

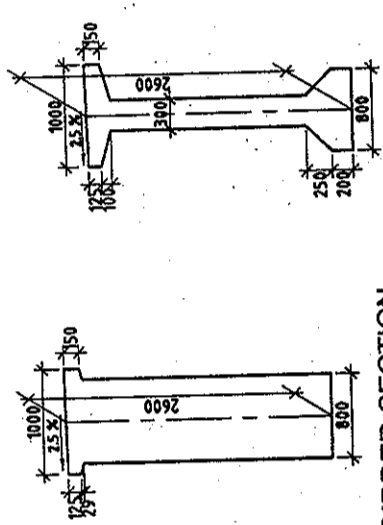
NOTES:-

1. ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE MENTIONED.
2. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED AND NO DIMENSION SHALL BE SCALED.
3. EACH 2-LANE CARRIAGEWAY OF PROPOSED BRIDGE IS DESIGNED FOR ONE LANE OF IRC CLASS 70R LOADING OR 2 LANES OF IRC CLASS 'A' LOADING WHICHEVER GOVERNS.
4. THE CONCRETE GRADE SHALL BE M-45.
5. THE HIGH YIELD STRENGTH DEFORMED BARS OF GRADE DESIGNATION Fe-415 CONFORMING TO IS:1786 SHALL ONLY BE USED.
6. CLEAR COVER TO OUTERMOST STEEL IS 40mm.
7. THE LOCATION OF JACKS FOR LIFTING OF THE SUPERSTRUCTURE TO REPLACE BEARINGS ETC. IS SHOWN THUS ↑ THIS SHALL BE DISTINCTLY ETCHED FOR EASY IDENTIFICATION ON THE END CROSS GIRDERS AND ABUTMENT CAPS.
8. DURING THE LIFTING OPERATION ALL THE FOUR JACKS PLACED UNDER THE END CROSS-GIRDER IN LINE WITH THE BEARINGS SHALL BE OPERATED SIMULTANEOUSLY USING SINGLE OPERATING CONSOLE, GROUPING THE PUMP AND CONTROL SYSTEM SO AS TO ENSURE THAT THE REACTIONS ON ALL THE 4 JACKS ARE EQUAL AT ALL TIMES.
9. CAPACITY OF EACH JACK SHALL NOT BE LESS THAN 105T.

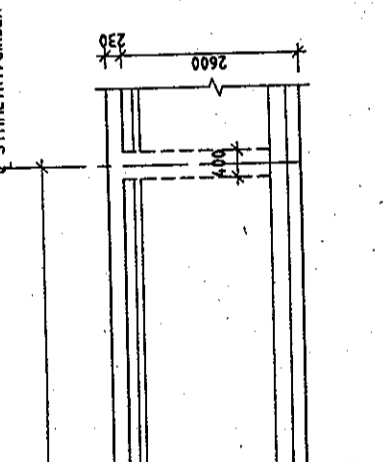
- ⊗ LOCATION OF JACK IN PLAN
- ↑ LOCATION OF JACK IN CROSS SECTION

REFERENCE DRAWINGS:-

- i) 12/13/SMEC/LUDHIANA/26+900/G-01(SHEET 1 OF 7 TO 7 OF 7)
- ii) 12/13/SMEC/LUDHIANA/21+100/G-01(SHEET 1 OF 7 TO 7 OF 7)
- iii) 12/13/SMEC/LUDHIANA/22+005/G-01(SHEET 1 OF 6 TO 6 OF 6)
- iv) 12/13/SMEC/LUDHIANA/26+666/G-01(SHEET 1 OF 10 TO 10 OF 10)
- v) 12/13/SMEC/LUDHIANA/SUP-64(SHEET 1 OF 2 & 2 OF 2)
- vi) 12/13/SMEC/LUDHIANA/SUP-65(SHEET 1 OF 2 & 2 OF 2)
- vii) 12/13/SMEC/LUDHIANA/SUP-66
- viii) 12/13/SMEC/LUDHIANA/SUP-67
- ix) 12/13/SMEC/LUDHIANA/SUP-68
- x) 12/13/SMEC/LUDHIANA/SUP-69



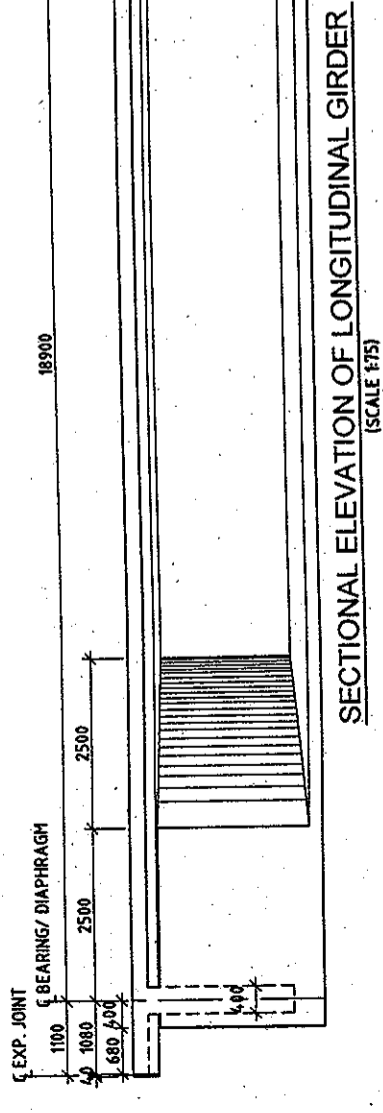
GIRDER SECTION AT MID SPAN (SCALE 1:50)



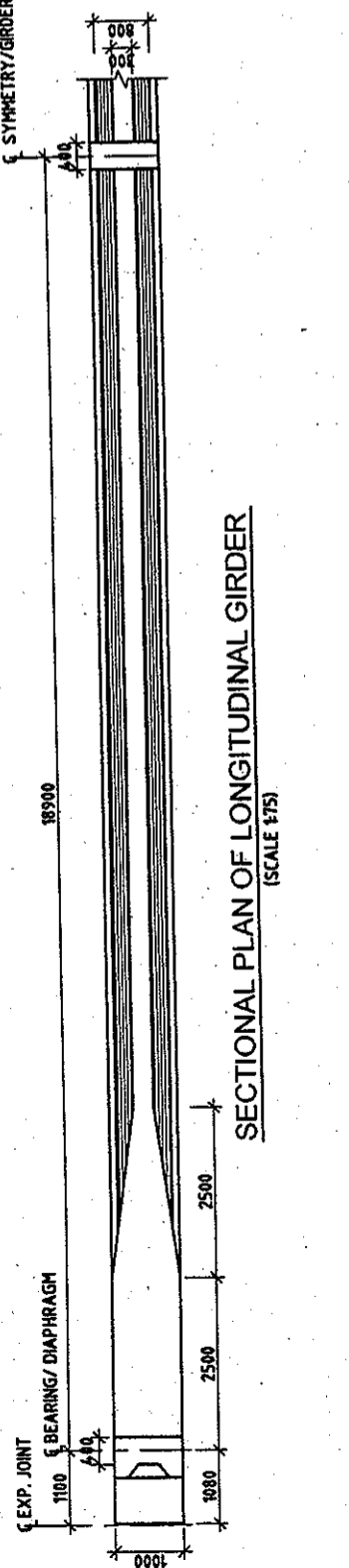
GIRDER SECTION AT SUPPORT (SCALE 1:50)

APPROVED FOR EXECUTION

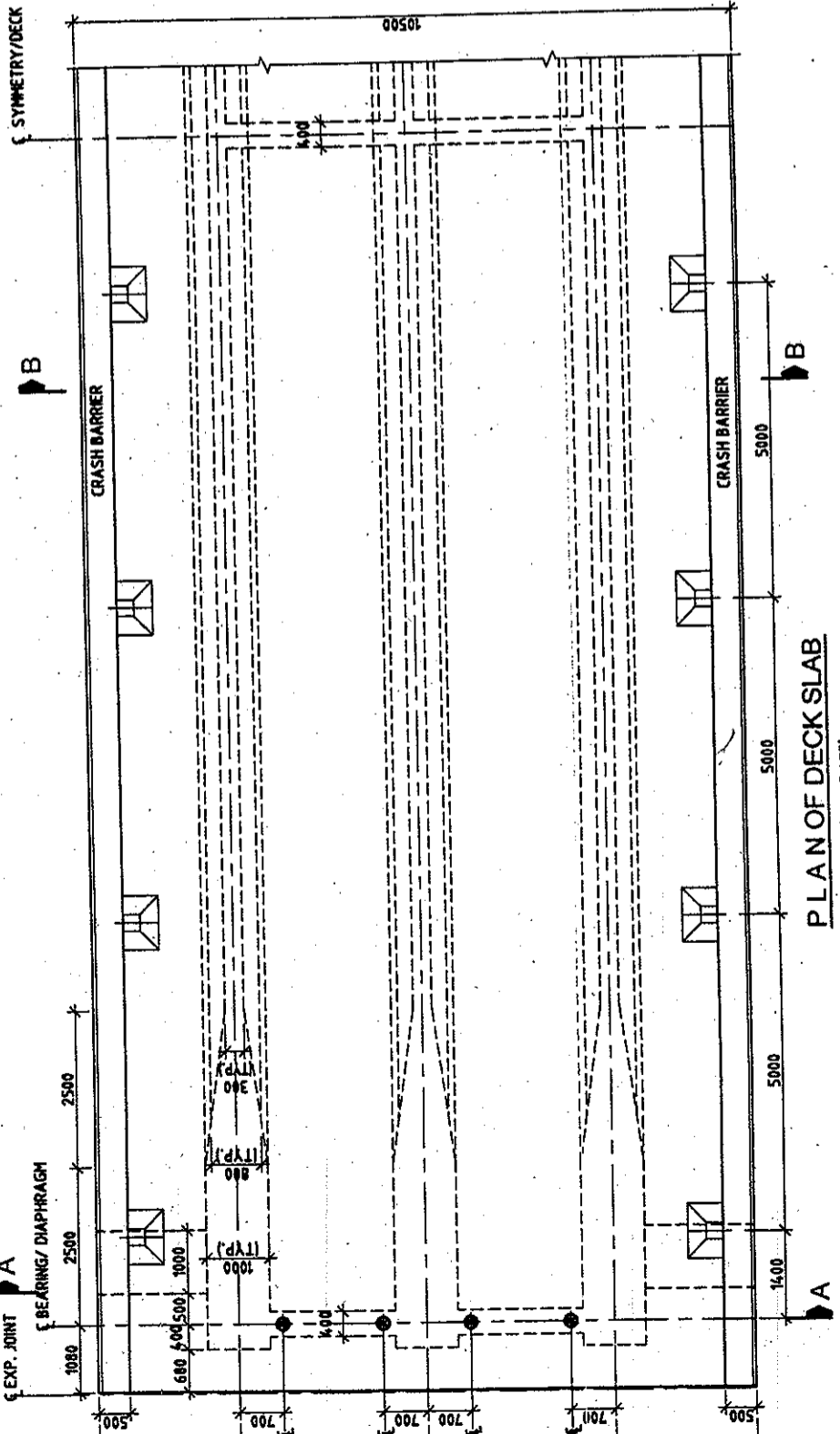
ISSUED	Chief Engineer (IP)
Executive Engineer (IP)	Design Engineer (IP)
Approved	Chief Engineer (IP)
PUNJAB P.W.D. (B & R)	



