR WITHOUT ANY COST IMPLICATION.
19. CARRIER PROTECTION - ALL CASING PIPES FOR OUTWAY CROSSING SHALL BE C.P.P. PROTECTED, USING SACRIFICIAL ANGLE.
20. TEST STATION ON BOTH SIDE OF CROSSING.
21. THE LOCATION OF ENTRY AND EXIT PIT SHALL BE DECIDED AT SITE TO SUIT THE SITE REQUIREMENT.
22. AT EACH CROSSING PIPELINE CROSSING WARNING SIGN SHALL BE INSTALLED ON EITHER SIDE OF CROSSING. THE WARNING PANEL MAY BE MOUNTED ON THE VENT/ DRAIN OFF PIPE.
23. ALL CARRIER PIPELINE JOINTS SHALL BE RADICAPPED.
24. PIPELINE SECTION SHALL BE PROVIDED WITH HYDROSTATICALLY SEPARATELY FROM THE MAIN LINE USING WELLS REQUIRED BY COMPETENT AUTHORITY OR AS DIRECTED BY CONSULTANT.
25. THE CASING PIPE SHALL BE PROVIDED WITH MINIMUM 50 MM DIAMETER VENT PIPE FOR FILLING THE FILLER MATERIAL IF REQUIRED AS PER PROJECT SPECIFICATION. AFTER FILLING VENT PIPE AT BOTH ENDS SHALL BE TRIMMED AND PLUGGED/SEALED WITH END CAPS.
26. IN ANY CASE, THE MINIMUM LENGTH OF CASING PIPE SHALL BE 70M FOR NATIONAL HIGHWAY CROSSING AND 50M FOR ALL STATE HIGHWAY/RTE CROSSING.
27. THICKNESS OF CASING PIPE SHALL BE CALCULATED AS PER ARI 11.02 AND SUBMITTED FOR APPROVAL.



**SECTION A-A
TYPICAL BORE PIT EXCAVATION**



| S. NO. | SIZE OF CARRIER PIPE (INCH NB) | MINIMUM SIZE OF CASING PIPE (FOR TYPE-I) | MATERIAL |
|--------|--------------------------------|--|---------------------------|
| 1. | 4" | 10" | AH SL Gr. B or equivalent |
| 2. | 6" | 12" | AH SL Gr. B or equivalent |
| 3. | 8" | 14" | AH SL Gr. B or equivalent |
| 4. | 10" | 15" | AH SL Gr. B or equivalent |
| 5. | 12" | 18" | AH SL Gr. B or equivalent |
| 6. | 16" | 20" | AH SL Gr. B or equivalent |
| 7. | 18" | 24" | AH SL Gr. B or equivalent |
| 8. | 20" | 25" | AH SL Gr. B or equivalent |
| 9. | 24" | 30" | AH SL Gr. B or equivalent |
| 10. | 30" | 33" | AH SL Gr. B or equivalent |
| 11. | 36" | 42" | AH SL Gr. B or equivalent |
| 12. | 42" | 48" | AH SL Gr. B or equivalent |
| 13. | 48" | 54" | AH SL Gr. B or equivalent |

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|------|----------|----------------------------|-------|---------|----------|-----------|
| 1 | 16.04.21 | REVISED AND RE-ISSUED. | KS | MKS | MS | KNS |
| 0 | 29.09.16 | APPROVED FOR CONSTRUCTION. | JV | MS | NC | SKH |
| Rev. | D M Y | Modifications | Drawn | Checked | Approved | Validated |

SUBJECT: TYPICAL ROAD CASED CROSSING (B+C)
TYPE - I
SEPARATE CASING FOR CARRIER AND OFC

Size Scale Sheet
A3 NTS 01 of 01
Drawing No. Rev.
GGNG-D-20707-004-A 1

1

2

3

4

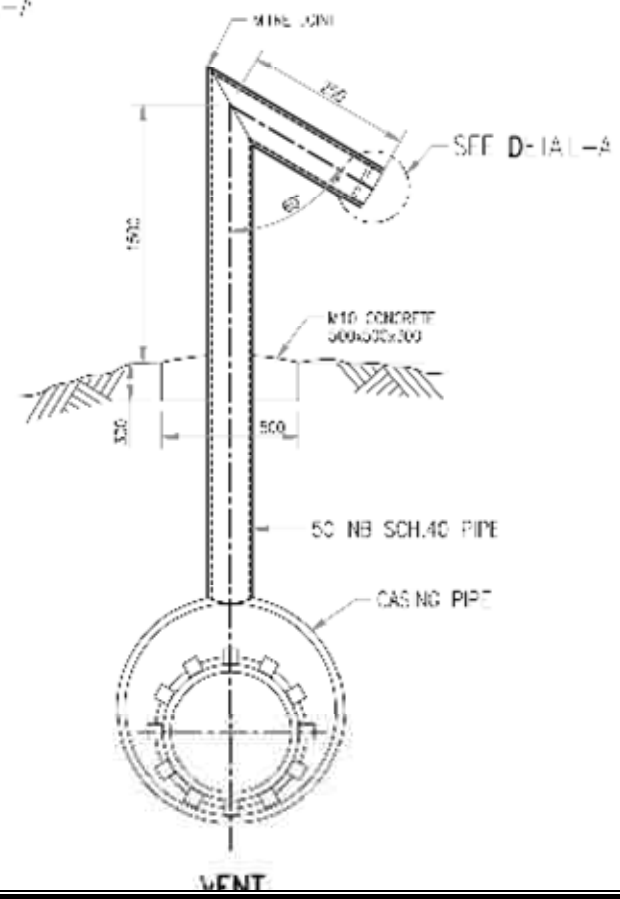
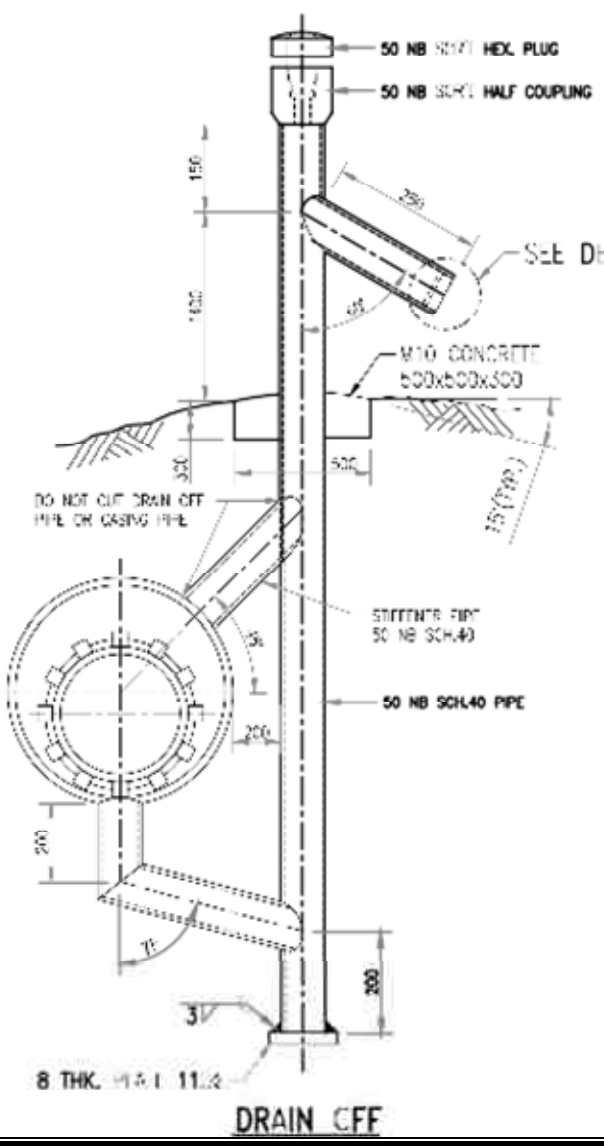
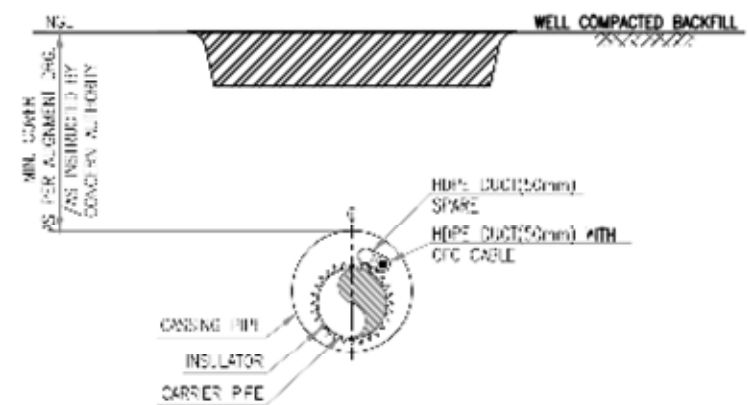
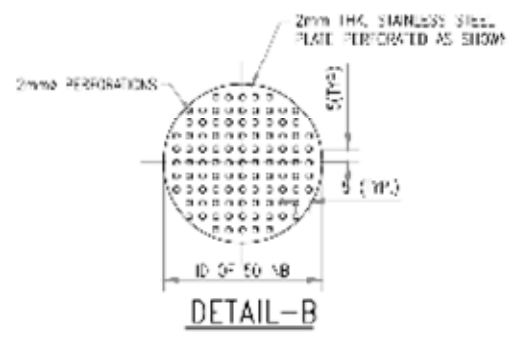
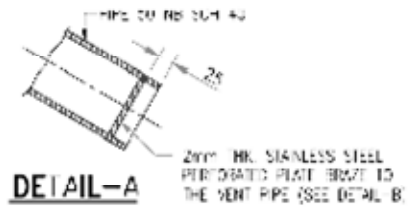
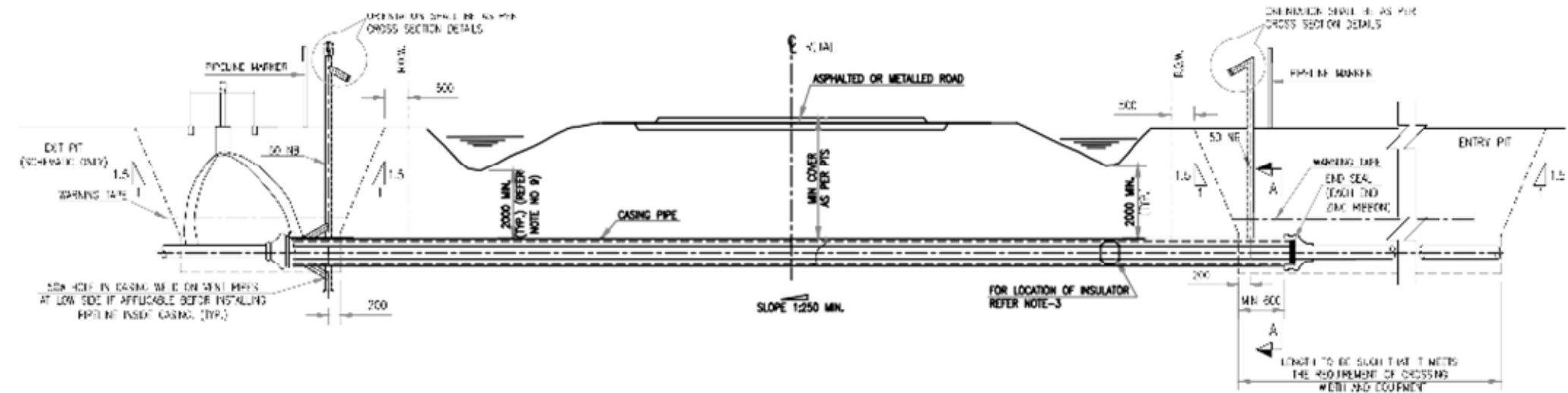
A

B

C

D

E

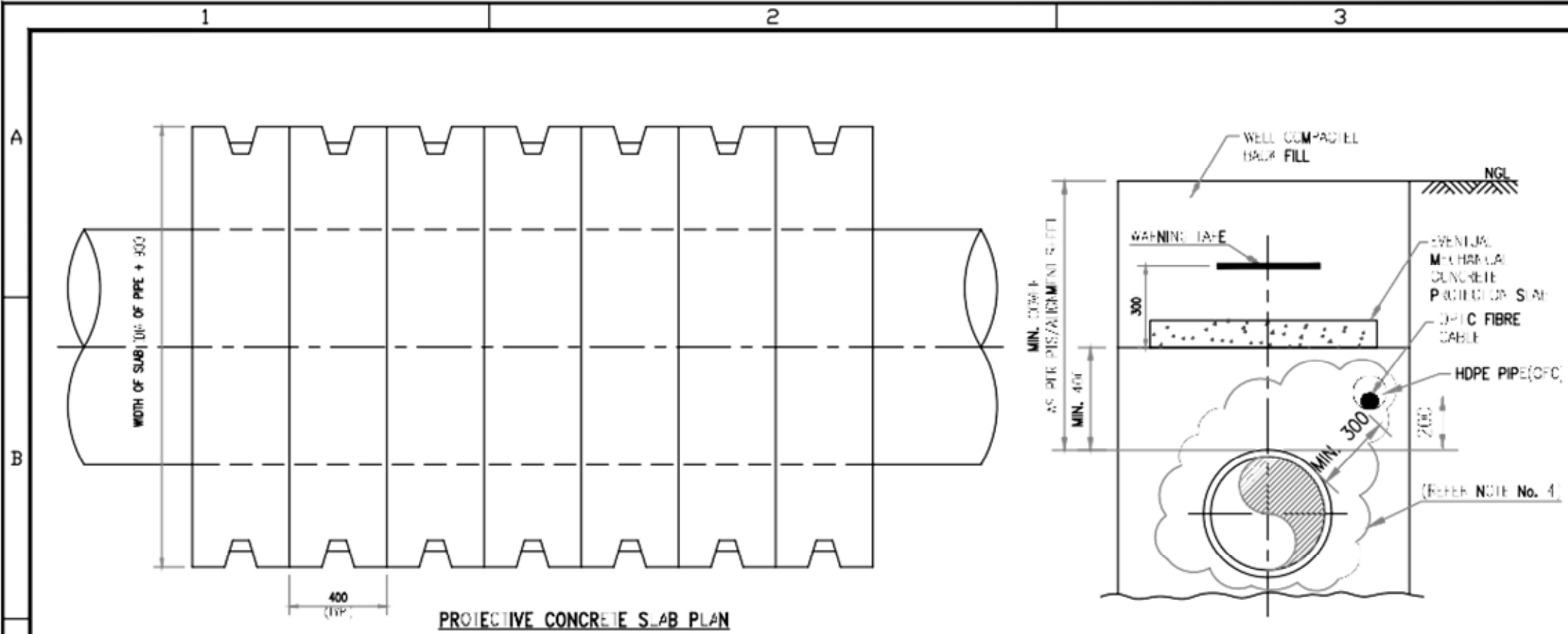


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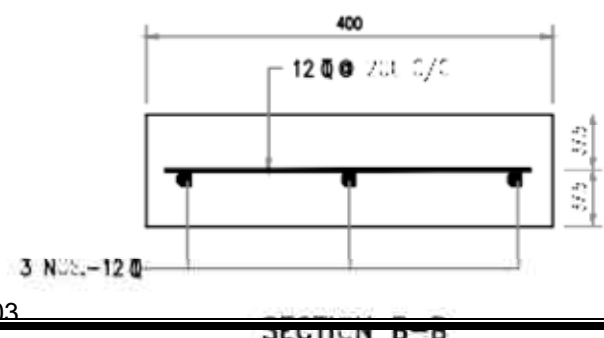
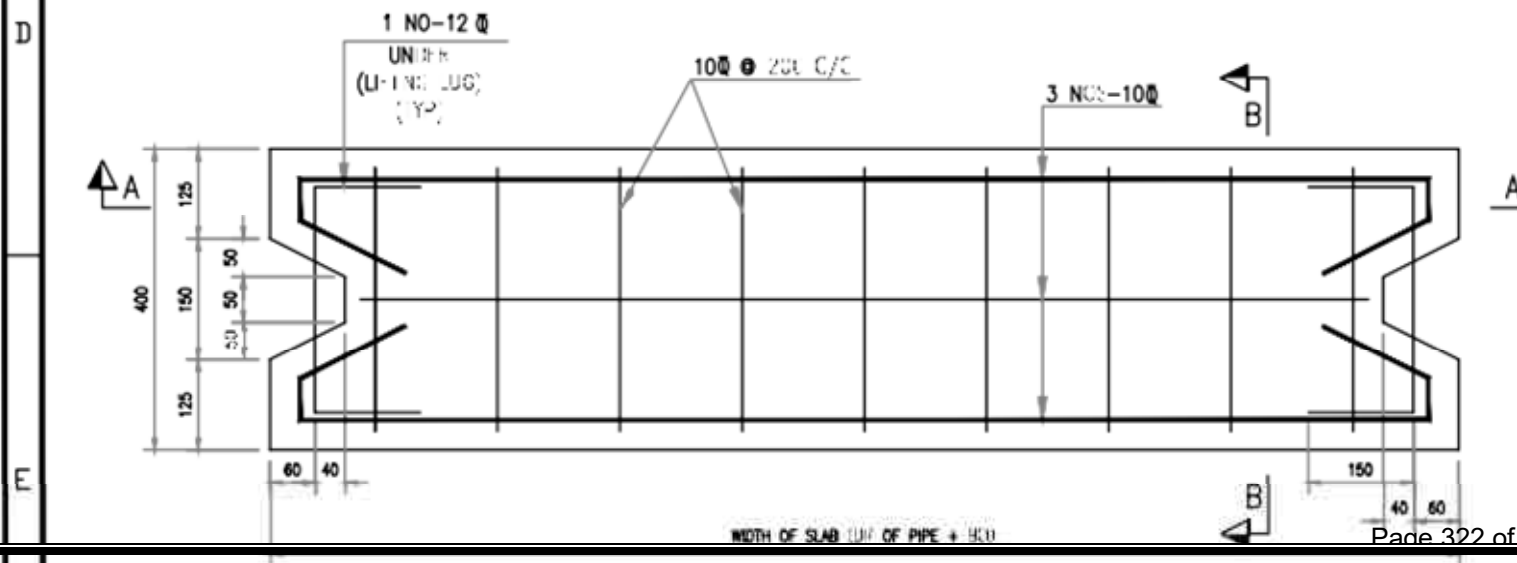
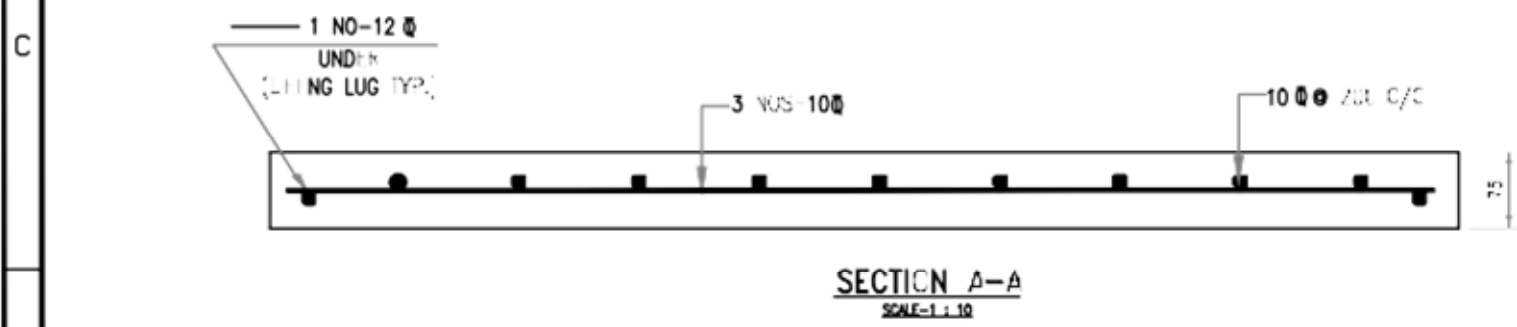
1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE CROSSING WORKS SHALL BE EXECUTED IN ACCORDANCE WITH ARII RECOMMENDED PRACTICE 11.13 (A) PART II EN.
3. 500mm AWAY FROM BOTH ENDS, TWO NO. INSULATORS SHALL BE PLACED, IN BRIDGE LENGTH MAX. SPACING OF INSULATORS SHALL BE 2000 mm.
4. ELECTRICAL INSULATION BETWEEN THE CASING AND CARRIER PIPE SHALL BE CHECKED WITH A SUITABLE MEGGER.
5. MATERIAL OF THE CASING INSULATORS SHALL BE HIGH END SHALL BE HEAT SHRINKABLE TYPE (MAKE HAYDOR OR EQUIVALENT), CONTRACTOR SHOULD TAKE PRIOR APPROVAL FOR MATERIAL OF CONSTRUCTION FOR END SEAL & SHALL SUBMIT MATERIAL CERTIFICATES TO OWNER/ CONSULTANT FOR APPROVAL.
6. 1:250 SLOPE TO BE PROVIDED FOR DRAINING DURING INSTALLATION OF CASING PIPE.
7. CASING PIPE SHOULD EXTEND MIN. 600mm BEYOND THE TOE OF THE SLOPE OR BENT GRADE, OR MIN 300mm BEYOND THE BOTTOM OF THE DRAINAGE DITCH, WHICHEVER IS MORE.
8. CONTRACTOR SHOULD SUBMIT DETAILED WORK PROCEDURE ALONG WITH SKETCHES AND MATERIAL TEST CERTIFICATES FOR APPROVAL.
9. THE CROSSING SHALL BE CARRIED OUT WITH PIPE SIZE AND MINIMUM THICKNESS GIVEN IN THE P.S. & DESIGN BASIS, THE SIZE GIVEN IN THIS SHEET ARE MINIMUM INDICATED ONLY.
17. FILLING OF ANNUAL SPACE BETWEEN CASING AND CARRIER PIPE SHALL BE AS PER PROJECT SPECIFICATION.
18. CROSSING MAY BE CARRIED OUT PRIOR TO MAINLINE ACTIVITIES ADDITIONAL IF REQUIRED FOR APPROACH TO CROSSING PIPELINE SURROUNDING HYDROTESTING, WORKING IN THE DRAINAGE TO AVOID CAVING OF SOIL, SHALL BE PROVIDED BY CONTRACTOR WITHOUT ANY COST IMPLICATION.
19. GALVANIC PROTECTION :- ALL CASING PIPES FOR HIGHWAY CROSSING SHALL BE C.P. PROTECTED, USING SACRIFICIAL ANODE.
20. TEST STATION ON BOTH SIDE OF CROSSING.
21. THE LOCATION OF ENTRY AND EXIT PIT SHALL BE DECIDED AT SITE TO SUIT THE SITE REQUIREMENT.
22. AT EACH CROSSING PIPELINE CROSSING WARNING SIGN SHALL BE INSTALLED ON EITHER SIDE OF CROSSING THE WARNING SHALL BE MOUNTED ON THE VENT/DRAIN OFF PIPE.
23. ALL CARRIER PIPELINE JOINTS SHALL BE TADOLAPPED.
24. PIPELINE SIGNAGE SHALL BE PROVIDED HYDROSTATICALLY SEPARATELY FROM THE MAIN LINE SIGNAGE WHEN REQUIRED BY CONCERNED AUTHORITIES OR AS DIRECTED BY CLIENT.
25. THE CASING PIPE SHALL BE PROVIDED WITH MINIMUM 50 MM DIAMETER VENT PIPE FOR FILLING THE FILLER MATERIAL IF REQUIRED AS PER PROJECT SPECIFICATION. AFTER FILLING VENT PIPE AT BOTH ENDS SHALL BE TRIMMED AND PLUGGED/SEALED WITH END CAPS.
26. IN ANY CASE, THE MINIMUM LENGTH OF CASING PIPE SHALL BE 70M FOR NATIONAL HIGHWAY CROSSING, AND 60M FOR ALL STATE HIGHWAY/STATE CROSSING.
27. THICKNESS OF CASING PIPE SHALL BE CALCULATED AS PER ARII RP 11.13 AND SUBMITTED FOR APPROVAL.

| S. NO. | SIZE OF CARRIER PIPE (INCH NO.) | MINIMUM SIZE OF CASING PIPE (FOR TYPE-II) | MATERIAL |
|--------|---------------------------------|---|---------------------------|
| 1. | 4" | 10" | AH 5L Gr. B or equivalent |
| 2. | 6" | 12" | AH 5L Gr. B or equivalent |
| 3. | 8" | 14" | AH 5L Gr. B or equivalent |
| 4. | 10" | 15" | AH 5L Gr. B or equivalent |
| 5. | 12" | 18" | AH 5L Gr. B or equivalent |
| 6. | 16" | 22" | AH 5L Gr. B or equivalent |
| 7. | 18" | 24" | AH 5L Gr. B or equivalent |
| 8. | 21" | 25" | AH 5L Gr. B or equivalent |
| 9. | 24" | 30" | AH 5L Gr. B or equivalent |
| 10. | 31" | 35" | AH 5L Gr. B or equivalent |
| 11. | 36" | 42" | AH 5L Gr. B or equivalent |
| 12. | 42" | 48" | AH 5L Gr. B or equivalent |
| | 48" | 54" | AH 5L Gr. B or equivalent |

Rev. 16.04.21 REVISED AND MODIFIED. Drawn Checked Approved Validated
 0.29.09.16 APPROVED FOR CONSTRUCTION. JV MS NC SKH
 SUBJECT TYPICAL ROAD Cased CROSSING (B+C) TYPE - II
 COMMON CASING - OFC BUNDLED WITH CARRIER (WITHOUT CS CONDUIT)
 Size Scale Sheet
 A3 NTS 01 of 01
 Drawing No. Rev.
 GGNG-D-20707-004-B 1



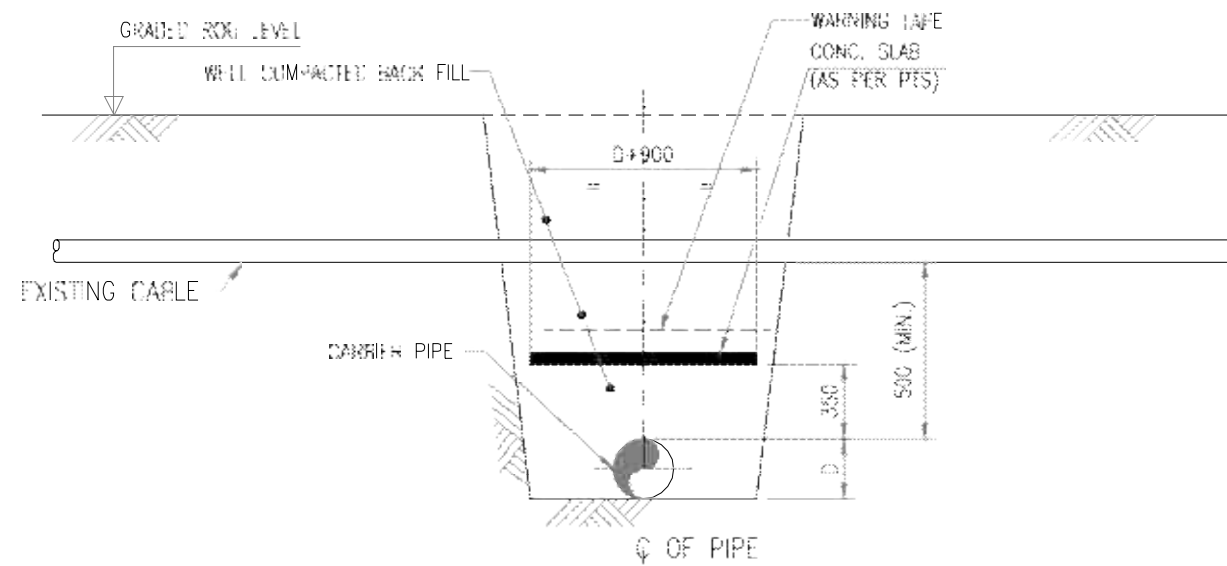
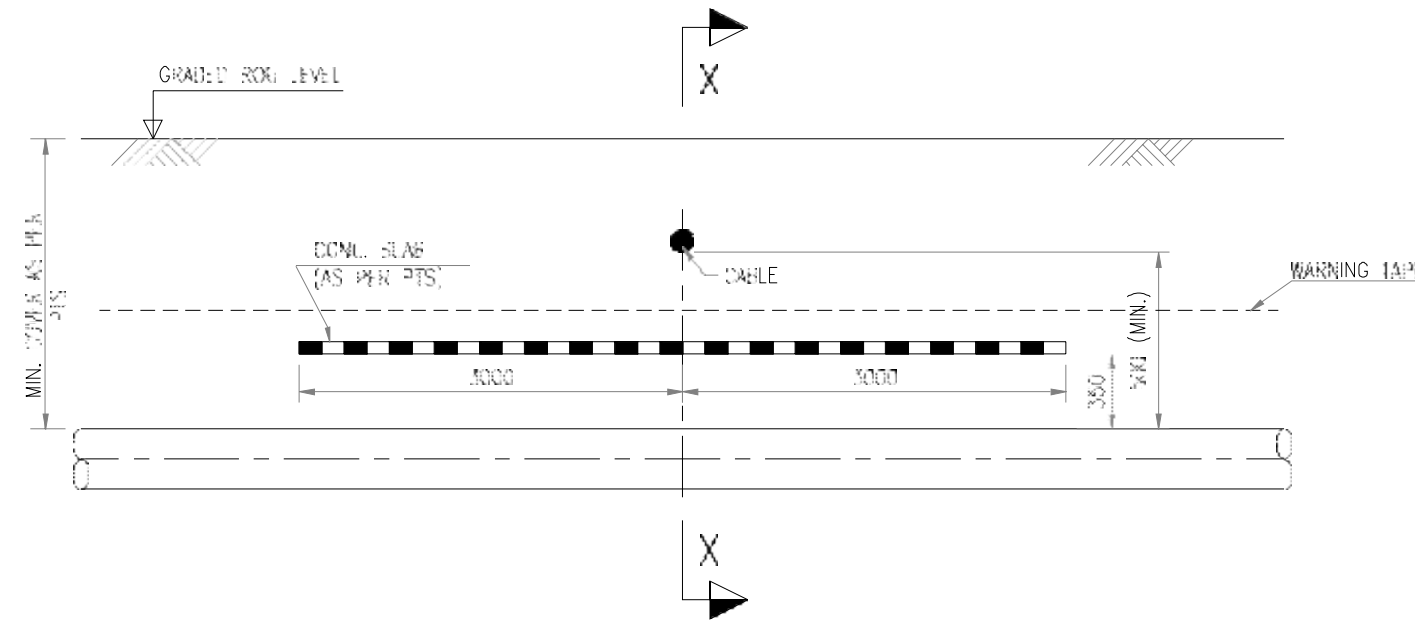
- NOTES**
1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
 2. MINIMUM COVER OVER LINE PIPE SHALL BE AS PER SPECIFICATIONS AND REQUIREMENT OF CONCERNED AUTHORITIES.
 3. THIS SKETCH IS INDICATIVE ONLY.
 4. TYPE OF TRENCHING SHALL BE AS PER PDS AND APPROVED PROCEDURE.
 5. CONCRETE MIX M20 SHALL BE USED.
 6. LENGTH OF THE MECHANICAL PROTECTION SLAB REQUIREMENT SHALL BE AS PER SITE REQUIREMENT.



| | | | | | |
|--|---------------|---------------------------|---------|----------|-----------|
| Rev. D M Y | Modifications | Drawn | Checked | Approved | Validated |
| SUBJECT: TYPICAL MECHANICAL PROTECTION CONCRETE SLAB DETAILS | | | | | |
| 0 | 16.04.21 | APPROVED FOR CONSTRUCTION | MKS | MS | KNS |
| Size: A3 NTS 01 of 01 | | | | | |
| Drawing No. GGNG-D-20707-007 | | | | | |
| Rev. 0 | | | | | |

NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. A MODIFIED PIPELINE WARNING SIGN SHALL BE INSTALLED CLOSE TO THE CROSSING.
3. IN CASE OF UNARMoured CABLE, C.P. BONDING IS TO BE PROVIDED BETWEEN PIPELINE AND CABLE ARMOUR. IN CASE OF UNARMoured CABLE, ARRANGEMENT FOR SHIELDING (BY PROVIDING CASING ON EITHER SIDE OF THE PIPELINE OR CABLE) SHALL BE CONSIDERED.
4. APPROVAL OF THE CROSSING SHALL BE OBTAINED FROM CONCERNED AUTHORITIES.
5. FOR CONCRETE SLAB, REFER STD. DRG No. GGNG-D-20707-007.



SECTION X-X

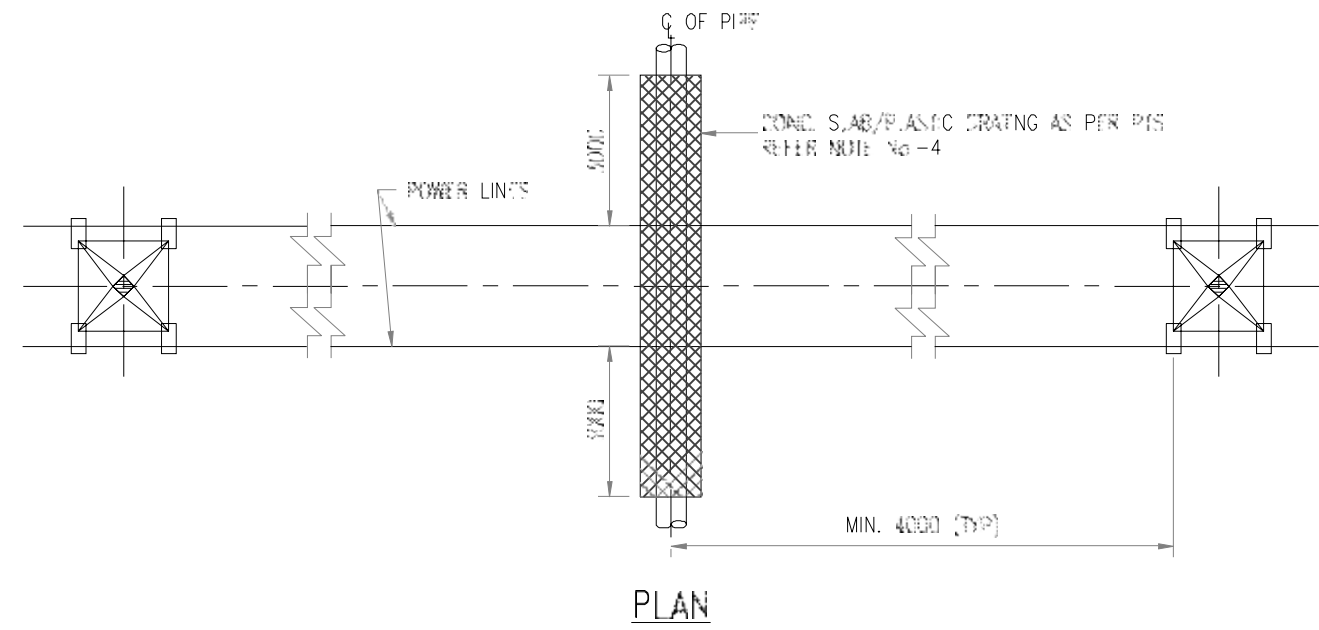
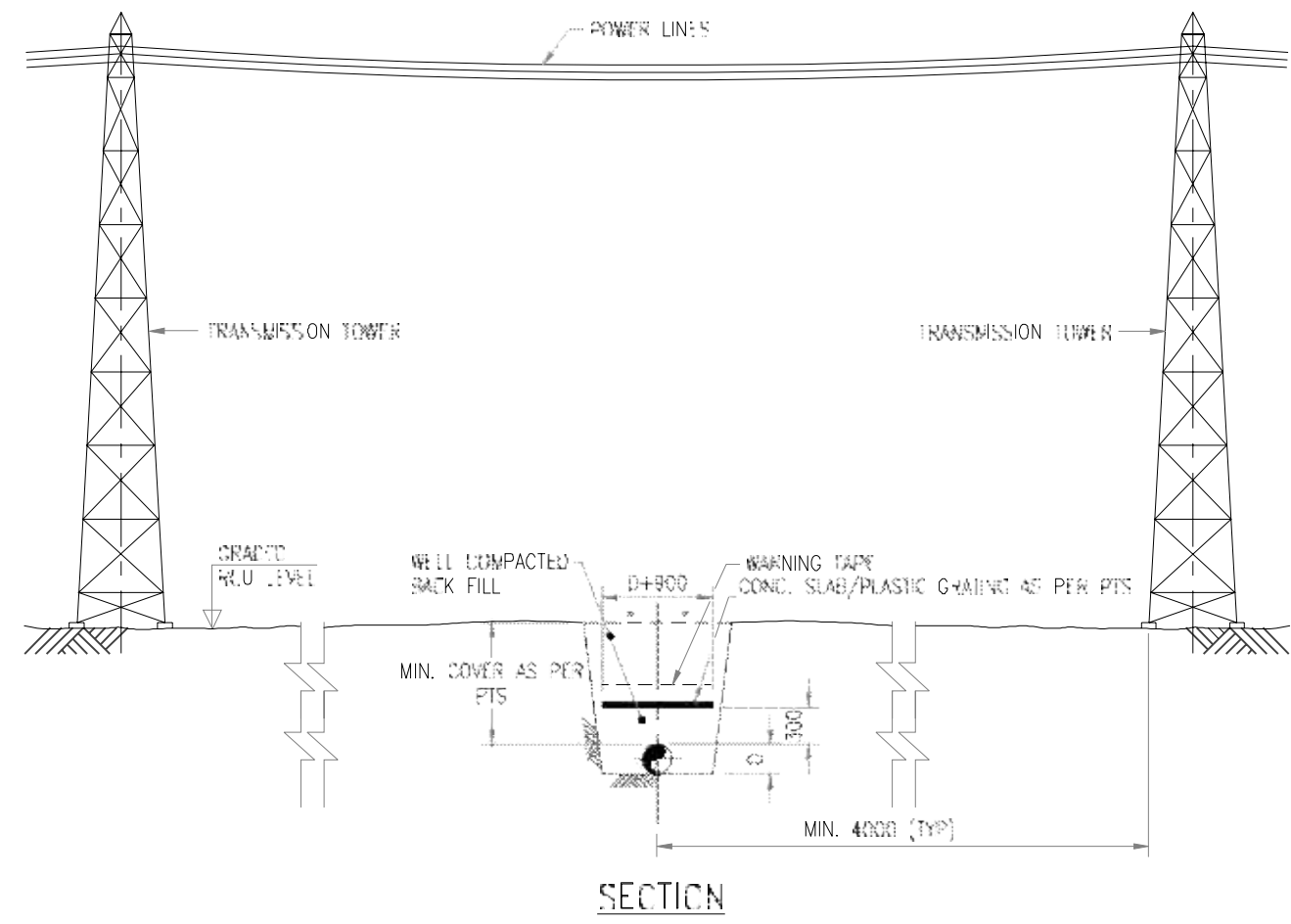
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| 0 | 16.04.21 | APPROVED FOR CONSTRUCTION. | KS | MKS | MS | KNS |
| Rev. | D M Y | Modifications | Drawn | Checked | Approved | Validated |

SUBJECT: TYPICAL UNDERGROUND CABLE CROSSING DETAILS

| | | |
|-------------|------------------|----------|
| Size | Scale | Sheet |
| A3 | NTS | 01 of 01 |
| Drawing No. | GGNG-D-20707-008 | Rev. 0 |

NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. SUITABLE MEASURES SHALL BE TAKEN FOR THE PROTECTION OF THE LINE AND SECURITY OF PERSONNEL WHEREVER FOUND NECESSARY.
3. APPROVAL OF THE CROSSING SHALL BE OBTAINED FROM CONCERNED AUTHORITIES.
4. FOR CONCRETE SLAB REFER STD DWG NO. GGNG-D-20707-007.
5. HIPE SHEET SHALL BE PROVIDED FOR HIGH VOLTAGE LINES FROM 11KV TO 66KV. FOR 66KV AND ABOVE CONCRETE SLAB SHALL BE PROVIDED.