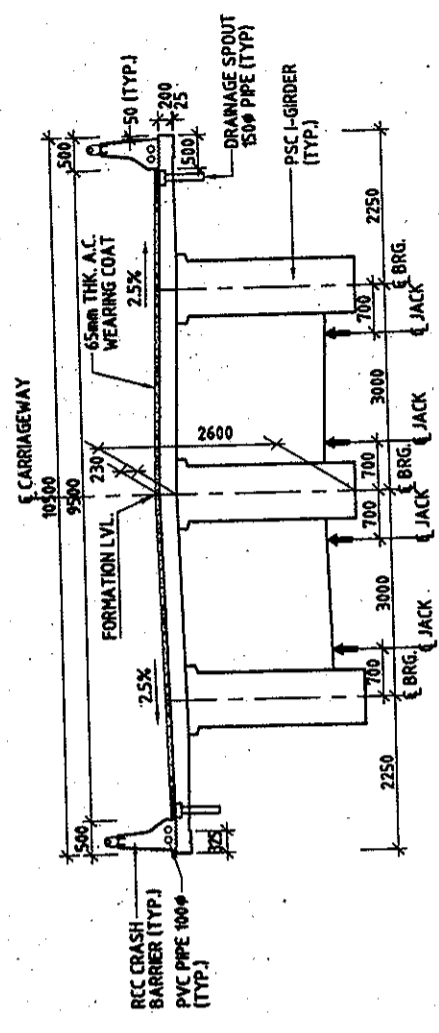
SECTIONAL ELEVATION OF LONGITUDINAL GIRDER (SCALE 1:75)



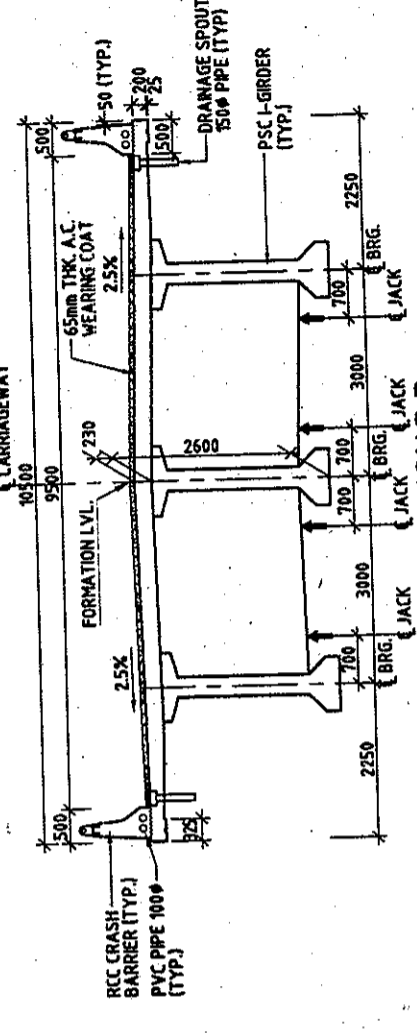
SECTIONAL PLAN OF LONGITUDINAL GIRDER (SCALE 1:75)



PLAN OF DECK SLAB (SCALE 1:75)

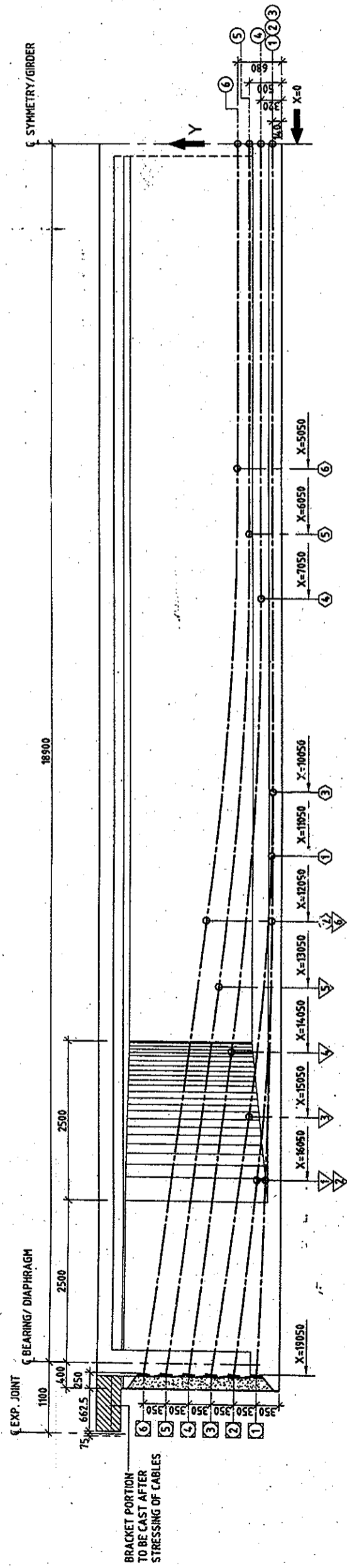


SECTION A-A (SCALE 1:75)

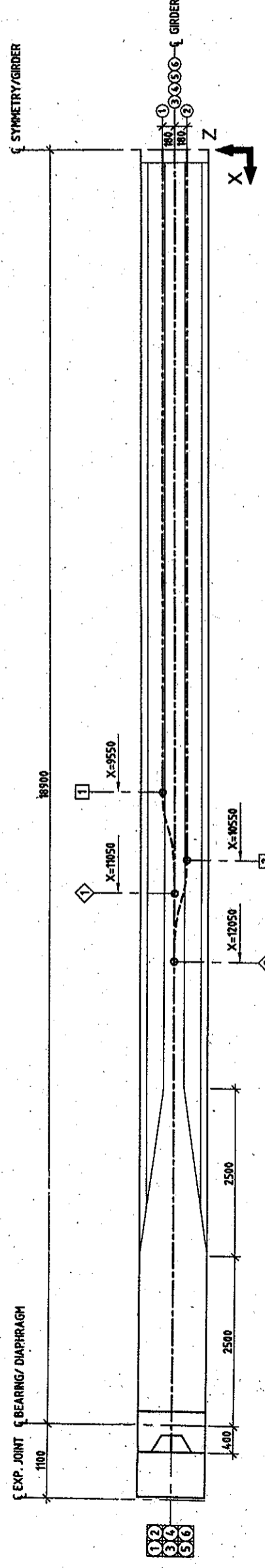


SECTION B-B (SCALE 1:75)

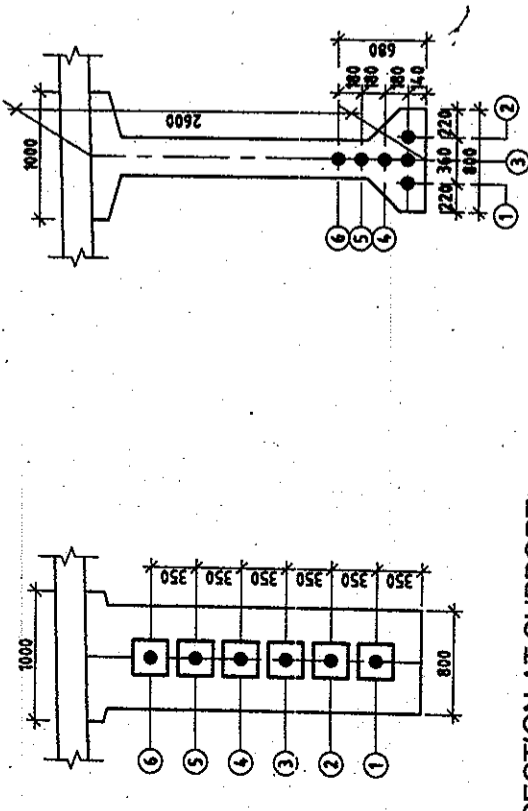
<p>THE DRAWING HAS NOT BEEN PUBLISHED AND IS THE SOLE PROPERTY OF SMEC INDIA PVT. LTD. AND IS ISSUED TO THE PARTY FOR THE SPECIFIC PURPOSE AS STATED IN THE AGREEMENT AND IT SHALL NOT BE REPRODUCED, COPIED, LENT OR OTHERWISE DISPOSED OFF DIRECTLY OR INDIRECTLY, NOR USED FOR ANY OTHER PURPOSE OTHER THAN FOR WHICH IT IS FURNISHED.</p>		<p>SCALE: AS SHOWN</p>	<p>DETAILED PROJECT REPORT</p>
<p>PROJECT TITLE:</p> <p>PREPARATION OF DETAILED PROJECT REPORT FOR UP-GRADATION OF SOUTHERN BYE-PASS LUDHIANA</p>	<p>CLIENT:</p> <p>PUNJAB INFRASTRUCTURE DEVELOPMENT BOARD</p>	<p>SHEET SIZE: A2</p>	<p>DETAILED DIMENSION FOR LONGITUDINAL PSC I GIRDERS (37.8m EFFECTIVE SPAN)</p>
<p>CONSULTANT:</p> <p>SMEC INDIA PVT. LTD. SMEC (INDIA) PVT. LTD. D/F BUILDING NO. 1, C TOWER, 2ND FLOOR, CYBER CITY, PHASE 2, GURGAON, HARYANA, INDIA - 122002 Tel: 0122-420042, 420100</p>	<p>DATE: 08/2009</p> <p>DESIGN: POK</p> <p>DRAWN: RAYWAT</p> <p>CHECKED: VMM</p> <p>APPROVED: S.L.HIRI</p> <p>DETAILS OF REVISION:</p>	<p>DRW: DPR</p>	<p>12/13/SMEC/LUDHIANA/SUP-63</p>
<p>CONTRACT NO.:</p> <p>14/13/INFRA/2008/FINAL</p>	<p>REV: R0</p>	<p>DRW: R0</p>	<p>12/13/SMEC/LUDHIANA/SUP-63</p>



HALF SECTIONAL ELEVATION (OUTER GIRDER)
(SCALE 1:50)



HALF PLAN
(SCALE 1:50)



SECTION AT SUPPORT
(SCALE 1:40)

SECTION AT MID SPAN
(SCALE 1:40)

APPROVED FOR EXECUTION

Assistant Engineer Design (R)	Executive Engineer Design (R)	Chief Engineer (R)
<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>
PUNJAB P.W.D. (B & R)		

LEGEND:-

- - INDICATES START OF CURVE IN ELEVATION
- △ - INDICATES END OF CURVE IN ELEVATION
- - INDICATES START OF CURVE IN PLAN
- ◇ - INDICATES END OF CURVE IN PLAN
- ◻ - INDICATES END OF CABLE
- - INDICATES CABLE NUMBER

CLIENT: PWD PROJECT TITLE: PREPARATION OF DETAILED PROJECT REPORT FOR UPGRADATION OF SOUTHERN BYPASS LUDHIANA	CONSULTANT: SMIEC SMIEC (Punjab) PVT. LTD. DAF BUILDING IN A C TOWER, 2ND FLOOR, CYBER CITY, PHASE I, GURGAON, HARYANA, INDIA - 122002 TEL: 0122-5030002, 50100	R0 20/05/2009 PCK RAYWAT VNM S. SAHRI	APPROVED CHECKED DESIGN APPROVED	DETAILS OF REVISION FIRST ISSUE	SCALE: AS SHOWN SHEET SIZE: A2	DETAILED PROJECT REPORT DETAILS OF PRESTRESSING CABLES LONGITUDINAL PSC GIRDER 37.8m EFFECTIVE SPAN (OUTER GIRDER) SHEET 1 OF 2	DRW DPR 1213/SMIEC/LUDHIANA/SUP-64	RO	
	PREPARED BY: PUNJAB INFRASTRUCTURE DEVELOPMENT BOARD PWD PROJECT TITLE: PREPARATION OF DETAILED PROJECT REPORT FOR UPGRADATION OF SOUTHERN BYPASS LUDHIANA		APPROVED FOR EXECUTION		SCALE: AS SHOWN SHEET SIZE: A2		DETAILED PROJECT REPORT DETAILS OF PRESTRESSING CABLES LONGITUDINAL PSC GIRDER 37.8m EFFECTIVE SPAN (OUTER GIRDER) SHEET 1 OF 2		DRW DPR 1213/SMIEC/LUDHIANA/SUP-64

CABLE CO-ORDINATES

CABLE NO.	X=953	X=1905	X=2856	X=3810	X=4763	X=5715	X=6668	X=7620	X=8573	X=9525	X=10478		X=11430		X=12383		X=13335		X=14288		X=15240		X=16193		X=17145		X=18098		X=19050					
											Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z
1	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180			
2	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180			
3	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180		
4	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180	140	180		
5	320	0	320	0	320	0	320	0	320	0	320	0	320	0	320	0	320	0	320	0	320	0	320	0	320	0	320	0	320	0	320	0	320	0
6	500	0	500	0	500	0	500	0	500	0	500	0	500	0	500	0	500	0	500	0	500	0	500	0	500	0	500	0	500	0	500	0	500	0
7	680	0	680	0	680	0	680	0	680	0	680	0	680	0	680	0	680	0	680	0	680	0	680	0	680	0	680	0	680	0	680	0	680	0

TABLE B - CABLE LENGTH AND ELONGATION

CABLE NO. OF STRANDS IN CABLE	JACKING FORCE (H)	TOTAL LENGTH OF CABLE IN (mm)	THEORETICAL ELONGATION AT JACKING END Δ_s (mm)	ANGLE (θ) (JACKING END)
1	224.85	4028	124.6	2.18°
2	224.85	4072	14.02	6.39°
3	252.95	40202	130.6	7.97°
4	252.95	40209	131.3	7.24°
5	267.81	40234	131.5	7.50°
6	267.81	40259	131.8	7.70°

CABLE CO-ORDINATES

DIMENSIONS ARE IN MM. UNLESS OTHERWISE SHOWN ON THE DRAWING.	
PRESTRESSING TENDON IS A MULTISTRAND CABLE COMPRISING OF NUMBER 7 mm DIA 7-PLY CLASS 2 LOW RELAXATION STRANDS AS PER IS: 14268.	
PRESTRESSING STEEL AND ACCESSORIES SHALL BE SUBJECT TO ACCEPTANCE TESTS PRIOR TO THEIR ACTUAL USE ON THE WORKS (GUIDANCE MAY BE TAKEN FROM IS: 447). ONLY MULTISTRAND JACKS SHALL BE USED FOR TENSIONING OF CABLES.	
MEASUREMENT DEVICE TO BE ATTACHED IN CONSULTATION WITH SYSTEM MANUFACTURER.	
WIRING SHALL HAVE 85 mm INTERNAL DIAMETER AND MANUFACTURED FROM 1/2" METAL DUCT. IT SHALL BE TESTED AS PER IRC:18-2000, APPENDIX-1A, FOLLOWING PROPERTIES OF STRANDS HAVE BEEN ASSUMED IN DESIGN:	
CROSS SECTIONAL AREA OF 1 STRAND = 98.7mm ²	
POISSON'S RATIO $\mu = 0.25$ / RADIANT	
COEFFICIENT OF ELASTICITY OF STEEL (ES) OF STRAND = 195,000 MPa	
SLIP AT ANCHORAGE OF TENSIONING END = 6 mm.	
ULTIMATE TENSILE FORCE PER STRAND = 183.7 KN	
TENSIONING OF TENDONS SHALL BE CARRIED OUT AS PER APPENDIX-5 OF IRC:18-2000.	
LENGTH MENTIONED IN THE DRAWINGS ARE INCLUSIVE OF 1000mm EXTRA LENGTH AT EACH END.	
DIMENSIONS AT EACH END INDICATED IN THE TABLE B ARE FOR PORTION OF THE TENDON LAYING BETWEEN CENTER OF SPAN AND THE JACKING POINT. THESE DIMENSIONS ARE ADDITIONAL EXTENSION FOR CABLE LENGTH BETWEEN JACKING POINT AND GRIPPING POINT.	
PRESTRESSING OPERATION SHALL BE CARRIED OUT SYMMETRICALLY W.R.T. CENTRAL AXIS.	
CABLE NO 1, 19 STRANDS WILL BE PLACED AND ONLY 16 STRANDS SHALL BE STRESSED TO A JACKING FORCE OF 76.5% OF UTS. REMAINING STRANDS (03MM) WILL BE STRESSED ONLY WHEN REQUIRED TO MAKE UP THE DEFICIENCY IN THE TENSIONING TENDONS. IF NOT REQUIRED THE SAME SHALL BE TAKEN OUT AND GROUTED.	
ANCHORAGES SHALL BE SEALED WITH NON-SHRINK MORTAR FOR PRESTRESSING THE TENDONS.	
ACES OF SUPERSTRUCTURE TO BE COATED WITH 2 COATS OF EPOXY.	

13. THE PRESTRESSING WORK SHALL BE CARRIED OUT BY FREYSSINET SYSTEM OR ANY OTHER EQUIVALENT APPROVED SYSTEM AFTER CARRYING OUT NECESSARY MODIFICATIONS IN THE DRAWINGS WITH THE APPROVAL OF ENGINEER-IN-CHARGE ENSURING THEREBY THE SPECIFIED PRESTRESSING FORCE WITH ITS ECCENTRICITY OVER THE LENGTH OF THE MEMBER AND THE MAGNITUDE OF THE FINAL EFFECTIVE FORCE AS PRESCRIBED IN THE APPROVED DESIGN AND DRAWINGS. ALL PRESTRESSING AND GROUTING WORK BE UNDERTAKEN BY TRAINED PERSONNEL ONLY. A REPRESENTATIVE OF THE SUPPLIER OF THE PRESTRESSING SYSTEM SHALL BE PRESENT DURING ALL TENSIONING AND GROUTING OPERATIONS AND SHALL ENSURE, MONITOR AND CERTIFY THEIR CORRECTNESS.

14. ALL CABLES SHALL BE LAID IN SMOOTH PROFILE THROUGH THE GIVEN COORDINATES. ALL CABLE SHALL BE SUPPORTED AT A SPACING NOT EXCEEDING 1000mm C/C BY A 16mm DIA CROSS BAR TACK WELDED/SECURELY HELD IN POSITION WITH VERTICAL WEB REINFORCEMENT.