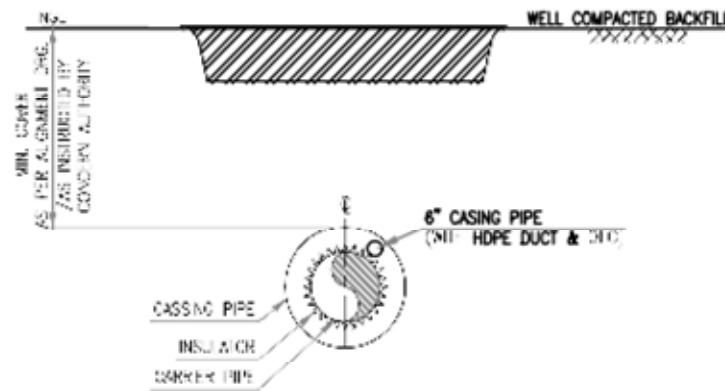
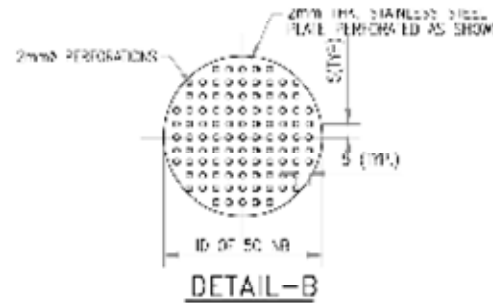
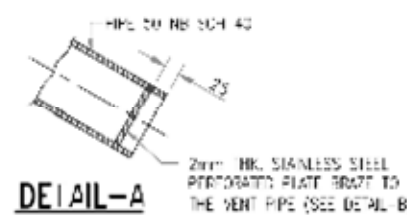
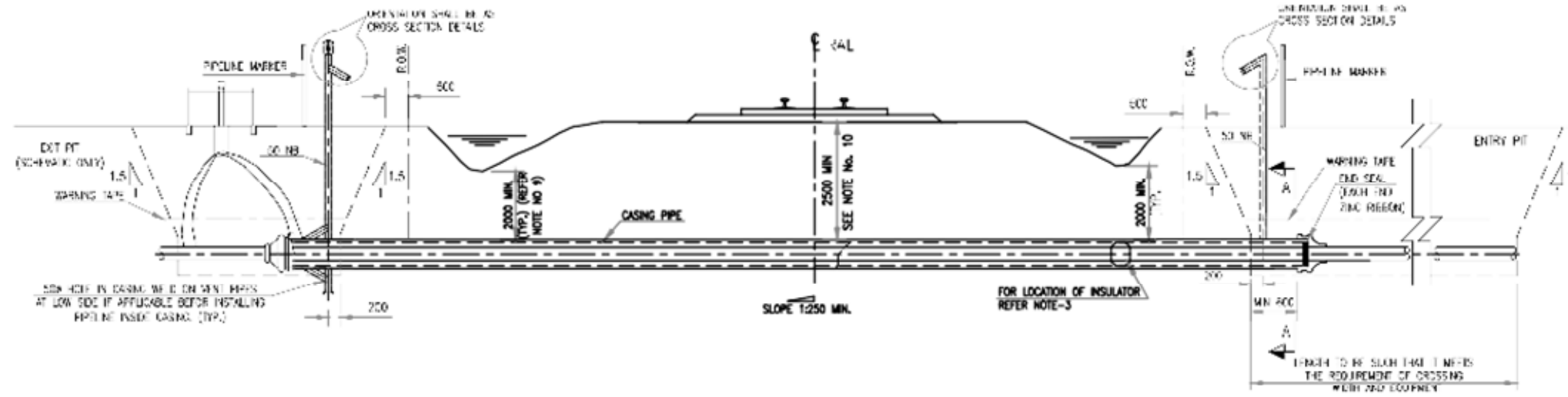
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| 0 | 16.04.21 | APPROVED FOR CONSTRUCTION. | KS | MKS | MS | KNS |
| Rev. | D M Y | Modifications | Drawn | Checked | Approved | Validated |

SUBJECT OVERHEAD POWER LINE CROSSING DETAILS

| | | |
|-------------|------------------|----------|
| Size | Scale | Sheet |
| A3 | NTS | 01 of 01 |
| Drawing No. | GGNG-D-20707-009 | Rev. 0 |

NOTES

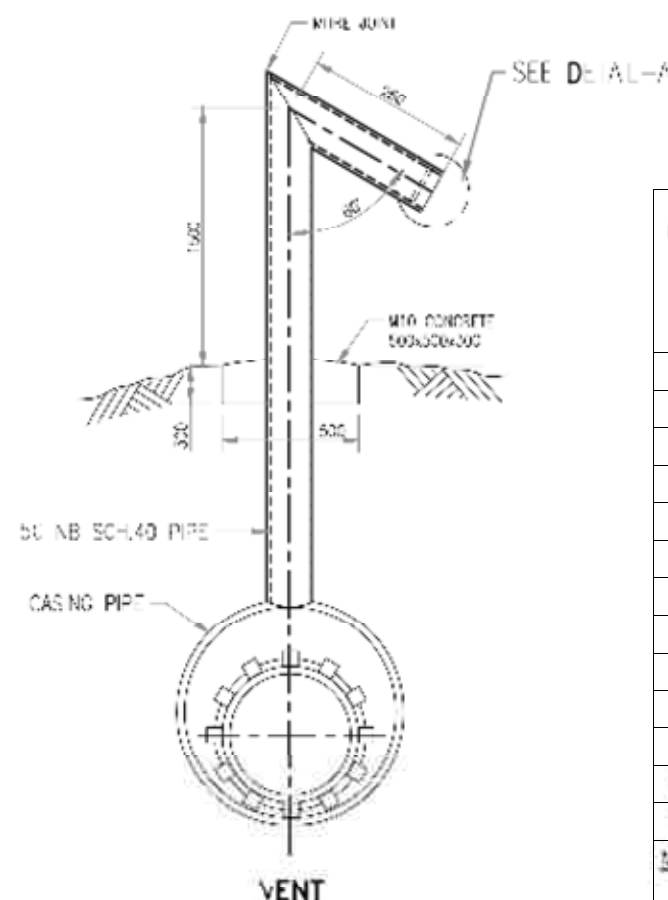
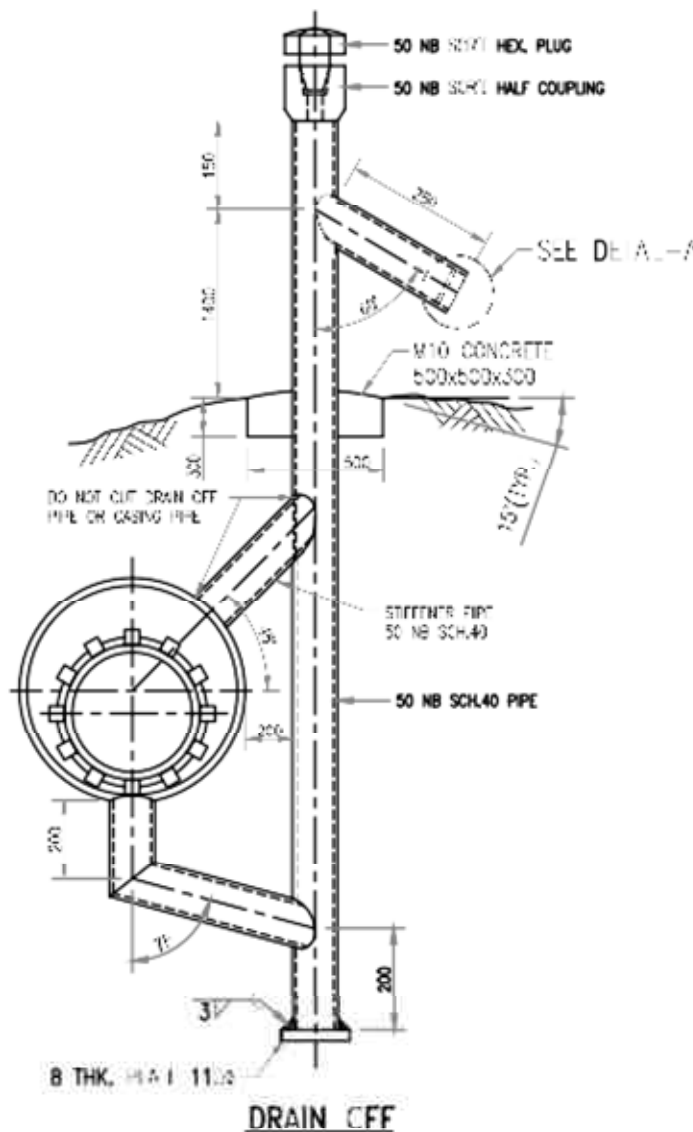
- ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
- THE CROSSING WORKS SHALL BE EXECUTED IN ACCORDANCE WITH ARI RECOMMENDED PRACTICE 1102 LATEST EDITION.
- 500mm AWAY FROM BOTH ENDS, TWO NOS. INSULATORS SHALL BE PLACED. IN BALANCE LENGTH MAX. SPACING OF INSULATORS SHALL BE 2000 mm.
- ELECTRICAL INSULATION BETWEEN THE CASING AND CARRIER PIPE SHALL BE CHECKED WITH A MEGGER.
- MATERIAL OF THE CASING INSULATORS SHALL BE HDPE END SEALS SHALL BE HEAT SHRINKABLE TYPE, CONTRACTOR SHOULD TAKE PRIOR APPROVAL FOR MATERIAL OF CONSTRUCTION FOR END SEAL & SHALL SUBMIT MATERIAL CERTIFICATES TO OWNER/CONSULTANT FOR APPROVAL.
- 1:250 SLOPE TO BE PROVIDED TOWARDS DRAIN DURING INSTALLATION OF CASING PIPE.
- CONTRACTOR SHOULD SUBMIT DETAILED WORK PROCEDURE ALONG WITH SKETCHES AND MATERIAL TEST CERTIFICATES FOR APPROVAL.
- THE MINIMUM 2.5M COVERAGE SHALL BE MAINTAINED BETWEEN TOP SURFACE OF CASING PIPE AND BOTTOM OF RAIL UNLESS OTHERWISE STATED IN PIS OR REQUIRED BY RAILWAY AUTHORITIES.
- AT EACH CROSSING, PIPELINE CROSSING WARNING SIGN SHALL BE INSTALLED ON EITHER SIDE OF CROSSING. THE WARNING PLATE MAY BE MOUNTED ON THE VENT/ DRAIN OFF PIPE.
- ALL CARRIER PIPELINE JOINTS SHALL BE RADIOGRAPHED.
- PIPELINE SECTION SHALL BE PRESTRESSED HYDROSTATICALLY SEPARATELY FROM THE MAIN LINE TESTING WHEN REQUIRED BY CONCRETED AUTHORITIES/OR AS DIRECTED BY CLIENT.
- CASING PIPE SHOULD EXTEND A MIN OF 600MM BEYOND THE TOP OF THE SLOPE OR BASE GRADE, OR 900MM BEYOND THE BOTTOM OF THE DRAINAGE DITCH WHICHEVER IS GREATER.
- CROSSING SHALL BE CARRIED OUT WITH CASING PIPE SIZE & THICKNESS GIVEN IN PIS & DESIGN BASIS. THE SIZES & THICKNESS GIVEN IN THIS SHEET ARE MINIMUM REQUIREMENT AND INDICATIVE ONLY.
- CROSSING MAY BE CARRIED OUT PRIOR TO MAINLINE ACTIVITIES. ADDITIONAL R.O.L, IF REQUIRED, FOR APPROACH TO CROSSING, PIPELINE STRING, HYDROTESTING, WORKING PIT FOR CROSSING, TO AVOID GAYING OF SOIL, SHALL BE PROVIDED BY CONTRACTOR WITHOUT ANY COST VARIATION.
- CATHODIC PROTECTION :- ALL CASING PIPES FOR RAILWAY CROSSING SHALL BE C.P.P. PROTECTED.
- TEST STATION ON BOTH SIDE OF CROSSING.
- CONCRETE FILLING PROCEDURE SHALL BE DONE AS PER OWNER/CONSULTANT'S INSTRUCTIONS.
- THE LOCATION OF ENTRY AND EXIT PIT SHALL BE DECIDED AT SITE TO SUIT THE SITE REQUIREMENT.
- THE CASING PIPE SHALL BE PROVIDED WITH MINIMUM 50 MM DIAMETER VENT PIPE FOR FILLING BENIGNITE. AFTER FILLING OF BENIGNITE, VENT PIPE AT BOTH ENDS SHALL BE TRIMMED AND PLUGGED/SEALED WITH END CAPS.
- MINIMUM LENGTH OF THE CASING SHALL BE AS INDICATED IN ALIGNMENT SHEET OR 80M WHICHEVER IS MORE.
- THICKNESS OF CASING PIPE SHALL BE CALCULATED AS PER API RP 1102 AND SUBMITTED FOR APPROVAL.



**SECTION A-A
TYPICAL BORE PIT EXCAVATION**

| S. NO. | SIZE OF CARRIER PIPE | MINIMUM SIZE OF CASING PIPE WITH 6" HDPE DUCT | MINIMUM THICKNESS OF CASING (MM) | MINIMUM SIZE OF CASING PIPE WITH 6" CASING PIPE FOR HDPE JOINT | MINIMUM THICKNESS OF CASING (MM) |
|--------|----------------------|---|----------------------------------|--|----------------------------------|
| 1. | 4" | 10" | 5 | 15" | 6 |
| 2. | 6" | 12" | 5 | 18" | 7 |
| 3. | 8" | 14" | 5 | 20" | 8 |
| 4. | 10" | 16" | 6 | 22" | 8 |
| 5. | 12" | 18" | 7 | 24" | 8 |
| 6. | 16" | 22" | 8 | 28" | 10 |
| 7. | 18" | 24" | 8 | 30" | 11 |
| 8. | 21" | 28" | 9 | 32" | 12 |
| 9. | 24" | 30" | 11 | 36" | 12 |
| 10. | 30" | 36" | 12 | 42" | 15 |
| 11. | 36" | 42" | 15 | 48" | 16 |
| 12. | 42" | 48" | 16 | 54" | 19 |
| 13. | 48" | 54" | 19 | 60" | 21 |

MADE IN INDIA AS PER IS Gr. 3: PSL1 or IS 5005 (fabricated from steel plate conforming IS-2062)



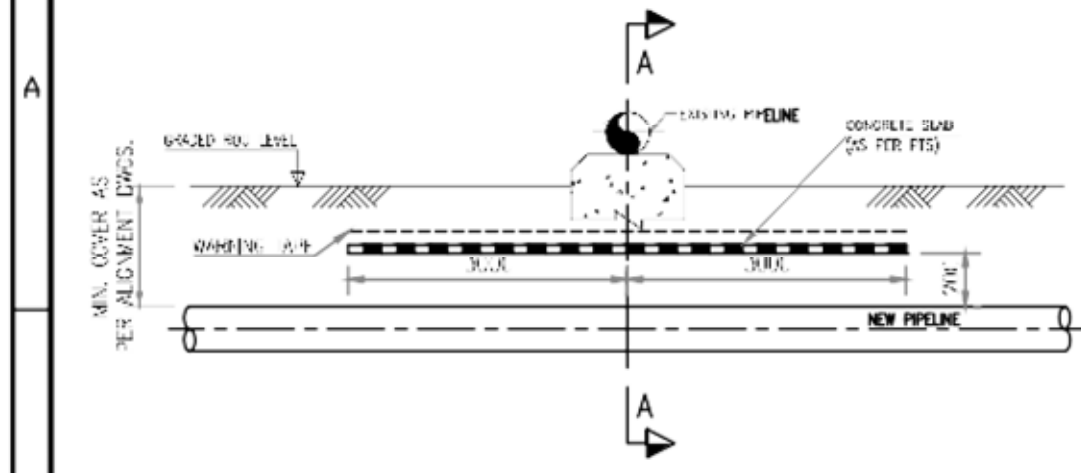
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| 1 | 16.04.21 | REVISED AND RE-ISSUED. | KS | MKS | MS | KNS |
| 0 | 29.09.16 | APPROVED FOR CONSTRUCTION. | JV | MS | NC | SKH |
| Rev. | D M Y | Modifications | Drawn | Checked | Approved | Validated |

SUBJECT: TYPICAL RAILWAY CAGED CROSSING (B+C) TYPE-I
SEPARATE CSING FOR CARRIER AND OFC

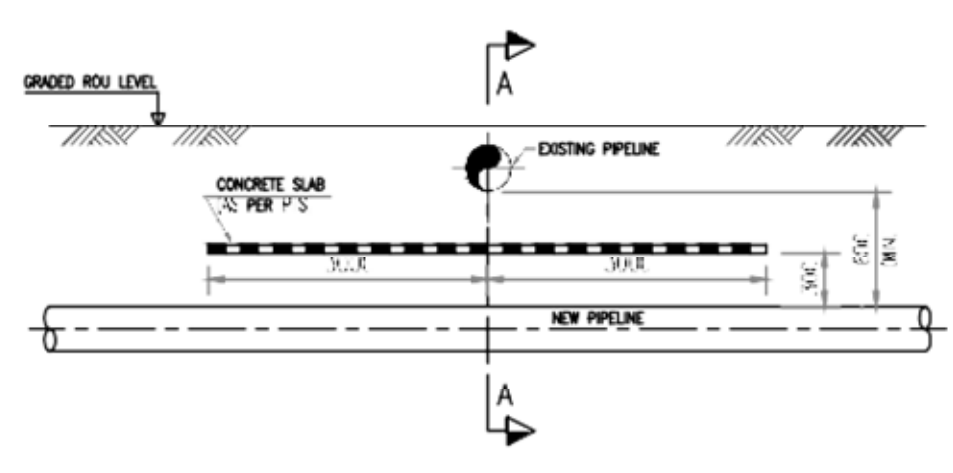
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Drawing No. GGNG-D-20707-012-A Rev. 1

NOTES

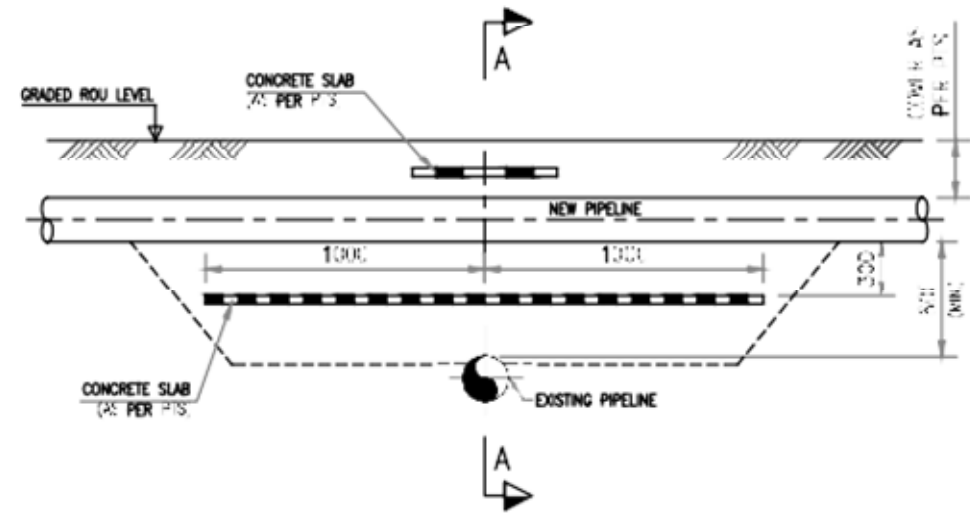
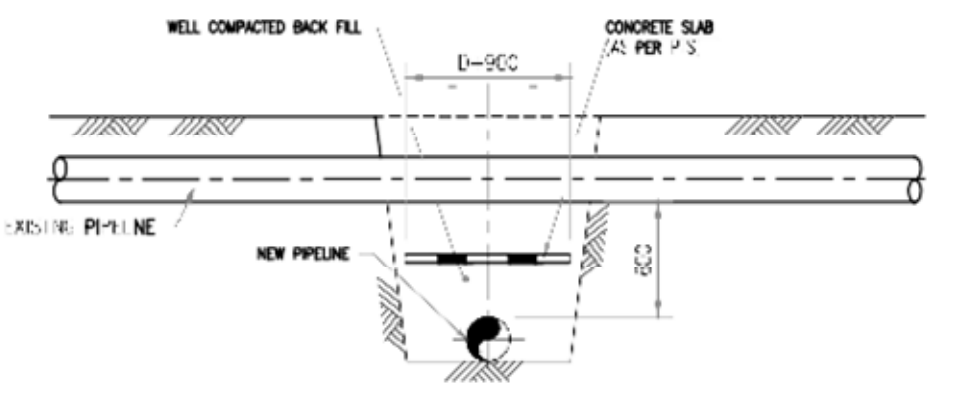
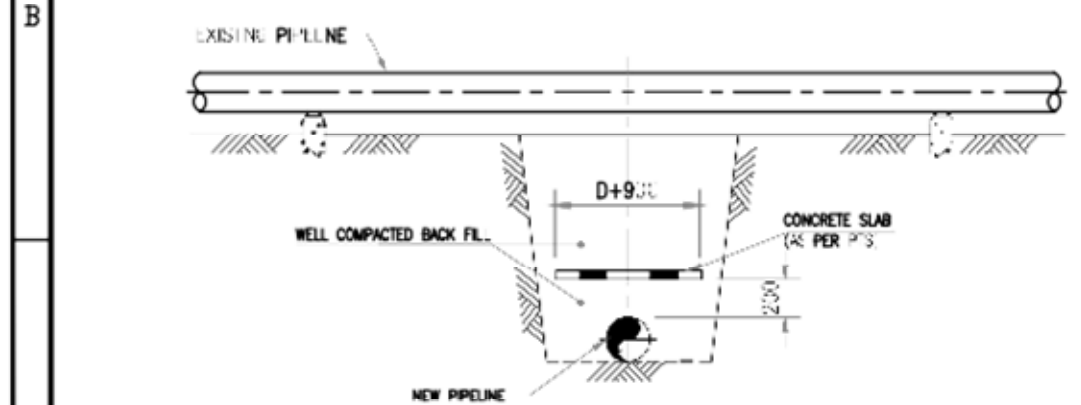
1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE STATED.
2. A MODIFIED PIPELINE WARNING SIGN SHALL BE INSTALLED WHERE THE PIPELINE CROSSES AN EXISTING PIPELINE CARRYING HAZARDOUS FLUID.
3. FOR CONCRETE SLAB REFER DWC No. GGNG-D-20707-007.
4. SUITABLE CATHODIC PROTECTION BONDING SHALL BE PROVIDED BETWEEN CROSSING PIPELINES. IN SOME CASES THE NEW PIPELINE MAY REQUIRE ELECTRICAL ISOLATION.
5. TRENCH DIMENSIONS SHALL BE IN ACCORDANCE WITH RELEVANT STANDARDS/SPECIFICATIONS.
6. APPROVAL OF THE CROSSING SHALL BE OBTAINED FROM CONCERNED AUTHORITIES.



**SECTION A-A
EXISTING ABOVEGROUND PIPE CROSSING**



**SECTION A-A
EXISTING UNDERGROUND PIPE CROSSING (TYPE-1)**



**SECTION A-A
EXISTING UNDERGROUND PIPE CROSSING (TYPE-2)**

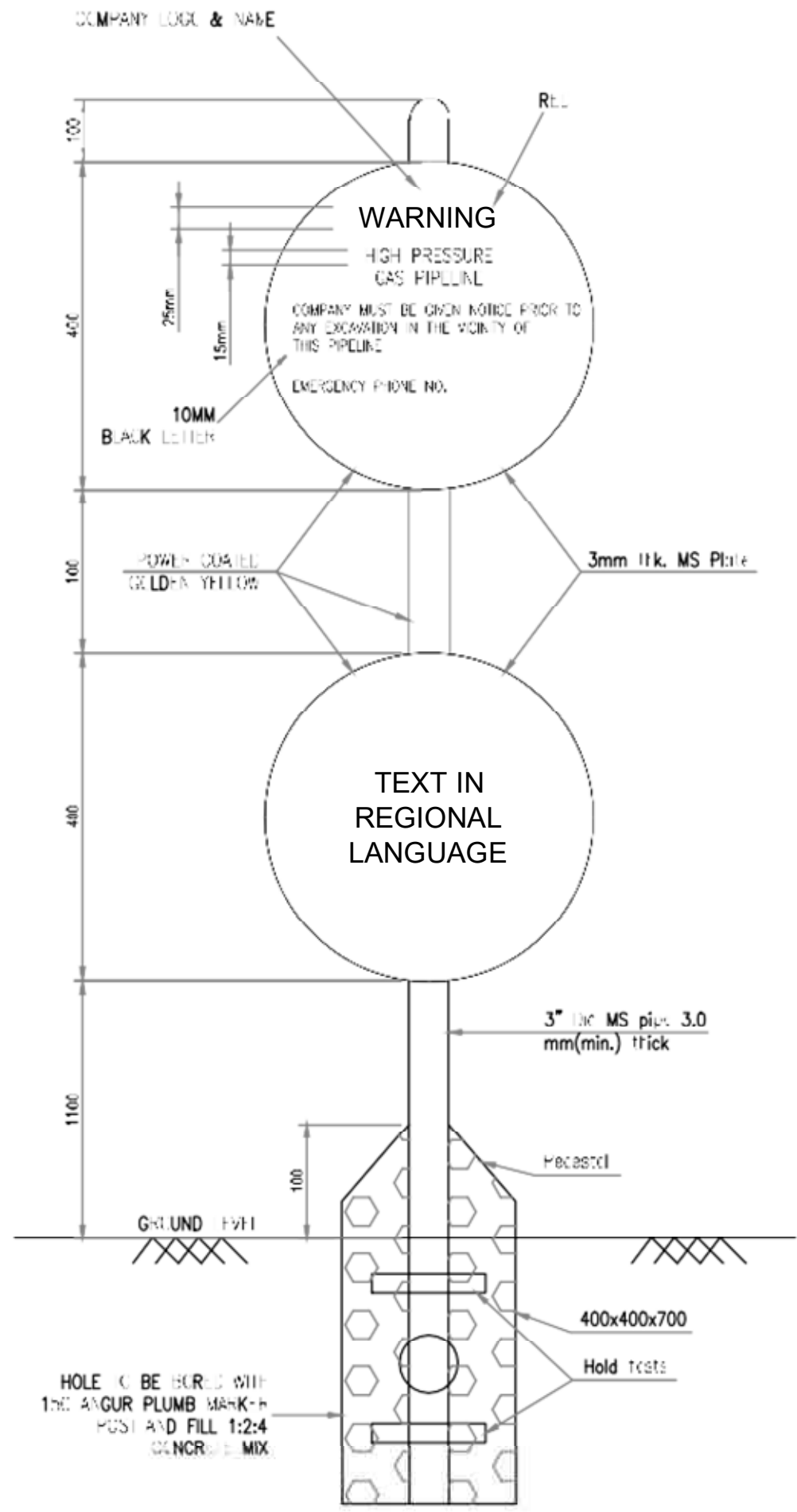
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| 0 | 16.04.10 | APPROVED FOR CONSTRUCTION. | KS | MKS | MS | KNS |
| Rev. | D M Y | Modifications | Drawn | Checked | Approved | Validated |

| | | | | | | |
|-------------------------------------|------------------|-------|----|----|------|---|
| SUBJECT | | | | | | |
| TYPICAL EXISTING PIPE LINE CROSSING | | | | | | |
| Size | Scale | Sheet | | | | |
| A3 | NTS | 01 | of | 01 | | |
| Drawing No. | GGNG-D-20707-014 | | | | Rev. | 0 |

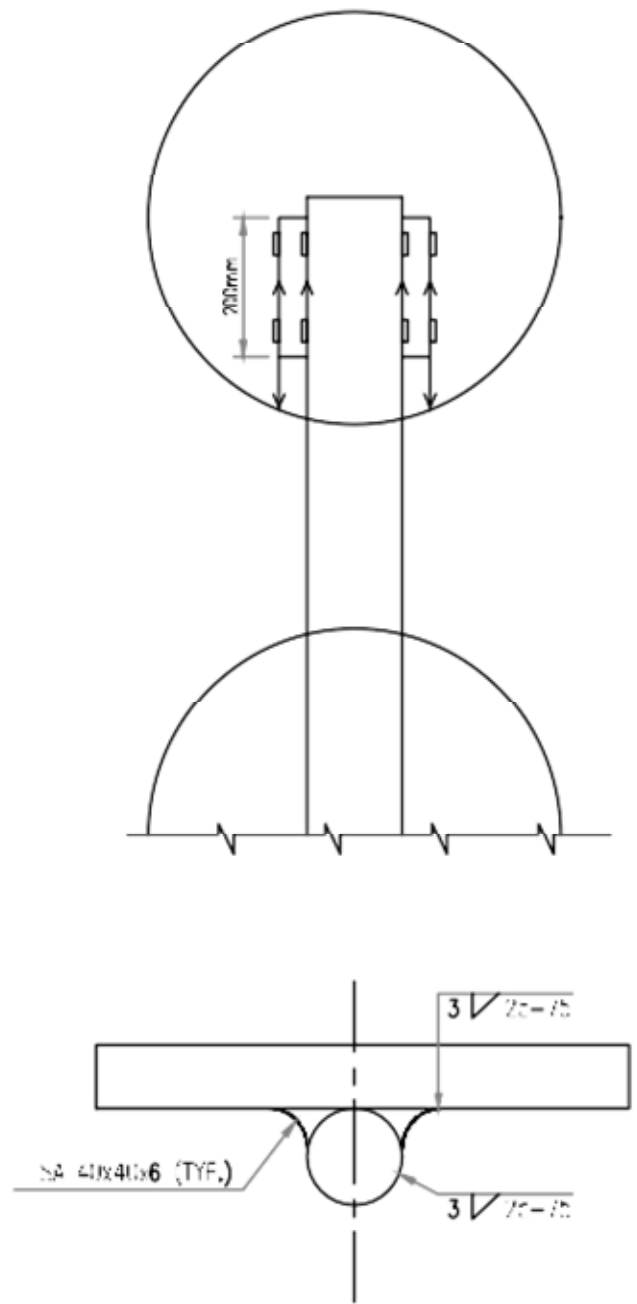
NOTES

1. THE FULL WORKING AND SIZES ARE ONLY INDICATIVE AND ARE SUBJECT TO THE APPROVAL BY OWNER/OWNER'S REPRESENTATIVE BEFORE FABRICATION.
2. SCHEME FOR POWDER COATING AND COLORING. ONE COAT OF PRIMER & TWO COATS OF SPECIFIED PAINTS. ALL LETTERS EXCEPT "WARNING" TO BE PAINTED BLACK.
3. ALL DIMENSION ARE IN MM. UNLESS OTHERWISE SPECIFIED.
4. APPROVAL OF WARNING MARKER DESIGN SHALL BE OBTAINED BEFORE THE COMMENCEMENT OF WORK.

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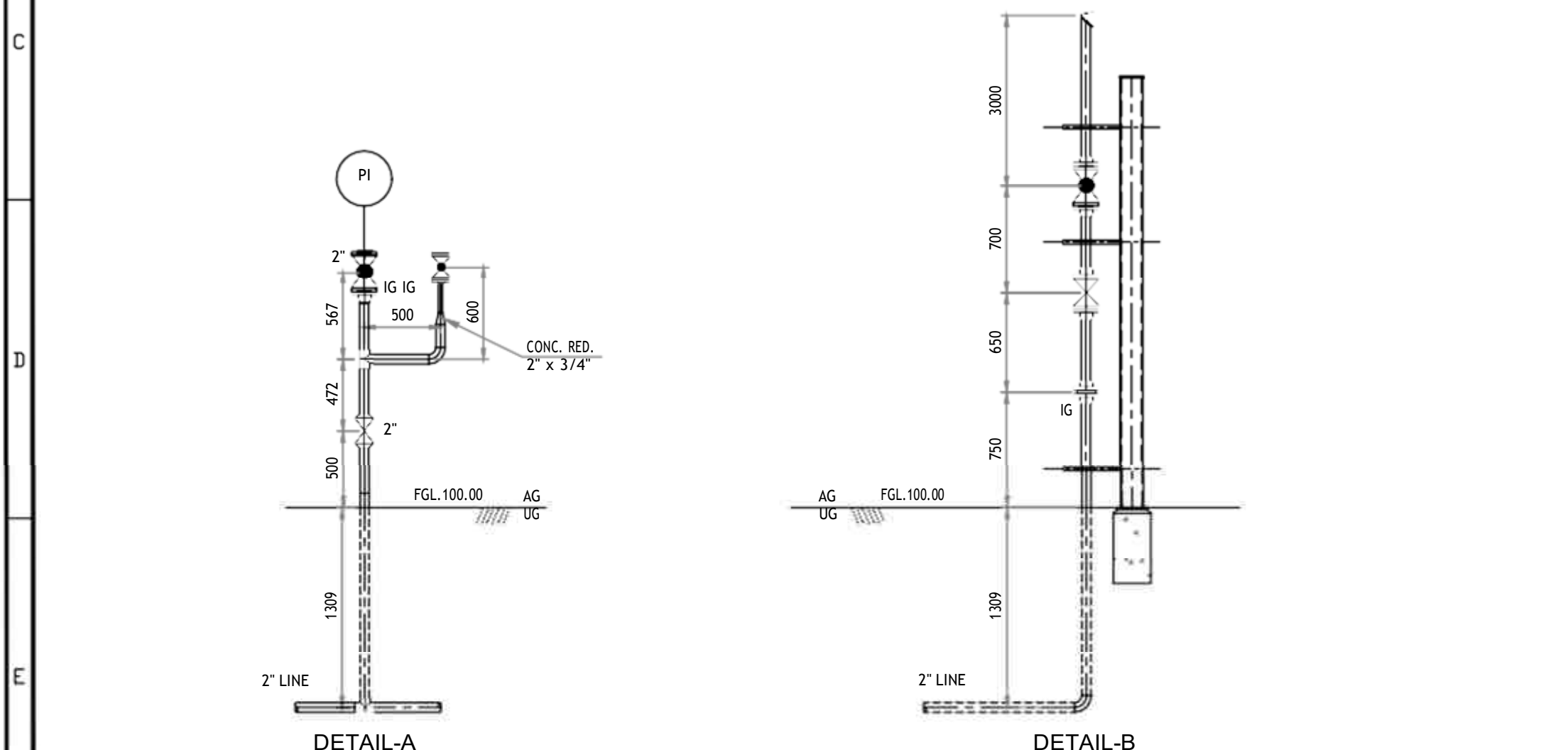
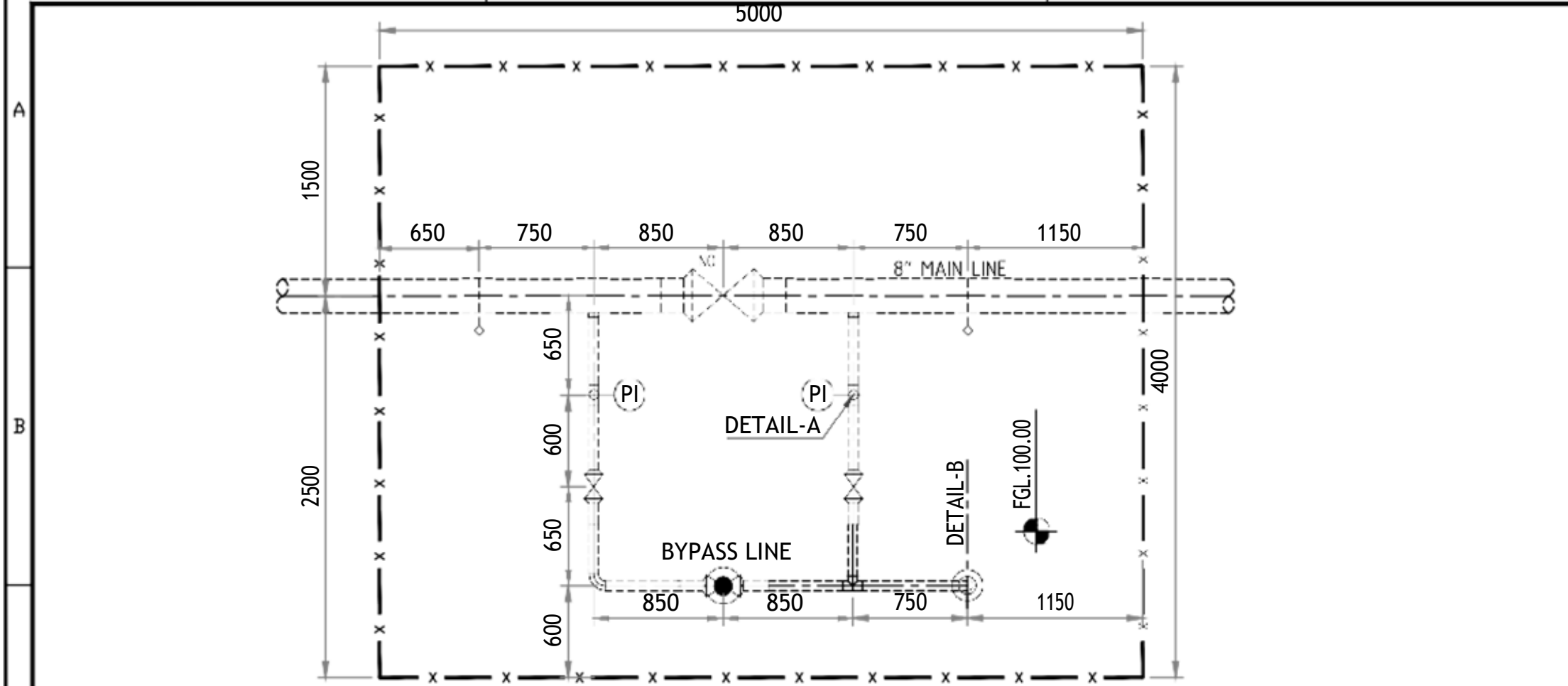
FIXING DETAILS



| | | | | | | |
|------|----------|----------------------------|-------|---------|----------|-----------|
| 0 | 16.04.21 | APPROVED FOR CONSTRUCTION. | KS | MKS | MS | KNS |
| Rev. | D M Y | Modifications | Drawn | Checked | Approved | Validated |

SUBJECT: POLE MARKER WITH FOUNDATION

| | | |
|-------------|------------------|----------|
| Size | Scale | Sheet |
| A3 | NTS | 01 of 01 |
| Drawing No. | GGNG-D-20707-053 | Rev. |
| | | 0 |



REFERENCE DRAWING

| S. NO. | DRAWING TITLE | DRAWING NO. |
|--------|---------------|-------------|
| 1 | | |

NOTES

1. ALL DIMENSIONS ARE IN MM OR LEVELS ARE IN M.
2. DRAWING ARE INDICATED & SUBJECT TO CHANGE DURING DETAIL ENGG.
3. LAYING OF PIPELINE AND STATION PIPING, VENDOR SHALL MAINTAIN SPECIFIED COVER OF PIPELINE.
4. MAINLINE VALVE IS ACTUATED VALVE.
5. ALL UG VALVE AND BURRIED VALVES WHICH WILL BE OPERATED FROM GROUND LEVEL. HENCE MAINLINE & BYPASS LINE VALVE IS LONG STEM EXTENDED VALVES.