15. INITIAL SLACK IN CABLES SHALL FIRST BE REMOVED BY APPLYING A SMALL INITIAL TENSION. THE INITIAL TENSION REQUIRED TO REMOVE SLACK, SHALL BE TAKEN AS THE STARTING POINT OF MEASURING THE ELONGATION AND CORRECTION SHALL BE APPLIED AS PER CLAUSE 12.2.13 OF IS:1343-1988.

16. ELONGATION OF CABLES SHALL BE RECHECKED AFTER 24 HOURS OF ANCHORAGE TO OBSERVE SLOW SLIPPAGE, IF ANY AND THE MATTER SHALL BE REPORTED TO ENGINEER-IN-CHARGE.

17. EXTRA LENGTH OF STRANDS BEYOND THE ANCHORAGE SHALL NOT BE CUT JUST AFTER THE STRESSING. THESE SHALL BE CUT ONLY WHEN, INSTRUCTIONS FOR GROUTING ARE ISSUED BY ENGINEER-IN-CHARGE.

18. STRANDS SHALL NOT BE CUT WITH GAS FLAME.

3. STOP STRESSING AND INFORM THE ENGINEER. IF SPECIFIED EXTENSION HAS NOT BEEN REACHED CONTINUE TENSIONING UNTIL THE CALCULATED EXTENSION IS REACHED PROVIDED APPLIED FORCE DOES NOT EXCEED 76.5% OF ULTIMATE TENSILE FORCE VALUE (2670KN FOR 19 T 13 CABLE).

4. IF THE EXTENSION AT JACKING FORCE OF 76.5% UTS VALUE (2670KN FOR 19 T 13 CABLE) IS LESS THAN 0.95 TIMES THE CALCULATED EXTENSION STOP STRESSING AND INFORM THE ENGINEER FOR FURTHER INSTRUCTIONS.

5. CABLE EXTENSIONS GIVEN IN THE DRAWING SHALL BE MODIFIED AT SITE IN CASE ACTUAL VALUE OF (Ea) AS PER TEST CERTIFICATES IS DIFFERENT THAN THAT ASSUMED IN DESIGN VALUE BY MULTIPLYING IT WITH A FACTOR $\left(\frac{195 \times 10^3}{E_a}\right)$ (ACTUAL VALUE OF Ea)

REFERENCE DRAWINGS:-
 i) 1213/SMEC/LUDHIANA/20-199/G-01 (SHEET 1 OF 7 TO 7 OF 7)
 ii) 1213/SMEC/LUDHIANA/21-100/G-01 (SHEET 1 OF 7 TO 7 OF 7)
 iii) 1213/SMEC/LUDHIANA/22-005/G-01 (SHEET 1 OF 6 TO 6 OF 6)
 iv) 1213/SMEC/LUDHIANA/24-686/G-01 (SHEET 1 OF 10 TO 10 OF 10)
 v) 1213/SMEC/LUDHIANA/SUP-63
 vi) 1213/SMEC/LUDHIANA/SUP-64 (SHEET 1 OF 2)

PREPARATION OF DETAILED PROJECT REPORT FOR UPGRADATION OF SOUTHERN BAY-PASS LUDHIANA

PROJECT TITLE: PREPARATION OF DETAILED PROJECT REPORT FOR UPGRADATION OF SOUTHERN BAY-PASS LUDHIANA

APPROVED FOR EXECUTION

ISSUED

Assessing Engineer Design (IP)

Executive Engineer Design (IP)

Chief Engineer (IP)

PUNJAB P.W.D. (B & R)

SCALE: AS SHOWN

SHEET SIZE: A2

FIRST ISSUE

DETAILS OF REVISION

DPR

DRW

1213/SMEC/LUDHIANA/SUP-64

R0

PRESTRESSING STAGE-1
 (A) ALL THE STRANDS IN CABLE NOS. ①②③ SHALL BE STRESSED IN FIRST STAGE PRESTRESSING WHEN THE SECTION IS 14 DAYS OLD AND THE CONCRETE HAS ATTAINED A MINIMUM STRENGTH OF 39 MPa

(B) CASTING OF DECK SLAB SHALL BE DONE 28 DAYS AFTER THE CASTING OF GIRDER.

(C) PRESTRESSING STAGE-2

CABLES ④ SHALL BE STRESSED AFTER THE CASTING OF DECK SLAB.

IF SPECIFIED EXTENSION IS ACHIEVED BEFORE SPECIFIED JACKING FORCE IS APPLIED, CONTINUE TENSIONING TILL ATTAINING GIVEN JACKING FORCE PROVIDED, THAT THE EXTENSION DOES NOT EXCEED 1.05 TIMES THE CALCULATED EXTENSION. IF 1.05 TIMES THE CALCULATED EXTENSION IS ACHIEVED BEFORE GIVEN JACKING FORCE IS APPLIED STOP STRESSING AND INFORM THE ENGINEER.

SEQUENCE OF CONSTRUCTION SHALL BE AS FOLLOWED:-

REVISIONS

REV

DATE

DESIGN

CHECKED

APPROVED

SMEC CONSULTANT

SHEK PRAKASH
 6/F, BUILDING 14, C TOWER, 9B FLOOR
 CYBER CITY, PHASE-II GURGAON
 HARYANA, INDIA - 122002
 TEL: 0124-430092, 430100

PREPARATION OF DETAILED PROJECT REPORT FOR UPGRADATION OF SOUTHERN BAY-PASS LUDHIANA

PROJECT TITLE: PREPARATION OF DETAILED PROJECT REPORT FOR UPGRADATION OF SOUTHERN BAY-PASS LUDHIANA

SMEC PROJECT NO. 1213/SMEC/LUDHIANA/SUP-64

SCALE: AS SHOWN

SHEET SIZE: A2

FIRST ISSUE

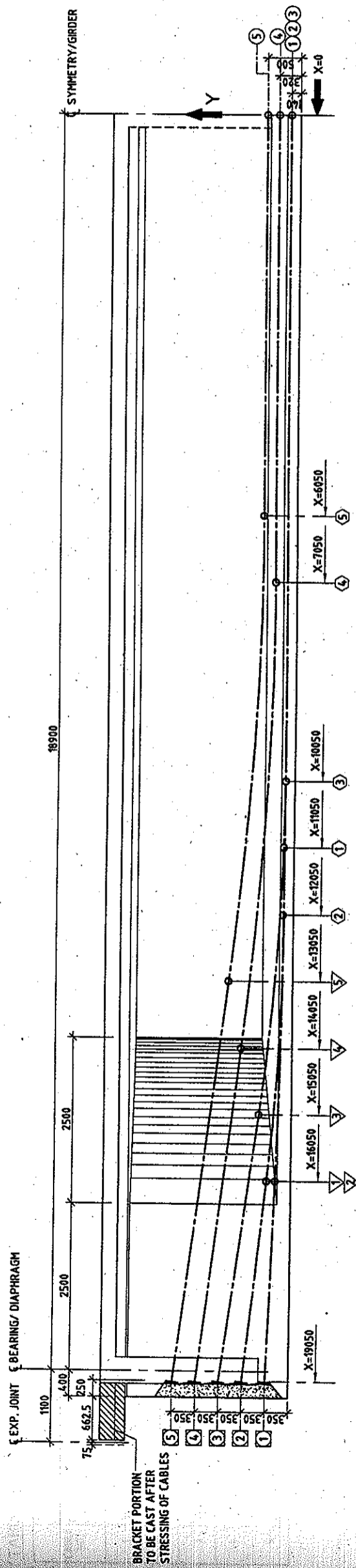
DETAILS OF REVISION

DPR

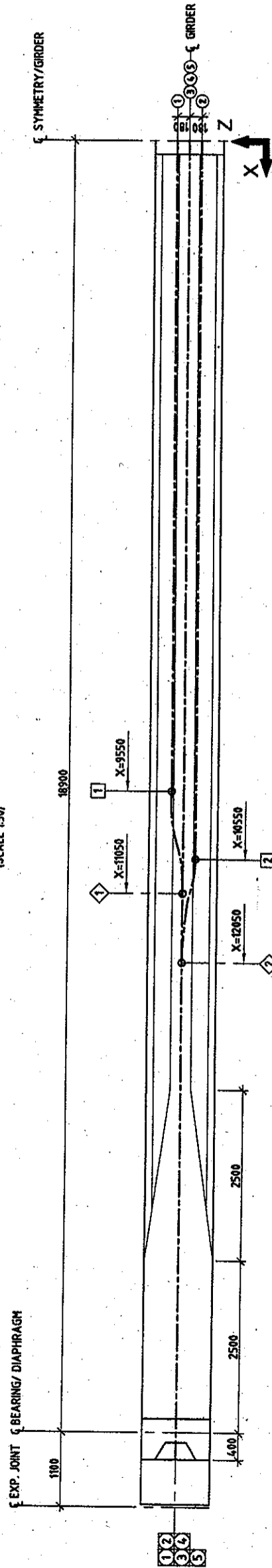
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1213/SMEC/LUDHIANA/SUP-64

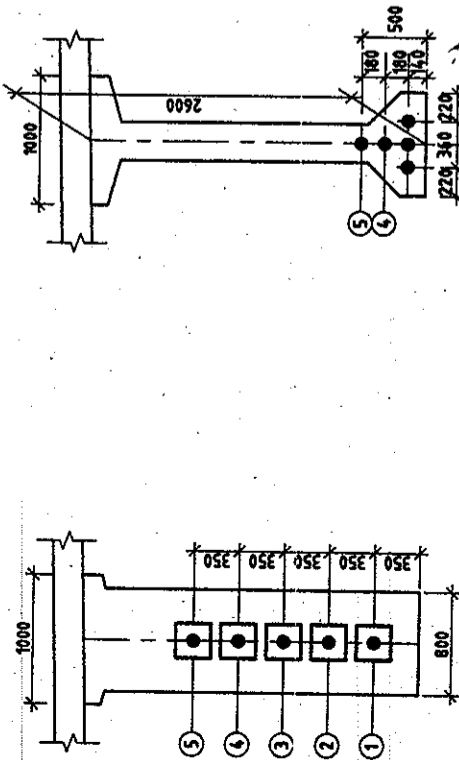
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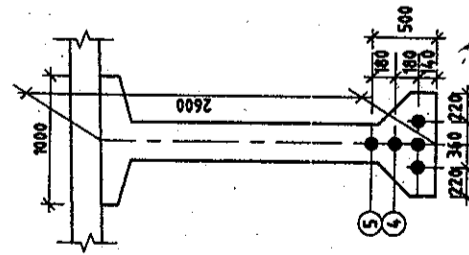
HALF SECTIONAL ELEVATION (INNER GIRDER)
(SCALE 1:50)