LEGENDS

- BALL VALVE
- GLOBE VALVE
- TIE-IN POINT
- CENTER LINE OF PIPE
- CENTER LINE OF PIPE
- NG - NATURAL GAS
- PIPELINE

| MAIN LINE | BYPASS LINE | BRANCH CONNECTION | REMARKS |
|-----------|----------------|-------------------|---------|
| 4" | NO BYPASS LINE | - | - |
| 6" | 2" | WELDOLET | - |
| 8" | 2" | WELDOLET | - |
| 10" | 4" | WELDOLET | - |
| 12" | 4" | WELDOLET | - |
| 16" | 6" | WELDOLET | - |

| Rev. | D | M | Y | Modifications | Drawn | Checked | Approved |
|------|----|----|----|----------------------|-------|---------|----------|
| 0 | 16 | 04 | 21 | ISSUED FOR APPROVAL. | KS | MKS | KNS |

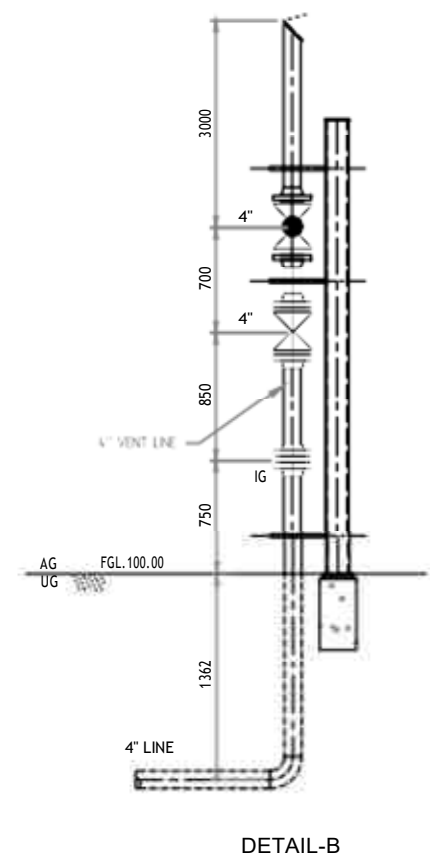
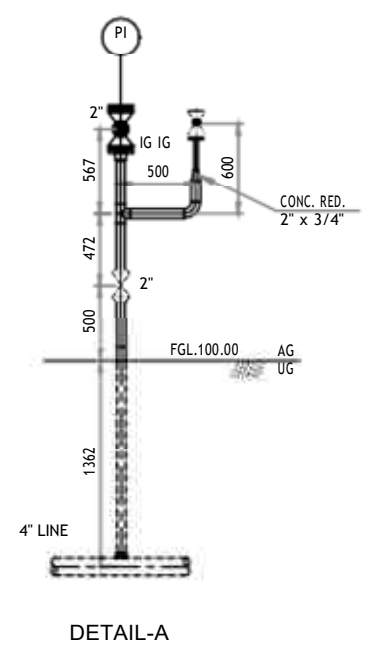
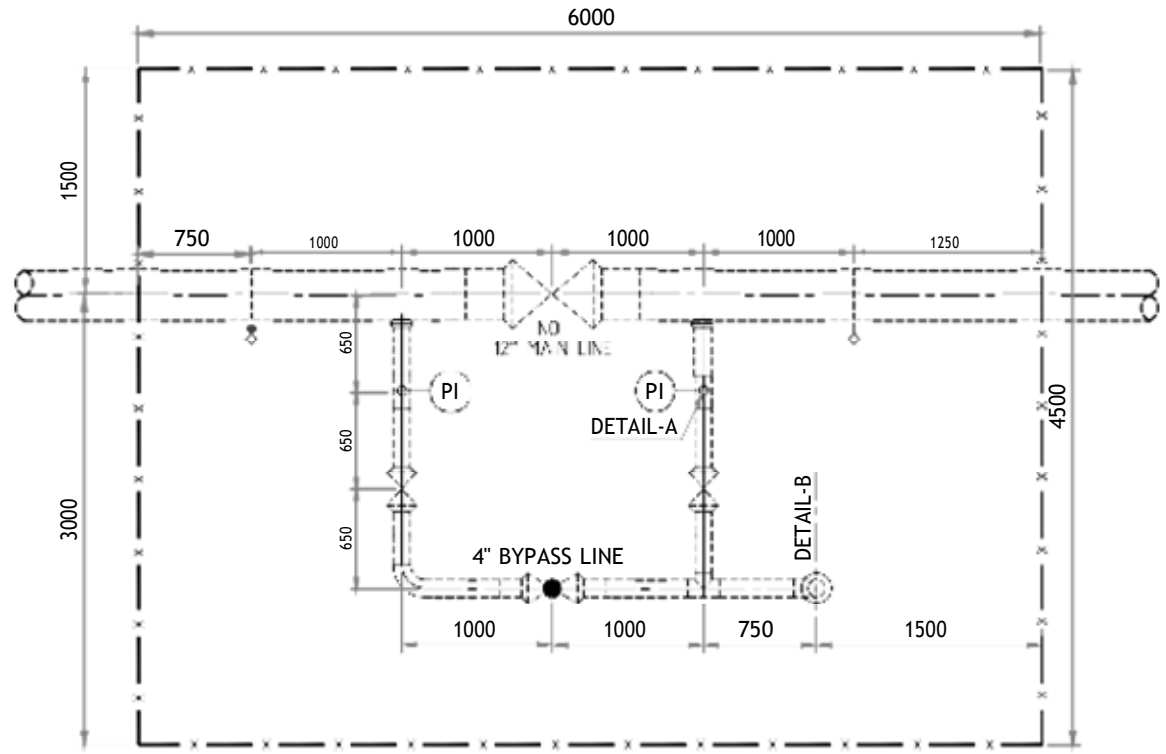
CUSTOMER: CENTRAL U. P. GAS LIMITED

PROJECT: CITY GAS DISTRIBUTION PROJECT

SUBJECT: PIPING GENERAL ARRANGEMENT DRAWING FOR SV STATION WITH VENTING ARRANGEMENT (LONG STEM EXTENDED ACTUATED VALVES)

| Size | Scale | Sheet | Rev. |
|-------------|-----------------|-------------|------------|
| A3 | 1:35 | 1 of 2 | 0 |
| Project No. | Discipline Code | System Code | Serial No. |
| P.014714 | G | 20749 | 004 |

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REFERENCE DRAWING

| S. NO. | DRAWING TITLE | DRAWING NO. |
|--------|---------------|-------------|
| 1 | | |

NOTES

1. ALL DIMENSIONS ARE IN MM OR LEVELS ARE IN M.
2. DRAWING ARE INDICATED & SUBJECT TO CHANGE DURING DETAIL ENGG.
3. LAYING OF PIPELINE AND STATION PIPING, VENDOR SHALL MAINTAIN SPECIFIED COVER OF PIPELINE.
4. MAINLINE VALVE IS ACTUATED VALVE.
5. ALL UG VALVE AND BURRIED VALVES WHICH WILL BE OPERATED FROM GROUND LEVEL. HENCE MAINLINE & BYPASS LINE VALVE IS LONG STEM EXTENDED VALVES.

LEGENDS

- BALL VALVE
- GLOBE VALVE
- TIE-IN POINT
- CENTER LINE OF PIPE
- NG - NATURAL GAS
- PIPELINE

| MAIN LINE | BYPASS LINE | BRANCH CONNECTION | REMARKS |
|-----------|----------------|-------------------|---------|
| 4" | NO BYPASS LINE | - | - |
| 6" | 2" | WELDOLET | - |
| 8" | 2" | WELDOLET | - |
| 10" | 4" | WELDOLET | - |
| 12" | 4" | WELDOLET | - |
| 16" | 6" | WELDOLET | - |

| Rev. | D | M | Y | Modifications | Drawn | Checked | Approved |
|------|----------|---|---|----------------------|-------|---------|----------|
| 0 | 16.04.21 | | | ISSUED FOR APPROVAL. | KS | MKS | RNS |

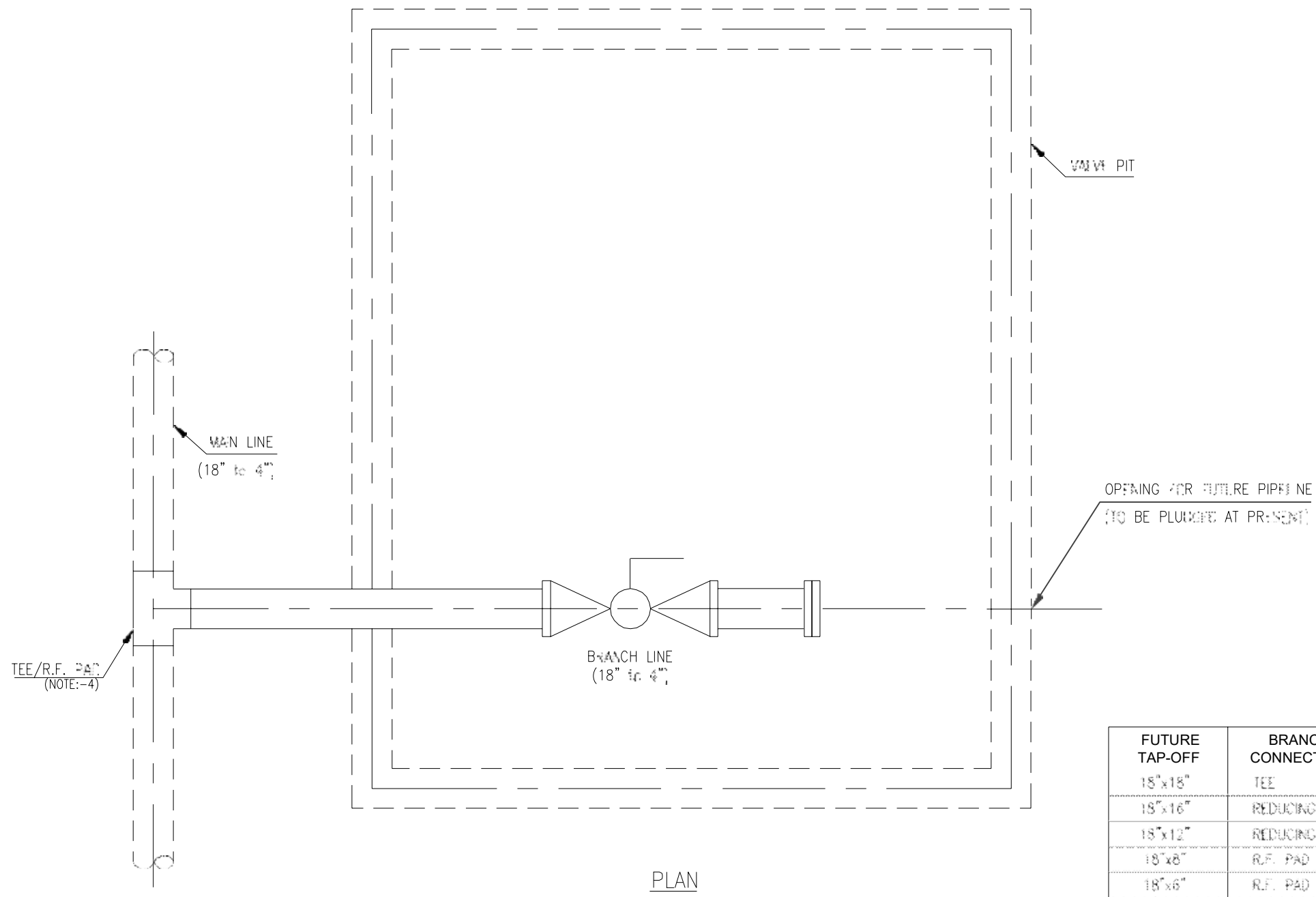
CUSTOMER **CENTRAL U. P. GAS LIMITED**

PROJECT **CITY GAS DISTRIBUTION PROJECT**

SUBJECT **PIPING GENERAL ARRANGEMENT DRAWING FOR SV STATION WITH VENTING ARRANGEMENT (LONG STEM EXTENDED ACTUATED VALVES)**

| Size | Scale | Sheet | Rev. |
|-------------|-----------------|-------------|------------|
| A3 | 1:50 | 2 of 2 | 0 |
| Project No. | Discipline Code | System Code | Serial No. |
| P.014714 | G | 20749 | 004 |

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PLAN

| FUTURE TAP-OFF | BRANCH CONNECTION |
|----------------|-------------------|
| 18"x18" | TEE |
| 18"x16" | REDUCING TEE |
| 18"x12" | REDUCING TEE |
| 18"x8" | R.F. PAD |
| 18"x6" | R.F. PAD |
| 16"x16" | TEE |
| 16"x12" | REDUCING TEE |
| 16"x8" | REDUCING TEE |
| 16"x6" | R.F. PAD |
| 12"x12" | TEE |
| 12"x8" | REDUCING TEE |
| 12"x6" | REDUCING TEE |
| 12"x4" | R.F. PAD |
| 8"x8" | TEE |
| 8"x6" | REDUCING TEE |
| 8"x4" | REDUCING TEE |
| 6"x6" | TEE |
| 6"x4" | REDUCING TEE |
| 4"x4" | TEE |

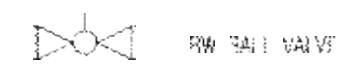
REFERENCE DRAWING

| S. NO. | DRAWING TITLE | DRAWING NO. |
|--------|---------------|-------------|
| 1 | | |

NOTES

1. TOP OF THE PIPE SHALL BE AT MINIMUM 1.0M DEPTH.
2. APPROXIMATE SIZE OF THE PIT WILL BE 200CM X 200CM.
3. FOR DETAIL DRAWINGS OF THE PIT, REFER DRAWING NO. : P.0113554-C-21008-00 TO 003
4. BRANCHING CONNECTIONS (TEE/ R.F. PAD) SHALL DEPEND UPON THE MAIN LINE & BRANCH LINE.

LEGEND



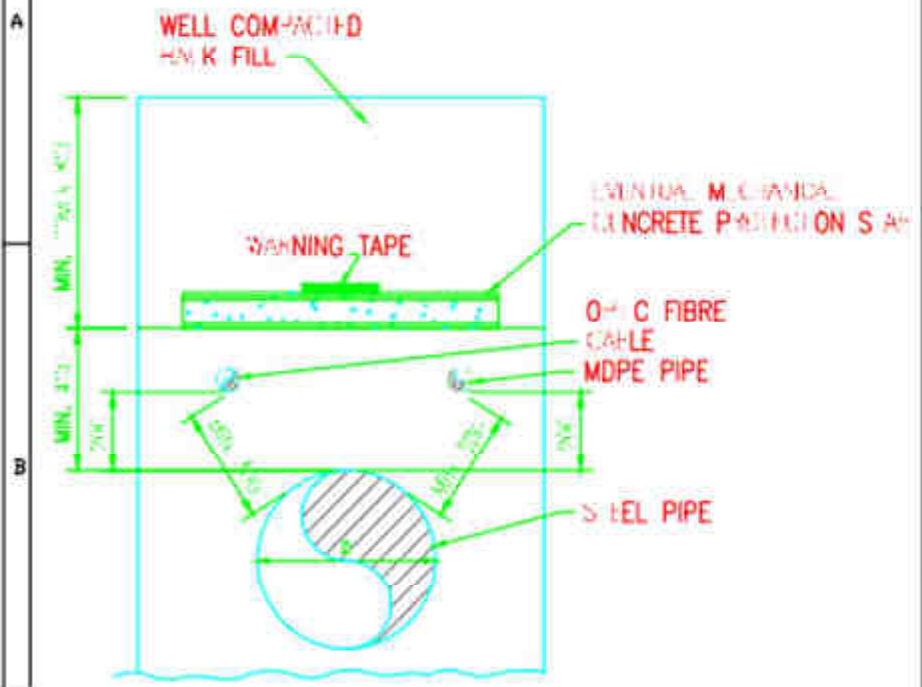
| Rev. | D | M | Y | Modifications | KS | MS | KNS |
|------|----|----|----|--------------------|----|----|-----|
| 0 | 16 | 04 | 21 | ISSUED FOR TENDER. | | | |

CUSTOMER: **CENTRAL U. P. GAS LIMITED**

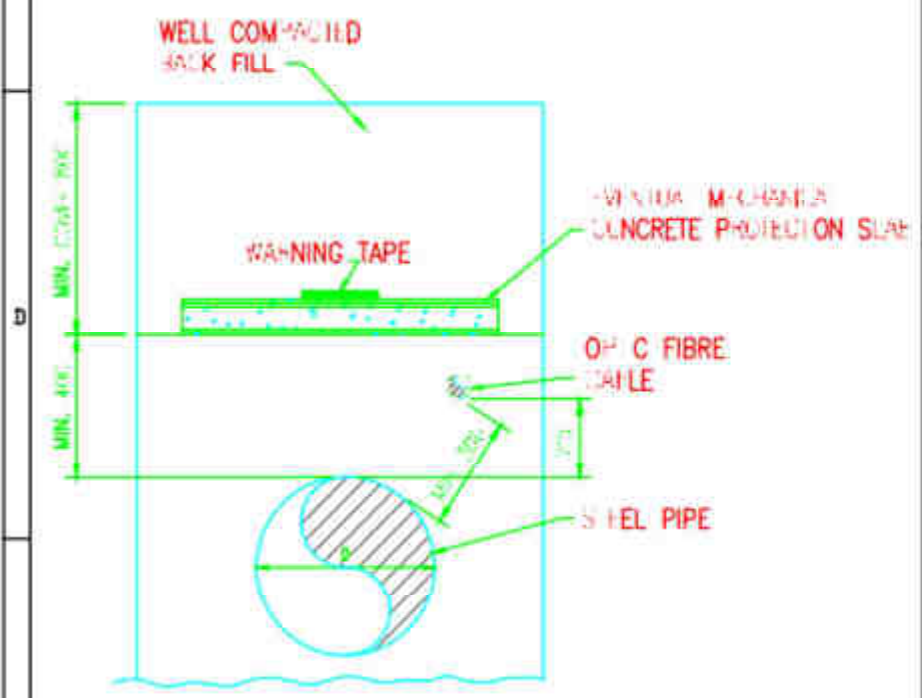
PROJECT: **CITY GAS DISTRIBUTION PROJECT**

SUBJECT: **GENERAL ARRANGEMENT DRAWING FOR FUTURE TAP-OFF POINTS**

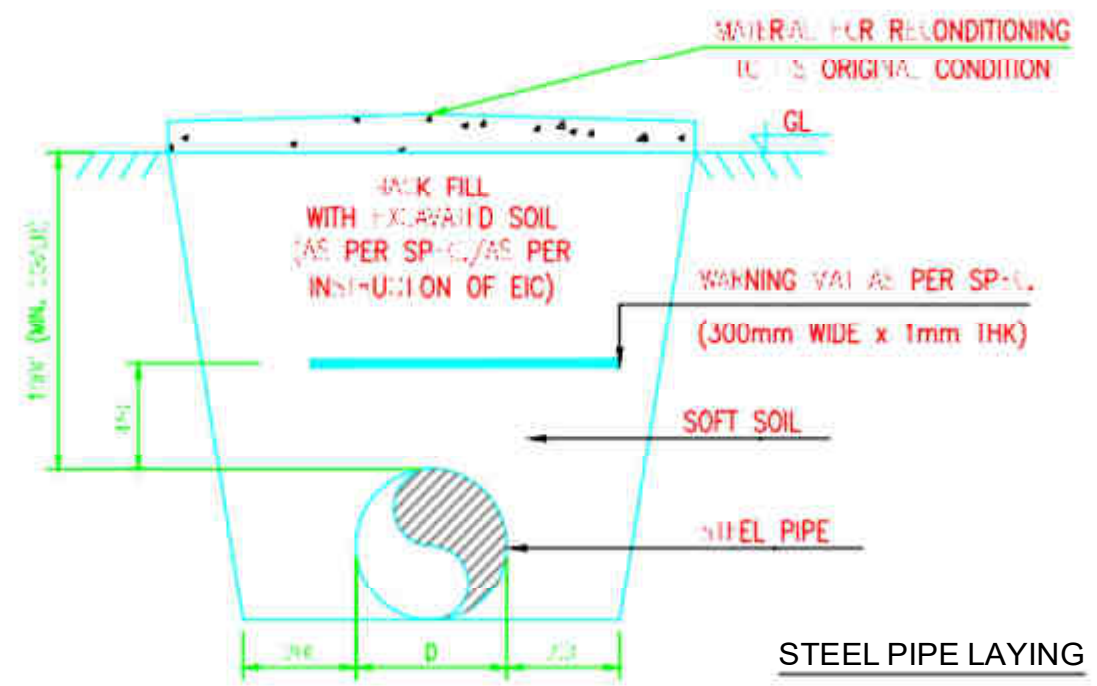
| Size | Scale | Sheet | Rev. |
|-------------|-----------------|-------------|------------|
| A3 | NTS | 1 of 1 | 0 |
| Project No. | Discipline Code | System Code | Serial No. |
| P.014714 | G | 20749 | 001 |



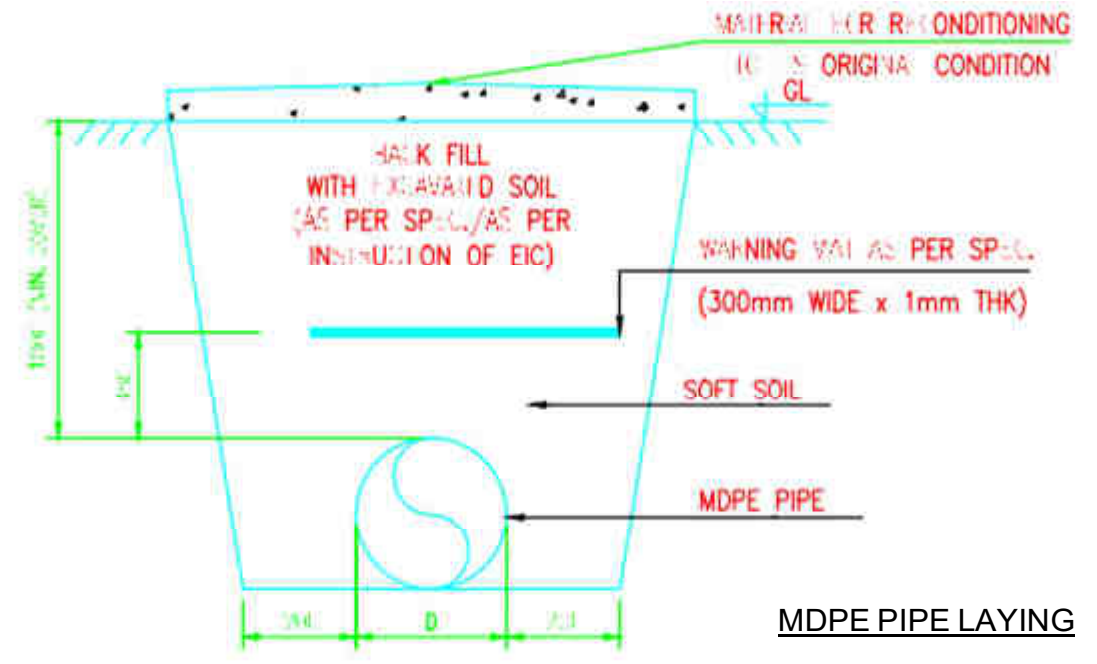
STEEL PIPE LAYING WITH OFC DUCT & MDPE PIPE



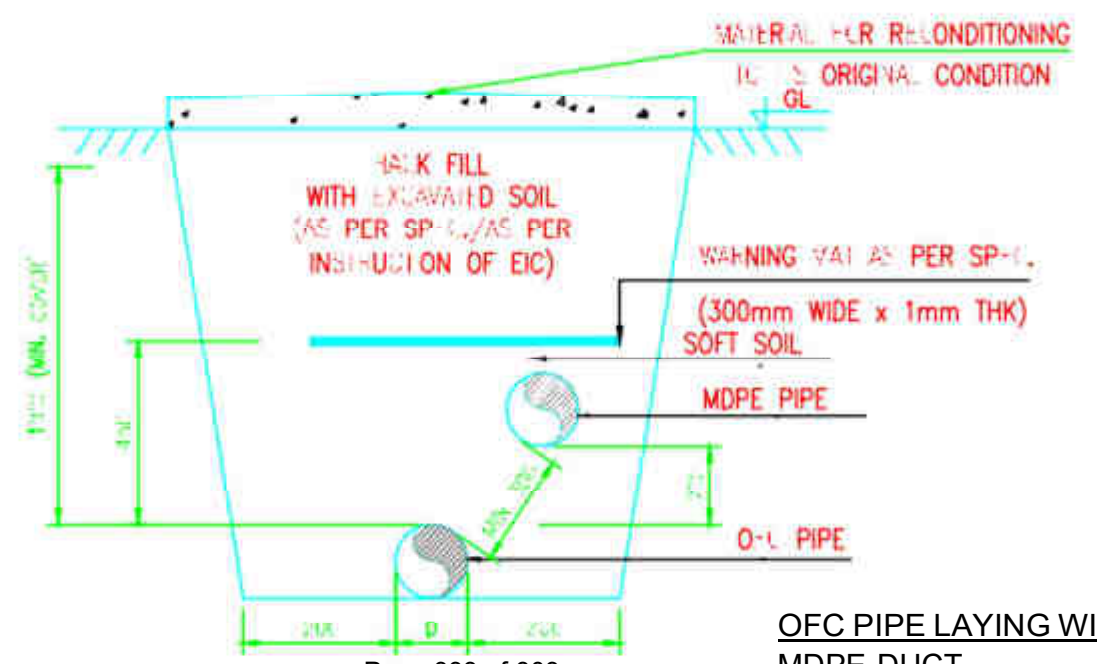
STEEL PIPE LAYING WITH OFC DUCT



STEEL PIPE LAYING



MDPE PIPE LAYING



OFC PIPE LAYING WITH MDPE DUCT

- NOTES
1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
 2. HEIGHT WITH REFERENCE TO DIMENSION ONLY & NOT SCALE.
 3. PRELAYS SLAB SHALL BE AS PER HA 1:24

| | | | | | |
|-------------|--|---------------------|------------|------------|-------------|
| 0 | 14.04.21 | ISSUED FOR APPROVAL | KS | TBS/MKS | MS |
| Rev | D M Y | Modifications | Drawn By | Checked By | Approved By |
| CUSTOMER | CENTRAL U. P. GAS LIMITED | | | | |
| PROJECT | CITY GAS DISTRIBUTION PROJECT | | | | |
| SUBJECT | STANDARD SKETCH FOR TRENCH CROSS STEEL & MDPE PIPE | | | | |
| Size | Scale | Sheet | Rev. | | |
| A3 | NTS | 01 | of | 01 | 0 |
| Project No. | Discipline Code | System Code | Serial No. | | |

REFERENCE DRAWING

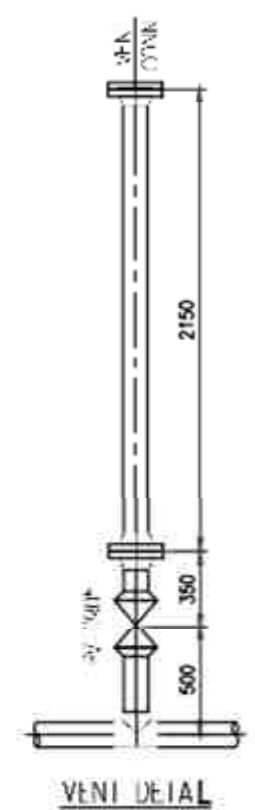
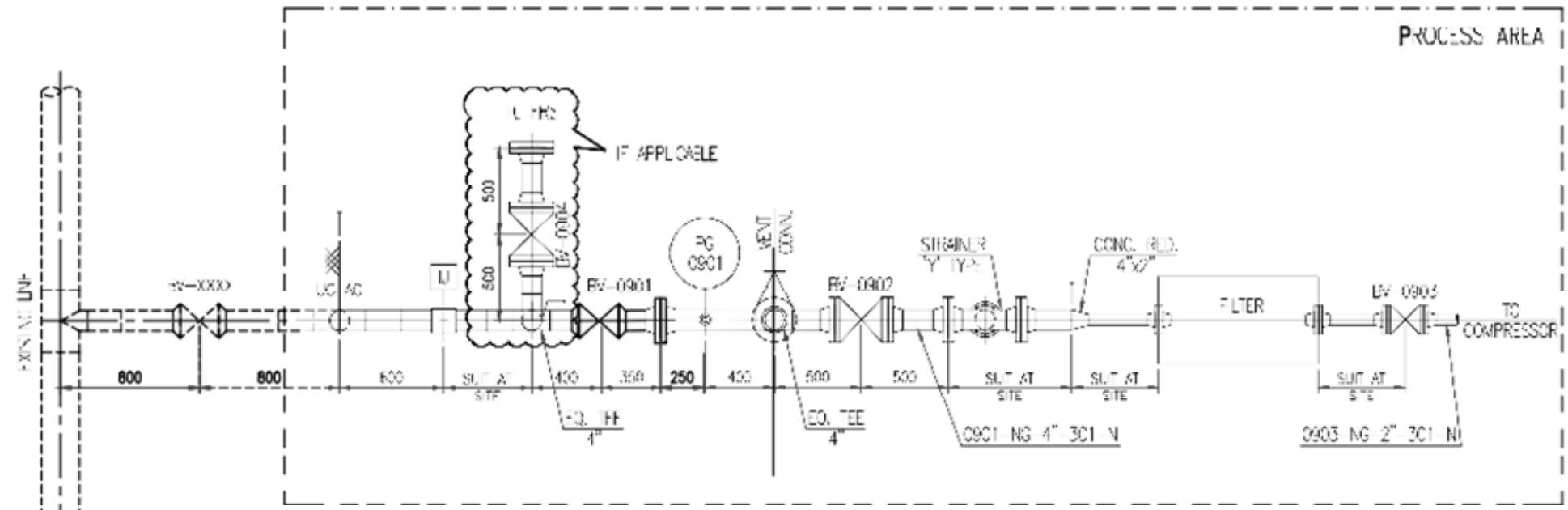
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| S. NO. | DRAWING TITLE | DRAWING NO. |
| 1 | | |

NOTES

- 1 ALL DIMENSIONS ARE IN MILLIMETERS.
- 2 FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE.
- 3 VENT SHALL BE LOCATED AT SAFE HEIGHT (3 METER ABOVE THE HIGHEST WORKING PLATFORM) WITH VENT CAP/FLANGED END.
- 4 ELEVATION OF ABOVE GROUND AND UNDER GROUND PIPELINE SHALL BE SUIT AT SITE.

LEGEND

- BALL VALVE
- GLOBE VALVE
- ENDS OF A LINE NUMBER
- CENTER LINE OF PIPE
- NG - NATURAL GAS
- AG - ABOVE GROUND
- UG - UNDER GROUND
- UNDER GROUND PIPE
- ABOVE GROUND PIPE
- PROCESS AREA



| | | | | | |
|------|----------|--------------------|-------|---------|----------|
| 0 | 16.04.21 | ISSUED FOR TENDER. | KS | MKS | KNS |
| Rev. | D M Y | Modifications | Drawn | Checked | Approved |

CUSTOMER: CENTRAL U. P. GAS LIMITED
 PROJECT: CITY GAS DISTRIBUTION PROJECT
 SUBJECT: PIPING GENERAL ARRANGEMENT DRAWING FOR CONNECTIVITY TO RO/ CNG STATIONS

| | | | |
|-------------|-----------------|-------------|------------|
| Size | Scale | Sheet | Rev. |
| A1 | 1:35 | 1 of 1 | 0 |
| Project No. | Discipline Code | System Code | Serial No. |
| P.014714 | G | 20749 | 002 |

| REFERENCE DRAWING | |
|-------------------|---|
| S. NO. | DRAWING TITLE |
| 1 | TYPICAL DETAILS FOR 4" SV STATION RCC VALVE CHAMBER |
| | DRAWING NO. P.014714 - 20749 - 0201-15M - 1 OF 2 |

- NOTES**
- ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
 - PIPELINE COVER OR LEVELS SHALL BE MAINTAINED AS MENTIONED IN TENDER.
 - VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGENDS

| | | | |
|--|------------------------|--|------------------|
| | BV BALL VALVE | | NG - NATURAL GAS |
| | GV GLOBE VALVE | | PIPELINE |
| | IG INSULATING GASKET | | |
| | TI TIE-IN POINT | | |
| | CL CENTER LINE OF PIPE | | |

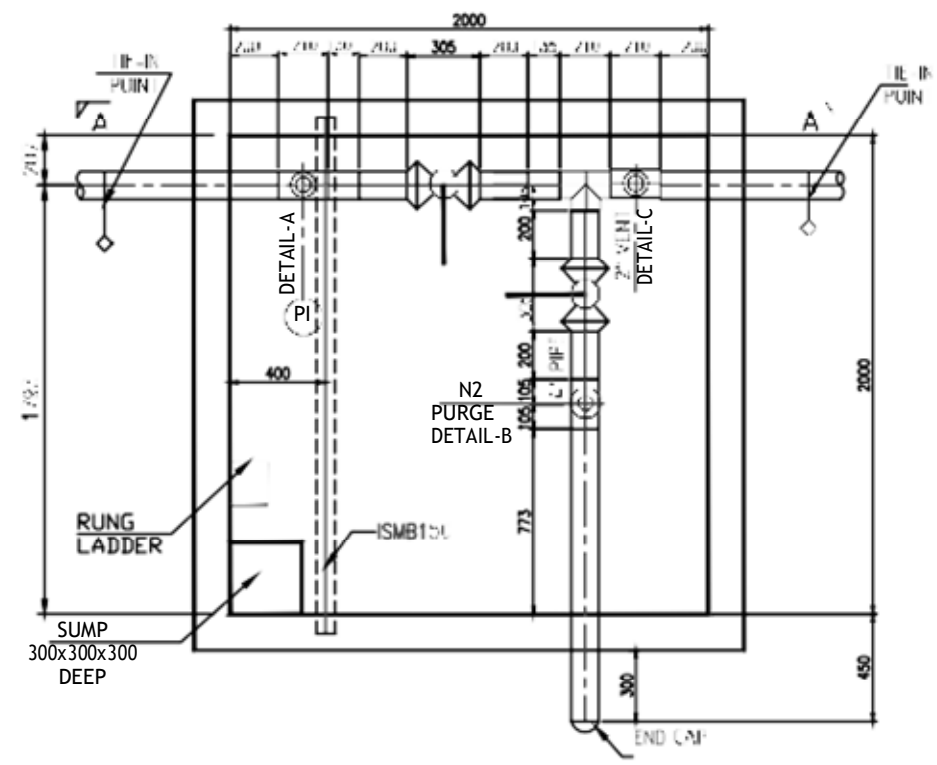
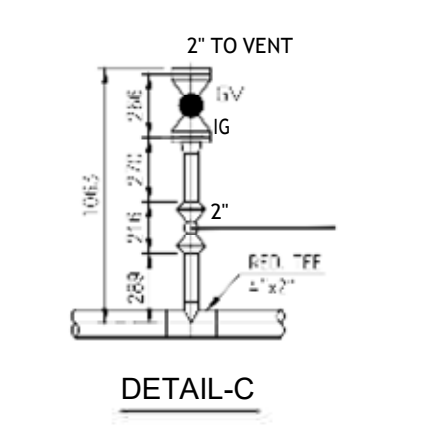
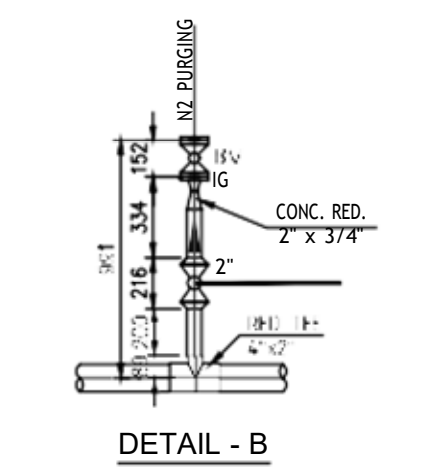
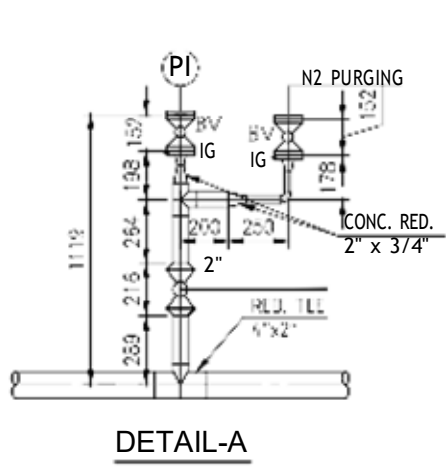
| REV. | DATE | BY | CHKD. | APPD. | VALD. |
|------|----------|-----|-------|-------|-------|
| 0 | 01.06.21 | DMY | | | |

CLIENT: CENTRAL U. P. GAS LIMITED

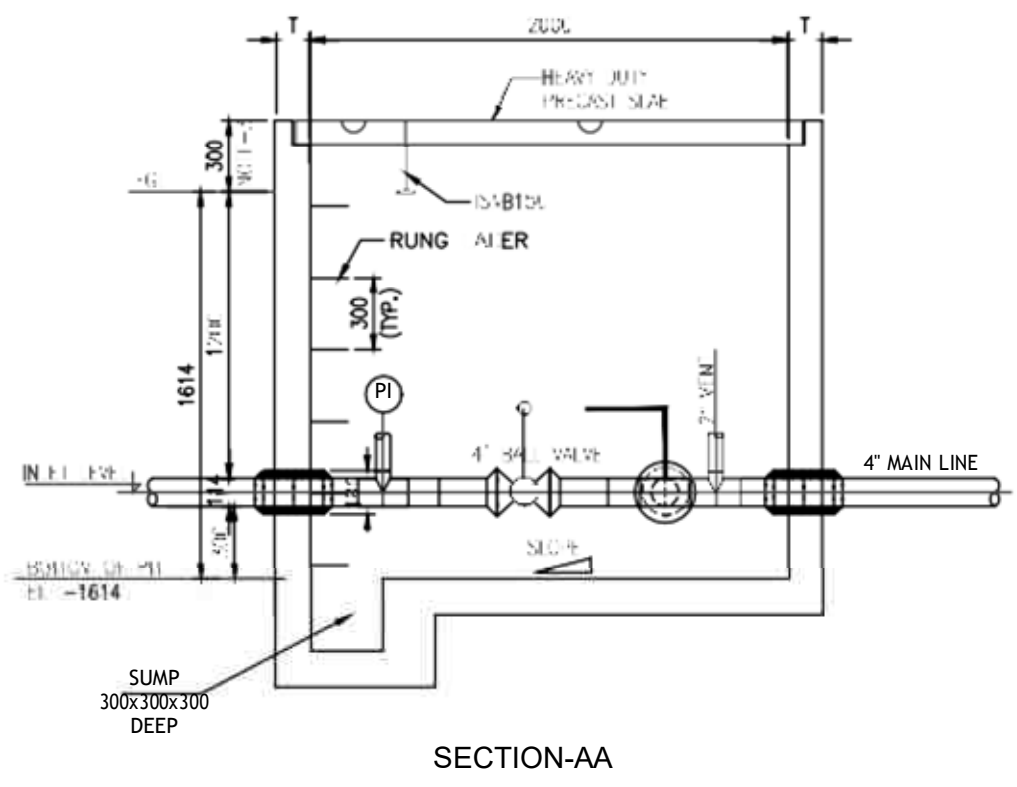
PROJECT: CITY GAS DISTRIBUTION PROJECT

SUBJECT: PIPING GENERAL ARRANGEMENT DRAWING FOR 4" SV VALVE CHAMBER WITH VENT & WITH TAP-OFF ARRANGEMENT FOR BAREILLY, KANPUR & UNNAO AND JHANSI GAS

| | | | |
|-------------|-----------------|-------------|------------|
| Size | Scale | Sheet | Rev. |
| A3 | 1:30 | 1 of 6 | 0 |
| Project No. | Discipline Code | System Code | Serial No. |
| P.014714 | G | 20749 | M151 |



4" SV VALVE CHAMBER WITH VENT & WITH TAP-OFF

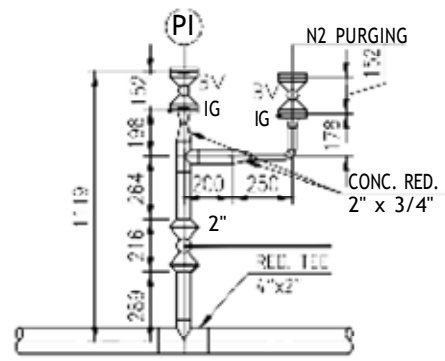


SECTION-AA

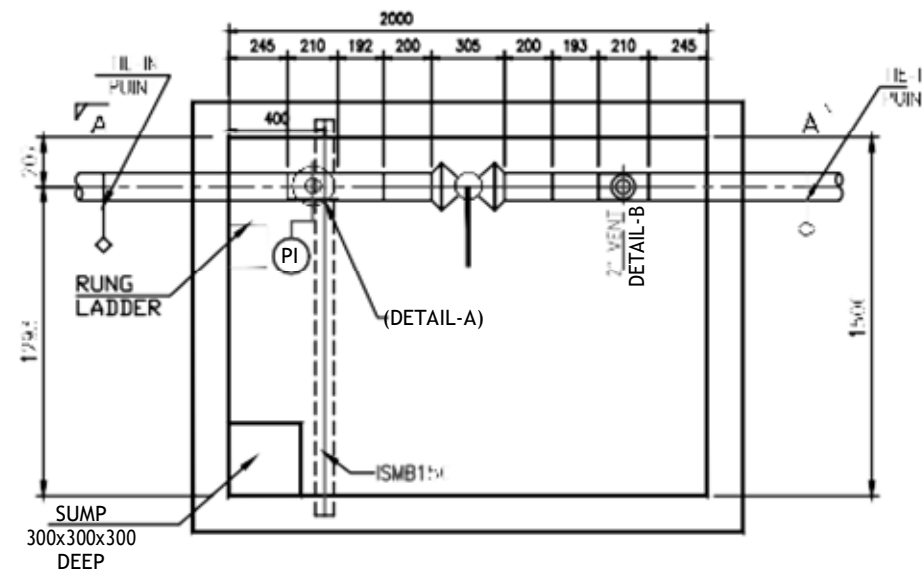
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A
B
C
D
E

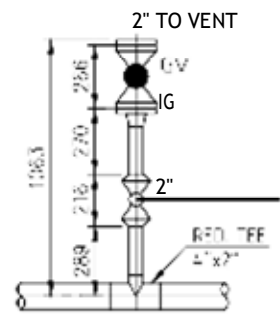
FOR 4" MAIN LINE



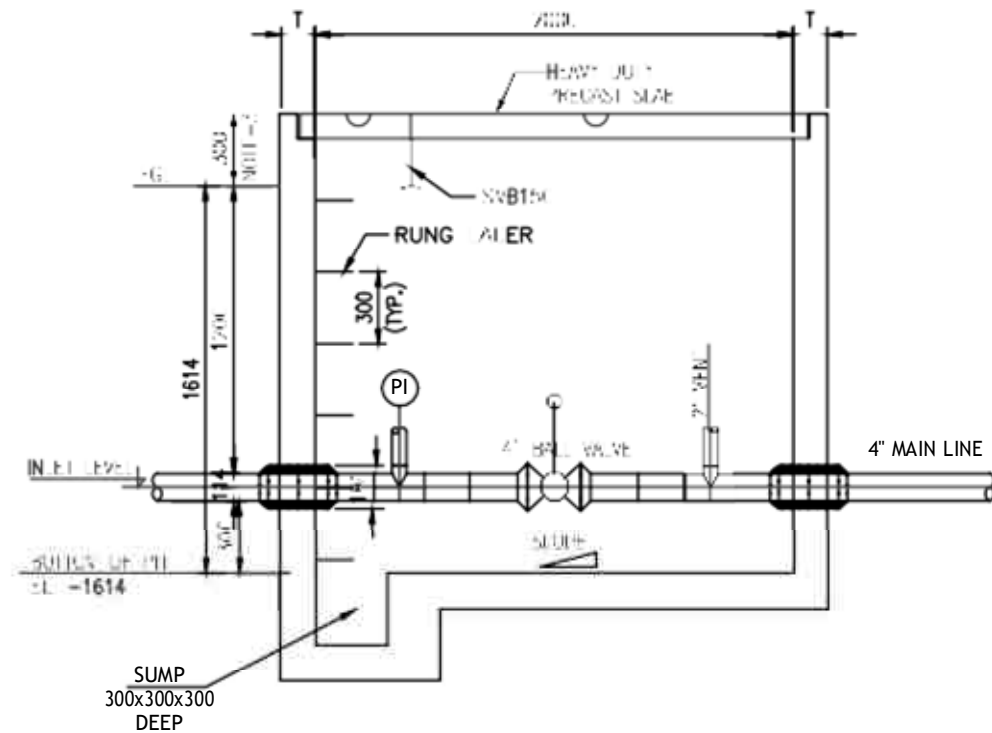
DETAIL-A



4" SV VALVE CHAMBER WITH VENT & WITHOUT TAP-OFF



DETAIL-B



SECTION-AA

REFERENCE DRAWING

| S. NO. | DRAWING TITLE | DRAWING NO. |
|--------|---|---------------------------------------|
| 1 | TYPICAL DETAILS FOR 4" SV STATION RCC VALVE CHAMBER | P.014714 - 2 2019 - 06/20/19/11/1/1/1 |

NOTES

- ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
- PIPELINE COVER OR LEVELS SHALL BE MAINTAINED AS MENTIONED IN TENDER.
- VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGENDS

- BV BALL VALVE
- GV GLOBE VALVE
- IG INSULATING GASKET
- PI TIE-IN POINT
- ▼ CENTER LINE OF PIPE
- NG - NATURAL GAS
- PIPELINE

| Rev. | DM Y | ISSUED FOR TENDER | Modifications | Drawn | Checked | Approved | Validated |
|------|----------|-------------------|---------------|-------|---------|----------|-----------|
| 0 | 03.06.21 | ISSUED FOR TENDER | | | | | |

CLIENT: CENTRAL U. P. GAS LIMITED

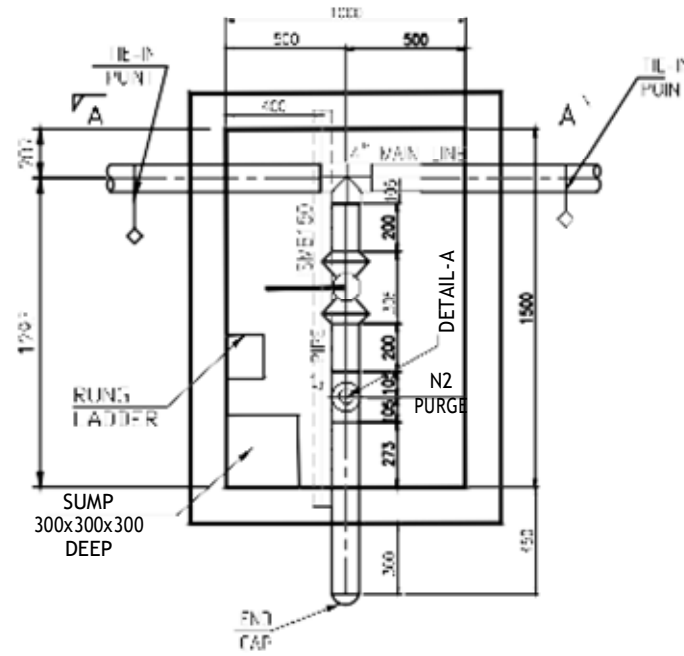
PROJECT: CITY GAS DISTRIBUTION PROJECT

SUBJECT: PIPING GENERAL ARRANGEMENT DRAWING FOR 4" SV VALVE CHAMBER WITH VENT ARRANGEMENT ARRANGEMENT FOR BAREILLY, KANPUR & UNNAO AND JHANSI GAS

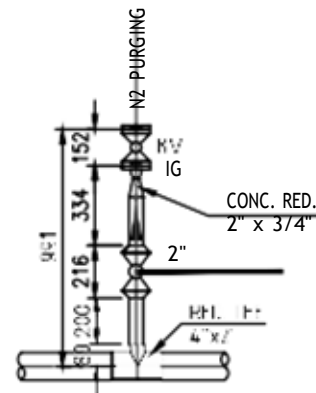
| Size | Scale | Sheet | Rev. |
|-------------|-----------------|-------------|------------|
| A3 | 1:30 | 2 of 6 | |
| Project No. | Discipline Code | System Code | Serial No. |
| P.014714 | G | 20749 | M151 |

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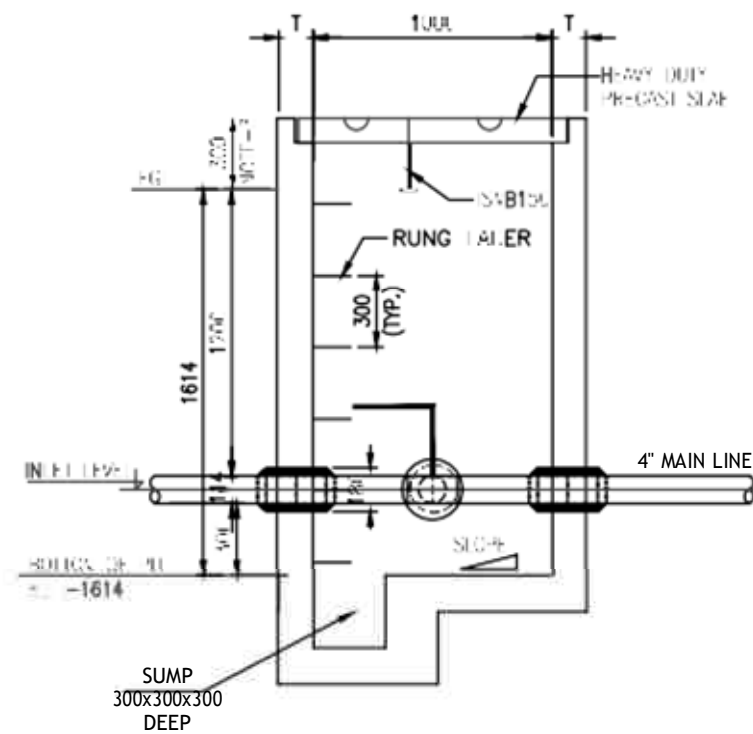
FOR 4" MAIN LINE



4" TAP-OFF CHAMBER



DETAIL - A



SECTION-AA

REFERENCE DRAWING

| S. NO. | DRAWING TITLE | DRAWING NO. |
|--------|---|-------------|
| 1 | TYPICAL DETAILS FOR 4" SV STATION RCC VALVE CHAMBER | P.014714 |

NOTES

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. PIPELINE COVER OR LEVELS SHALL BE MAINTAINED AS MENTIONED IN TENDER.
3. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGENDS

| | | |
|-----|---------------------|------------------|
| BV | BALL VALVE | NG - NATURAL GAS |
| GV | GLOBE VALVE | PIPELINE |
| IG | INSULATING GASKET | |
| TIP | TIE-IN POINT | |
| CL | CENTER LINE OF PIPE | |

| NO. | DATE | BY | CHKD. | APPD. |
|-----|------------|-------|-------|-------|
| 1 | 16/05/2024 | D M Y | | |

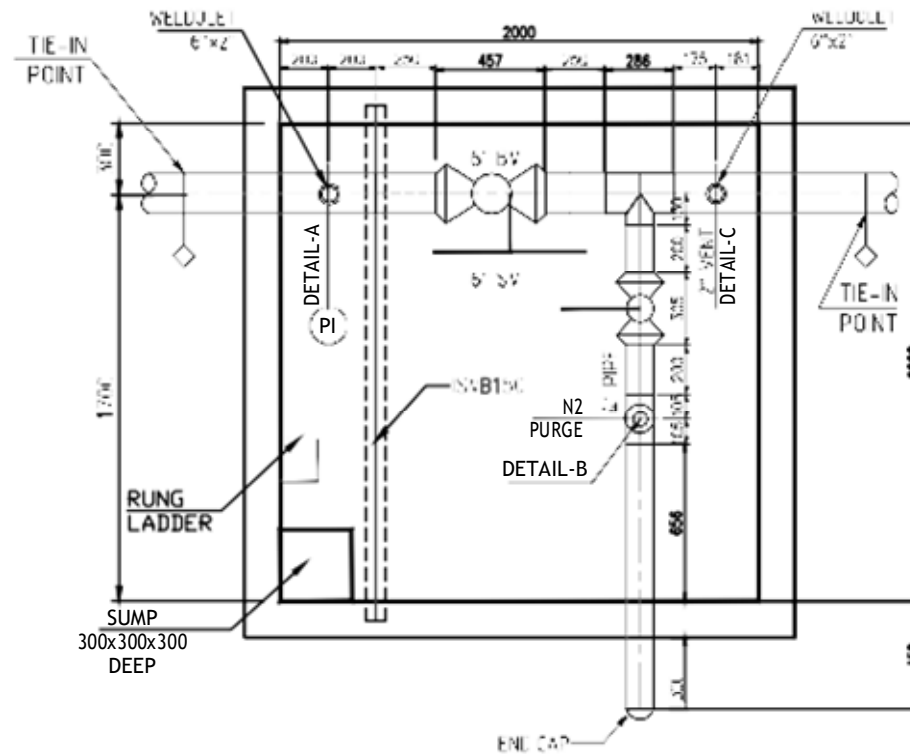
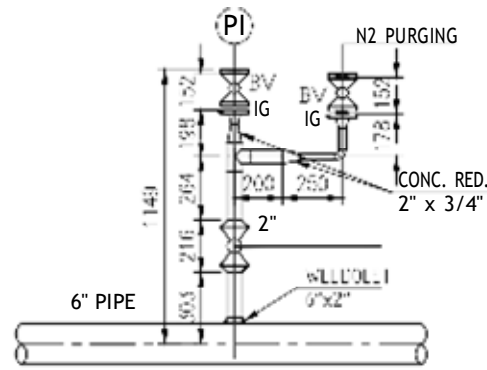
CLIENT: **CENTRAL U. P. GAS LIMITED**

PROJECT: **CITY GAS DISTRIBUTION PROJECT**

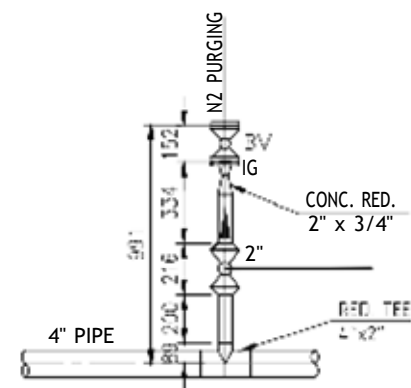
SUBJECT: **PIPING GENERAL ARRANGEMENT DRAWING FOR 4" TAP-OFF CHAMBER ARRANGEMENT FOR BAREILLY, KANPUR & UNNAO AND JHANSI GAS**

| Size | Scale | Sheet | Rev. |
|-------------|-----------------|-------------|------------|
| A3 | 1:30 | 3 of 6 | 0 |
| Project No. | Discipline Code | System Code | Serial No. |
| P.014714 | G | 20749 | M151 |

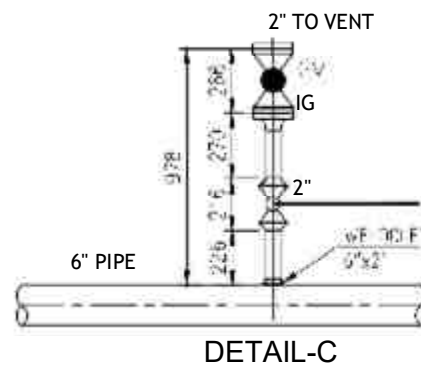
FOR 6" MAIN LINE



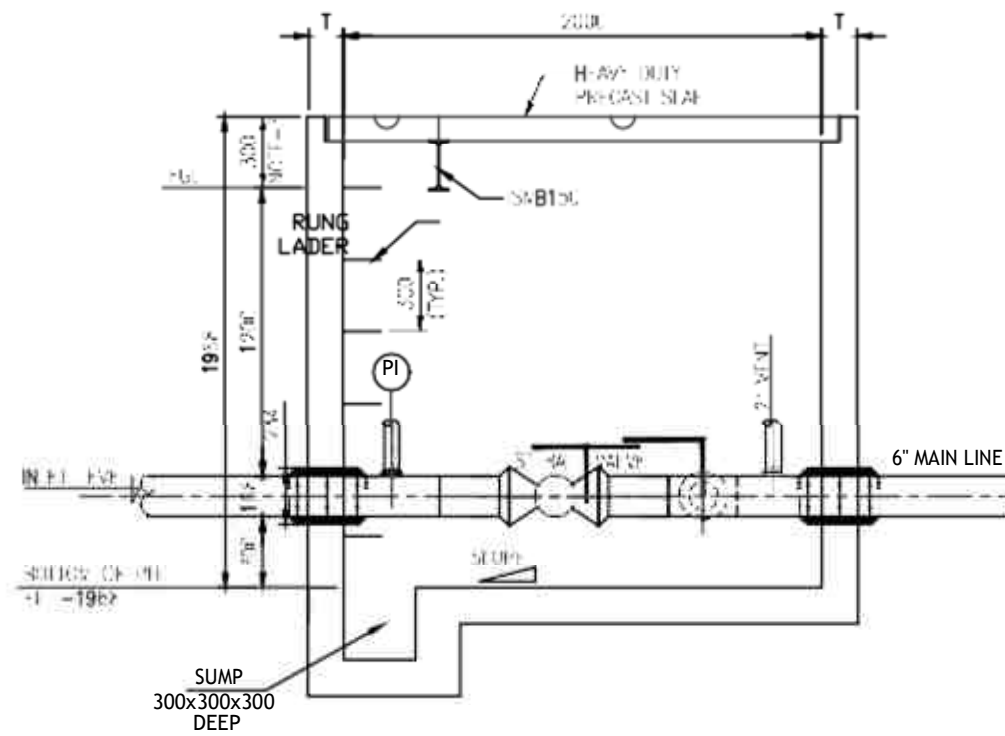
6" SV VALVE CHAMBER WITH VENT & WITH TAP-OFF



DETAIL-B



DETAIL-C



SECTION-AA

REFERENCE DRAWING

| S. NO. | DRAWING TITLE | DRAWING NO. |
|--------|---|----------------------------------|
| 1 | TYPICAL DETAILS FOR 4" SV STATION RCC VALVE CHAMBER | P.014714 - 20749 - 1511 - 1 OF 2 |

NOTES

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. PIPELINE COVER OR LEVELS SHALL BE MAINTAINED AS MENTIONED IN TENDER.
3. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGENDS

| | | | |
|--|----------------------|--|------------------|
| | BV BALL VALVE | | NG - NATURAL GAS |
| | GV GLOBE VALVE | | PIPELINE |
| | IG INSULATING GASKET | | |
| | TIE-IN POINT | | |
| | CENTER LINE OF PIPE | | |

| Rev. | DM Y | ISSUED FOR TENDER | Modifications | Drawn | Checked | Approved | Validated |
|------|------|-------------------|---------------|-------|---------|----------|-----------|
| | | | | | | | |

CLIENT: CENTRAL U. P. GAS LIMITED

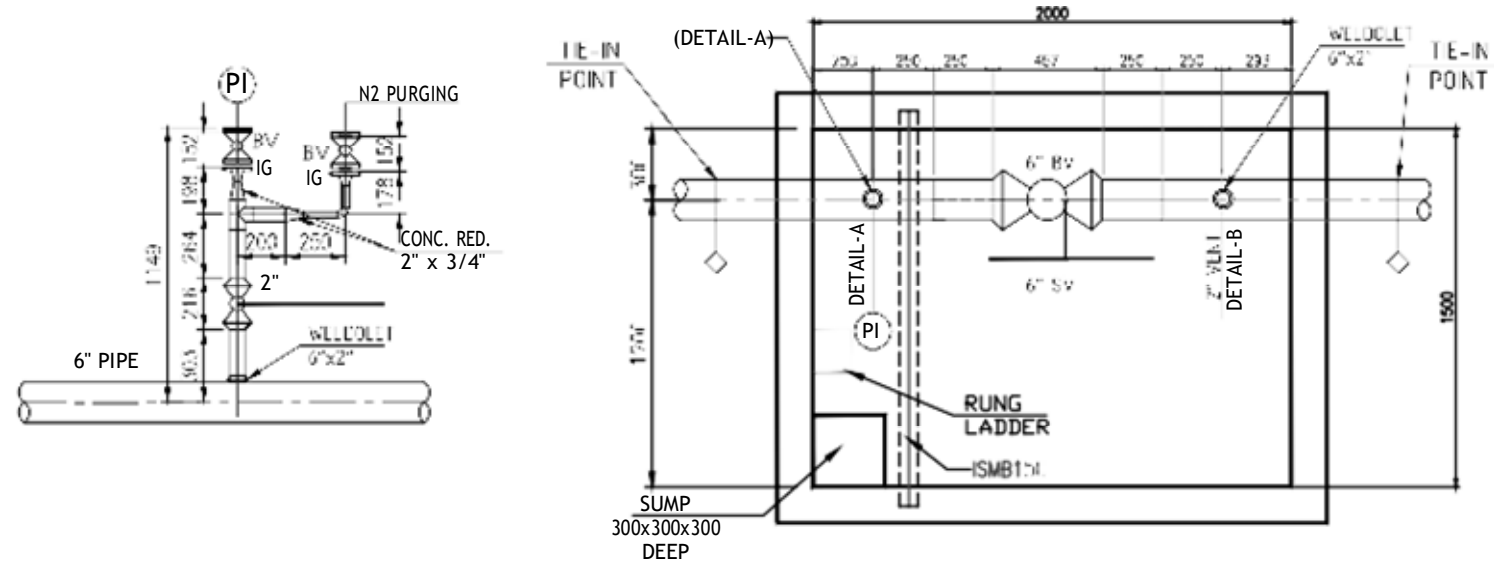
PROJECT: CITY GAS DISTRIBUTION PROJECT

SUBJECT: PIPING GENERAL ARRANGEMENT DRAWING
FOR 6" SV VALVE CHAMBER WITH VENT & WITH TAP-OFF ARRANGEMENT FOR BAREILLY, KANPUR & UNNAO AND JHANSI GAS

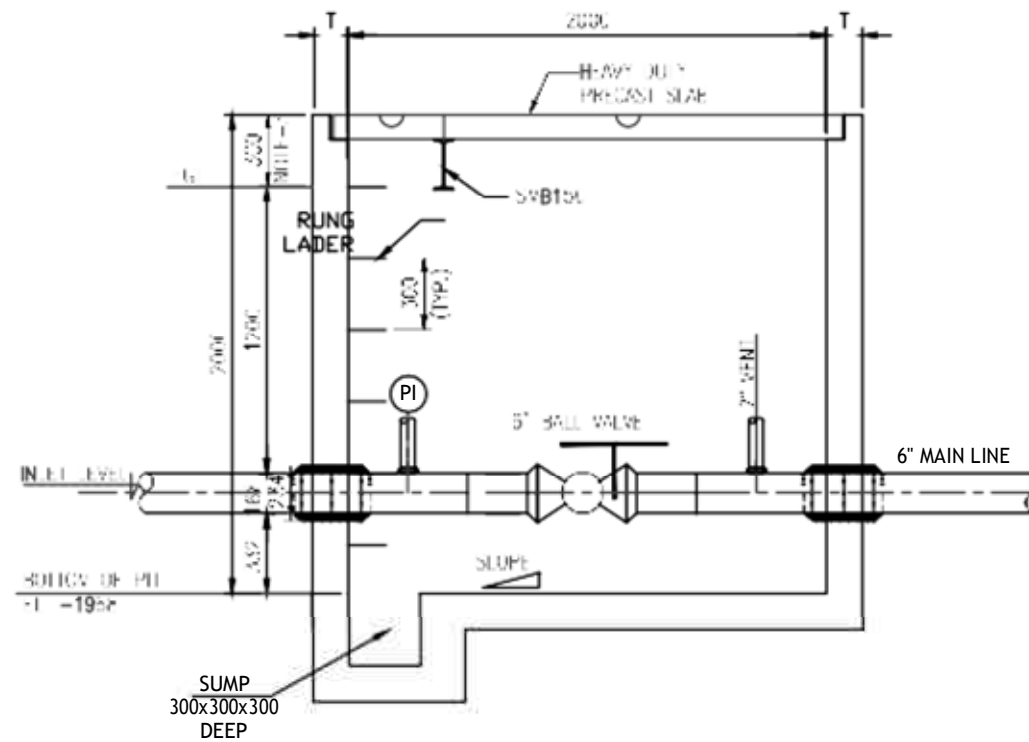
| Project No. | Discipline Code | System Code | Serial No. |
|-------------|-----------------|-------------|------------|
| P.014714 | G | 20749 | M151 |

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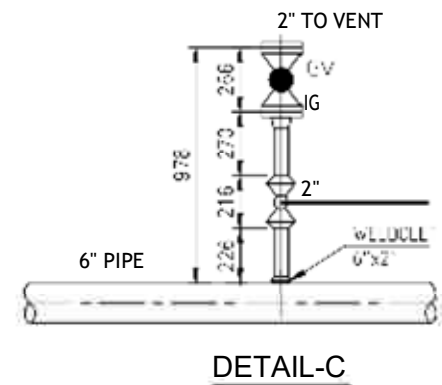
FOR 6" MAIN LINE



6" SV VALVE CHAMBER WITH VENT & WITHOUT TAP-OFF



SECTION-AA



DETAIL-C

REFERENCE DRAWING

| S. NO. | DRAWING TITLE | DRAWING NO. |
|--------|---|---|
| 1 | TYPICAL DETAILS FOR 4" SV STATION RCC VALVE CHAMBER | P.014714 - 2 2079 - 0020 - 15M - 1 OF 2 |

NOTES

- ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
- PIPELINE COVER OR LEVELS SHALL BE MAINTAINED AS MENTIONED IN TENDER.
- VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGENDS

- BV BALL VALVE
- GV GLOBE VALVE
- IG INSULATING GASKET
- PI TIE-IN POINT
- ▼ CENTER LINE OF PIPE
- NG - NATURAL GAS
- PIPELINE

| REV | DATE | BY | CHKD | APPD | VALIDATED |
|-----|----------|-------------------|-------|---------|-----------|
| 0 | 03.06.21 | ISSUED FOR TENDER | | | |
| 1 | DM Y | Modifications | Drawn | Checked | Approved |

CLIENT: CENTRAL U. P. GAS LIMITED

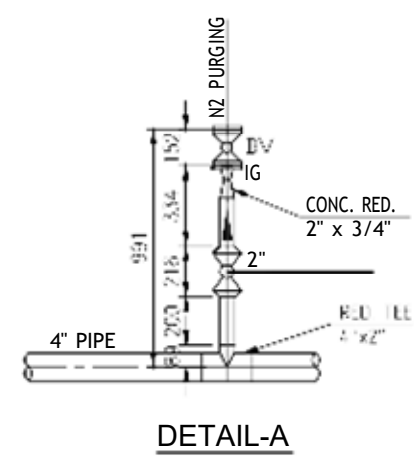
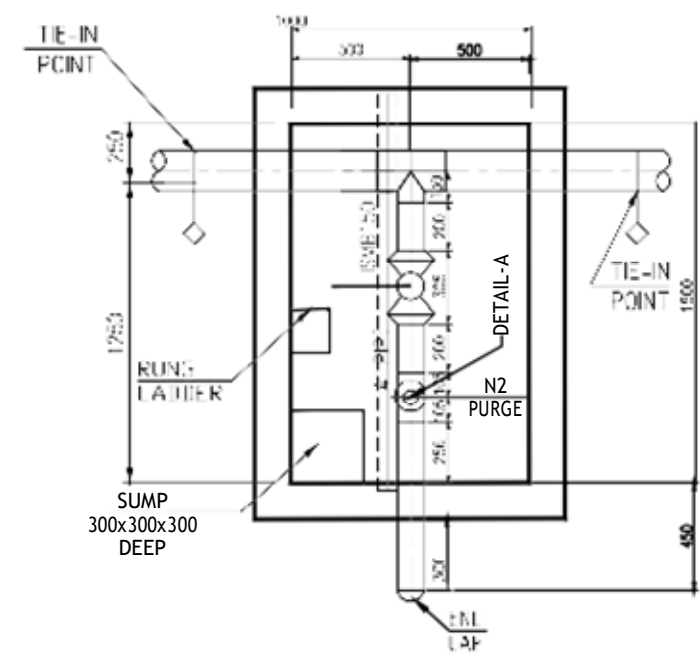
PROJECT: CITY GAS DISTRIBUTION PROJECT

SUBJECT: PIPING GENERAL ARRANGEMENT DRAWING FOR 6" SV VALVE CHAMBER WITH VENT ARRANGEMENT FOR BAREILLY, KANPUR & UNNAO AND JHANSI GAS

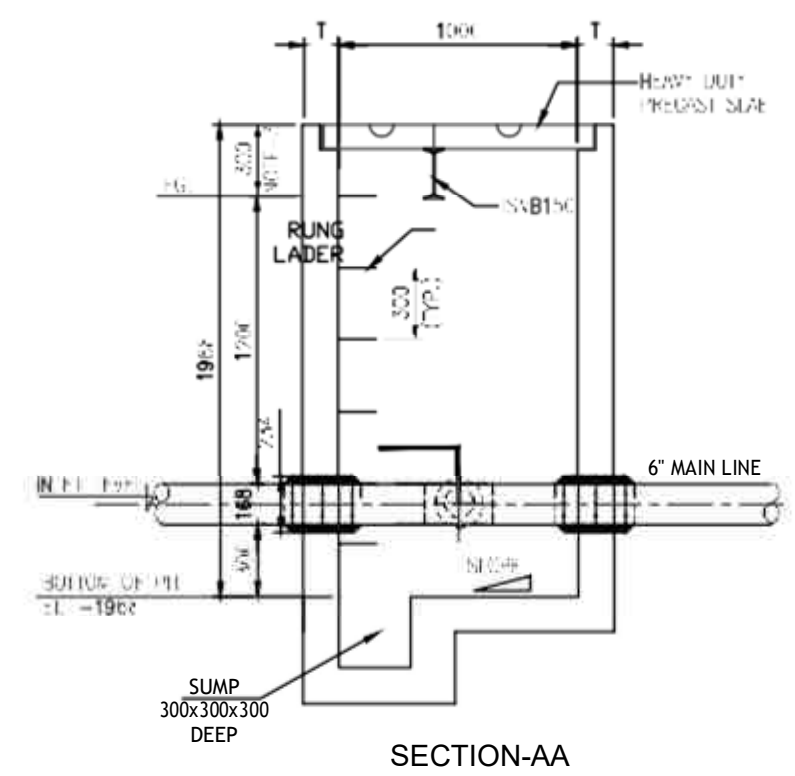
| Size | Scale | Sheet | Rev. |
|-------------|-----------------|-------------|------------|
| A3 | 1:30 | 5 of 6 | 0 |
| Project No. | Discipline Code | System Code | Serial No. |
| P.014714 | G | 20749 | M151 |

A
B
C
D
E

FOR 6" MAIN LINE



6" TAP-OFF CHAMBER



REFERENCE DRAWING

| S. NO. | DRAWING TITLE | DRAWING NO. |
|--------|---|---|
| 1 | TYPICAL DETAILS FOR 4" SV STATION RCC VALVE CHAMBER | P.014714 - 2 2019 - 0620 - 137 - 1 OF 2 |

NOTES

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN M UNLESS OTHERWISE MENTIONED.
2. PIPELINE COVER OR LEVELS SHALL BE MAINTAINED AS MENTIONED IN TENDER.
3. VALVE CHAMBER PROJECTION ABOVE FGL SHALL BE 150MM-300MM SUITED AS PER SITE CONDITIONS.

LEGENDS

- BV BALL VALVE
- GV GLOBE VALVE
- IG INSULATING GASKET
- TIE-IN POINT
- ▼ CENTER LINE OF PIPE
- NG - NATURAL GAS
- PIPELINE

| Rev. | D M Y | ISSUED FOR TENDER | Modifications | Drawn | Checked | Approved | Validated |
|------|-------|-------------------|---------------|-------|---------|----------|-----------|
| | | | | | | | |

CLIENT: **CENTRAL U. P. GAS LIMITED**

PROJECT: **CITY GAS DISTRIBUTION PROJECT**

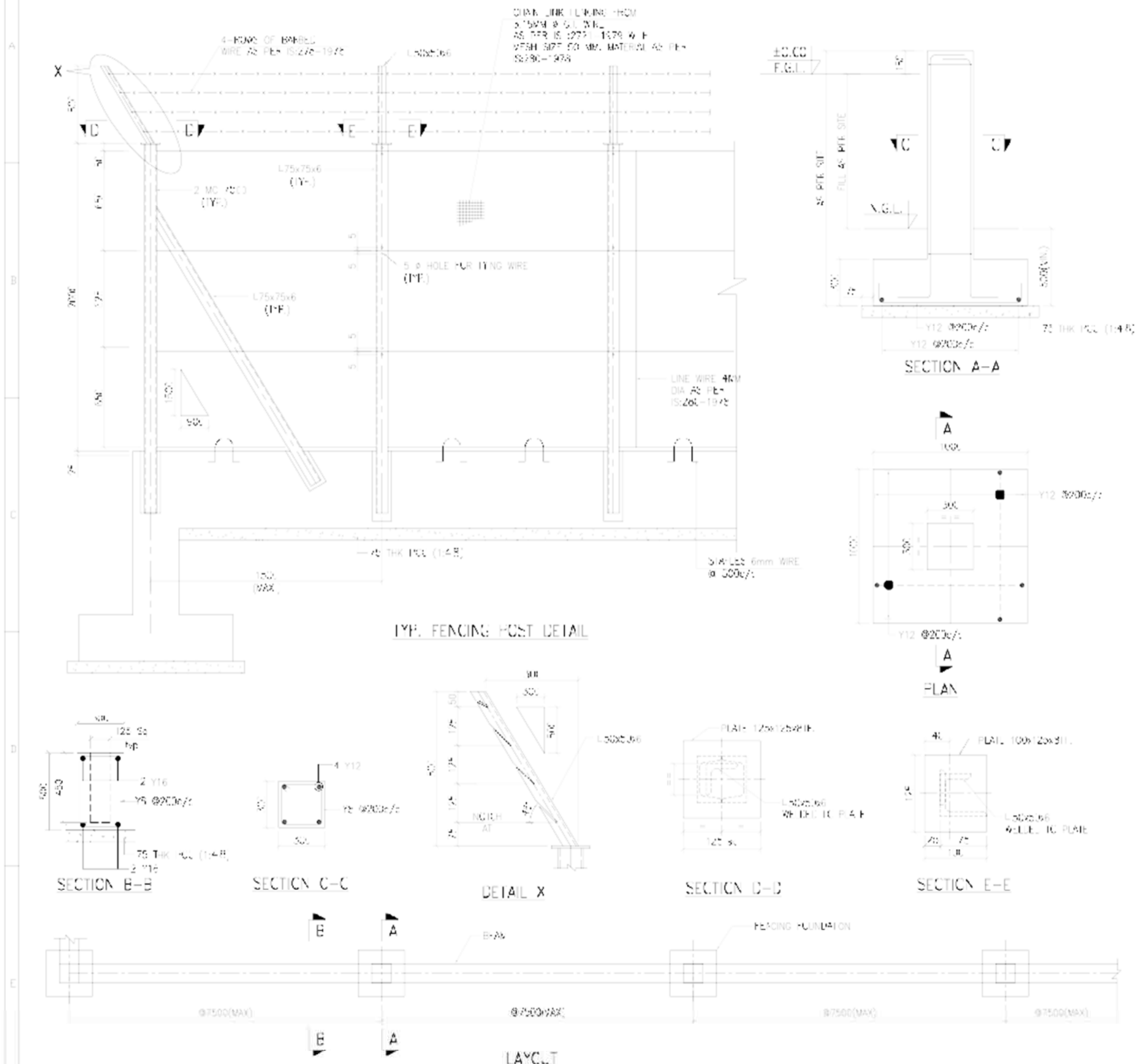
SUBJECT: **PIPING GENERAL ARRANGEMENT DRAWING FOR 6" TAP-OFF CHAMBER ARRANGEMENT FOR BAREILLY, KANPUR & UNNAO AND JHANSI GAS**

| Size | Scale | Sheet | Rev. |
|-------------|-----------------|-------------|------------|
| A3 | 1:30 | 6 of 6 | |
| Project No. | Discipline Code | System Code | Serial No. |
| P.014714 | G | 20749 | M151 |

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NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. ALL DIMENSIONS ARE DIMENSIONS ONLY. DO NOT SCALE THE DIMENSIONS.



| Rev. | Issued For | Drawn By | Checked By | Approved By |
|------|-------------------|----------|------------|-------------|
| 0 | ISSUED FOR TENDER | | | |
| 1 | Modifications | | | |