HALF PLAN
(SCALE 1:50)



SECTION AT SUPPORT
(SCALE 1:40)



SECTION AT MID SPAN
(SCALE 1:40)

LEGEND:-

- - INDICATES START OF CURVE IN ELEVATION
- △ - INDICATES END OF CURVE IN ELEVATION
- - INDICATES START OF CURVE IN PLAN
- ◇ - INDICATES END OF CURVE IN PLAN
- ◻ - INDICATES END OF CABLE
- - INDICATES CABLE NUMBER

APPROVED FOR EXECUTION

ISSUED

Assistant Engineer
Design (P)

Executive Engineer
Design (P)

Chief Engineer
(B)

SRINAGAR P.W.D. (B & R)

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<p>PROJECT TITLE: PREPARATION OF DETAILED PROJECT REPORT FOR UPGRADATION OF SOUTHERN BYE-PASS LUDHIANA</p>		<p>CLIENT: PUNJAB INFRASTRUCTURE DEVELOPMENT BOARD</p>		<p>CONSULTANT: SMEC INDIA PVT. LTD. SMEC (INDIA) PVT. LTD. D/F BUILDING IN C TOWER, 8th FLOOR, CHYR CITY, PHASE I, GURGAON, HARYANA, INDIA - 122002 TEL: 0124-2335542, 20100</p>	
<p>REV</p>	<p>DATE</p>	<p>DESIGN</p>	<p>CHECKED</p>	<p>APPROVED</p>	<p>DETAILS OF REVISION</p>
<p>RO</p>	<p>20/5/2009</p>	<p>RAWAT</p>	<p>VNM</p>	<p>S. SAHRI</p>	<p>FIRST ISSUE</p>
<p>DPR</p>	<p>DRW</p>	<p>DRW</p>	<p>DRW</p>	<p>DRW</p>	<p>1213/SMEC/LUDHIANA/SUP-65</p>
					<p>R0</p>



TABLE A - CABLE CO-ORDINATES

CABLE NO.	X=0		X=953		X=1905		X=2858		X=3810		X=4763		X=5715		X=6668		X=7620		X=8573		X=9525		X=10478		X=11430		X=12383		X=13335		X=14288		X=15240		X=16193		X=17145		X=18098		X=19050			
	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z	Y	Z				
1	14.0	180	14.0	180	14.0	180	14.0	180	14.0	180	14.0	180	14.0	180	14.0	180	14.0	180	14.0	180	14.0	180	14.0	178	14.0	36	14.1	0	14.7	0	16.0	0	18.0	0	20.7	0	24.1	0	27.7	0	31.4	0	35.0	0
2	14.0	-180	14.0	-180	14.0	-180	14.0	-180	14.0	-180	14.0	-180	14.0	-180	14.0	-180	14.0	-180	14.0	-180	14.0	-180	14.0	-180	14.0	-180	14.0	-0.53	14.2	0	16.3	0	21.0	0	28.2	0	38.0	0	48.7	0	59.3	0	70.0	0
3	14.0	0	14.0	0	14.0	0	14.0	0	14.0	0	14.0	0	14.0	0	14.0	0	14.0	0	14.0	0	14.0	0	14.0	0	14.3	0	16.7	0	21.6	0	29.1	0	39.1	0	51.7	0	65.0	0	78.3	0	91.7	0	105.0	0
4	320	0	320	0	320	0	320	0	320	0	320	0	320	0	320	0	320	0	323	0	341	0	376	0	427	0	494	0	578	0	679	0	795	0	916	0	1037	0	1158	0	1279	0	1400	0
5	500	0	500	0	500	0	500	0	500	0	500	0	500	0	504	0	523	0	560	0	614	0	684	0	772	0	877	0	998	0	1123	0	1249	0	1374	0	1499	0	1625	0	1750	0		

NOTES:-

- ALL DIMENSIONS ARE IN mm. UNLESS OTHERWISE SHOWN ON THE DRAWING.
- EACH PRESTRESSING TENDON IS A MULTISTRAND CABLE COMPRISING OF NUMBER OF 12.7 mm DIA 7-PLY CLASS 2 LOW RELAXATION STRANDS AS PER IS: 14268.
- THE PRESTRESSING STEEL AND ACCESSORIES SHALL BE SUBJECTED TO ACCEPTANCE TESTS PRIOR TO THEIR ACTUAL USE ON THE WORKS (GUIDANCE MAY BE TAKEN FROM BS:4447). ONLY MULTISTRAND JACKS SHALL BE USED FOR TENSIONING OF CABLES. FORCE MEASUREMENT DEVICE TO BE ATTACHED IN CONSULTATION WITH SYSTEM MANUFACTURER.
- SHEATHING SHALL HAVE 85 mm INTERNAL DIAMETER AND MANUFACTURED FROM BRIGHT METAL DUCT. IT SHALL BE TESTED AS PER IS:10-2000, APPENDIX-1A.
- THE FOLLOWING PROPERTIES OF STRANDS HAVE BEEN ASSUMED IN DESIGN:
 - (i) SECTIONAL AREA OF 1 STRAND = 98.7mm²
 - (ii) WOBBLE COEFFICIENT K = 0.00467/m
 - (iii) FRICTIONAL COEFFICIENT μ = 0.25 / RADIAN } FOR BRIGHT METAL SHEATHING.
 - (iv) MODULUS OF ELASTICITY OF STEEL (Es) OF STRAND = 195kN/MPa
 - (v) SLIP AT ANCHORAGE OF STRESSING END = 6 mm.
 - (vi) ULTIMATE TENSILE FORCE PER STRAND = 183.7 KN
- GROUTING OF TENDONS SHALL BE CARRIED OUT AS PER APPENDIX-5 OF IS:10-2000.
- CABLE LENGTH MENTIONED IN THE DRAWINGS ARE INCLUSIVE OF 100mm EXTRA LENGTH AT EACH END.
- EXTENSIONS AT EACH END INDICATED IN THE TABLE B ARE FOR PORTION OF THE CABLE LYING BETWEEN CENTER OF SPAN AND THE JACKING POINT. THESE INCLUDE ADDITIONAL EXTENSION FOR CABLE LENGTH BETWEEN JACKING POINT AND GRIPPING POINT.
- PRESTRESSING OPERATION SHALL BE CARRIED OUT SYMMETRICALLY W.R.T VERTICAL AXIS.
- IN CABLE NO 1, 19 STRANDS WILL BE PLACED AND ONLY 15 STRANDS SHALL BE STRESSED TO A JACKING OF 76.5% OF UTS. REMAINING STRANDS (DUMMY) WILL BE STRESSED ONLY WHEN REQUIRED TO MAKE UP THE DEFICIENCY IN THE WORKING TENDONS. IF NOT REQUIRED THE SAME SHALL BE TAKEN OUT AND DUCTS GROUTED.
- RECESSES FOR ANCHORAGES SHALL BE SEALED WITH NON-SHRIEK MORTAR AFTER PRESTRESSING THE TENDONS.
- END FACES OF SUPERSTRUCTURE TO BE COATED WITH 2 COATS OF EPOXY.

- THE PRESTRESSING WORK SHALL BE CARRIED OUT BY FREYSSINET SYSTEM OR ANY OTHER EQUIVALENT APPROVED SYSTEM AFTER CARRYING OUT NECESSARY MODIFICATIONS IN THE DRAWINGS WITH THE APPROVAL OF ENGINEER-IN-CHARGE ENSURING THEREBY THE SPECIFIED PRESTRESSING FORCE WITH ITS ECCENTRICITY OVER THE LENGTH OF THE MEMBER AND THE MAGNITUDE OF THE FINAL EFFECTIVE FORCE AS PRESCRIBED IN THE APPROVED DESIGN AND DRAWINGS. ALL PRESTRESSING AND GROUTING WORK BE UNDERTAKEN BY TRAINED PERSONNEL ONLY. A REPRESENTATIVE OF THE SUPPLIER OF THE PRESTRESSING SYSTEM SHALL BE PRESENT DURING ALL TENSIONING AND GROUTING OPERATIONS AND SHALL ENSURE, MONITOR AND CERTIFY THEIR CORRECTNESS.
- ALL CABLES SHALL BE LAID IN SMOOTH PROFILE THROUGH THE GIVEN COORDINATES. ALL CABLE SHALL BE SUPPORTED AT A SPACING NOT EXCEEDING 1000mm C/C BY A 16mm DIA CROSS BAR TACK WELDED/SECURELY HELD IN POSITION WITH VERTICAL WEB REINFORCEMENT.
- INITIAL SLACK IN CABLES SHALL FIRST BE REMOVED BY APPLYING A SMALL INITIAL TENSION. THE INITIAL TENSION REQUIRED TO REMOVE SLACK, SHALL BE TAKEN AS THE STARTING POINT OF MEASURING THE ELONGATION AND CORRECTION SHALL BE APPLIED AS PER CLAUSE 12.2.1.3 OF IS:1343-1980.
- ELONGATION OF CABLES SHALL BE RECHECKED AFTER 24HOURS OF ANCHORAGE TO OBSERVE SLOW SLIPPAGE. IF ANY AND THE MATTER SHALL BE REPORTED TO ENGINEER-IN-CHARGE.
- EXTRA LENGTH OF STRANDS BEYOND THE ANCHORAGE SHALL NOT BE CUT JUST AFTER THE STRESSING. THESE SHALL BE CUT ONLY WHEN, INSTRUCTIONS FOR GROUTING ARE ISSUED BY ENGINEER-IN-CHARGE.
- STRANDS SHALL NOT BE CUT WITH GAS FLAME.