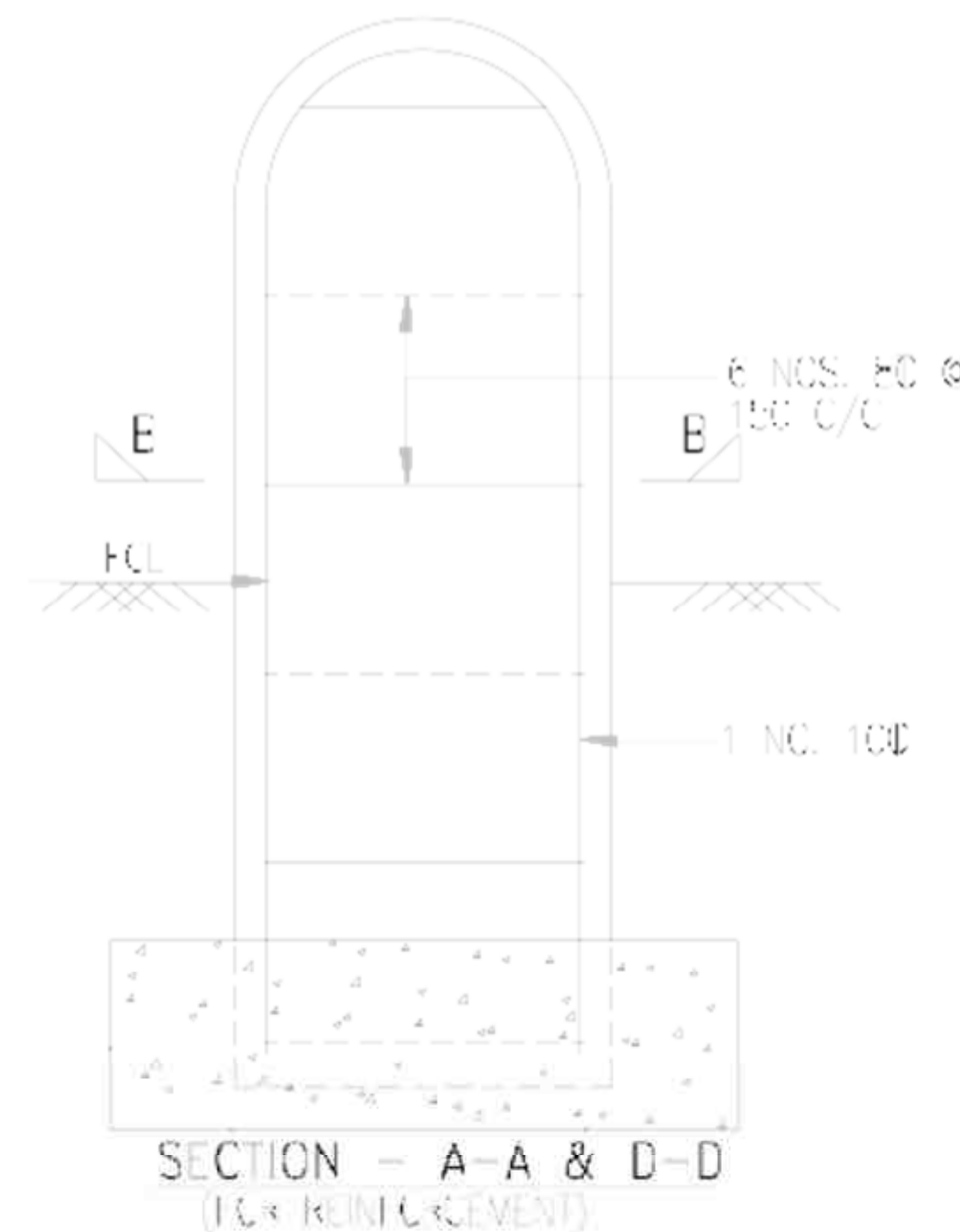
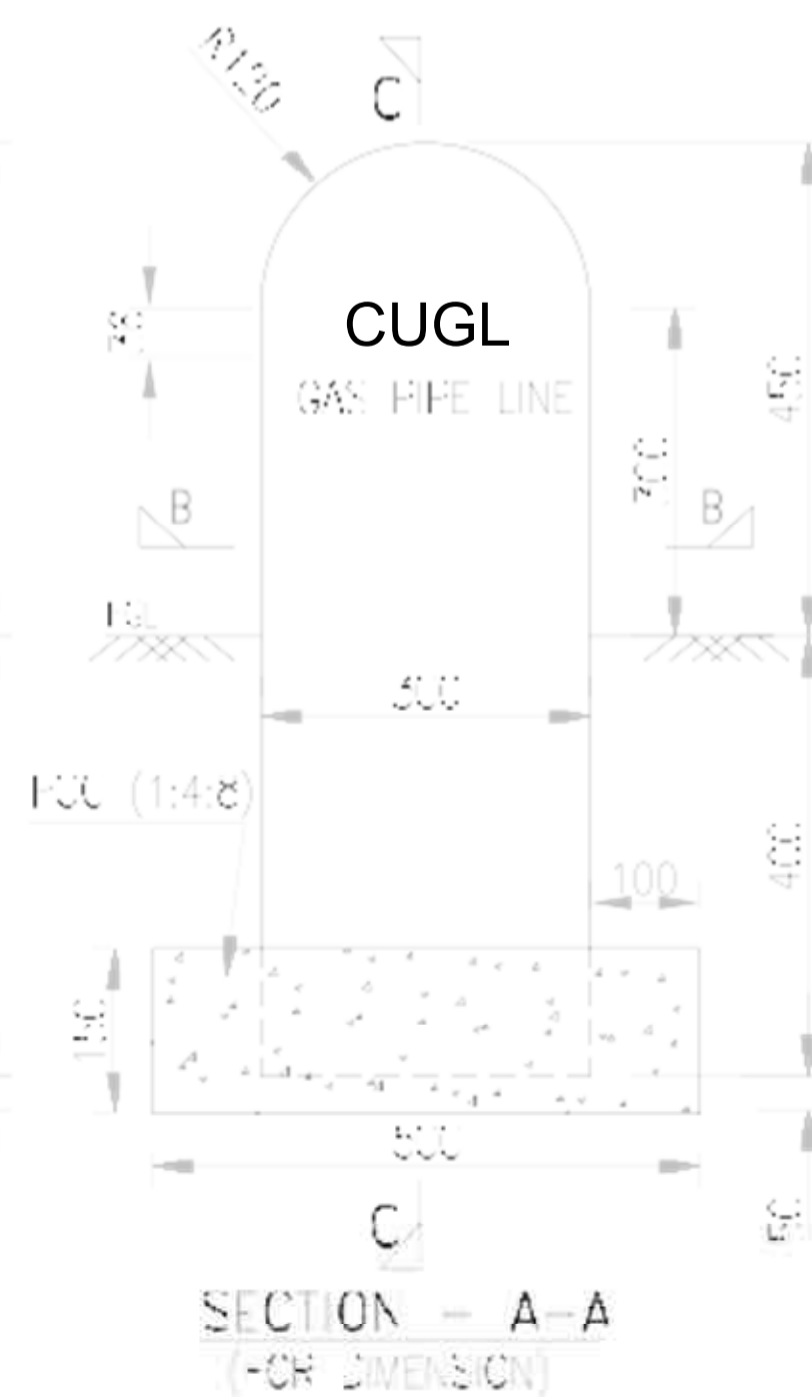
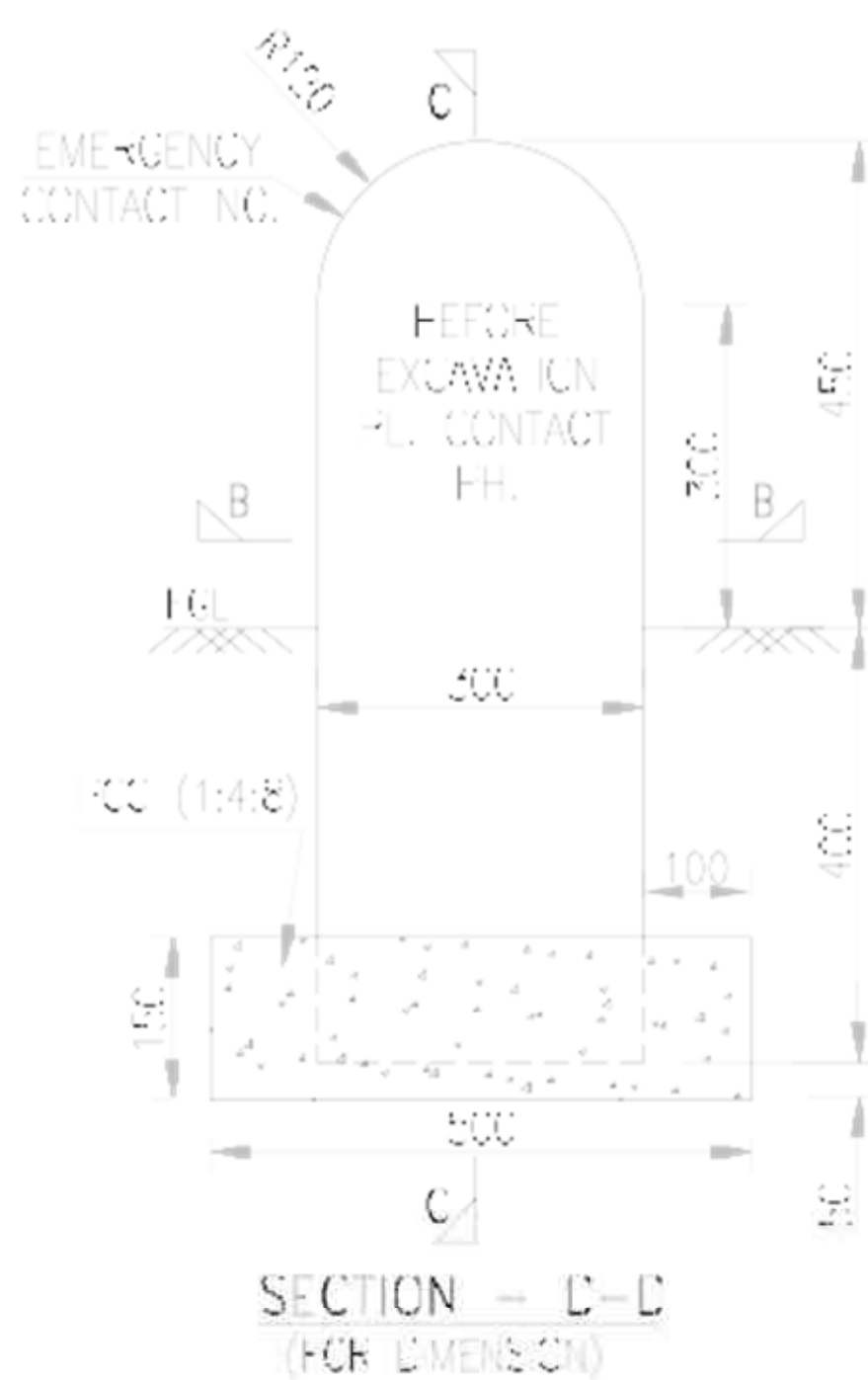
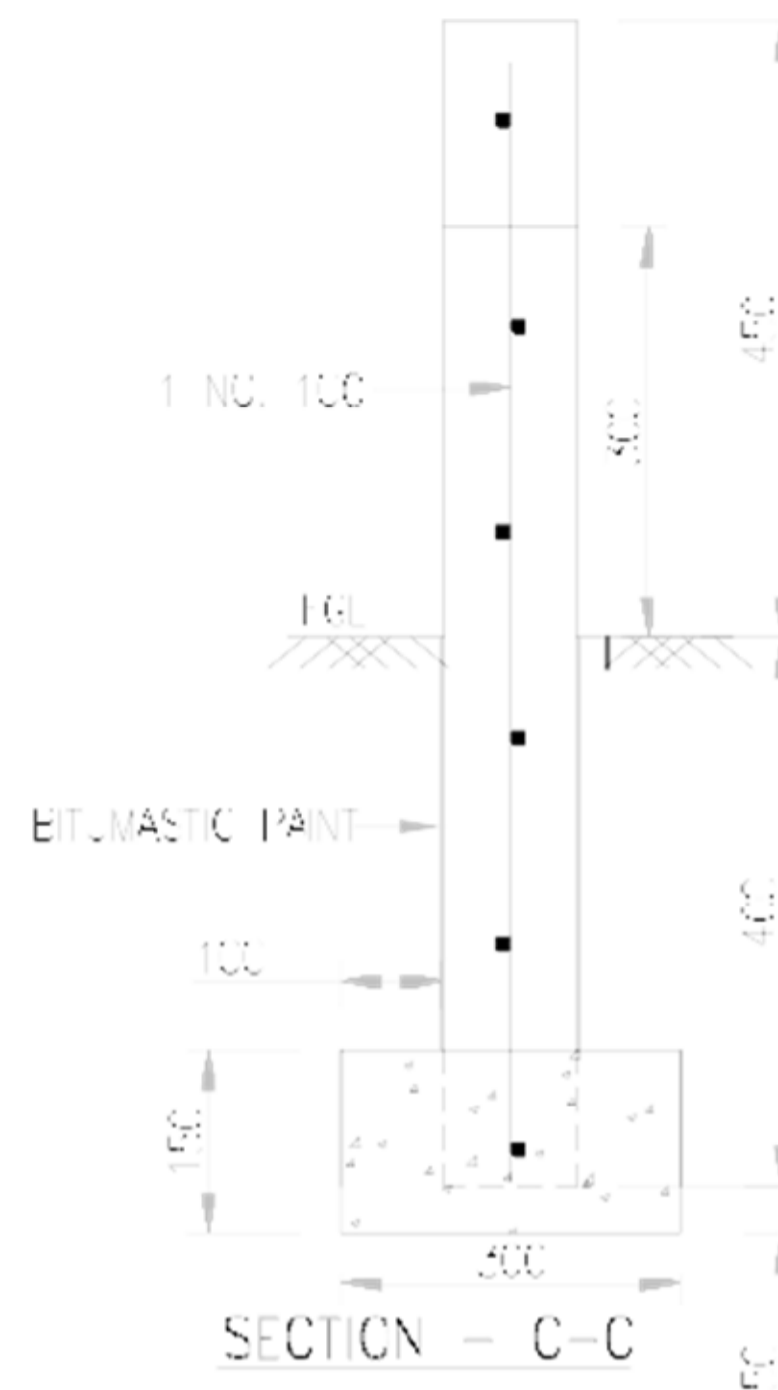
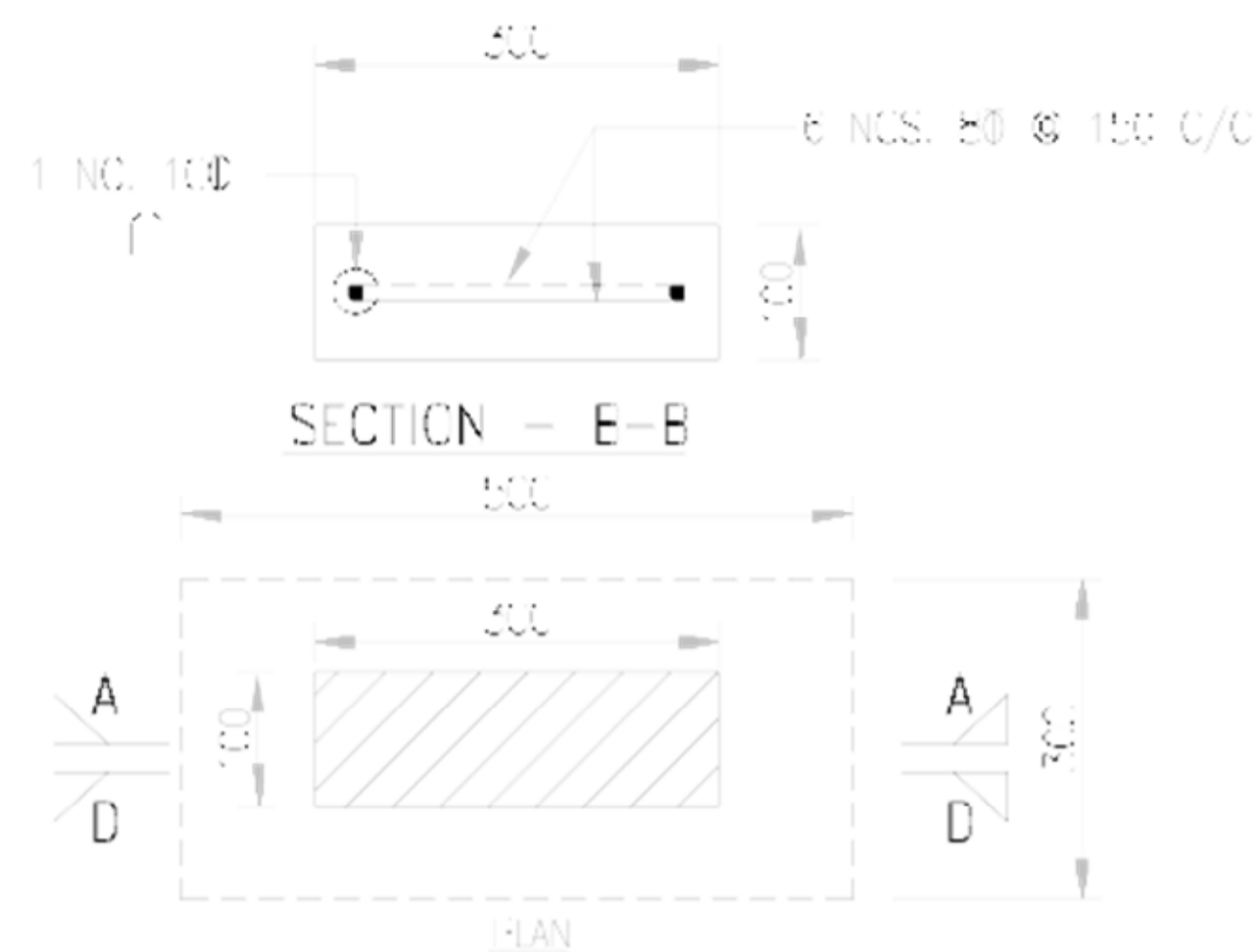
CUSTOMER: CENTRAL U. P. GAS LIMITED

PROJECT: CITY GAS DISTRIBUTION PROJECT

SUBJECT: TYPICAL DETAILS OF FENCING

| Size | Scale | Sheet | Rev. |
|-------------|-----------------|-------------|------------|
| A1 | NTS | 01 of 01 | 0 |
| Project No. | Discipline Code | System Code | Serial No. |
| P.014714 | G | 21028 | 004 |

1. DRAWING IS NOT TO SCALE.
2. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
3. MARKERS SHALL BE INSTALLED IN EVERY 20 METER INTERVAL AS PER INSTRUCTIONS OF ENGINEER-IN-CHARGE.
4. ALL BOUNDARY MARKERS SHALL BE PRECAST & INSCRIPTIONS SHALL BE ENGRAVED 5mm DEEP IN THE MOULD ON BOTH FACE.
5. CONCRETE FOR BOUNDARY MARKER SHALL BE M - 20.



| | | | | | |
|------|----------|-------------------|----------|------------|-------------|
| 0 | 28/03/19 | ISSUED FOR TENDER | Sumit | AMK | MS |
| Rev. | D M Y | Modifications | Drawn By | Checked By | Approved By |

CUSTOMER: **CENTRAL U. P. GAS LIMITED**

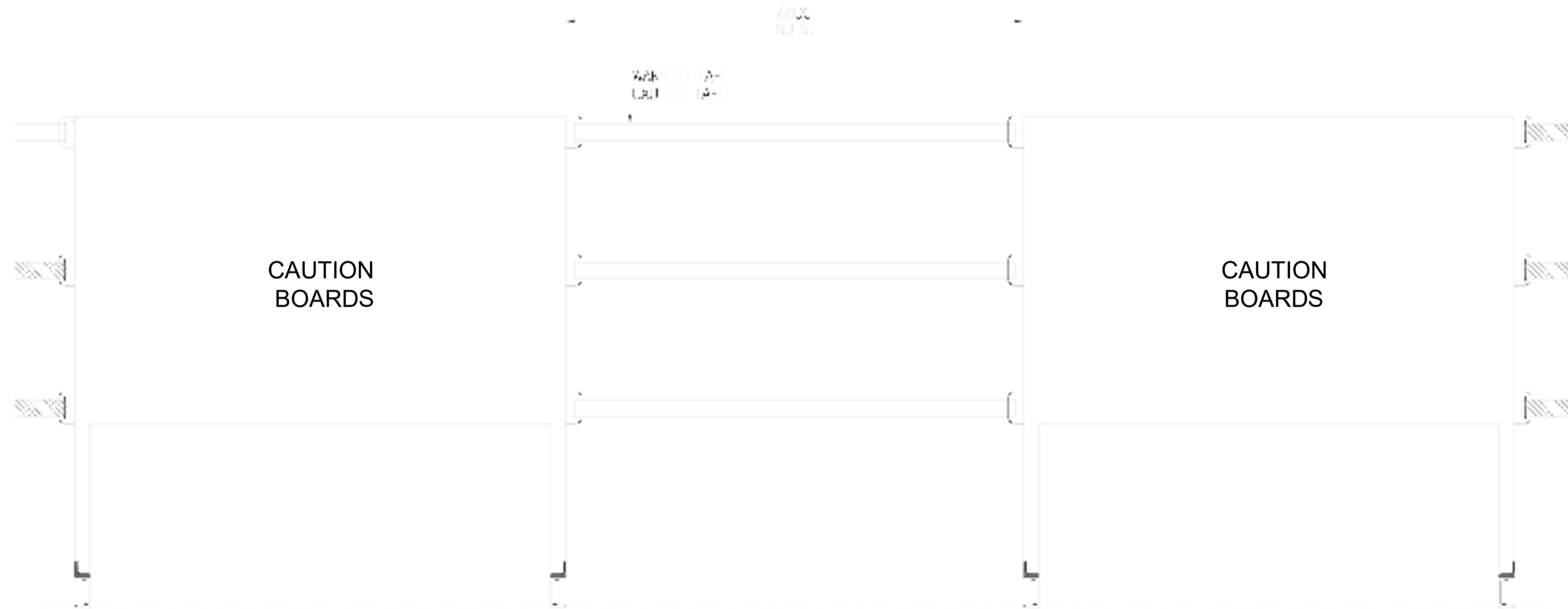
PROJECT: **CITY GAS DISTRIBUTION PROJECT**

SUBJECT: **TYPICAL DETAILS OF RCC ROUTE MARKER**


| | | | |
|-------------|-----------------|-------------|------------|
| Size | Scale | Sheet | Rev. |
| A1 | NTS | 01 of 01 | 0 |
| Project No. | Discipline Code | System Code | Serial No. |
| P.014714 | G | 21028 | 007 |

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SPECIFIED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT CALL.

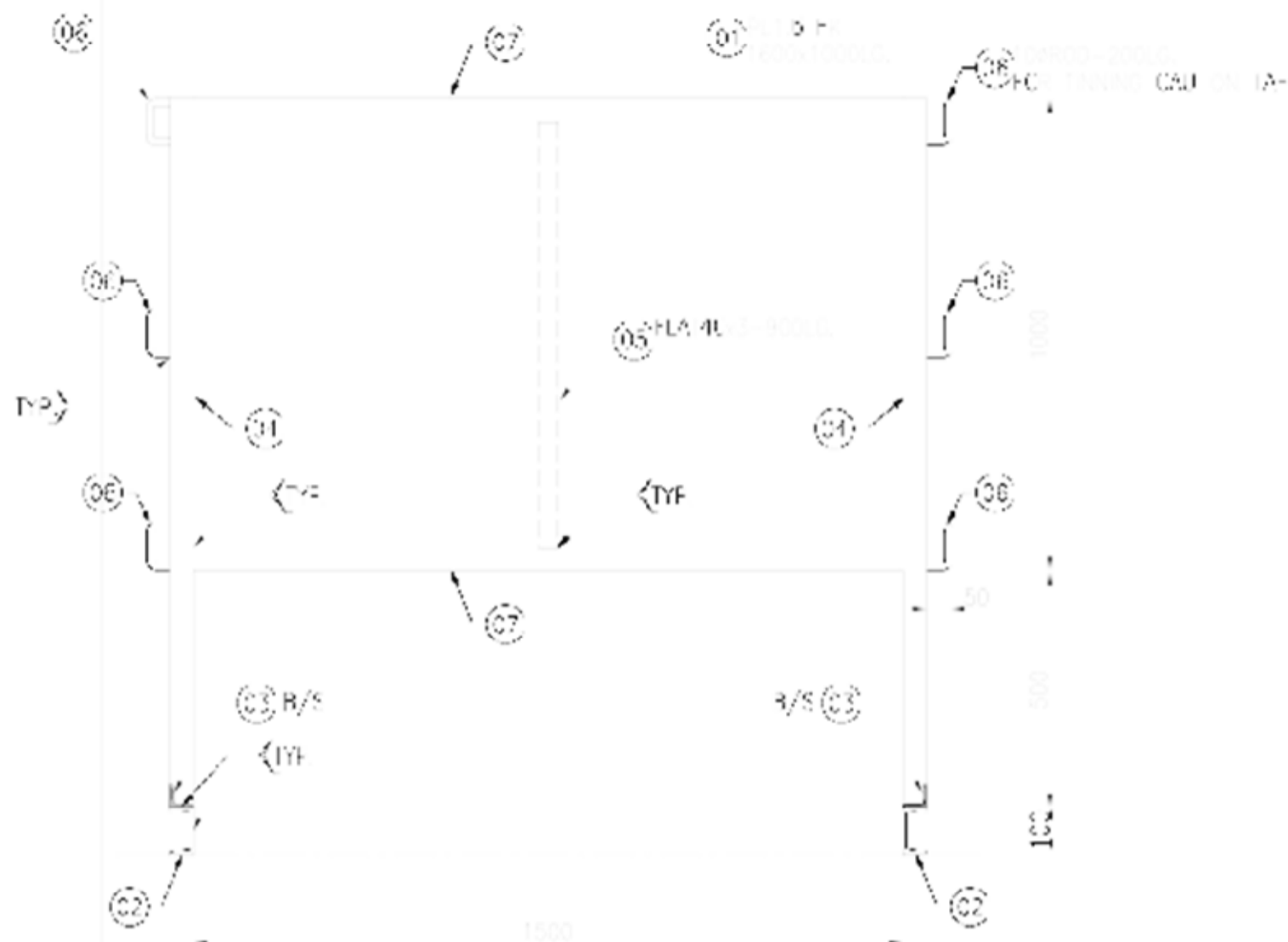


SCHEMATIC LAYOUT OF CAUTION BOARDS AND BARRICADDING

| | | | | | |
|--|----------|-------------------|----------|------------|-------------|
| 0 | 08/03/19 | ISSUED FOR TENDER | | | |
| Rev. | D M Y | Modifications | Drawn By | Checked By | Approved By |
| CUSTOMER | | | | | |
|  CENTRAL U. P. GAS LIMITED | | | | | |
| PROJECT | | | | | |
| CITY GAS DISTRIBUTION PROJECT | | | | | |
| SUBJECT | | | | | |
| TYPICAL DETAIL OF BARRICADDING | | | | | |
| Size | | Scale | | Sheet | |
| A1 | | NTS | | 01 of 01 | |
| Project No. | | Discipline Code | | Serial No. | |
| P.014714 | | G | | 21028 009 | |

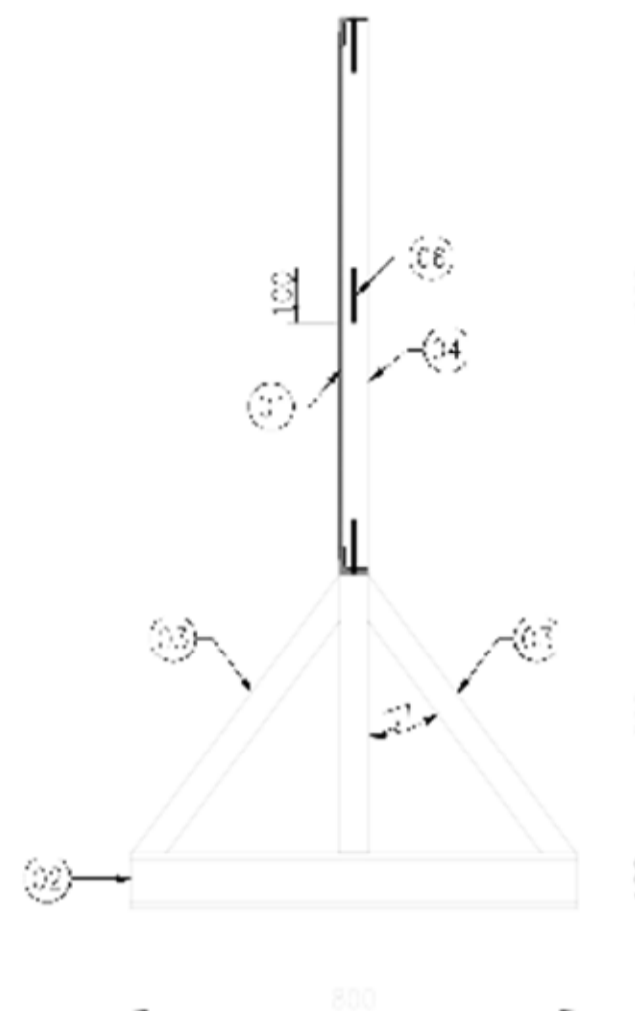
NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. FOLLOW WRITTEN DIMENSIONS ONLY IN ALL CASES.



ELEVATION A-A

SCALE: 1:100



ELEVATION B-B

SCALE: 1:100



PLAN VIEW

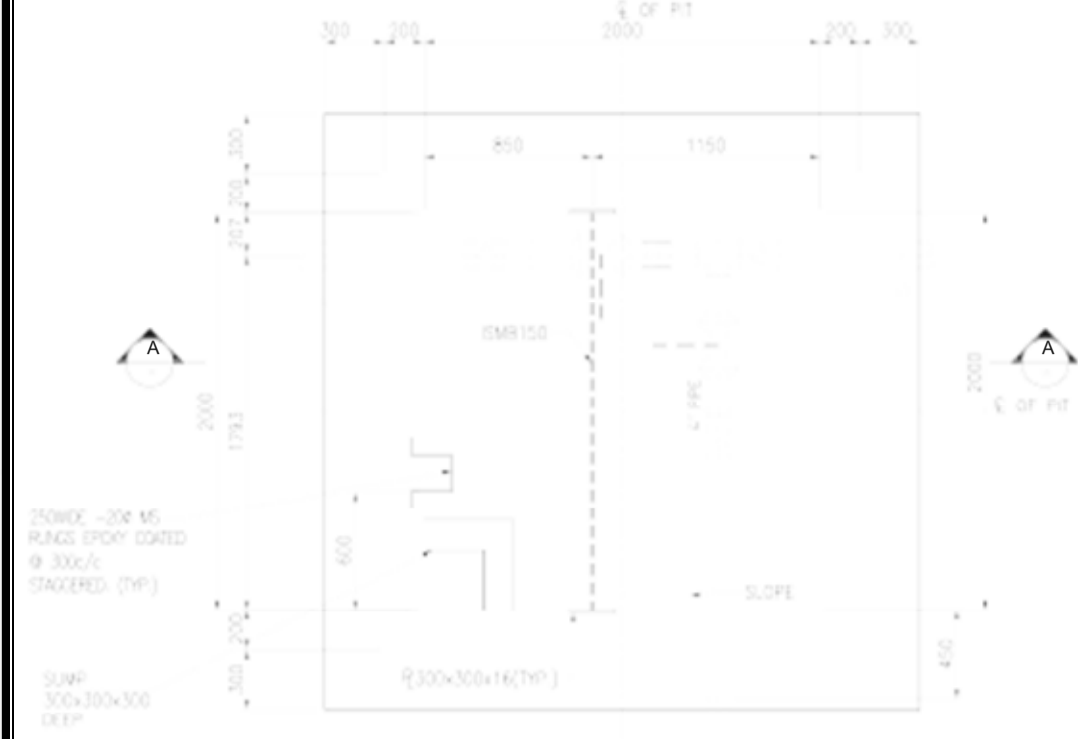
SCALE: 1:100

CAUTION
 WARNING: HIGH VOLTAGE
 ELECTRICAL WORK IN PROGRESS
 DO NOT TOUCH
 ALL DIMENSIONS IN MM UNLESS OTHERWISE SPECIFIED
 FOLLOW WRITTEN DIMENSIONS ONLY IN ALL CASES

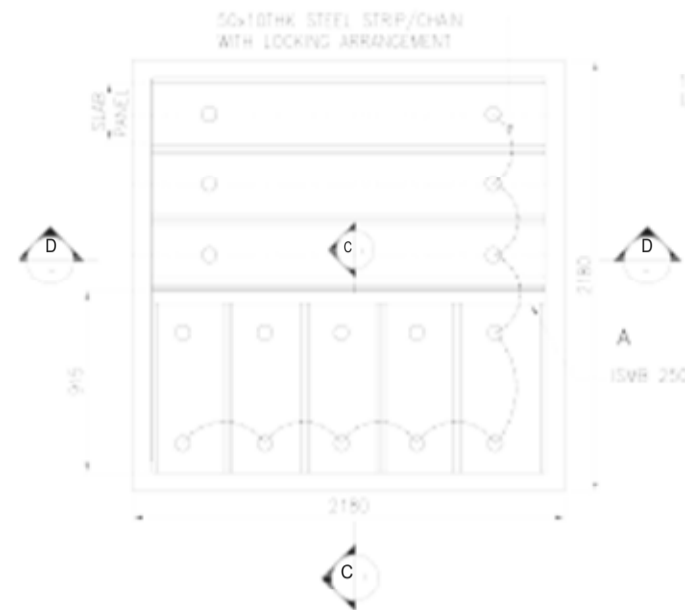
**(TO BE PRINTED ON BOTH SIDE
 OF ITEM NO. 01)**

| BILL OF MATERIAL | | | | | | |
|-------------------------|-------------|-------|--------|-------------|------------|--------------|
| Item Mkd. | Section | Width | Length | Item Qty. | Weight | In Kgs |
| | | | | (All Marks) | Kgs./M, M2 | Total Weight |
| 1 | PL 1.6 Thk. | 1600 | 1000 | 1 | 12.56 | 20.10 |
| 2 | ISMC 100 | -- | 800 | 2 | 9.20 | 14.72 |
| 3 | L50x50x6 | -- | 625 | 4 | 4.50 | 11.25 |
| 4 | L50x50x6 | -- | 1500 | 2 | 4.50 | 13.50 |
| 5 | Flat 3 Thk. | 40 | 900 | 1 | 0.94 | 0.03 |
| 6 | 10φ Rod | -- | 200 | 6 | 0.62 | 0.74 |
| 7 | L50x50x6 | -- | 1600 | 2 | 4.50 | 14.40 |
| Grand Total (Kg) | | | | | | 74.74 |

| | | | | | |
|---------------------------------|----------|-----------------|-----|-------------|----------|
| Rev. | 01 | 01 | 01 | 01 | 01 |
| Drawn By | DMY | Checked By | | Approved By | |
| CUSTOMER | | | | | |
| CENTRAL U. P. GAS LIMITED | | | | | |
| PROJECT | | | | | |
| CITY GAS DISTRIBUTION PROJECT | | | | | |
| SUBJECT | | | | | |
| TYPICAL DETAIL OF CAUTION BOARD | | | | | |
| Size | A1 | Scale | NTS | Sheet | 01 of 01 |
| Project No. | P.014714 | Discipline Code | G | System Code | 21028 |
| Serial No. | | | | | 008 |



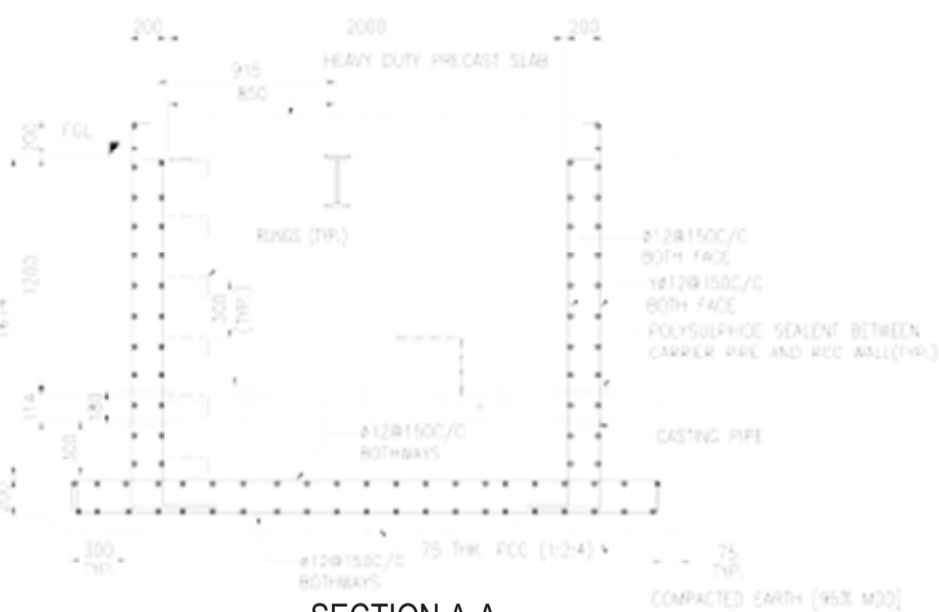
VALVE PIT BOTTOM PLAN
(SCALE 1:25)



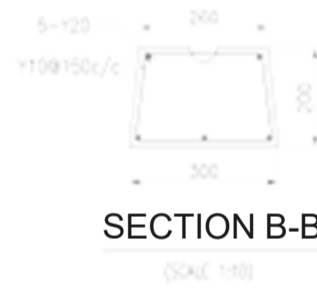
LOCKING ARRANGEMENT OF
PRECAST COVER SLAB
(SCALE 1:25)

DETAIL OF HOOK
(SCALE 1:10)

JOINTING DETAIL OF PRECAST
COVER SLAB
(SCALE 1:10)



SECTION A-A
(SCALE 1:25)



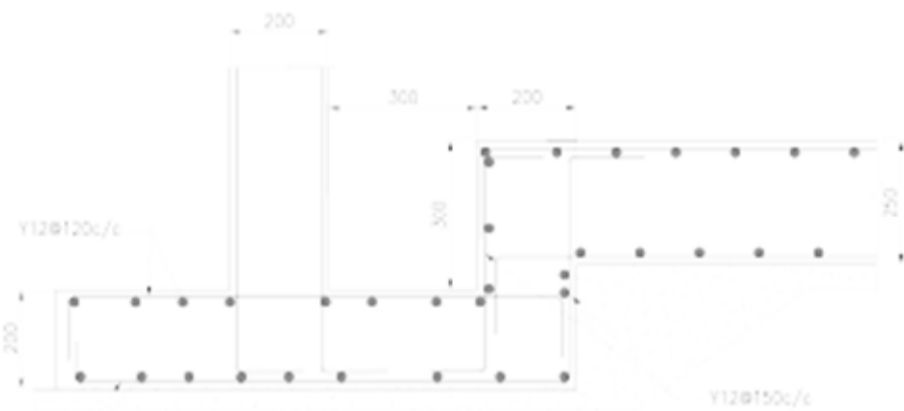
SECTION B-B
(SCALE 1:10)



INSERT PLATE IP1
(SCALE 1:10)



SECTION IP-IP
(SCALE 1:10)



TYP. REINF. DETAIL
FOR SUMP
(SCALE 1:10)

PLAN OF PRECAST COVER SLAB
(FOR VEHICLE MOVING AREA)
(SCALE 1:10)



DSECTION D-D
(SCALE 1:10)

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. DO NOT MEASURE DIMENSIONS ON THE DRAWING ONLY WRITTEN DIMENSION SHOULD BE FOLLOWED.
3. GRADE OF CONCRETE SHALL M25.
4. ALL REINFORCEMENT SHALL BE HIGH YIELD STRENGTH DEFORMED (HYSD) BAR OF GRADE FE500 CONFORMING TO IS:1786.
5. MIN NOMINAL COVER TO REINFORCEMENT IS AS FOLLOWS:

| | BOTTOM | TOP | SIDE |
|----------|--------|------------|---------|
| RAFT | 50 | 50 | 50 |
| TOP SLAB | 20 | 20 | 20 |
| WALL | 20 | (OUTER) 30 | (INNER) |
6. LAP LENGTH SHALL BE 50 TMC DIA OF THE SMALLER BAR NOT MORE THAN 50% OF BARS SHALL BE LAPPED AT ANY SECTION.
7. DEVELOPMENT LENGTH (Ld) SHALL BE 45 TIMES DIA OF THE BAR.
8. NET SAFE BEARING CAPACITY AT 1.500M BELOW FGL IS CONSIDERED AS 50 KN/M² FROM STRUCTURAL LOADS ONLY.
9. FOR RCC WALL AND BASE SLAB WATER PROOFING COMPOUND SHALL BE WELL MIX WITH DRY CEMENT IN PROPORTION OF 10 BY WEIGHT OF CEMENT OR AS RECOMMENDED BY MANUFACTURER.
10. EXTERNAL SURFACE IN CONTACT WITH SOIL (BELOW FGL) FOR ALL WALL & RAFT SHALL BE PROVIDED WITH MINIMUM TWO COATS OF BITUMINOUS PAINTING OF GRADE 35/25 CONFORMING TO IS:102 @ 1.7 KG/SM² (MINIMUM) FOR WATER/DAMP PROOFING AS PER SPECIFICATION.

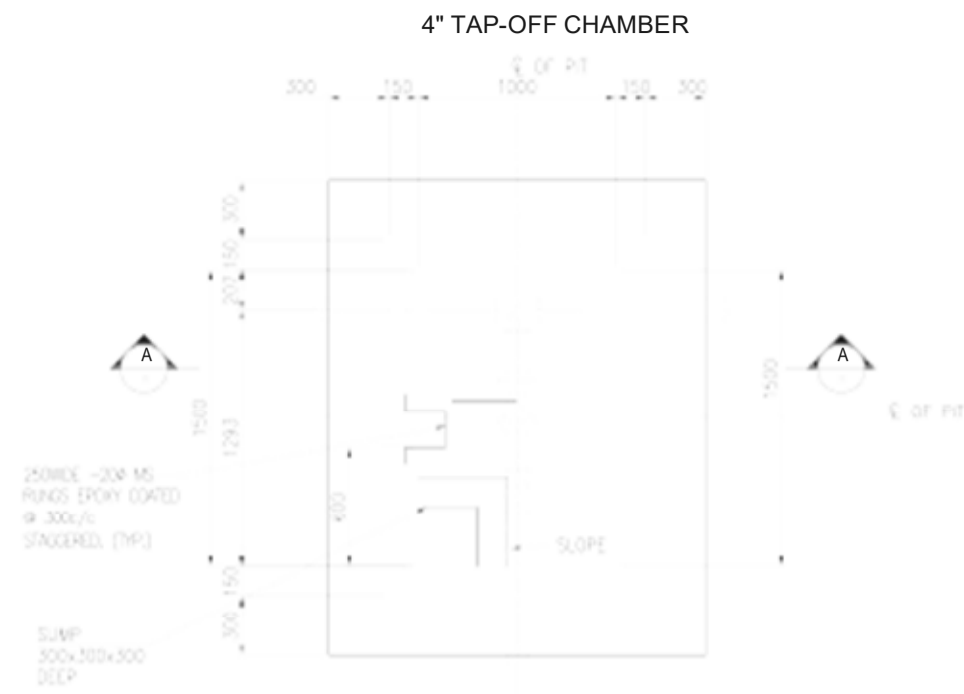
ISSUED FOR TENDER

| Rev. | Scale | Sheet | Rev. |
|------|-------|----------|------|
| A | 1:50 | 01 of 06 | A |

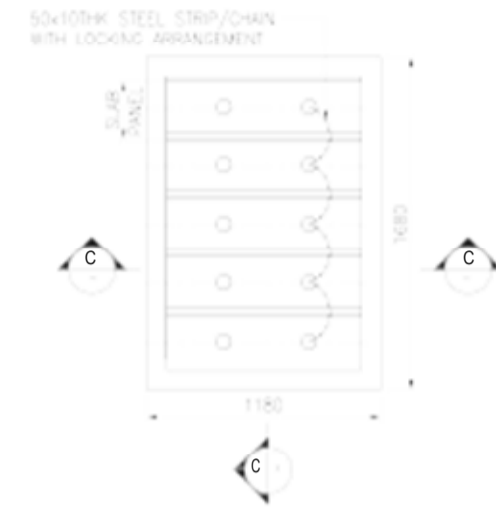
Project No. P.014714 Discipline Code G System Code 20730 Serial No. 010

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. DO NOT MEASURE DIMENSIONS ON THE DRAWING ONLY WRITTEN DIMENSION SHOULD BE FOLLOWED.
3. GRADE OF CONCRETE SHALL M25.
4. ALL REINFORCEMENT SHALL BE HIGH YIELD STRENGTH DEFORMED (HYSD) BAR OF GRADE FE500 CONFORMING TO IS:1786.
5. MIN NOMINAL COVER TO REINFORCEMENT IS AS FOLLOWS:

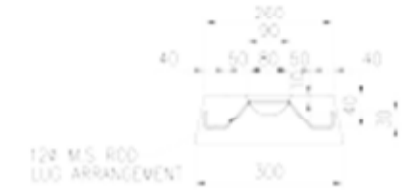
| | BOTTOM | TOP | SIDE |
|----------|--------|------------|---------|
| RAFT | 50 | 50 | 50 |
| TOP SLAB | 20 | 20 | 20 |
| WALL | 20 | (OUTER) 30 | (INNER) |
6. LAP LENGTH SHALL BE 50 TMC DIA OF THE SMALLER BAR NOT MORE THAN 50% OF BARS SHALL BE LAPPED AT ANY SECTION.
7. DEVELOPMENT LENGTH (Ld) SHALL BE 45 TIMES DIA OF THE BAR.
8. NET SAFE BEARING CAPACITY AT 1.50M BELOW FGL IS CONSIDERED AS 50 KN/M² FROM STRUCTURAL LOADS ONLY.
9. FOR RCC WALL AND BASE SLAB WATER PROOFING COMPOUND SHALL BE WELL MIX WITH DRY CEMENT IN PROPORTION OF 10 BY WEIGHT OF CEMENT OR AS RECOMMENDED BY MANUFACTURER.
10. EXTERNAL SURFACE IN CONTACT WITH SOIL (BELOW FGL) FOR ALL WALL & RAFT SHALL BE PROVIDED WITH MINIMUM TWO COATS OF BITUMINOUS PAINTING OF GRADE 35/25 CONFORMING TO IS:102 @ 1.7 KG/SQ.M (MINIMUM) FOR WATER/DAMP PROOFING AS PER SPECIFICATION.



VALVE PIT BOTTOM PLAN
(SCALE 1:25)



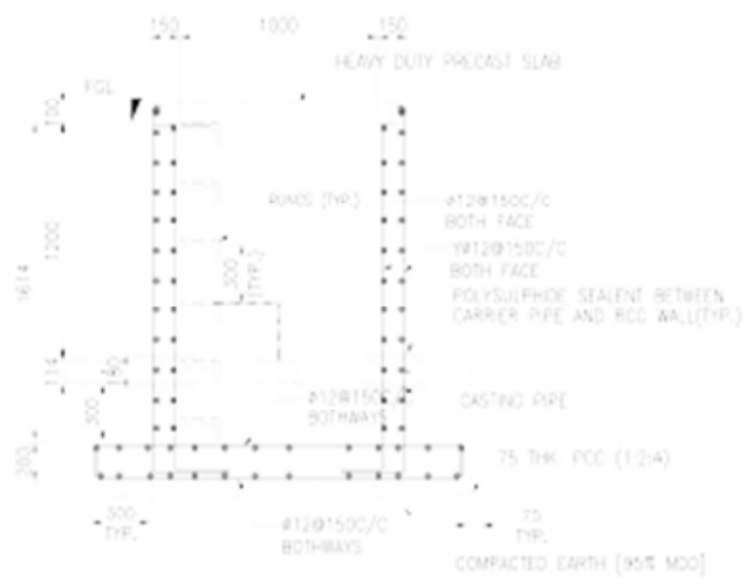
LOCKING ARRANGEMENT OF
PRECAST COVER SLAB
(SCALE 1:25)



DETAIL OF HOOK
(SCALE 1:10)



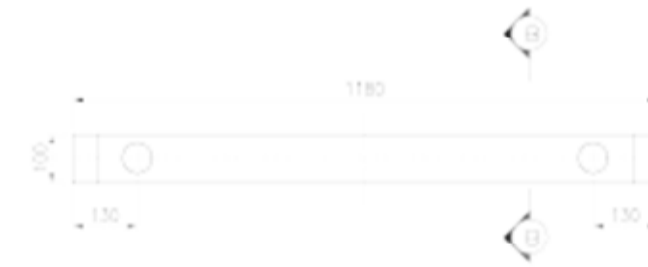
JOINTING DETAIL OF PRECAST
COVER SLAB
(SCALE 1:10)



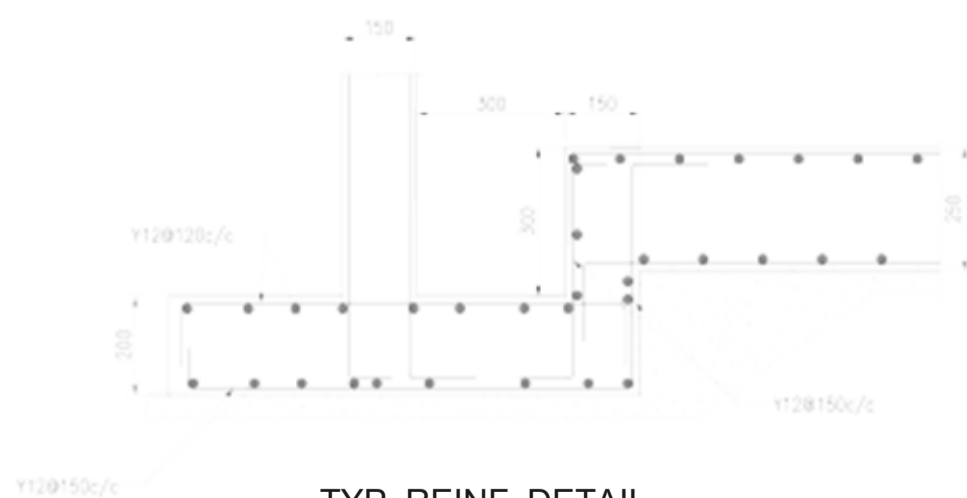
SECTION A-A
(SCALE 1:25)



SECTION B-B
(SCALE 1:10)



PLAN OF PRECAST COVER SLAB
(FOR VEHICLE MOVING AREA)
(SCALE 1:10)



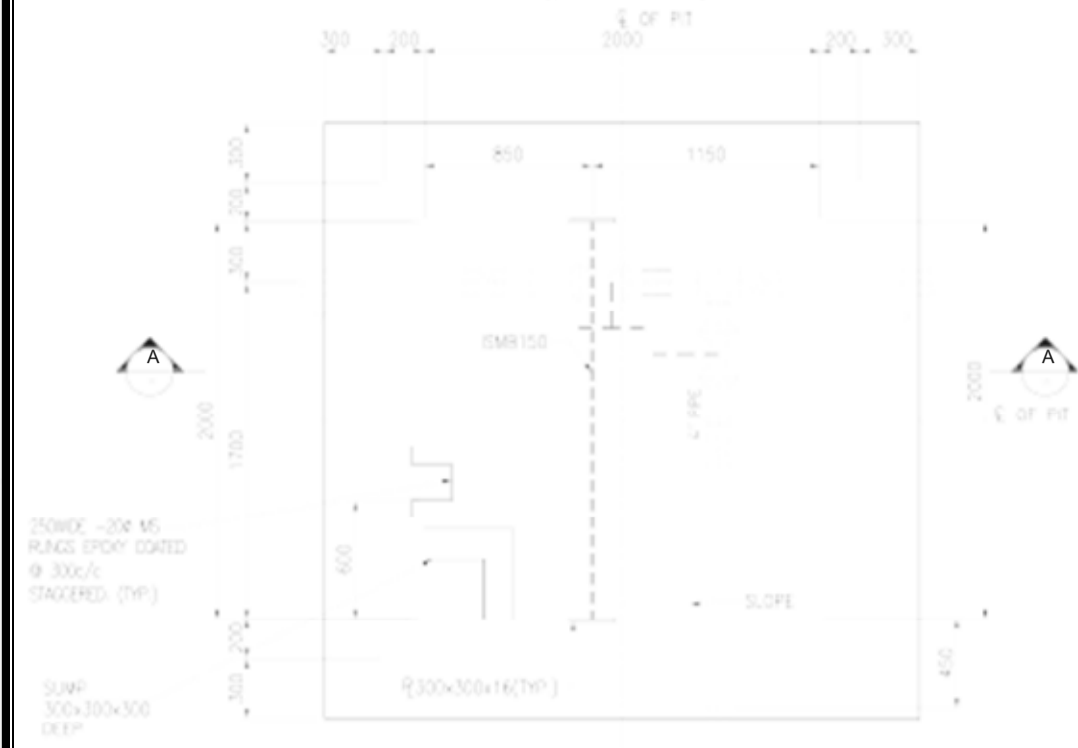
TYP. REINF. DETAIL
FOR SUMP
(SCALE 1:10)



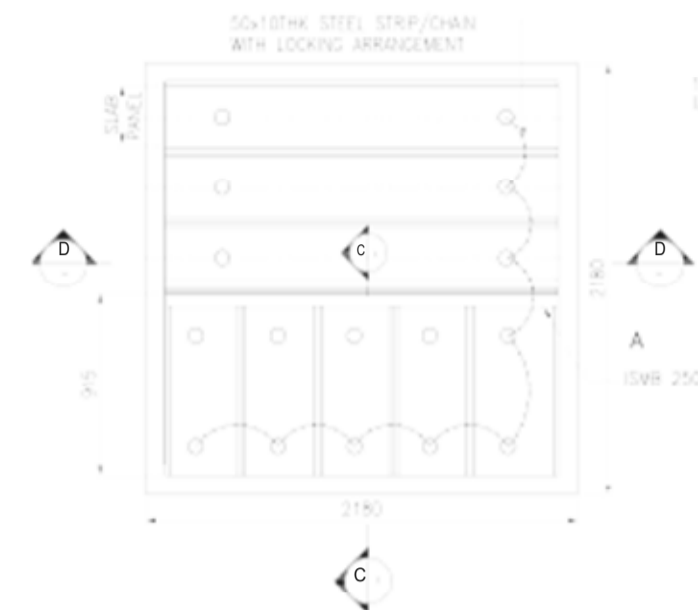
SECTION C-C
(SCALE 1:10)

ISSUED FOR TENDER

| Rev. | DATE | ISSUED FOR TENDER | Drawn | Checked | Approved | Validated |
|--|-----------------|-------------------|------------|---------|----------|-----------|
| A | 05.05.2025 | | | | | |
| CLIENT: CENTRAL U. P. GAS LIMITED PROJECT: CITY GAS DISTRIBUTION PROJECT SUBJECT: TYPICAL DETAILS FOR 4" TAP-OFF CHAMBER ARRANGEMENT FOR BAREILLY, KANPUR & UNNAO AND JHANSI GAS | | | | | | |
| Size | Scale | Sheet | Rev. | | | |
| A1 | 1:50 | 03 of 06 | A | | | |
| Project No. | Discipline Code | System Code | Serial No. | | | |
| P.014714 | G | 20730 | 012 | | | |



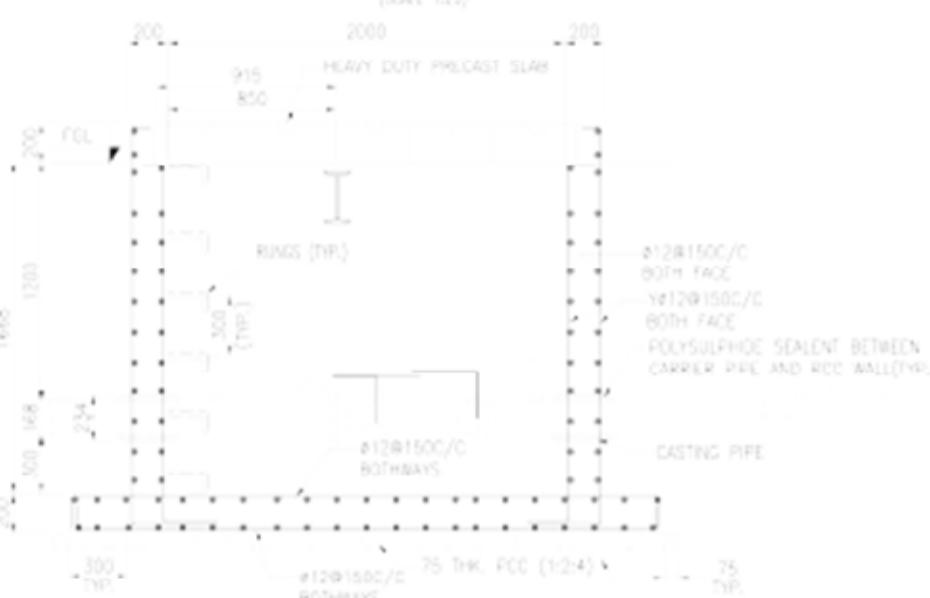
VALVE PIT BOTTOM PLAN (SCALE 1:25)



LOCKING ARRANGEMENT OF PRECAST COVER SLAB (SCALE 1:25)

DETAIL OF HOOK (SCALE 1:10)

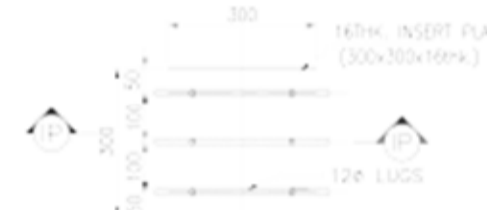
JOINTING DETAIL OF PRECAST COVER SLAB (SCALE 1:10)



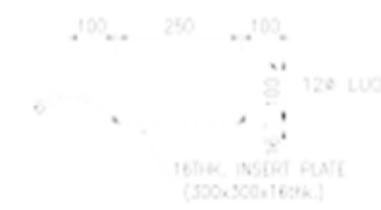
SECTION A-A (SCALE 1:25)



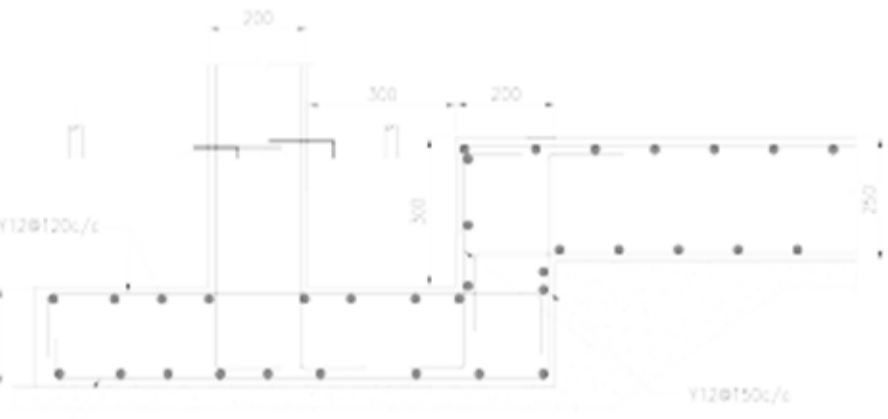
SECTION B-B (SCALE 1:10)



INSERT PLATE IP1 (SCALE 1:10)



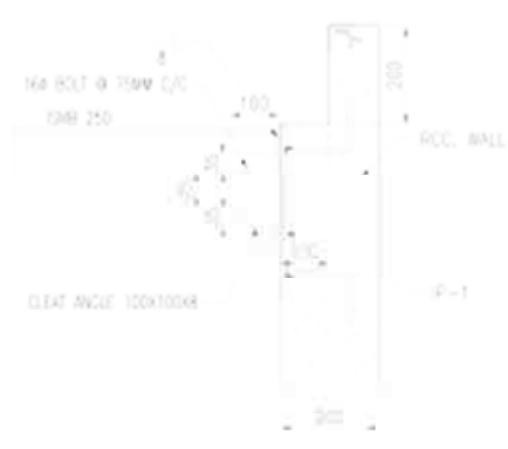
SECTION IP-IP (SCALE 1:10)



TYP. REINF. DETAIL FOR SUMP (SCALE 1:10)



PLAN OF PRECAST COVER SLAB (FOR VEHICLE MOVING AREA) (SCALE 1:10)



DETAIL-A



DSECTION D-D

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. DO NOT MEASURE DIMENSIONS ON THE DRAWING ONLY WRITTEN DIMENSION SHOULD BE FOLLOWED.
3. GRADE OF CONCRETE SHALL M25.
4. ALL REINFORCEMENT SHALL BE HIGH YIELD STRENGTH DEFORMED (HYSD) BAR OF GRADE FE500 CONFORMING TO IS1786.
5. MIN NOMINAL COVER TO REINFORCEMENT IS AS FOLLOWS:

| | BOTTOM | TOP | SIDE |
|----------|--------|------------|---------|
| RAFT | 50 | 50 | 50 |
| TOP SLAB | 20 | 20 | 20 |
| WALL | 20 | (OUTER) 30 | (INNER) |
6. LAP LENGTH SHALL BE 50 TMC DIA OF THE SMALLER BAR NOT MORE THAN 50% OF BARS SHALL BE LAPPED AT ANY SECTION.
7. DEVELOPMENT LENGTH (Ld) SHALL BE 45 TIMES DIA OF THE BAR.
8. NET SAFE BEARING CAPACITY AT 1.500M BELOW FGL IS CONSIDERED AS 50 KN/M² FROM STRUCTURAL LOADS ONLY.
9. FOR RCC WALL AND BASE SLAB WATER PROOFING COMPOUND SHALL BE WELL MIX WITH DRY CEMENT IN PROPORTION OF 10 BY WEIGHT OF CEMENT OR AS RECOMMENDED BY MANUFACTURER.
10. EXTERNAL SURFACE IN CONTACT WITH SOIL (BELOW FGL) FOR ALL WALL & RAFT SHALL BE PROVIDED WITH MINIMUM TWO COATS OF BITUMINOUS PAINTING OF GRADE 35/25 CONFORMING TO IS:102 @ 1.7 KG/SM² (MINIMUM) FOR WATER/DAMP PROOFING AS PER SPECIFICATION.

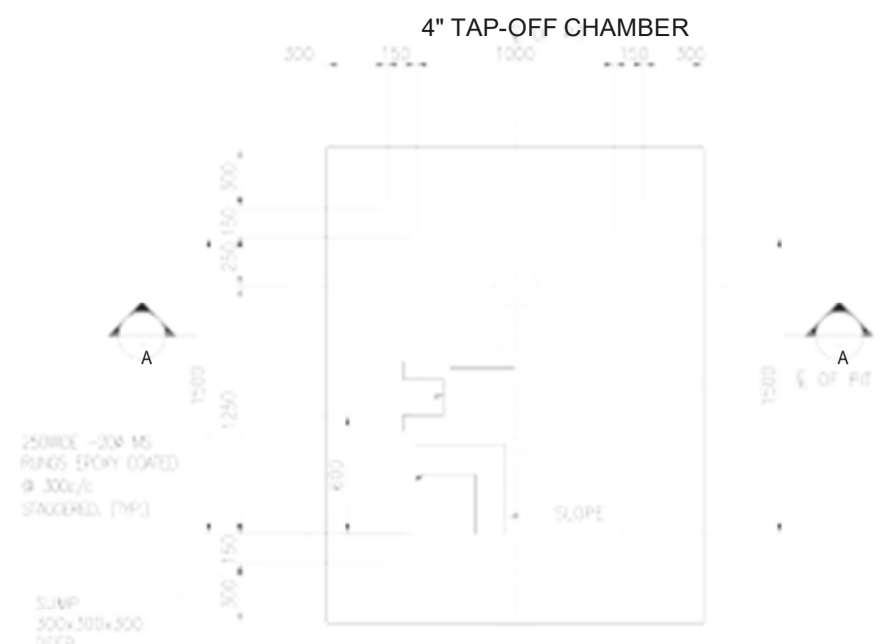
ISSUED FOR TENDER

| Rev. | Scale | Sheet | Rev. |
|------|-------|----------|------|
| A | 1:50 | 04 of 06 | A |

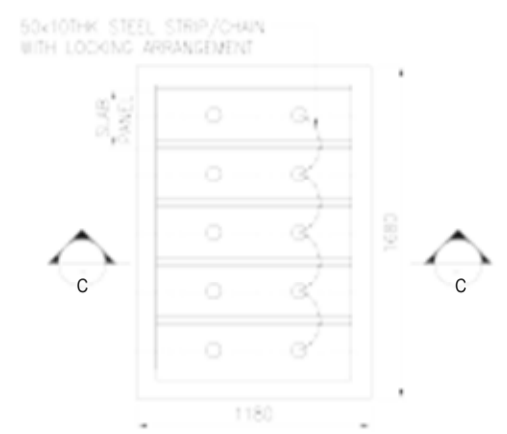
Project No. P.014714 Discipline Code G System Code 20730 Serial No. 013

1. DO NOT MEASURE DIMENSIONS BY THE DRAWING ONLY, WRITTEN DIMENSIONS SHOULD BE FOLLOWED.
2. GRADE OF CONCRETE SHALL M25.
3. ALL REINFORCEMENT SHALL BE HIGH YIELD STRENGTH DEFORMED (HYSD) BAR OF GRADE FE500 CONFORMING TO IS:1786.
4. MIN. NOMINAL COVER TO REINFORCEMENT IS AS FOLLOWS:

| | BOTTOM | TOP | SIDE |
|----------|------------|------------|------|
| RAFT | 50 | 50 | 50 |
| TOP SLAB | 30 | 30 | 30 |
| WALL | 50 (OUTER) | 30 (INNER) | |
5. LAP LENGTH SHALL BE 50 TMC DIA OF THE SMALLER BAR NOT MORE THAN 50% OF BARS SHALL BE LAPPED AT ANY SECTION.
6. DEVELOPMENT LENGTH (Ld) SHALL BE 45 TIMES DIA OF THE BAR.
7. NET SAFE BEARING CAPACITY AT 150MM BELOW FGL IS CONSIDERED AS 50 KN/M² FROM STRUCTURAL LOADS ONLY.
8. FOR RCC WALL AND BASE SLAB WATER PROOFING COMPOUND SHALL BE WELL MIX WITH DRY CEMENT IN PROPORTION OF 1% BY WEIGHT OF CEMENT OR AS RECOMMENDED BY MANUFACTURER.
9. EXTERNAL SURFACE IN CONTACT WITH SOIL (BELOW FGL) FOR ALL WALL & RAFT SHALL BE PROVIDED WITH MINIMUM TWO COATS OF BITUMINOUS PAINTING OF GRADE 80/25 CONFORMING TO IS: 102 @ 1.7 KG/SQ.M (MIN/M²) FOR WATER/DAMP PROOFING AS PER SPECIFICATION.



VALVE PIT BOTTOM PLAN



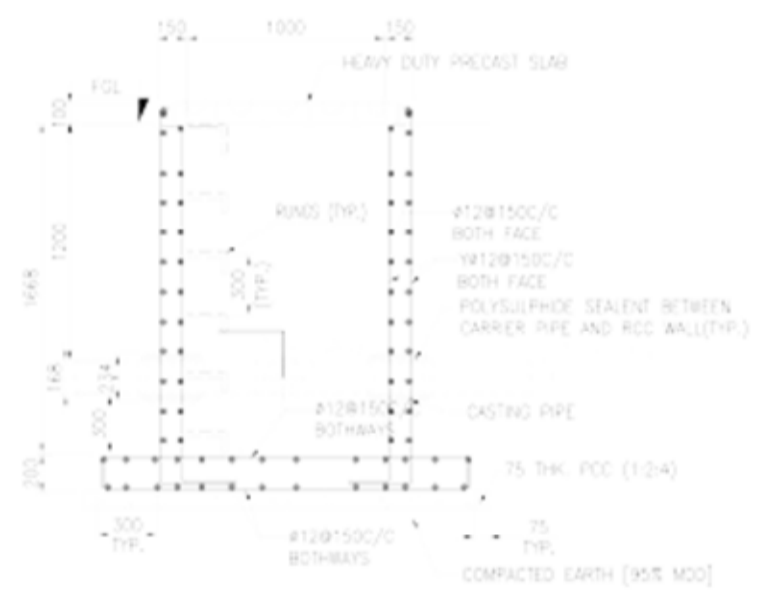
LOCKING ARRANGEMENT OF PRECAST COVER SLAB



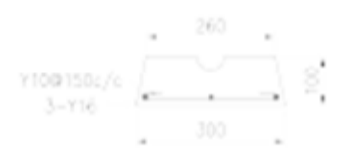
DETAIL OF HOOK



JOINTING DETAIL OF PRECAST COVER SLAB



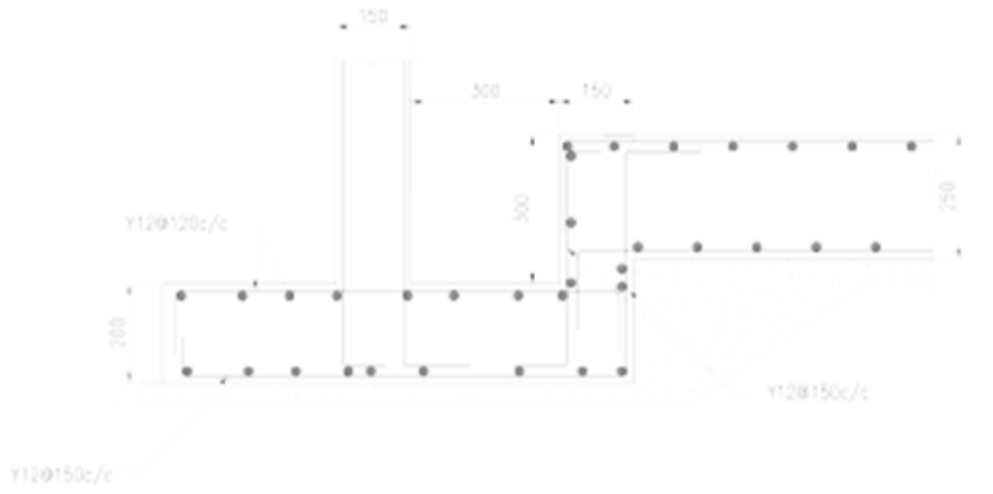
SECTION A-A



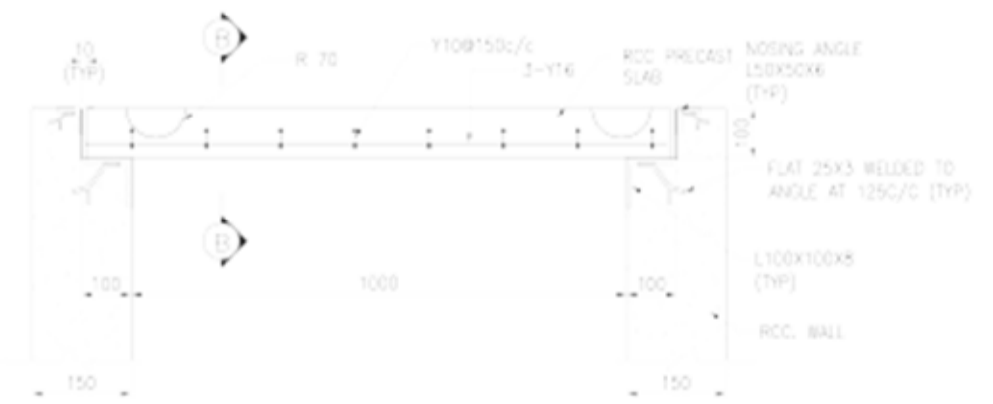
SECTION B-B



PLAN OF PRECAST COVER SLAB (FOR VEHICLE MOVING AREA)



TYP. REINF. DETAIL FOR SUMP



SECTION C-C

ISSUED FOR TENDER

| | | | | | | |
|-------------|--|---------------|-----------------|---------|-------------|-----------|
| Rev. | D.M. | Modifications | Drawn | Checked | Approved | Validated |
| CLIENT | CENTRAL U. P. GAS LIMITED | | | | | |
| PROJECT | CITY GAS DISTRIBUTION PROJECT | | | | | |
| SUBJECT | TYPICAL DETAILS FOR 6" TAP-OFF CHAMBER ARRANGEMENT | | | | | |
| Size | A1 | Scale | 1:50 | Sheet | 06 of 06 | Rev. A |
| Project No. | P.014714 | | Discipline Code | G | System Code | 20730 |
| Serial No. | 015 | | | | | |



NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. FOLLOW DIMENSIONS ONLY & NOT SCALE.
3. THESE DIMENSIONS ARE INDICATIVE ONLY THESE DIMENSIONS MUST BE ADJUSTED TO SUIT THE SITE REQUIREMENT.
4. THIS DRAWING FOR INFORMATION AND GUIDANCE ONLY. ACTUAL DRAWING AND COLUMN TO BE PREPARED BY CONTRACTOR AND APPROVAL FROM OWNER/CONSULTANT BEFORE EXECUTION OF SAME.
5. ANODE BED TYPE (DEEP WELL OR HORIZONTAL TYPE) SHALL BE FINALISED DURING DETAIL ENGINEERING SUBJECT TO APPROVAL.

PVC PIPE Ø 1"

10. M.S. HANDLE

IF

(-)/42V DC

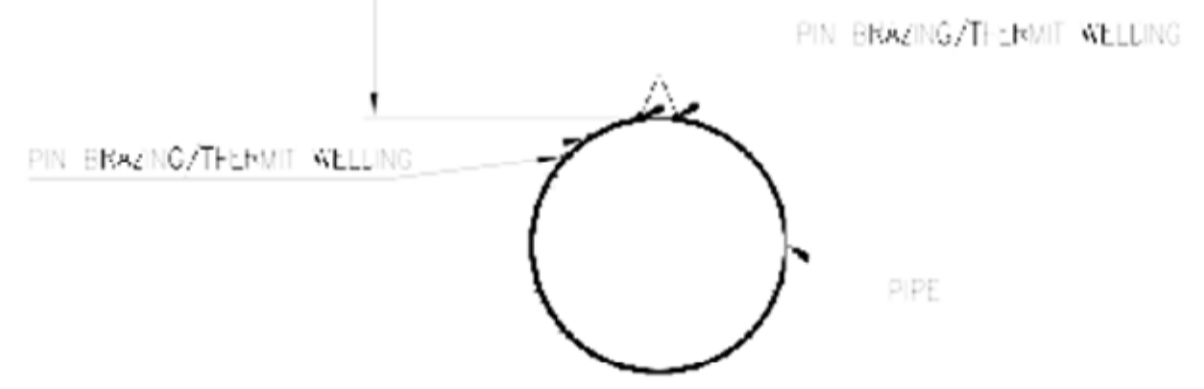
D.C. OUTPUT (+) TRANSFORMER
(-) RLC FILE UNIT / CP/EM

As Per CIVIL DETAIL

A/C

C/C

GRADE



PVC PIPE OF 12" DIA
As Per P/S/D/S

TOP TO BE FILLED WITH
GRAVEL AND SAND

TOP OF COKE
BREZZE COLUMN

PIPE TO BE FILLED
WITH ALTERNATE LAYERS OF FIRST
COKE BREZZE COLUMN AND SECOND
LAYER CONSISTING OF GRAVEL AND
SAND As Per P/S/D/S

REF. HOLE

**30 M DEEP ANODE BED
CONSISTING OF 1 STRING ANODES**

| | | | | | | | | | | | | | | | | | | | | | | |
|-----------|-----------------|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--|
| Rev. D | Rev. Y | Rev. U | Rev. S | Rev. R | Rev. Q | Rev. P | Rev. O | Rev. N | Rev. M | Rev. L | Rev. K | Rev. J | Rev. I | Rev. H | Rev. G | Rev. F | Rev. E | Rev. D | Rev. C | Rev. B | Rev. A | |
| | | | | | | | | | | | | | | | | | | | | | | |
| SUBJECT | | IMPRESSED CURRENT CATHODIC PROTECTION SCHEMATIC | | | | | | | | | | | | | | | | | | | | |
| Size | Scale | Sheet | | | | | | | | | | | | | | | | | | | | |
| A3 | NTS | 01 | | of 01 | | | | | | | | | | | | | | | | | | |
| Issue No. | 0 | | | | | | | | | | | | | | | | | | | | | |
| Doc. No. | GGNG-E-20712-32 | | | | | | | | | | | | | | | | | | | | | |

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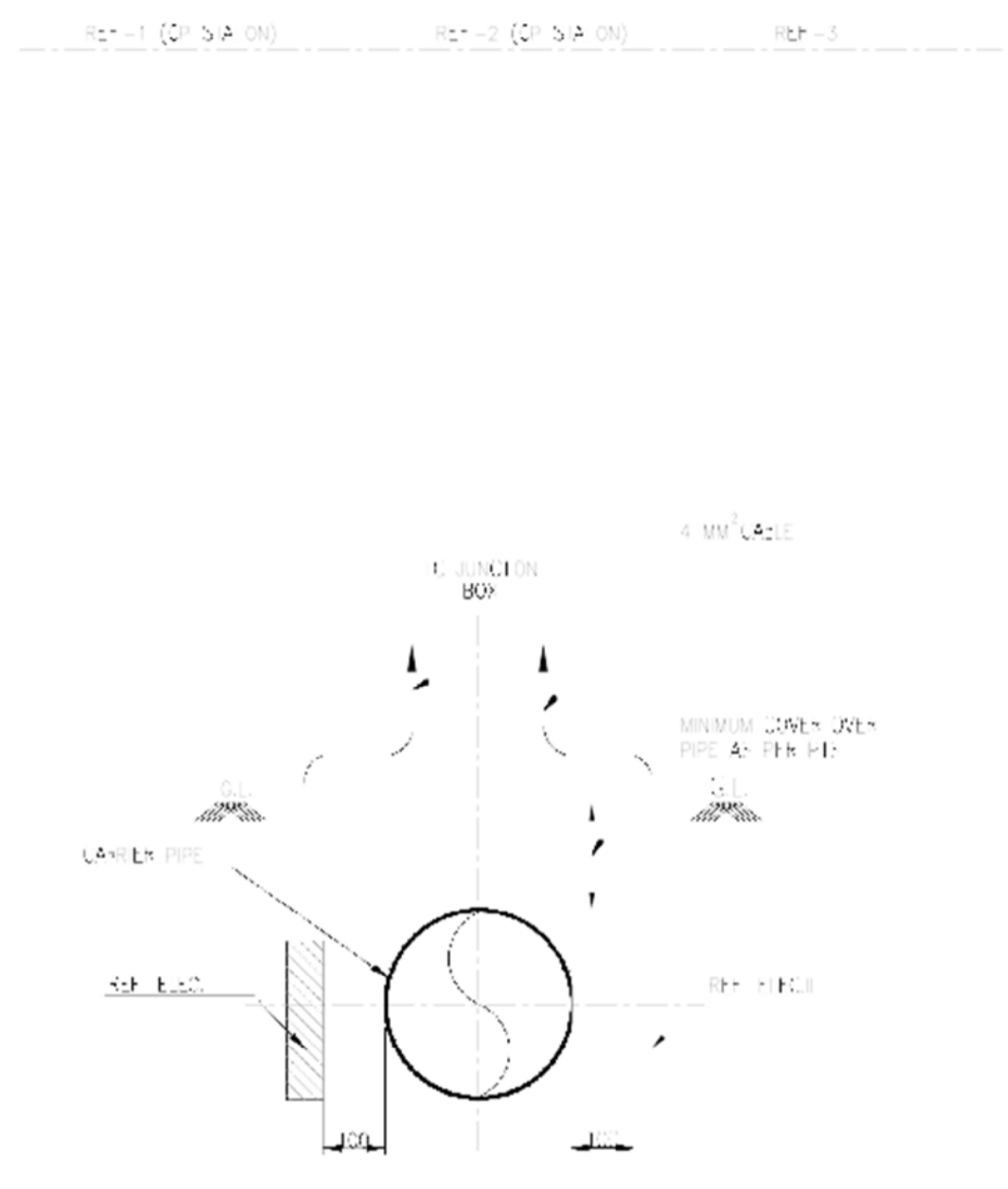


NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. FOLLOW WHATEVER DIMENSIONS ONLY. DO NOT SCALE.
3. THE PIPE ASSEMBLY SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.
4. BRICK WORK SHALL BE DONE AFTER COMPACTING THE SOIL.
5. INSTALLED DETAILS FOR PERMANENT Cu-CuSO4 REFERENCE CELLS AS MENTIONED IN DRAWING ARE FOR GUIDANCE ONLY.
6. HOWEVER, INSTALLATION PROCEDURE DESIGN DRAWING ETC SHALL BE DONE AS PER APPROVAL OF OWNER/CONSULTANT.