SPECIAL NOTES FOR PRESTRESSING

- PRESTRESSING STAGE-1
 (A) ALL THE STRANDS IN CABLE NOS 1, 2, 3, 4 SHALL BE STRESSED IN FIRST STAGE PRESTRESSING WHEN THE SECTION IS 14 DAYS OLD AND THE CONCRETE HAS ATTAINED A MINIMUM STRENGTH OF 39 MPa
 SEQUENCE OF CONSTRUCTION SHALL BE AS FOLLOWED:-
 (B) CASTING OF DECK SLAB SHALL BE DONE 28 DAYS AFTER THE CASTING OF GIRDER.
 (C) PRESTRESSING STAGE-2
 CABLES SHALL BE STRESSED AFTER THE CASTING OF DECK SLAB.
 IF SPECIFIED EXTENSION IS ACHIEVED BEFORE SPECIFIED JACKING FORCE IS APPLIED, CONTINUE TENSIONING TILL ATTAINING GIVEN JACKING FORCE PROVIDED, THAT THE EXTENSION DOES NOT EXCEED 1.05 TIMES THE CALCULATED EXTENSION. IF 1.05 TIMES THE CALCULATED EXTENSION IS ACHIEVED BEFORE GIVEN JACKING FORCE IS APPLIED STOP STRESSING AND INFORM THE ENGINEER.

REFERENCE DRAWINGS:-

- 1213/SMEC/LUDHIANA/20-198/G-01 (SHEET 1 OF 7 TO 7 OF 7)
- 1213/SMEC/LUDHIANA/21-198/G-01 (SHEET 1 OF 7 TO 7 OF 7)
- 1213/SMEC/LUDHIANA/22-005/G-01 (SHEET 1 OF 6 TO 6 OF 6)
- 1213/SMEC/LUDHIANA/24-086/G-01 (SHEET 1 OF 10 TO 10 OF 10)
- 1213/SMEC/LUDHIANA/SUP-63
- 1213/SMEC/LUDHIANA/SUP-65 (SHEET 1 OF 2)

TABLE B - CABLE LENGTH AND ELONGATION

CABLE NO.	NO. OF STRANDS IN CABLE	JACKING FORCE (t)	TOTAL LENGTH OF CABLE IN (mm)	THEORETICAL ELONGATION AT JACKING END (mm)	ANGLE (°) (JACKING END)
1	15	210.80	40728	124.62	2.19°
2	18	252.96	40772	140.19	6.39°
3	18	252.96	40202	130.58	7.97°
4	18	252.96	40209	131.30	7.24°
5	18	252.96	40234	131.54	7.50°

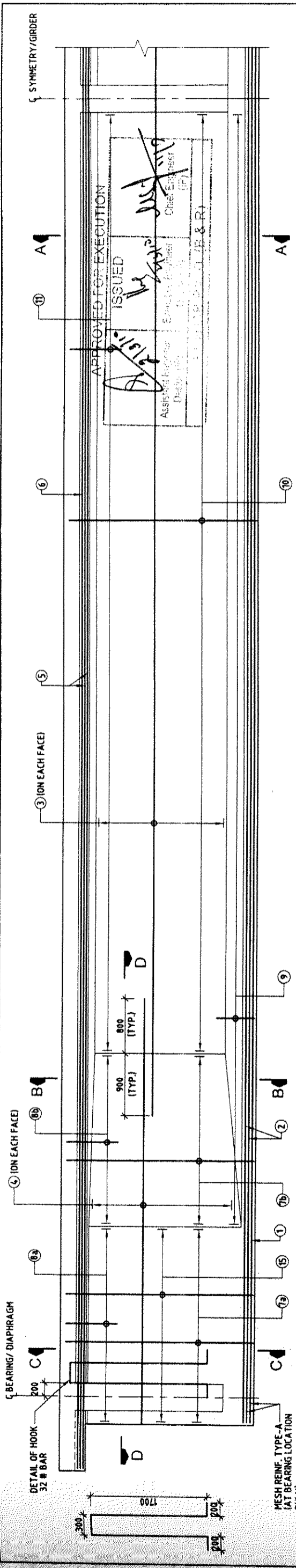
- IF SPECIFIED EXTENSION HAS NOT BEEN REACHED CONTINUE TENSIONING UNTIL THE CALCULATED EXTENSION IS REACHED PROVIDED APPLIED FORCE DOES NOT EXCEED 76.5% OF ULTIMATE TENSILE FORCE VALUE (2670KN FOR 19 T 13 CABLE).
- IF THE EXTENSION AT JACKING FORCE OF 76.5% UTS VALUE (2670KN FOR 19 T 13 CABLE) IS LESS THAN 0.95 TIMES THE CALCULATED EXTENSION STOP STRESSING AND INFORM THE ENGINEER FOR FURTHER INSTRUCTIONS.
- CABLE EXTENSIONS GIVEN IN THE DRAWING SHALL BE MODIFIED AT SITE IN CASE ACTUAL VALUE OF (Es) AS PER TEST CERTIFICATES IS DIFFERENT THAN THAT ASSUMED IN DESIGN VALUE BY MULTIPLYING IT WITH A FACTOR, $\left(\frac{1.95 \times 10^5}{\text{ACTUAL VALUE OF } E_s} \right)$

APPROVED FOR EXECUTION

ISSUED
 Assistant Engineer
 District Engineer
 Ludhiana (P)
 1213/SMEC/LUDHIANA/SUP-65 (SHEET 2 OF 2)

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PIDB PUBLIC INFRASTRUCTURE DEVELOPMENT BOARD			CONSULTANT: SMC INDIA SMC INDIA PVT. LTD. 6/F BUILDING IN L.C. TOWER, 9th FLOOR, CYBER CITY PHASE I GURGAON, HARYANA, INDIA - 122 002 Tel: 0124-695642, 691100			PROJECT TITLE: PREPARATION OF DETAILED PROJECT REPORT FOR UPGRADATION OF SOUTHERN BAY-PASS LUDHIANA			CLIENT: PREPAREDATION OF DETAILED PROJECT REPORT FOR UPGRADATION OF SOUTHERN BAY-PASS LUDHIANA			SCALE: AS SHOWN			SHEET SIZE: A2			APPROVED FOR EXECUTION			DETAILED PROJECT REPORT DETAILS OF PRESTRESSING CABLES LONGITUDINAL PSC GIRDER 37.8m EFFECTIVE SPAN (INNER GIRDER) (SHEET 2 OF 2)		
REV	DATE	DESIGN	CHECKED	APPROVED	DETAILS OF REVISION																		
RO	21/5/2009	RAWAT	PKK	VNM	S LAHIRI																		
					FIRST ISSUE																		
					DETAILS OF REVISION																		

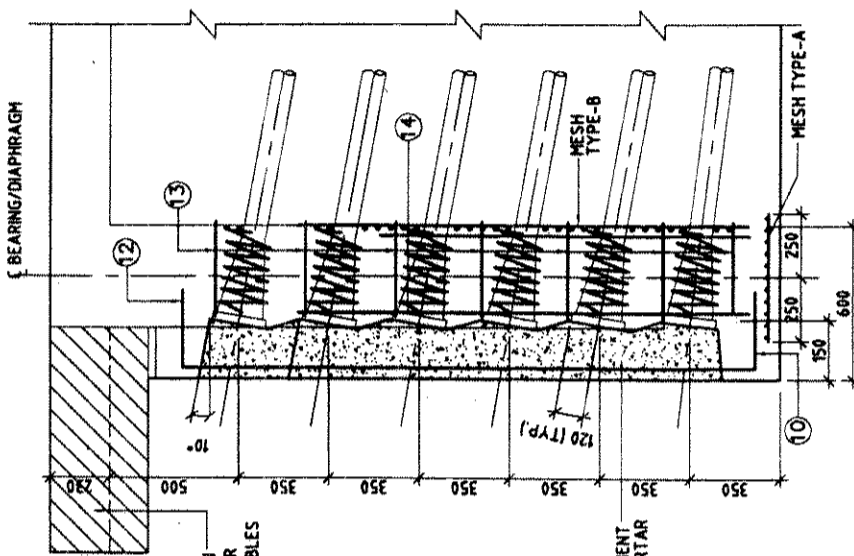


LONGITUDINAL SECTIONAL OF GIRGER
(SCALE 1:40)

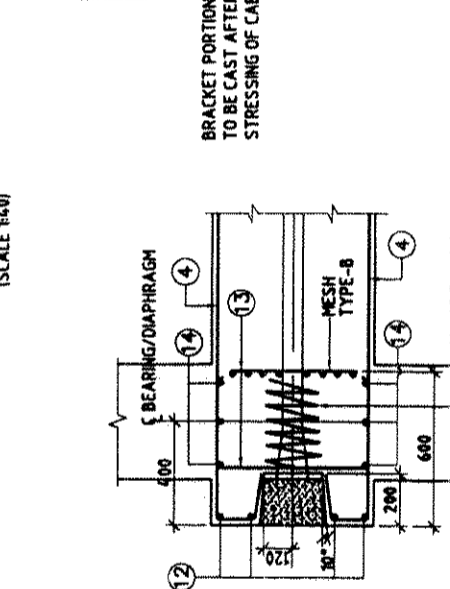
REINFORCEMENT DETAILS:

BAR MKD.	DIA (mm)	SPACING/Nos.	SHAPE
1	12	6 Nos.	
2	12	2 Nos.	
3	12	13 Nos.	
4	12	13 Nos.	
5	12	2 Nos.	
6	12	6 Nos.	
7a	12	150 c/c	□
7b	12	200 c/c	□
8a	12	125 c/c	⊗
8b	12	125 c/c	⊗
9	12	200 c/c	⊗
10	10	200 c/c	⊗
11	12	200 c/c	⊗
12	10	4 Nos.	⊗ 300(TYP.)
13	10	6 Nos.	⊗
14	10	6 Nos.	⊗
15	10	150 c/c	⊗