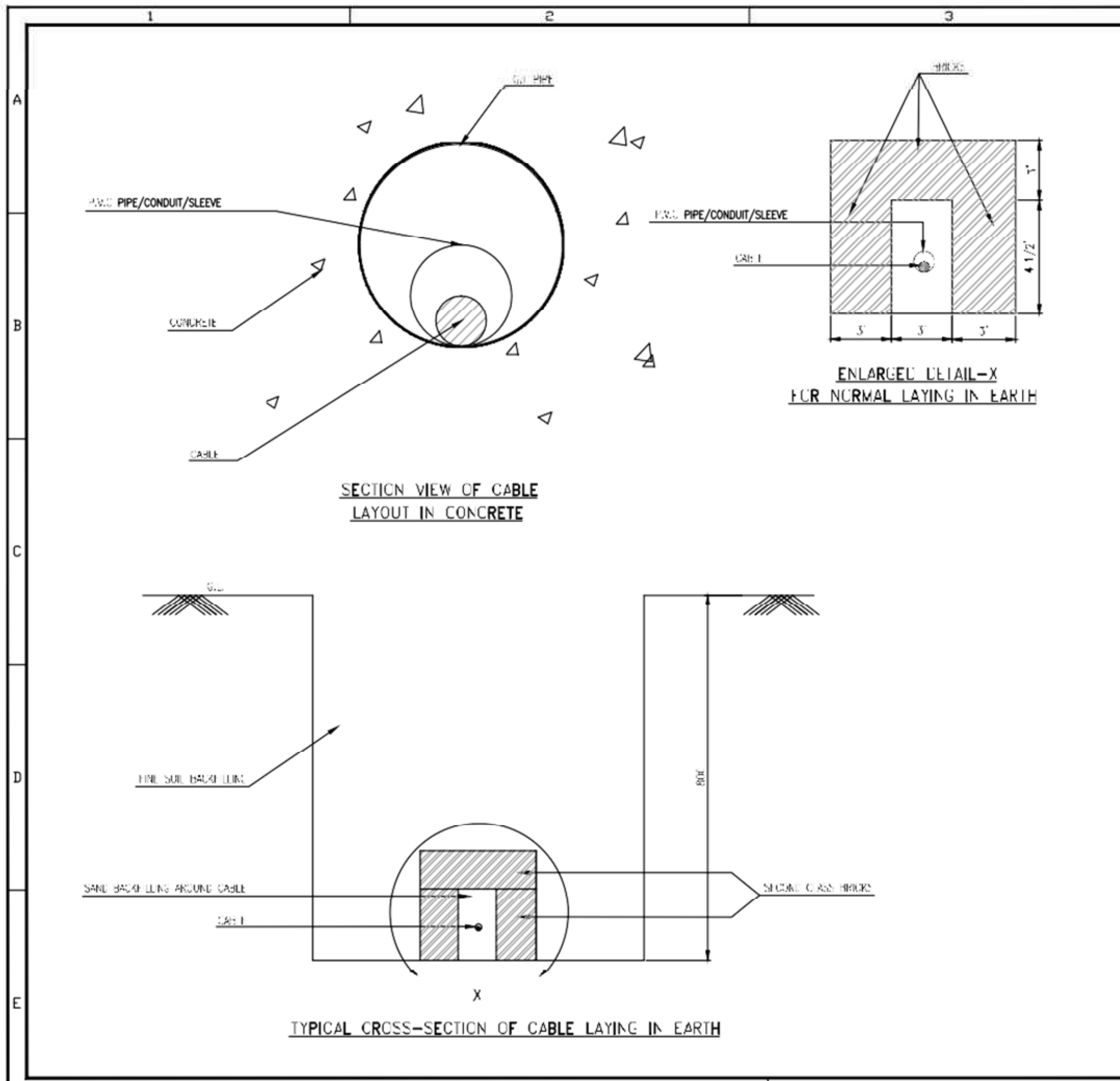
BILL OF MATERIAL

| SL. NO. | DESCRIPTION | QTY |
|---------|-------------------------------------|----------|
| 1. | PVC PIPE 3 MM THICK | 1 No. |
| 2. | SAL WOOD PLUG | 1 No. |
| 3. | CuSO ₄ CRYSTALS | AS REQD. |
| 4. | ELECTROLYTIC COPPER SPRAL φ 8 MM | 1 No. |
| 5. | CuSO ₄ SALINE SOLUTION | AS REQD. |
| 6. | BRAZED COPPER JOINT | 1 No. |
| 7. | WATER FILLING BULB, HOLES φ 8 MM | 2 Nos. |
| 8. | NYLON BUSH | 1 No. |
| 9. | COPPER LUG | 1 No. |
| 10. | PARALLEL CABLE CONNECTION | 1 No. |
| 11. | CONNECTION CABLE 10 MM ² | AS REQD. |
| 12. | EPOXY FOR SEALING | AS REQD. |



ARRANGEMENT OF TWO REFERENCE ELECTRODES ON PIPE LINE TYPICAL INSTALLATION DETAILS

Date: _____ Drawn: _____ Checked: _____
 Design: _____
SUBJECT: FABRICATION AND INSTALLATION DETAILS OF Cu-CuSO4 REFERENCE ELECTRODE
 Size: A3 Scale: NTS Sheet: 01 of 01
 Drawing No: GGNG-E-20712-322 Rev: 0



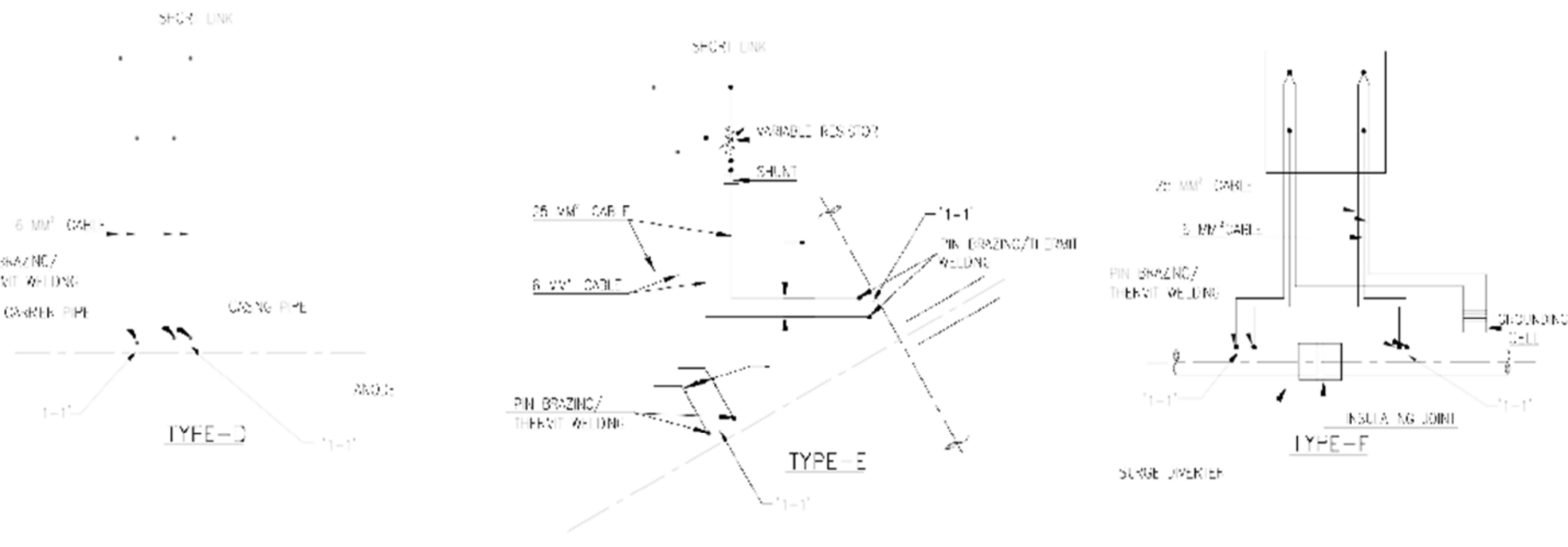
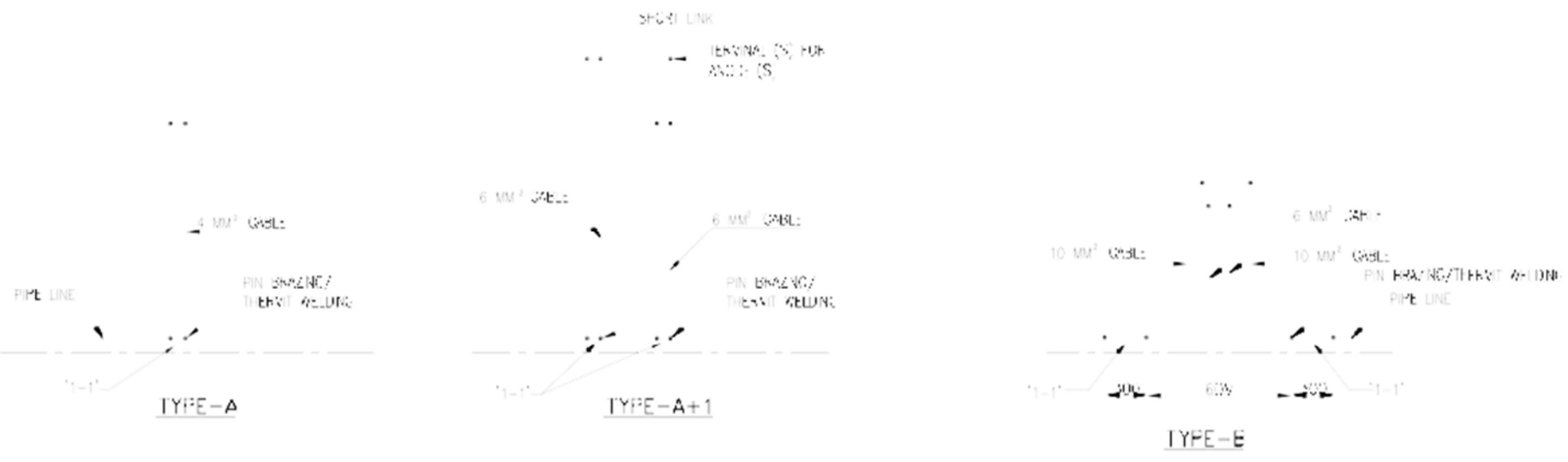
NOTES

- 1 ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
- 2 REFER TO WRITTEN DIMENSIONS UNLESS OTHERWISE SPECIFIED.
- 3 ALL UNDERGROUND CABLE SHALL BE LAID IN BRICK COVERING WITH SAND BACKFILL.
- 4 FOR MORE THAN ONE CABLE IN THE SAME CABLE TRENCH CABLE SHALL BE LAID SIDE BY SIDE IN SEPARATE BRICK COVERING.
- 5 AT BOTH ENDS OF CABLE TERMINATION, A LOOP OF ONE METER (MINIMUM) SHALL BE KEPT AS STAKE.
- 6 WHEREVER TERMINATION IN BETWEEN IS REQUIRED, T JOINTS OR ELBOWS SHALL BE PROVIDED.
- 7 AT ROAD/KALA CROSSINGS GL PIPE/CONDUIT SHALL BE USED.

| | | | | | | |
|-----|----------|---------------|-------|---------|----------|-----------|
| | | | | | | |
| 0 | 05.10.16 | APPROVED | RKS | KS | PR | SKH |
| Rev | D M Y | Modifications | Drawn | Checked | Approved | Validated |

SUBJECT: **FABRICATION AND INSTALLATION**
DETAILS OF CABLE LAYING (TYPICAL) FOR CATHODIC PROTECTION

| | | | | | | | |
|--|-------------|-------|------------------|----|----|------|---|
| | Size | Scale | Sheet | | | | |
| | A3 | NTS | 01 | of | 01 | Rev. | 0 |
| | Drawing No. | | GGNG-E-20712-323 | | | | |



DETAILS OF CONNECTION SCHEME

- TYPE A : FOR MAIN JUNK ONLY
- TYPE B : LINE CURRENT MEASUREMENT
- TYPE A+1 : ADD. TC PIPE CONNECTION
- TYPE E : PIPE LINE CROSSING
- TYPE D : CABLE CROSSING
- TYPE F : ISOLATING JOINT CONNECTION
- TYPE H : HIGH TENSION LINE CONNECTION



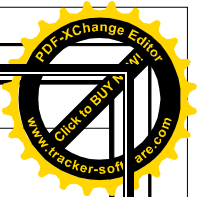
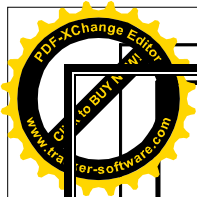
NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. FOLLOW WHATEVER DIMENSIONS ONLY. DO NOT SCALE.
3. THIS TEST STATION CONNECTION SCHEMES ARE TYPICAL. VENDOR MAY CHANGE/REVISE THE CONNECTION SCHEMES AS PER CUSTOMER EXISTING OR SYSTEM SCHEMES DRAWINGS.
4. REQUIRED CONN. ON SCHEME SHALL BE PROVIDED ON THE TERMINAL PLATE OF TEST LEAD POINT.

Rev: D R Y 4th Ver: 19/02/2012 19/02/2012 19/02/2012 19/02/2012
 Mod: 19/02/2012 19/02/2012 19/02/2012 19/02/2012
 Drawn: 19/02/2012 19/02/2012 19/02/2012 19/02/2012
 Checked: 19/02/2012 19/02/2012 19/02/2012 19/02/2012

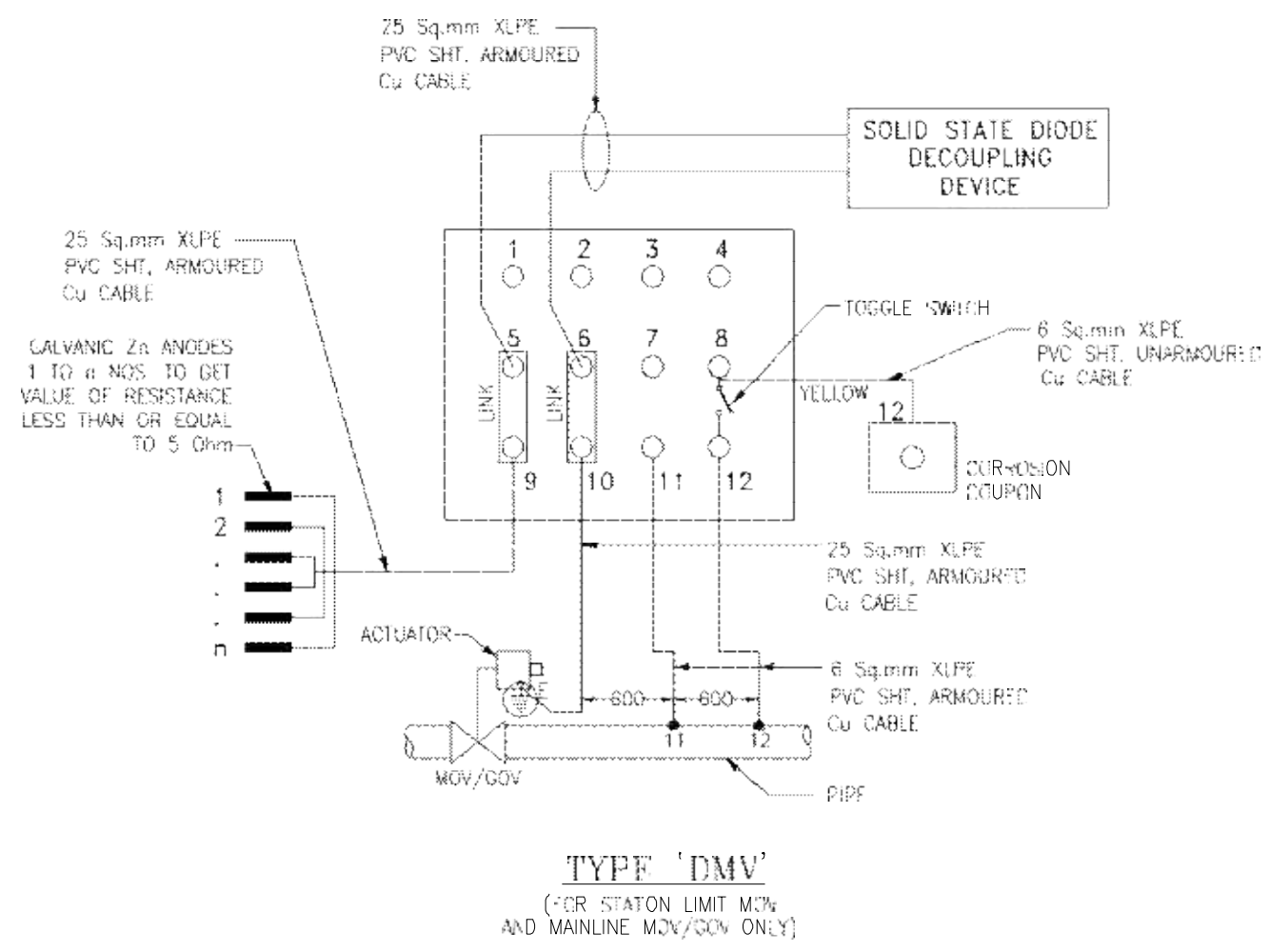
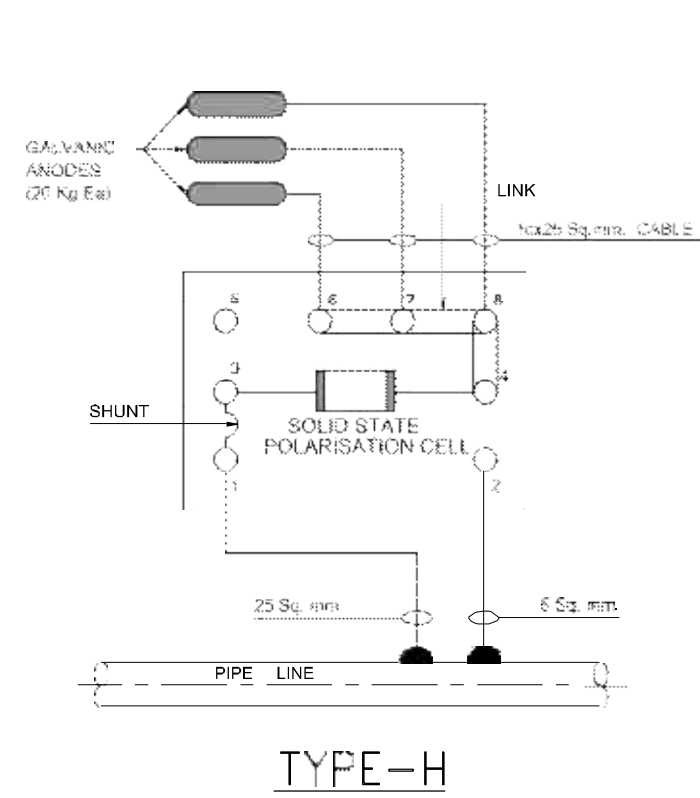
SUBJECT: **TEST STATION CONNECTION SCHEME (TYPICAL) DETAILS**

| | | |
|-------------|------------------|----------|
| Size | Scale | Sheet |
| A3 | NTS | 01 of 05 |
| Drawing No: | GGNG E 20712 325 | Rev: 0 |



NOTES

- 1 ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
- 2 FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE.
- 3 THIS TEST STATION CONNECTION SCHEMES ARE TYPICAL. VENDOR MAY CHANGE/REVISE THE CONNECTION SCHEMES AS PER CUSTOMER EXISTING I/P SYSTEM SCHEMES DRAWINGS.
- 4 REQUIRED CONNECTION SCHEMES SHALL BE PROVIDED ON THE TERMINAL PLATE OF TEST LEAD POINT.



| | | | | | | |
|------|----------|---------------|-------|---------|----------|-----------|
| 0 | 05.10.16 | APPROVED | RKS | KS | PR | SKH |
| Rev. | D M Y | Modifications | Drawn | Checked | Approved | Validated |

| | | |
|---|------------------|----------|
| SUBJECT: TEST STATION CONNECTION SCHEME (TYPICAL) DETAILS | | |
| Size | Scale | Sheet |
| AG | NTS | 02 of 05 |
| Drawing No: | GGNG-E-20712-326 | |
| Rev. | 0 | |



NOTES

ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF THE FOLLOWING STANDARDS:

AS/NZS 3000:2007 WIRING RULES

AS/NZS 4801:2001 SAFETY IN ELECTRICAL WORK

AS/NZS 1547:2005 ELECTRICAL INSTALLATION OF PHOTOVOLTAIC SYSTEMS

AS/NZS 1547.1:2005 PHOTOVOLTAIC SYSTEMS - SAFETY

AS/NZS 1547.2:2005 PHOTOVOLTAIC SYSTEMS - INSTALLATION

AS/NZS 1547.3:2005 PHOTOVOLTAIC SYSTEMS - TESTING

AS/NZS 1547.4:2005 PHOTOVOLTAIC SYSTEMS - MAINTENANCE

AS/NZS 1547.5:2005 PHOTOVOLTAIC SYSTEMS - DECOMMISSIONING

AS/NZS 1547.6:2005 PHOTOVOLTAIC SYSTEMS - DESIGN

AS/NZS 1547.7:2005 PHOTOVOLTAIC SYSTEMS - OPERATION

AS/NZS 1547.8:2005 PHOTOVOLTAIC SYSTEMS - REPAIR

AS/NZS 1547.9:2005 PHOTOVOLTAIC SYSTEMS - REPLACEMENT

AS/NZS 1547.10:2005 PHOTOVOLTAIC SYSTEMS - MODIFICATION

AS/NZS 1547.11:2005 PHOTOVOLTAIC SYSTEMS - ADDITION

AS/NZS 1547.12:2005 PHOTOVOLTAIC SYSTEMS - REMOVAL

AS/NZS 1547.13:2005 PHOTOVOLTAIC SYSTEMS - PROTECTION

AS/NZS 1547.14:2005 PHOTOVOLTAIC SYSTEMS - IDENTIFICATION

AS/NZS 1547.15:2005 PHOTOVOLTAIC SYSTEMS - RECORDS

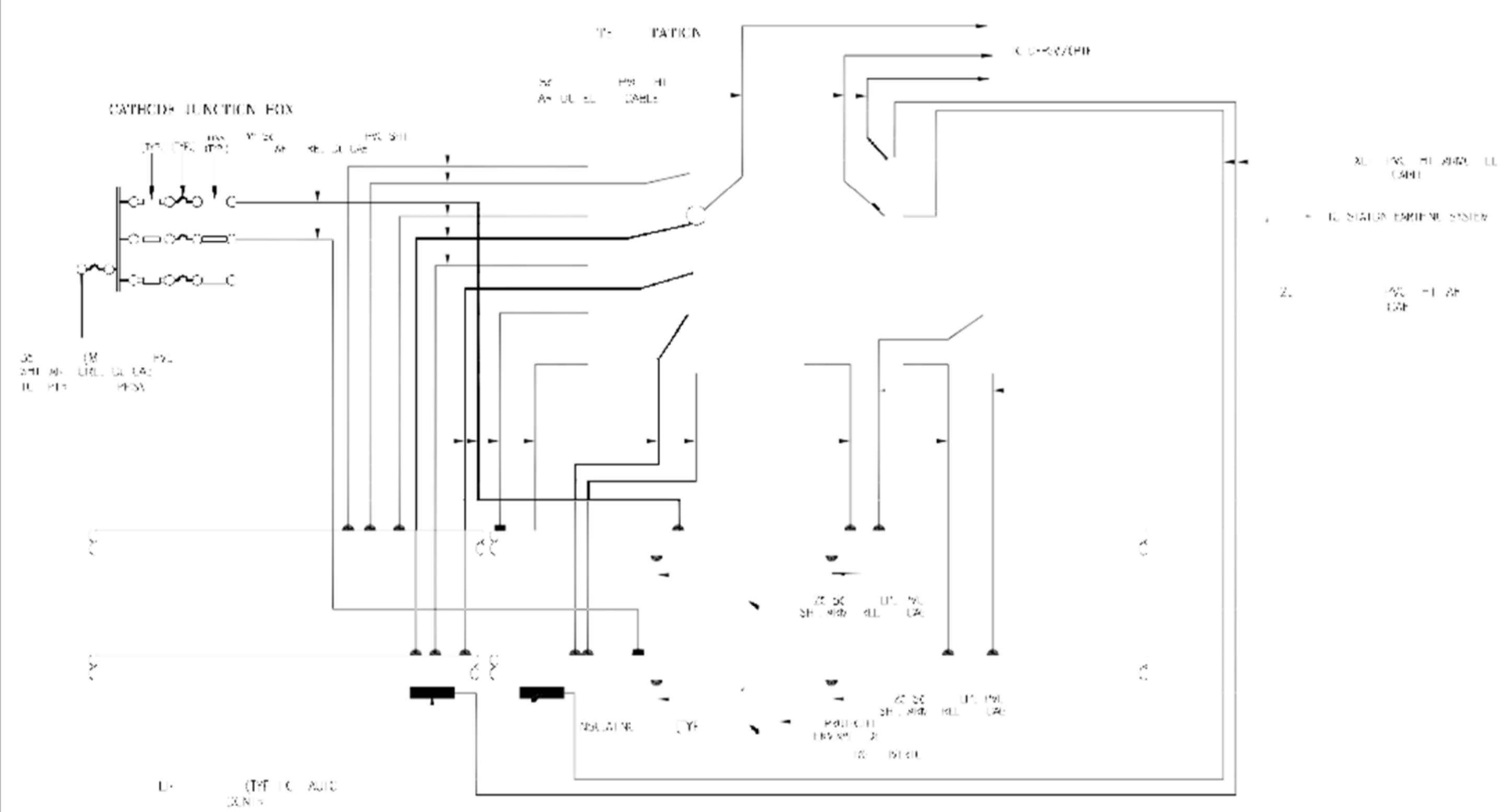
AS/NZS 1547.16:2005 PHOTOVOLTAIC SYSTEMS - TRAINING

AS/NZS 1547.17:2005 PHOTOVOLTAIC SYSTEMS - COMPETENCY

AS/NZS 1547.18:2005 PHOTOVOLTAIC SYSTEMS - SUPERVISION

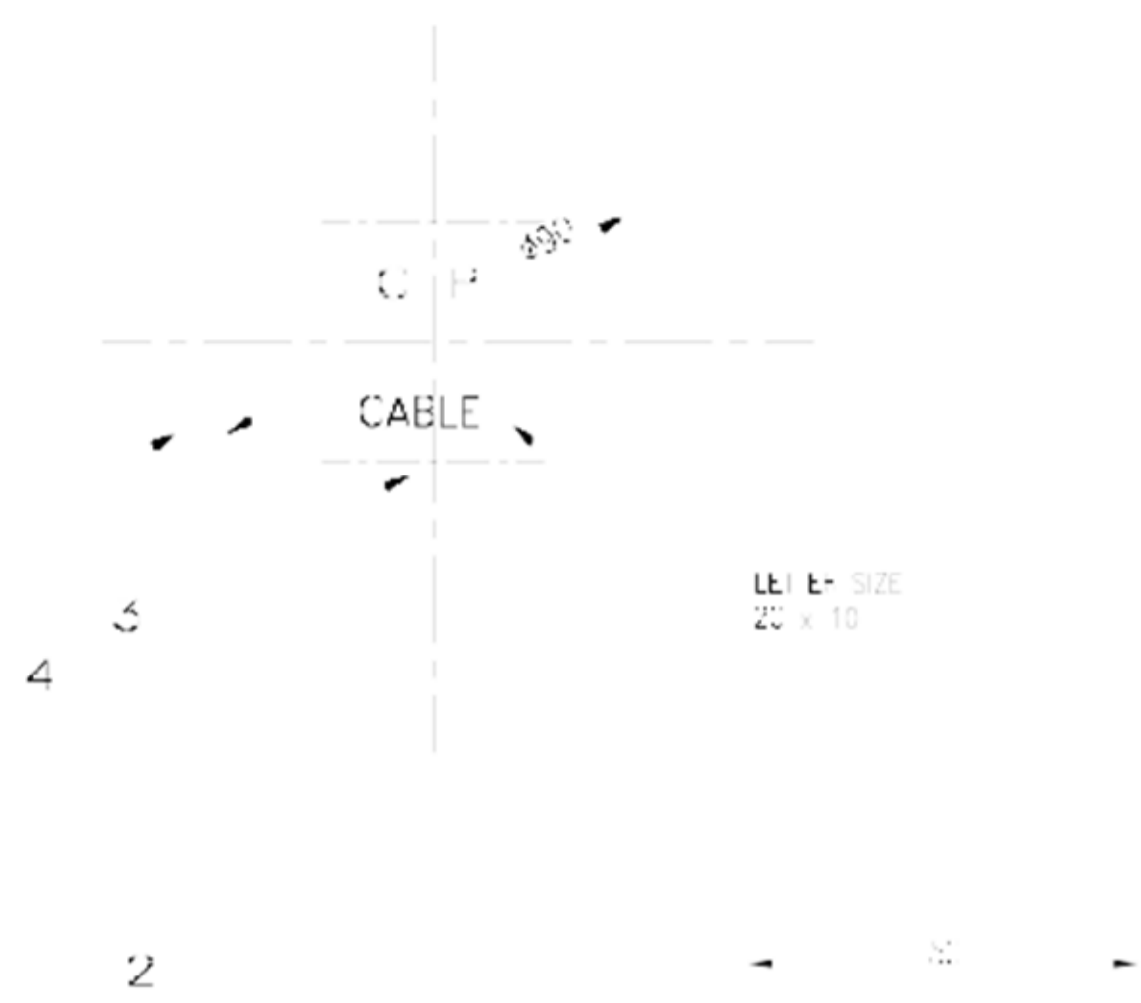
AS/NZS 1547.19:2005 PHOTOVOLTAIC SYSTEMS - MANAGEMENT

AS/NZS 1547.20:2005 PHOTOVOLTAIC SYSTEMS - COMPLIANCE



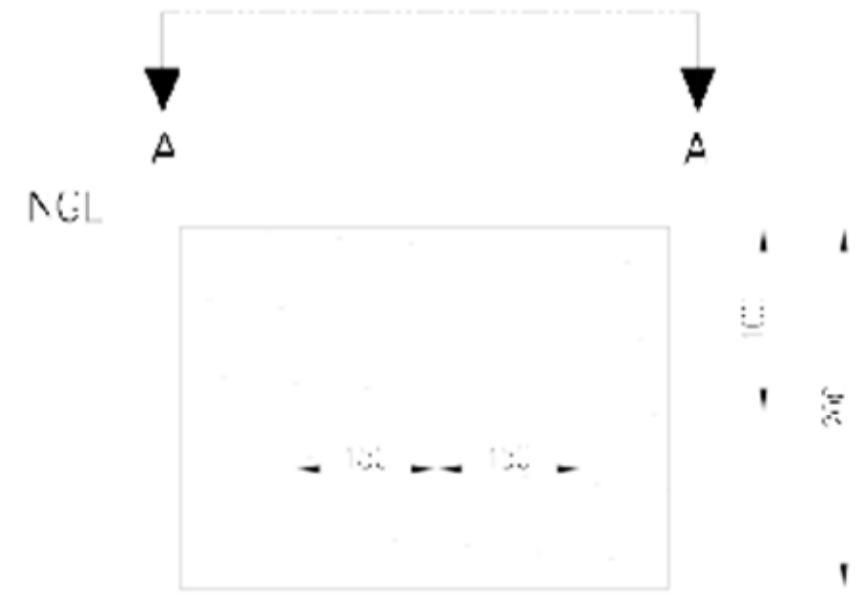
TERMINAL POINT MODULE PIPELINE TYPE FOR PWC POINT

| | | | | |
|--|-------|---------|----|-----|
| AP | UVC | AKC | AS | SPR |
| Day | D | Y | 1 | 1 |
| Author | | Checker | | |
| TFST STATION CONNECTION SCHEME (TYPICAL) DETAILS | | | | |
| Size | Scale | Sheet | | |
| A3 | NTS | 05 | of | 05 |
| Drawn by | Date | | | Rev |
| GGNG E 20712 326 | | | | 0 |



LETTER SIZE
20 x 10

SECTION A-A



NOTES

- 1 ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
- 2 FOLLOW WHITE DIMENSIONS ONLY (DO NOT SCALE)
- 3 IN CASE OF POWER CABLE REFERENCE "C.P." WITH "POWER".
- 4 THE CABLE MARKER SHALL BE PAINTED WITH APPROVED GRADE ALUMINIUM PAINT.
- 5 ALL THE INSCRIPTION /LETTER/ ARROW PROJECTED TYPE AND PAINTED WITH POST OFFICE RED COLOUR ON M.S. PLATE.
- 6 BEFORE RIVETING, MARKER PLATE IS TO STENOILED WITH NUMBER /LETTER PUNCH AS PER CABLE IN EACH SECTION NO. GIVEN IN LAYOUT DRAWING.

BILL OF MATERIAL

| SL. NO. | DESCRIPTION | QTY |
|---------|--------------------------|-------|
| 1. | MARKER PLATE (CAST IRON) | 1No. |
| 2. | M.S. ANGLE 20x20x3 LONG | 1No. |
| 3. | RIVETS M5x20 LONG | 2Nos. |
| 4. | NUTS M6 | 2Nos. |

Rev: 01 Date: 10/10/2018
 Drawn: [Name] Checked: [Name] Approved: [Name]

SUBJECT: **FABRICATION AND INSTALLATION DETAILS OF CABLE ROUTE MARKER**

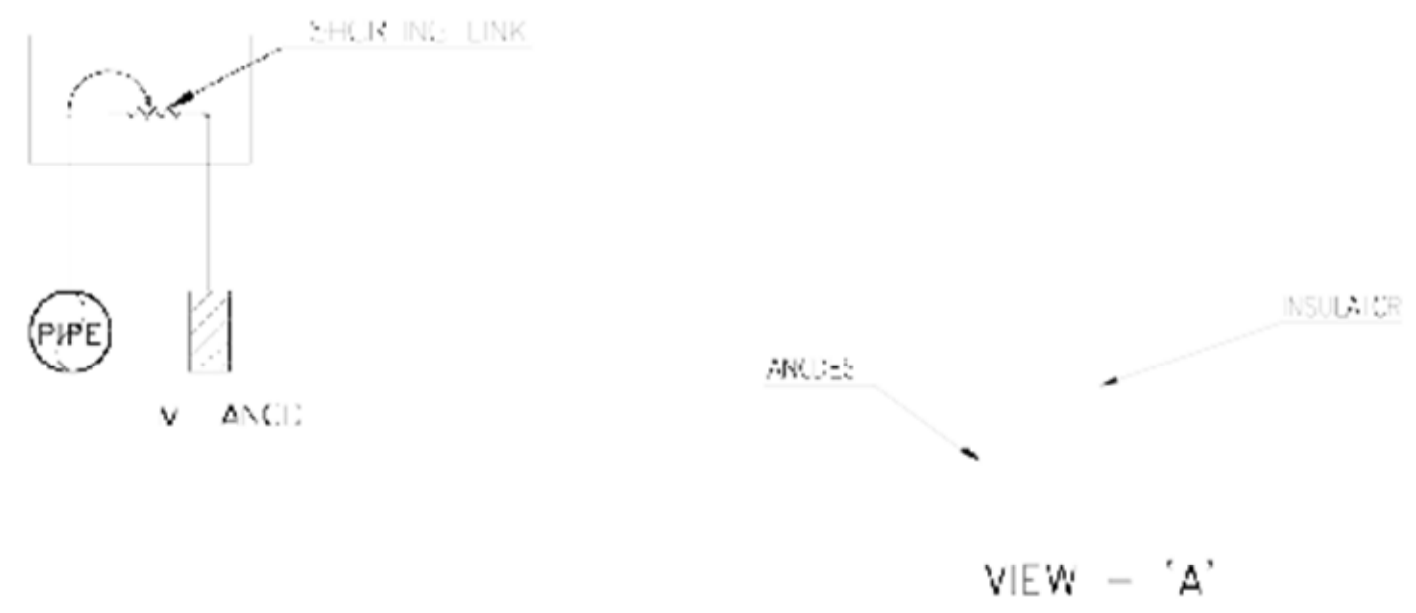
Sheet: 01 of 01
 Drawing No: GGNG-E-20712-327

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TEST LEAD POINTS (TLP) AT EVERY 1.0 Km.



TLP CONNECTION DETAILS



NOTES

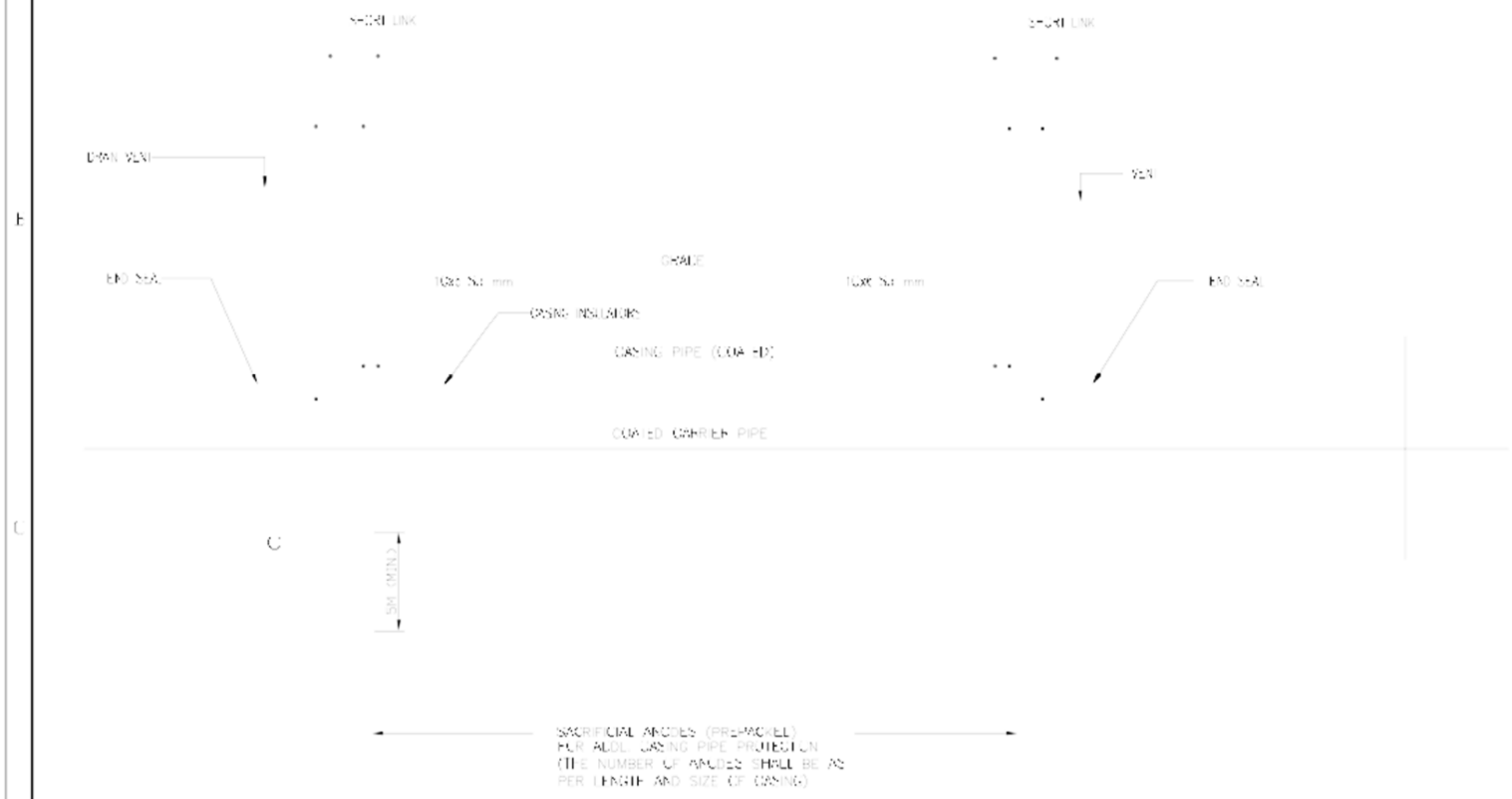
1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. FOLLOW WITH THE DIMENSIONS ON Y 12, NOT SCALE.
3. Mg ANODES TO BE INSTALLED AS PER THE 4-PHASED DESIGN DOCUMENT.
4. ALL NATIVE BACKFILL SOIL SHALL BE FREE OF ROCKS, GARBAGE, WOODS, PLANTS ETC.
5. CABLES SHALL BE LAD WITH ENOUGH SLACKNESS TO AVOID DAMAGE TO CABLES DURING BACK FILLING ETC.
6. ANODE TAIL CABLE SHALL NOT BE USED FOR LIFTING THE ANODE. ROPE SLINGS SHALL BE USED FOR LIFTING THE ANODE DURING INSTALLATION IN THE GROUND ONLY.
7. THE CABLE/SPLURIFICATION ARE FOR GUIDANCE ONLY.
8. ANODE CONFIGURATION SHALL BE CONINUOUS FORWARD/BACKWARD SEQUENCE (FOR REMOVABLE BONDING) AND IAW ANODE OUTPUT CURRENT SHALL NOT BE LESS THAN 90mA.
9. CABLE LOOP OF 0.5M IS TO BE PROVIDED WITH EACH ANODE.
 - (a) Mg ANODE WEIGH AS PER SCOPE OF WORK.
 - (b) TAIL CABLE-MINIMUM 10 MM THICK STAINING COMPOUND.
 - (c) CATHION BAL. 2000x200MM VENDOR TO CONFIRM.
 - (d) SPECIAL BACK FILL COMPOSITION
 - (i) GY-SUM - 75%
 - (ii) BLENKITE - 20%
 - (iii) SODIUM SULPHATE - 05%
 - (e) ANODE UTILIZATION FACTOR - 25%.
10. DRAWING REFERS TEST STA ON CONNECTION SCHEMATIC TYPE A & A-1. DRAWING NO TE-N-S-L-G-E-0326, SH 1 OF 3 R2.

| | | | |
|--|-----------------|-------------------|---------|
| Rev: D & Y | Rev: 01 | Rev: 02 | Rev: 03 |
| Author: [Name] | Checker: [Name] | Validator: [Name] | |
| SUBJECT: TEMPORARY CATHODIC PROTECTION SCHEMATIC | | | |
| Sheet No: A3 | Scale: NTS | Sheet: 01 | of 01 |
| Drawing No: GGNG-E-20712-328 | | | Rev: 0 |



NOTES

- 1 ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
- 2 FOLLOW WRITTEN DIMENSIONS ONLY DO NOT SCALE.
- 3 CASING PIPE SACRIFICIAL ANODE SHALL BE PROVIDED AT BOTH ENDS OF CASING PIPE FOR PROTECTION.
- 4 THE ANNULAR SPACE BETWEEN CASING AND CARRIER PIPE SHOULD BE FILLED WITH DIELECTRIC MATERIAL LIKE PETROLEUM WAX OR PETROLEUM BASED COMPOUNDS AS SPECIFIED IN NACE SP0200-2014.
- 5 THIS DRAWING FOR GUIDANCE ONLY HOWEVER, CONTRACTOR TO PREPARE SEPARATE DRAWING SPECIFICATION AND PROCEDURE FOR APPROVAL FROM OWNER/CONSULTANT.



Rev: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

| | | | |
|--------------|------------------|--|----------|
| SUBJECT | | TYPICAL CATHODIC PROTECTION SCHEME FOR CASED CROSSINGS | |
| Size | Scale | Sheet | 01 of 01 |
| A3 | NTS | 01 | 01 |
| Crossing No: | GGNG E 20712 329 | Rev | 0 |

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NOTES

- 1 ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
- 2 FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE.
- 3 THESE DIMENSIONS ARE INDICATIVE ONLY. THESE DIMENSIONS MUST BE ALTERED TO SUIT THE SITE REQUIREMENT.
- 4 QUANTITY OF ANODE SHALL BE FINALISED DURING DETAIL ENGINEERING BY APPROVAL OF OWNER AND CONSULTANT.
- 5 MMO ANODE SHALL BE INSTALLED IN GRAYSERS.
- 6 SPECIFICATION MENTIONED FOR GUIDANCE ONLY.

ANODE
JUNCTION
BOX

75° 180°

A12

A11

A10

GL

GL

7000
2000



7000
2000
1000



Rev: D B Y Date: Drawn: Checked: Valid to:

SUBJECT: **INSTALLATION DETAILS OF VERTICAL SHALLOW ANODE BED**

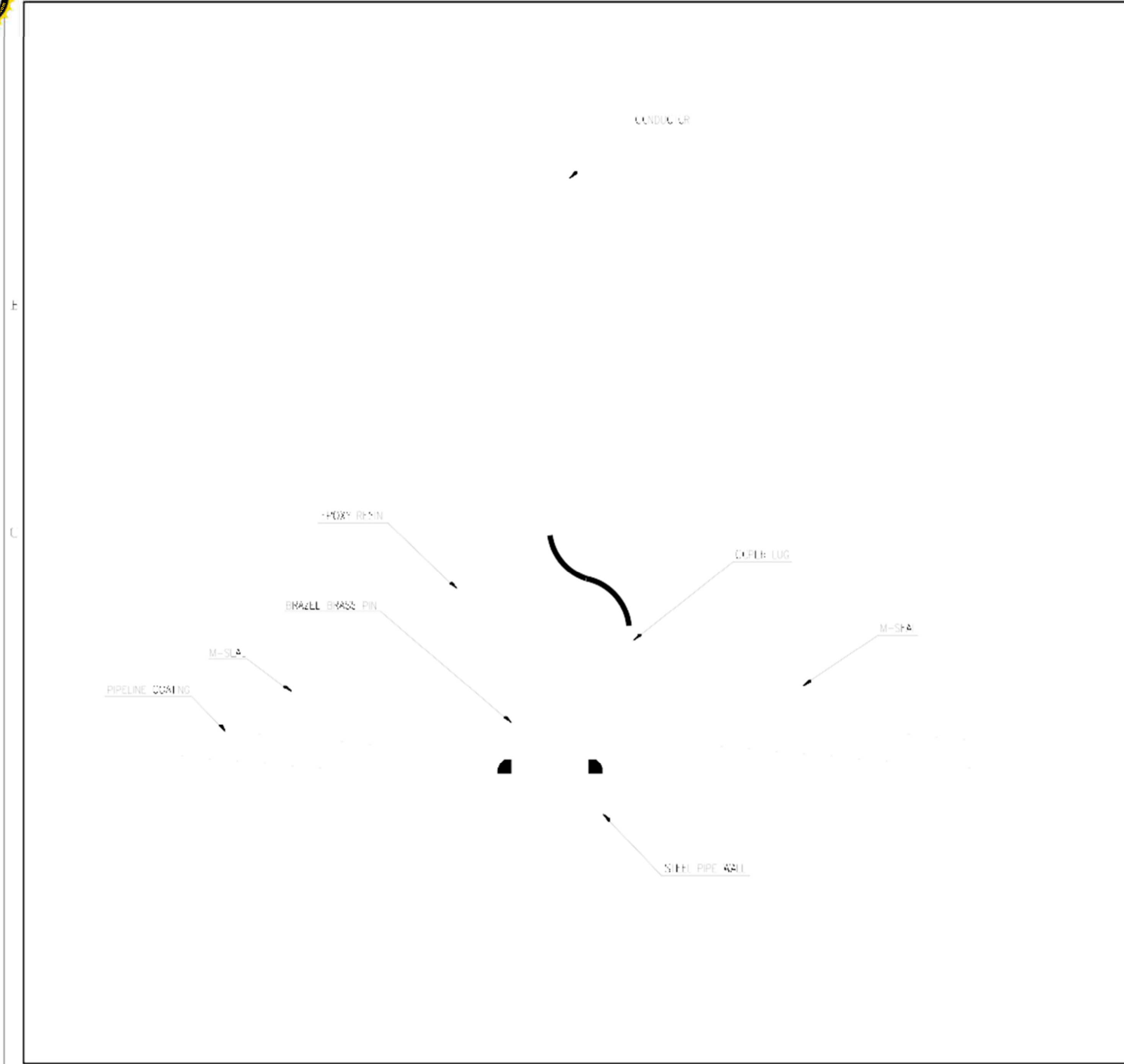
| | | |
|-------------|------------------|----------|
| Size | Scale | Sheet |
| A3 | NTS | 01 of 01 |
| Drawing No: | GGNG E 20712 330 | Rev: 0 |

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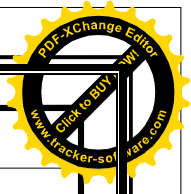
NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. FOLLOW WHITE DIMENSIONS ON Y-DIRECTION.
3. THE CABLE WILL BE FIXED TO THE PIPELINE AT AN ANGLE TO FACILITATE LAYING OF THE CABLE ALONG THE PIPELINE.
4. TEST CERTIFICATE & BATCH NOS OF PINS TO BE RECORDED.
5. THE PIN BRAZING TO HAVE THE FOLLOWING CHARACTERISTICS:
 - (a) EXTREMELY LOW CONTACT RESISTANCE : $\leq 0.1 \Omega$.
 - (b) LOW TRANSITION RESISTANCE : 7.5 TO 14 MO PER BRAZING JOINT
 - (c) HIGH MECHANICAL STRENGTH : BINDING STRENGTH- 450 N/MM²
SHEAR STRENGTH- 245 N/MM²
 - (d) BRAZING TEMPERATURE : 800C
 - (e) TIME PER BRAZE : 2 SECONDS
 - (f) WEATHER EFFECT : SUITABLE FOR ALL WEATHER OPERATION
 - (g) LIFE : 40 YEARS
 - (h) FIELD TEST : CABLE GUNNED ON THROUGH PIN BRAZING TO BE DONE IN-SITU FOR CONTACT RESISTANCE & TEMPERATURE E.T.C.



| | | | | | | |
|--|-----------------|------------|-----|-------|---------|----------|
| Rev | 0 | Uvc | | DRG | AS | + |
| Drawn By | | Checked By | | Drawn | Checked | Approved |
| SUBJECT: CABLE TO PIPE CONNECTION BY PIN BRAZING | | | | | | |
| Size | A3 | Scale | NTS | Sheet | 01 | of 01 |
| Drawing No | GGNG-E-20712-33 | | | | | Rev |
| | | | | | | 0 |

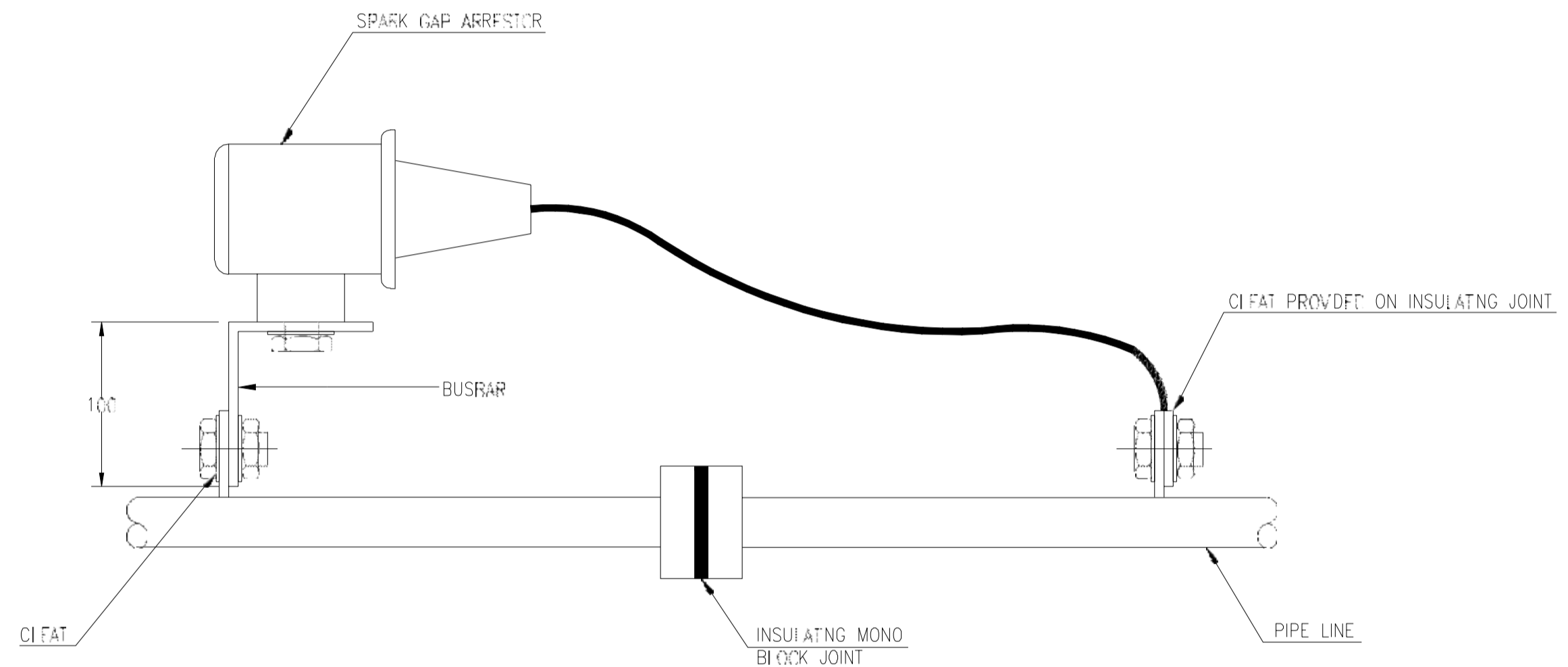
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NOTES

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE.
3. THIS DRAWING FOR INFORMATION ONLY.

| S.No. | DESCRIPTION | QTY. |
|-------|---|------|
| 1 | TINNED COPPER BUS BAR 25mm X 3mm THK 550mm LONG 90°SMOOTH BEND AT 100mm AT ONE END BOTH END WILL HAVE M12 HOLES | 1 |
| 2 | TINNED COPPER BUS BAR 25mm X 3mm THK 'L' SHAPE BEND AT CENTER FOR TOTAL LENGTH 200mm TO BE DIVIDED IN TWO PART BOTH END WILL HAVE M12 HOLES | 1 |
| 3 | NOS 10 SIZE BRASS NUT BOLTS, WASHERS NOT NUT BOLTS ARE PROVIDED WITH EACH SPARK GAP ARRESTOR. | 2 |



| | | | | | | |
|-----|----------|----------|---|---------------|----------|-----------|
| 0 | 05.10.16 | APPROVED | | | | |
| Rev | D | M | Y | Modifications | Drawn | Checked |
| | | | | | Approved | Validated |

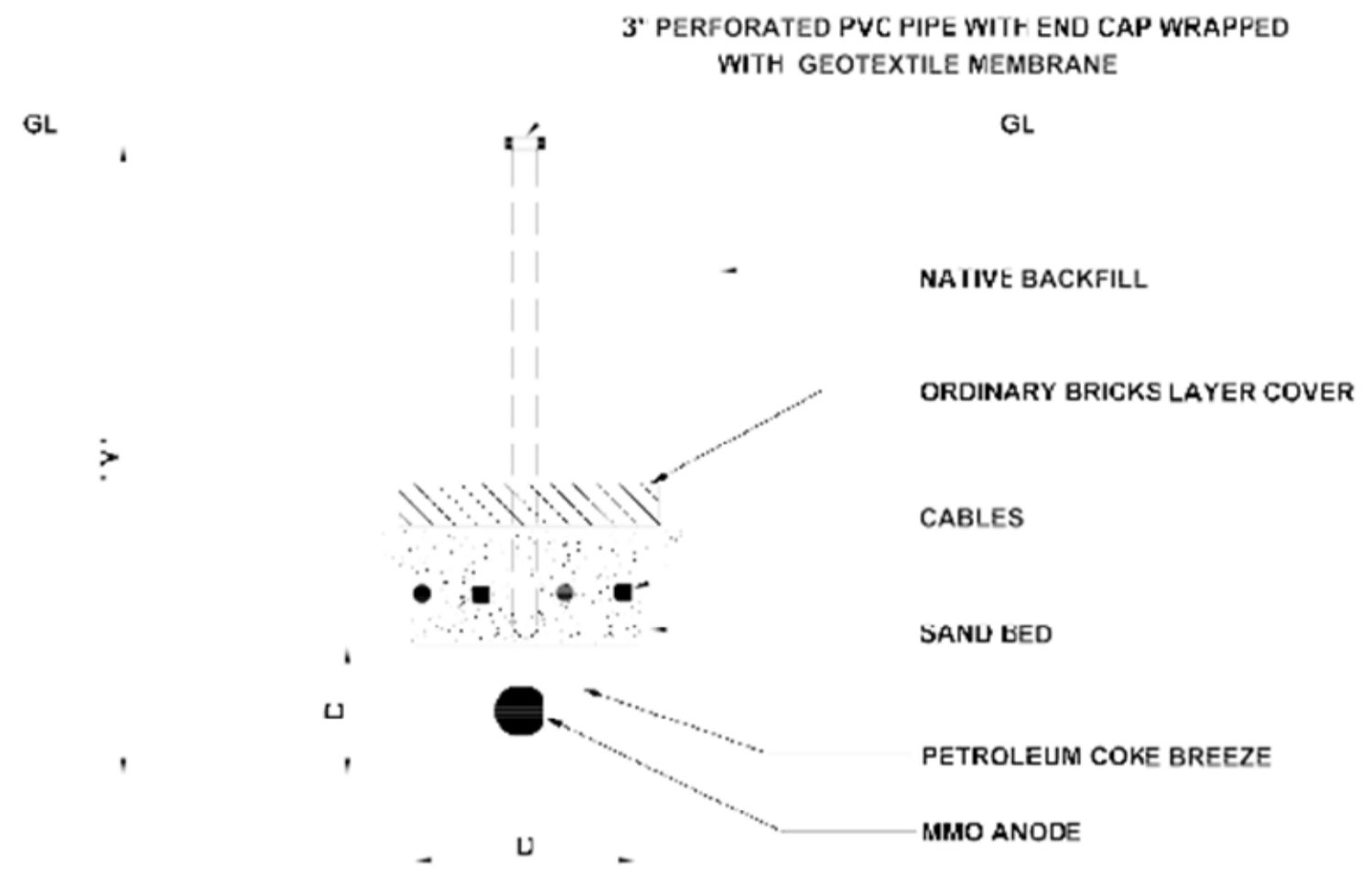
SUBJECT SPARK GAP ARRESTOR INSTALLATION

| | | |
|------------------|-------|----------|
| Size | Scale | Sheet |
| A3 | NTS | 01 of 01 |
| Drawing No. | Rev | |
| GGNG-E-20712-332 | 0 | |

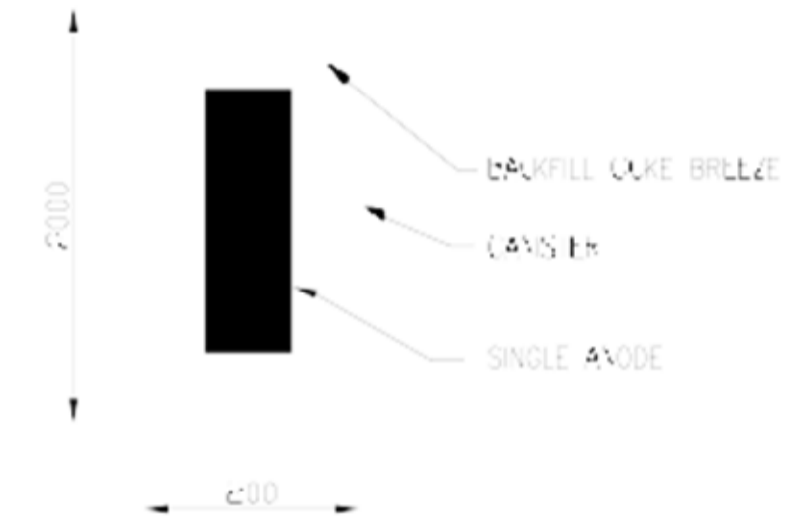
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NOTES

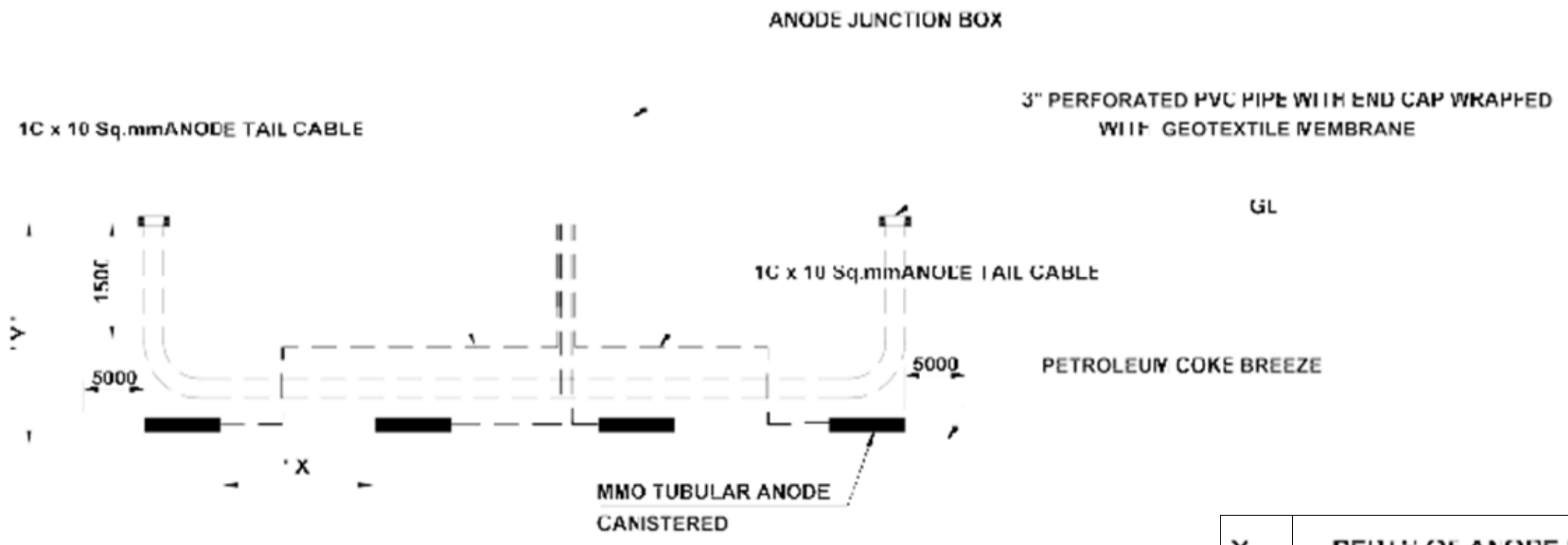
1. DIMENSION ARE IN MM UNLESS SPECIFIED.
2. NO. OF ANODE SHALL BE AS PER CP DESIGN REQUIREMENT.
3. DEPTH AREA & LENGTH OF ANODE BED INSTALLATION & ANODE DIMENSIONS SHALL BE IN LINE WITH DESIGN.
4. ALL ANODE SHALL BE INSTALLED WITH CANISTER.
5. AJB SHALL BE KEPT AS PER SITE SUITABILITY & ACCESS & NOT NECESSARILY AT CENTER OF ANODE BED.
6. DISTANCE BETWEEN ANODE TO ANODE SHALL BE AS PER DESIGN APPROVAL.
7. SHEET STEEL CANISTER SHALL BE 22 SWG, 200 MM DIA AND 2000 MM LONG.
8. DEPTH OF THE ANODE BED SHALL BE AS PER DESIGN APPROVAL ON CASE TO CASE.
9. ANODE TAIL CABLE SHALL BE LAID THROUGH SUITABLE FLEXIBLE PVC PIPE.
10. 3" PERFORATED PVC PIPE WITH CAP WRAPPED WITH GEOTEXTILE MEMBRANE SHALL BE INSTALLED FOR WATERING THE GROUND BED.
11. SPECIFICATION MENTIONED FOR GUIDANCE ONLY.
12. IDENTIFICATION OF ANODE -
 FIRST FIGURE - No OF Cp, STN
 SECOND FIGURE - No OF ANODE ROW
 THIRD FIGURE - ITS OWN SERIAL STARTING SEQUENTIALLY.



SIDE VIEW FOR DETAIL FOR HORIZONTAL ANODE GROUND BED INSTALLATION



PRE PACKAGED CANISTER ANODE



HORIZONTAL ANODE GROUND BED

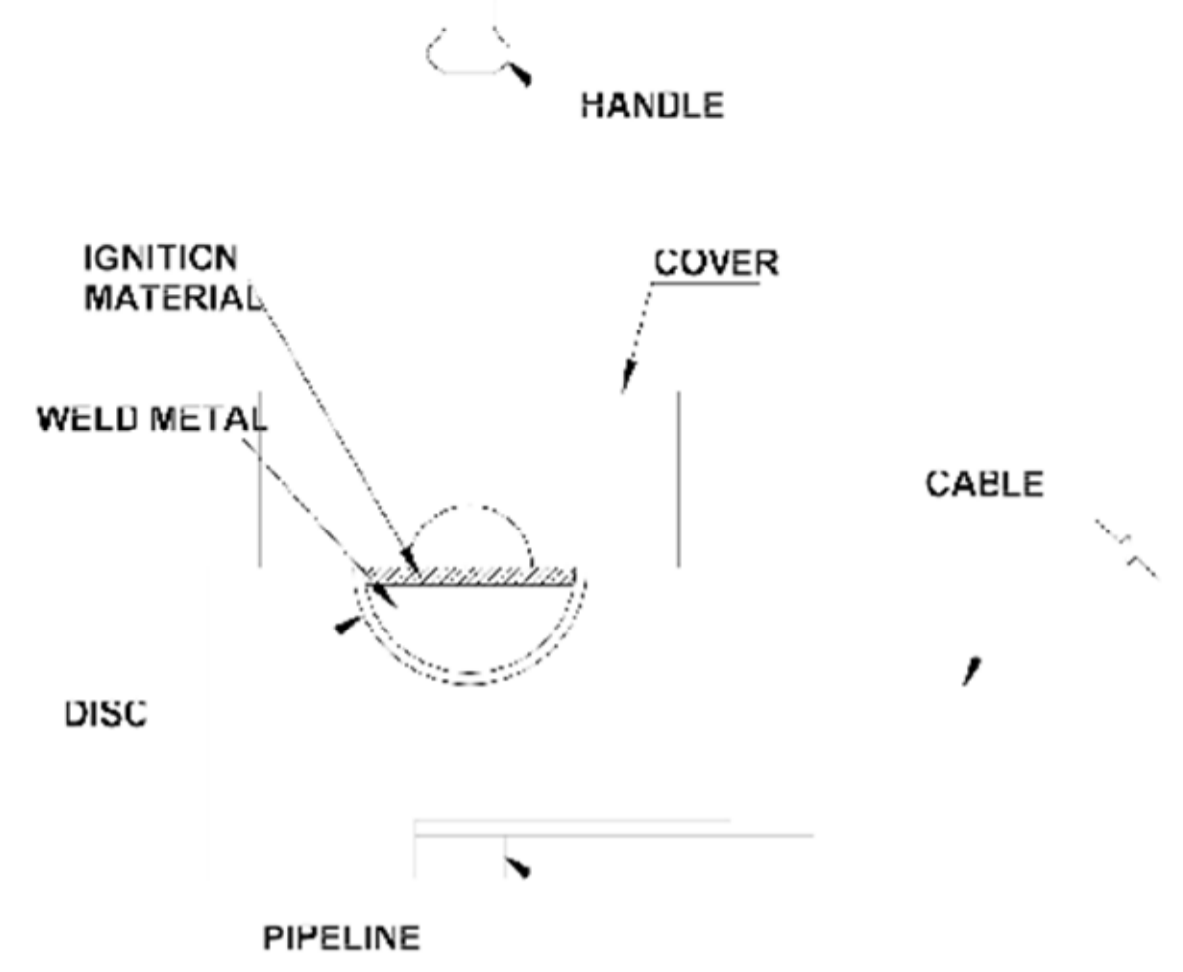
| | |
|---|-------------------------|
| Y | DEPTH OF ANODE BED(Mtr) |
| X | DISTANCE BETWEEN ANODE |

| | | | | | |
|--|-------|-------------|------|------------|------|
| APPROVED BY | DATE | DESIGNED BY | DATE | CHECKED BY | DATE |
| | | | | | |
| SUBJECT | | | | | |
| TYPICAL INSTALLATION DETAILS OF SHALLOW HORIZONTAL ANODE BED | | | | | |
| Size | Scale | Sheet | | | |
| A3 | NTS | 01 of 01 | | | |
| Drawing No: GGNG-E-20712-333 | | | | | |

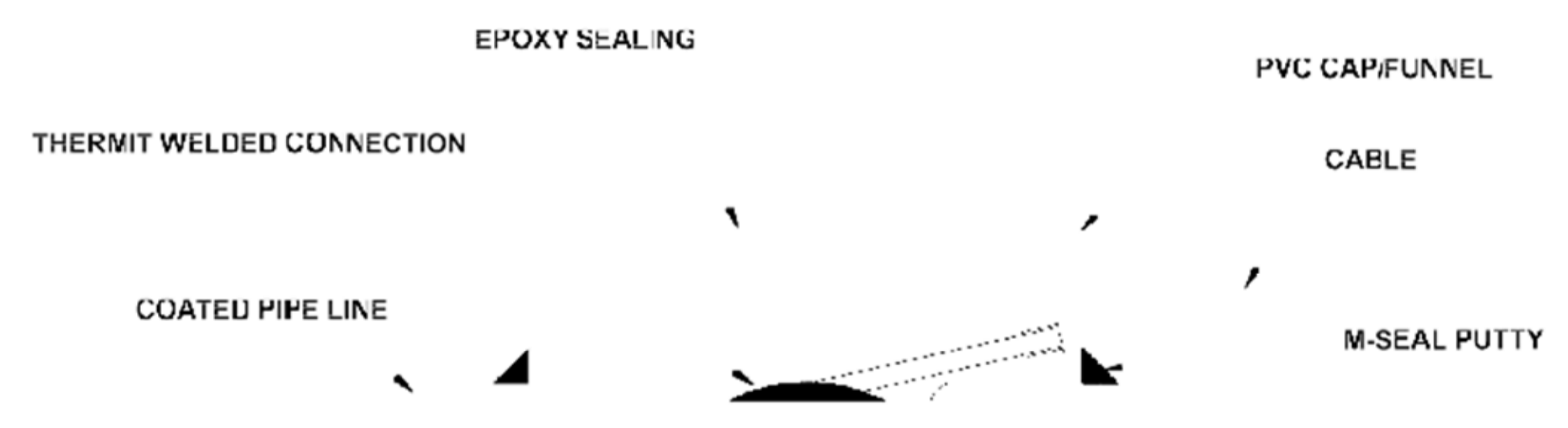


NOTES

- 1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
- 2. FOLLOW WRITTEN DIMENSIONS ONLY ON NTH SCALE.
- 3. THE CABLE WILL BE FIXED TO THE PIPELINE AT AN ANGLE TO MAINTAIN LAYING OF THE CABLE ALONG THE PIPELINE.
- 4. TEST GER FCA : & BATCH NOS OF PIPE TO BE RECORDED.
- 5. AT LOCATION OF THERMIT WELD, JUNCTION ON R/B, 400mm x 200mm SQUARE OF THE PIPELINE COATING EXPOSED AREA OF PIPELINE SHALL BE FILLED TO BRIGHT METAL AND BE FREE OF RUST, PAINT, OIL, GREASE AND MOISTURE.
- 6. WELD METAL SIZE SHALL DEPEND ON THE SIZE OF CABLE.
 - (a) 4 Sq mm - 16 Sq mm - GA-15
 - (b) 16 Sq mm - 30 Sq mm - GP-52



WELDED CABLE POSITION



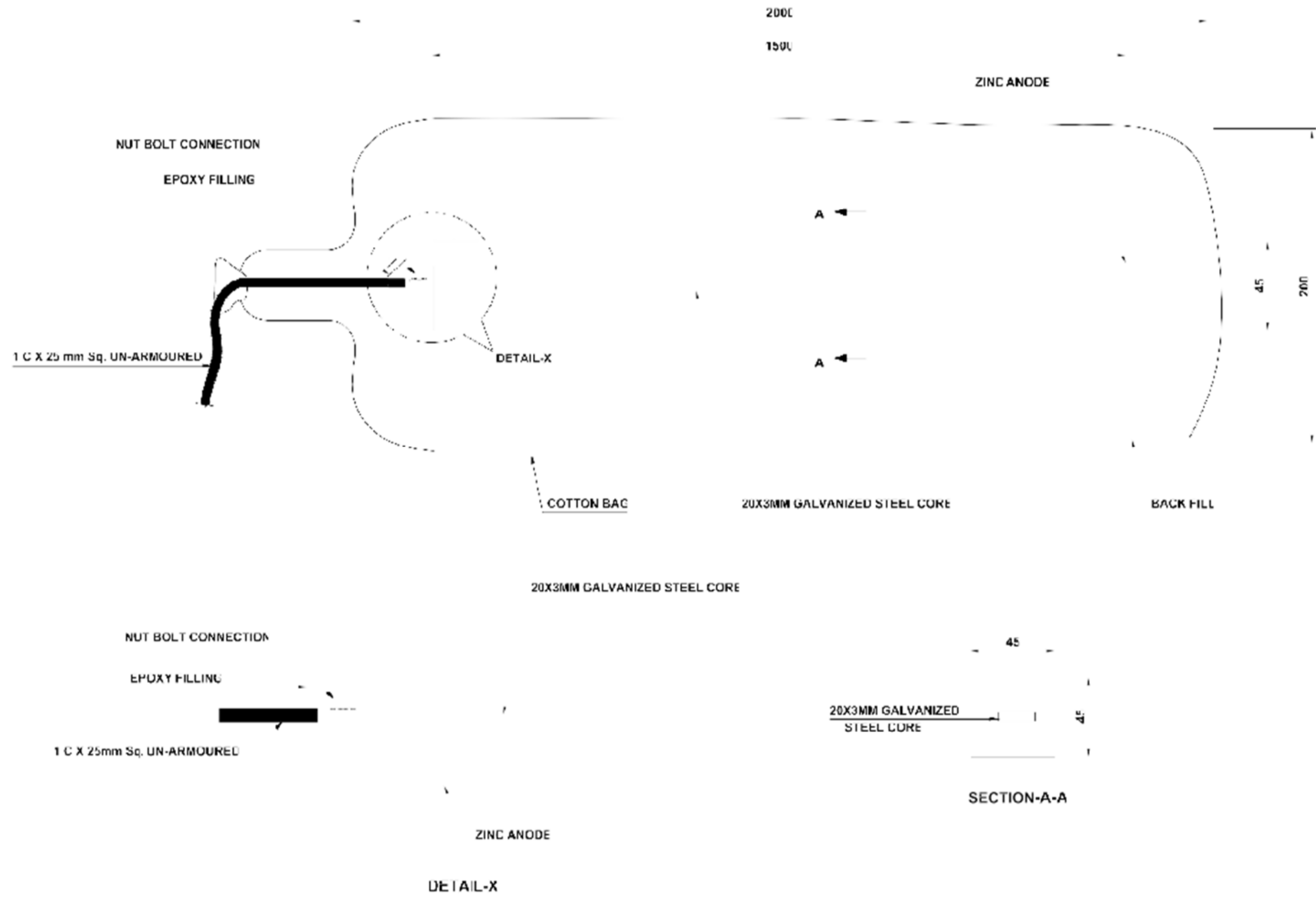
PIPE TO CABLE CONNECTION DETAIL

| | | | | | |
|-------------------------|----------|---------|---------|-----------|---|
| Rev | 0 | 0 | 0 | 0 | 0 |
| By | D. B. Y. | Checked | ADP/200 | Validated | |
| SUBJECT | | | | | |
| THERMIT WELDING DETAILS | | | | | |
| Sheet | Scale | Sheet | | | |
| A3 | NTS | 01 | | of 01 | |
| Drawing No | | | | | |
| GGNG-E-20712-334 | | | | | |
| 0 | | | | | |

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NOTES

1. THE DIMENSIONS ARE INDICATIVE.
2. PROVIDE BILL OF MATERIAL FOR ZINC GROUNDING CELL AND ACCEPTABLE CHEMICAL COMPOSITION.
3. ZINC ANODE SHALL BE PROVIDED ACROSS INSULATING JOINT AND HIGH TENSION LINE CROSSING.
4. (a) Pre packed weight 110kg.
 (b) open circuit potential -1.05 to -1.11 (w.r.t. Cu-CuSO4)
 (c) Current capacity 750 Amp Hrs/Kg
 (d) Actual consumption 11.2 Kg/Amp Year



BACKFILL COMPOSITION

| | |
|-----------------|-----|
| GYPSON | 75% |
| BENTONITE | 20% |
| SODIUM SLLPHATE | 5% |

DETAILS OF BARE ANODE DETAILS OF PREPACKED ANODE

| TOLERANCE | | NET BARE WEIGHT | LENGTH | SIZE | PREPACKED WEIGHT | LENGTH | DIA |
|-------------|----------|-----------------|--------|------------|------------------|--------|--------|
| LENGTH : | +/- 2.5% | 20 Kg | 1500mm | 45 x 45 mm | 110 Kg APPROX. | 2000mm | 200 mm |
| WIDTH : | +/- 5% | | | | | | |
| THICKNESS : | +/- 5% | | | | | | |

| | | | | | | | |
|---|----|-----|-------|-------|---------|----------|-----------|
| Rev | 01 | Uvc | | PKC | K2 | | |
| Day | D | M | Y | Issue | Checker | APP/1760 | Val/25/22 |
| SUBJECT | | | | | | | |
| CONSTRUCTION DETAILS OF ZINC GROUNDING CELL (20 kg) | | | | | | | |
| Scale | A3 | NTE | Sheet | 01 | of | 01 | |
| Drawn by | | | | | | | |
| GGNG-E-20712-005 | | | | | | | |