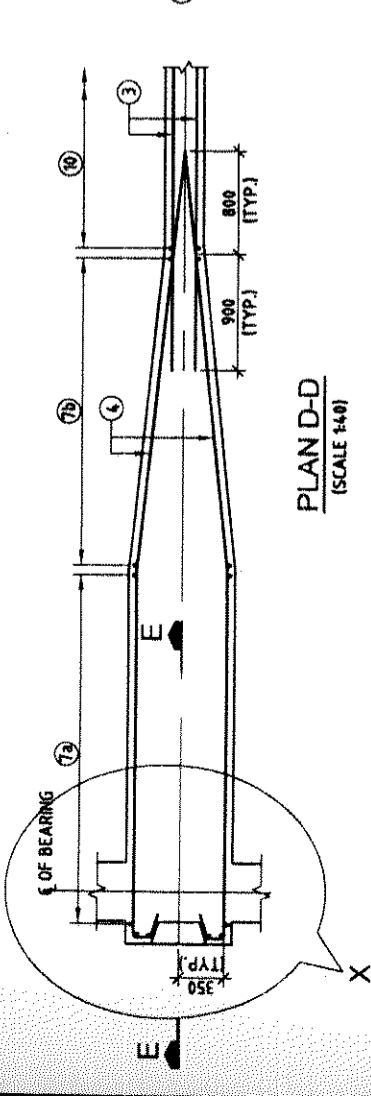
- NOTES**
- ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED. NO DIMENSION IS TO BE SCALED.
 - CONCRETE SHALL BE DESIGN MIX AND SHALL HAVE MINIMUM 28 DAYS CHARACTERISTIC STRENGTH ON 150mm CUBES AS 45 MPa.
 - TMT HIGH YIELD STRENGTH DEFORMED BARS OF GRADE DESIGNATION Fe-415 CONFORMING TO IS:1786 SHALL ONLY BE USED.
 - CLEAR COVER TO OUTER MOST STEEL SHALL BE 40mm.
 - MINIMUM BOND LENGTH FOR REINFORCEMENT BAR SHALL BE 72 x DIA OF BAR.
 - MINIMUM LAP LENGTH FOR REINFORCEMENT BAR SHALL BE 50x OF BARS SHALL BE LAPPED AT ANY ONE SECTION.
- REFERENCE DRAWINGS:-**
- (i) 1213/SM/EC/LUDHIANA/SUP-63
 - (ii) 1213/SM/EC/LUDHIANA/SUP-64 (SHEET 1 OF 2 & 2 OF 2)
 - (iii) 1213/SM/EC/LUDHIANA/SUP-65 (SHEET 1 OF 2 & 2 OF 2)



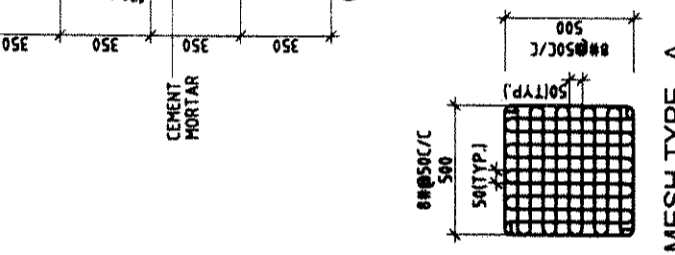
SECTION AT E-E
(SCALE 1:20)



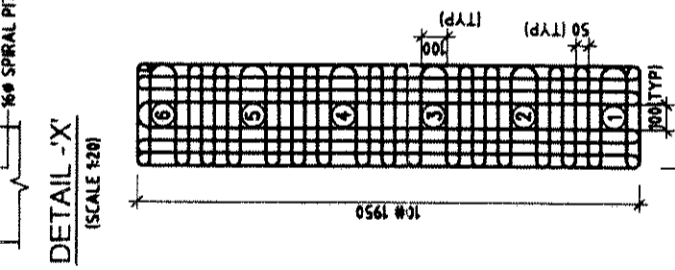
DETAIL -X'
(SCALE 1:20)



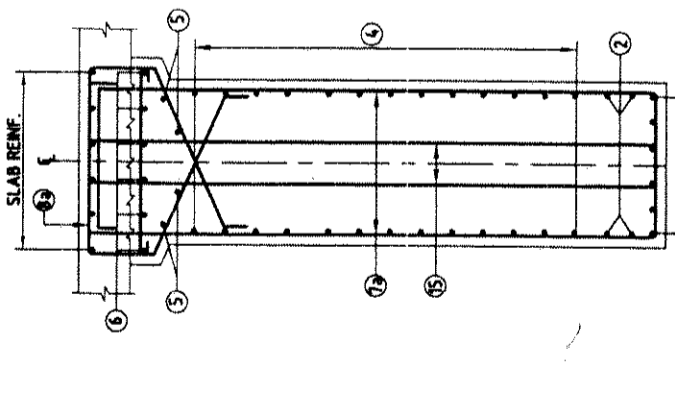
PLAN D-D
(SCALE 1:40)



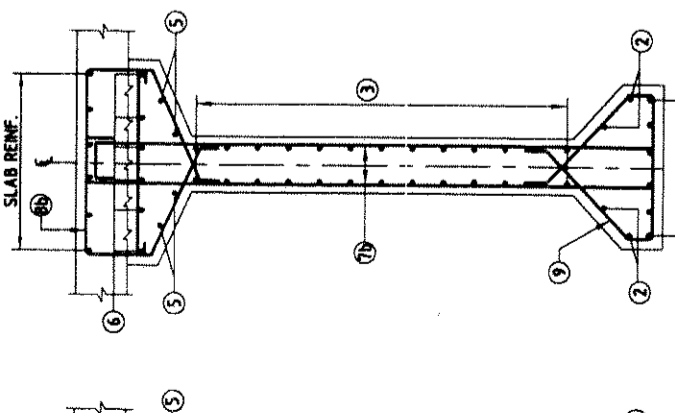
MESH TYPE - A
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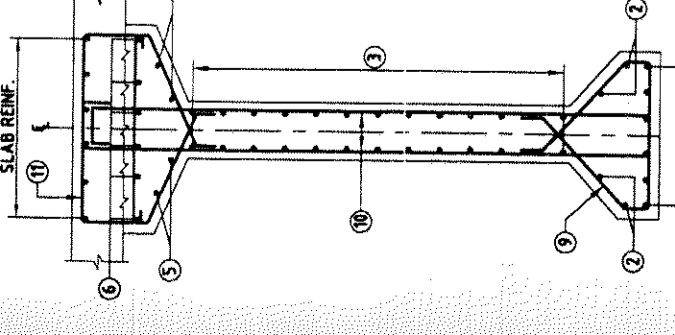
MESH TYPE - B
(SCALE 1:20)



SECTION C-C
(SCALE 1:25)



SECTION B-B
(SCALE 1:25)



SECTION A-A
(SCALE 1:25)

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CLIENT: PWD, RAJASTHAN

CONSULTANT: SMEC INDIA PVT. LTD.
SMEC (INDIA) PVT. LTD.
D/F BUILDING No. 1 C TOWER, 5th FLOOR,
CHANDI CHAUN, PHASE I, GATEWAY
TOWNSHIP, GATEWAY, GATEWAY,
INDIA - 380015

PROJECT TITLE: PREPARATION OF DETAILED PROJECT REPORT FOR UPGRADEATION OF SOUTHERN BYE-PASS LUDHIANA

REVISIONS:

REV	DATE	DESIGN	CHECKED	APPROVED	DETAILS OF REVISION
1	16/2/2009	RAVAT	PCK	VNM	FIRST ISSUE
2				SAHRI	

SCALE: AS SHOWN

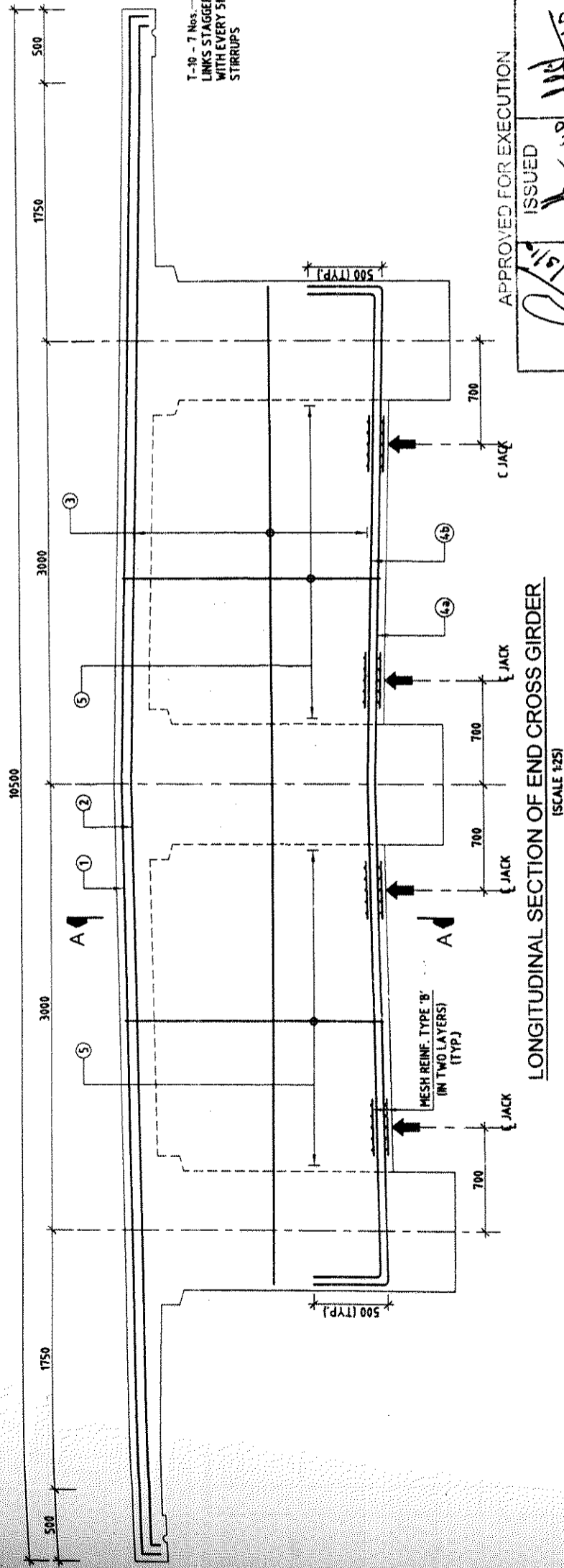
SHEET SIZE: A2

DPR: DRW

DETAILED PROJECT REPORT FOR LONGITUDINAL PSC GIRDERS (37.8m EFFECTIVE SPAN)

1213/SM/EC/LUDHIANA/SUP-66





APPROVED FOR EXECUTION

ISSUED

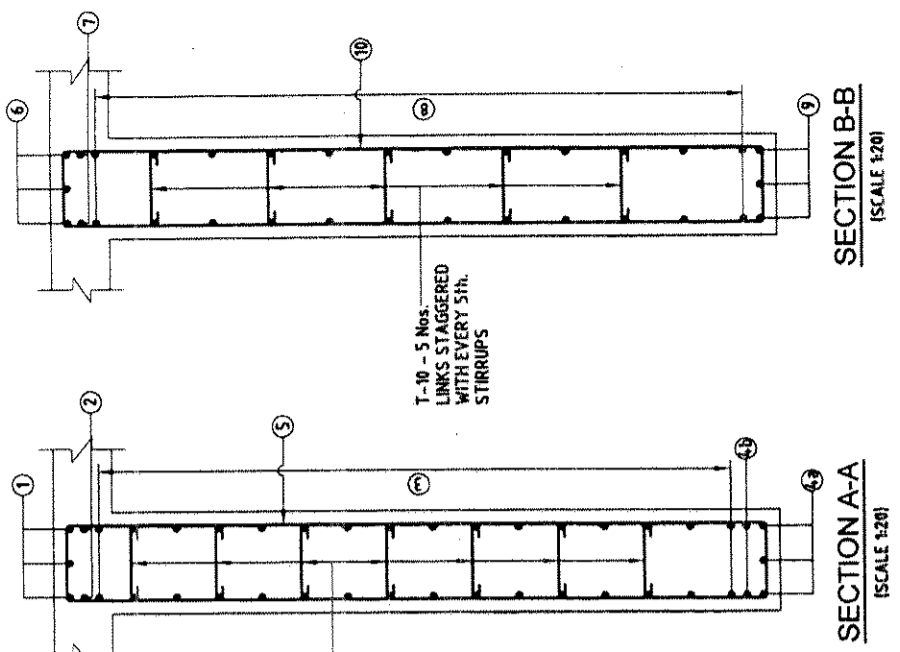
Assistant Engineer
Design

Chief Engineer
Design

Chief Engineer
Design

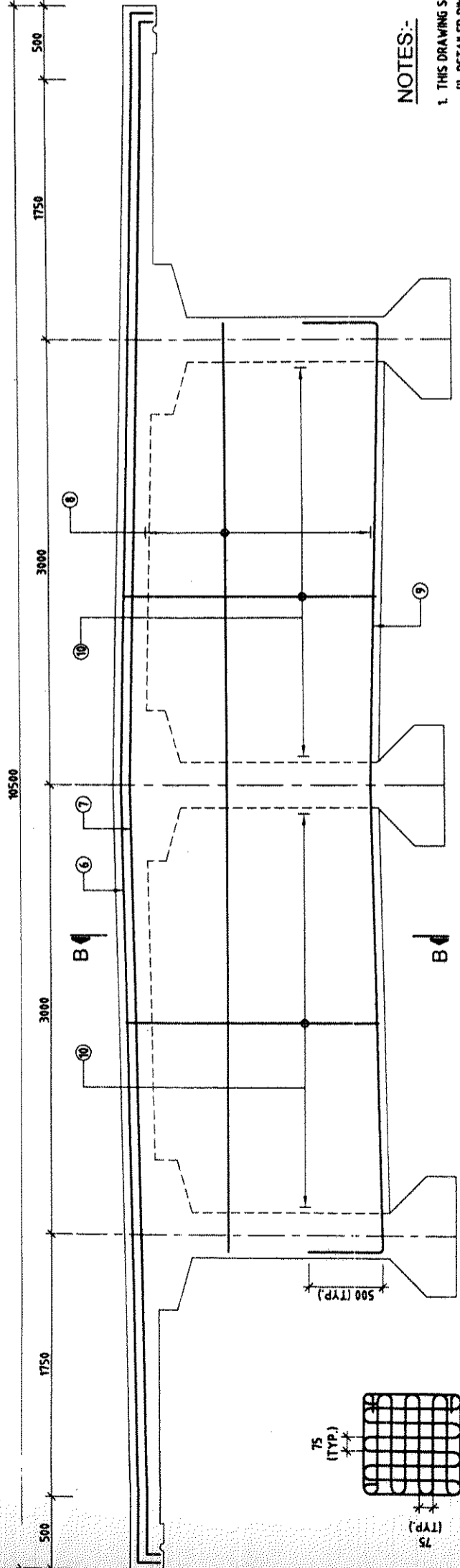
DR. RAJESH KUMAR (B & R)

LONGITUDINAL SECTION OF END CROSS GIRDER
(SCALE 1:25)

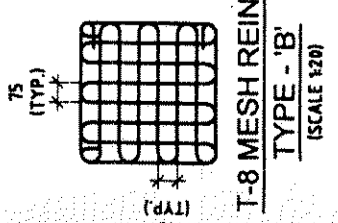


SECTION A-A
(SCALE 1:20)

SECTION B-B
(SCALE 1:20)



LONGITUDINAL SECTION OF INTERMEDIATE CROSS GIRDER
(SCALE 1:25)



REINFORCEMENT DETAIL:

BAR MKD.	DIA (mm)	SPACING/Nos.	SHAPE
1	25	3 Nos.	[Diagram]
2	20	2 Nos.	[Diagram]
3	12	16 Nos.	[Diagram]
4a	25	3 Nos.	[Diagram]
4b	20	2 Nos.	[Diagram]
5	12	100	[Diagram]
6	25	3 Nos.	[Diagram]
7	25	2 Nos.	[Diagram]
8	12	12 Nos.	[Diagram]
9	25	3 Nos.	[Diagram]
10	12	200	[Diagram]

NOTES:-

- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE FOLLOWING DRAWING.
- DETAILED DIMENSION FOR LONGITUDINAL PSC I GRIDERS DRG. No.-1213/SMEC/LUDHIANA/SUP-63

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CLIENT: PUNJAB INFRASTRUCTURE DEVELOPMENT BOARD

CONSULTANT: SMEC INDIA PVT. LTD.
SMEC INDIA PVT. LTD.
DLF BUILDING No. 4, C TOWER, 28 FLOOR,
CYBER CITY, PHASE-II, GURGAON,
HARYANA, INDIA - 122 002
TEL: 91-11-4360042, 4361100

PROJECT TITLE: PREPARATION OF DETAILED PROJECT REPORT FOR UPGRADATION OF SOUTHERN BYE-PASS LUDHIANA

REVISIONS:

REV	DATE	DRAWN	DESIGN	CHECKED	APPROVED	DETAILS OF REVISION
R0	01/02/2009	RAYVAT	PCK	VNM	S LAHIRI	FIRST ISSUE

SCALE: AS SHOWN

SHEET SIZE: A2

DPR DRW

1213/SMEC/LUDHIANA/SUP-67

R0

DETAILED PROJECT REPORT
DETAILS OF CROSS GIRDER
(37.8m EFFECTIVE SPAN)

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED. NO DIMENSION IS TO BE SCALED.
2. CONCRETE SHALL BE DESIGN MIX AND SHALL HAVE MINIMUM 28 DAYS CHARACTERISTIC STRENGTH ON 150mm CUBES AS f_{ck} MPa.
3. TMT HIGH YIELD STRENGTH DEFORMED BARS OF GRADE DESIGNATION Fe-415 CONFORMING TO IS:1786 SHALL ONLY BE USED.
4. CLEAR COVER TO OUTER MOST STEEL SHALL BE 40mm.
5. MINIMUM BOND LENGTH SHALL BE $56 \times$ DIA OF BAR.
6. MINIMUM LENGTH FOR REINFORCEMENT BAR SHALL BE $72 \times$ DIA OF BAR. LAPS SHALL BE STAGGERED AND NOT MORE THAN 50% OF BARS SHALL BE LAPPED AT ANY ONE SECTION.
7. THE STEEL OF ANTI CRASH RAILING SHALL BE EMBEDDED IN DECK SLAB.

REFERENCE DRAWINGS:-

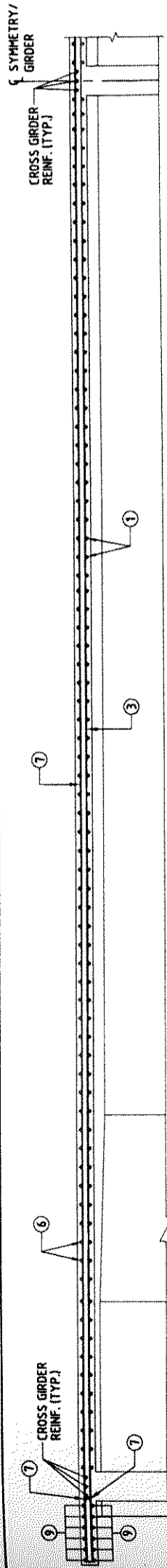
1) 1213/SMEC/LUDHIANA/SUP-63

REINFORCEMENT DETAILS:

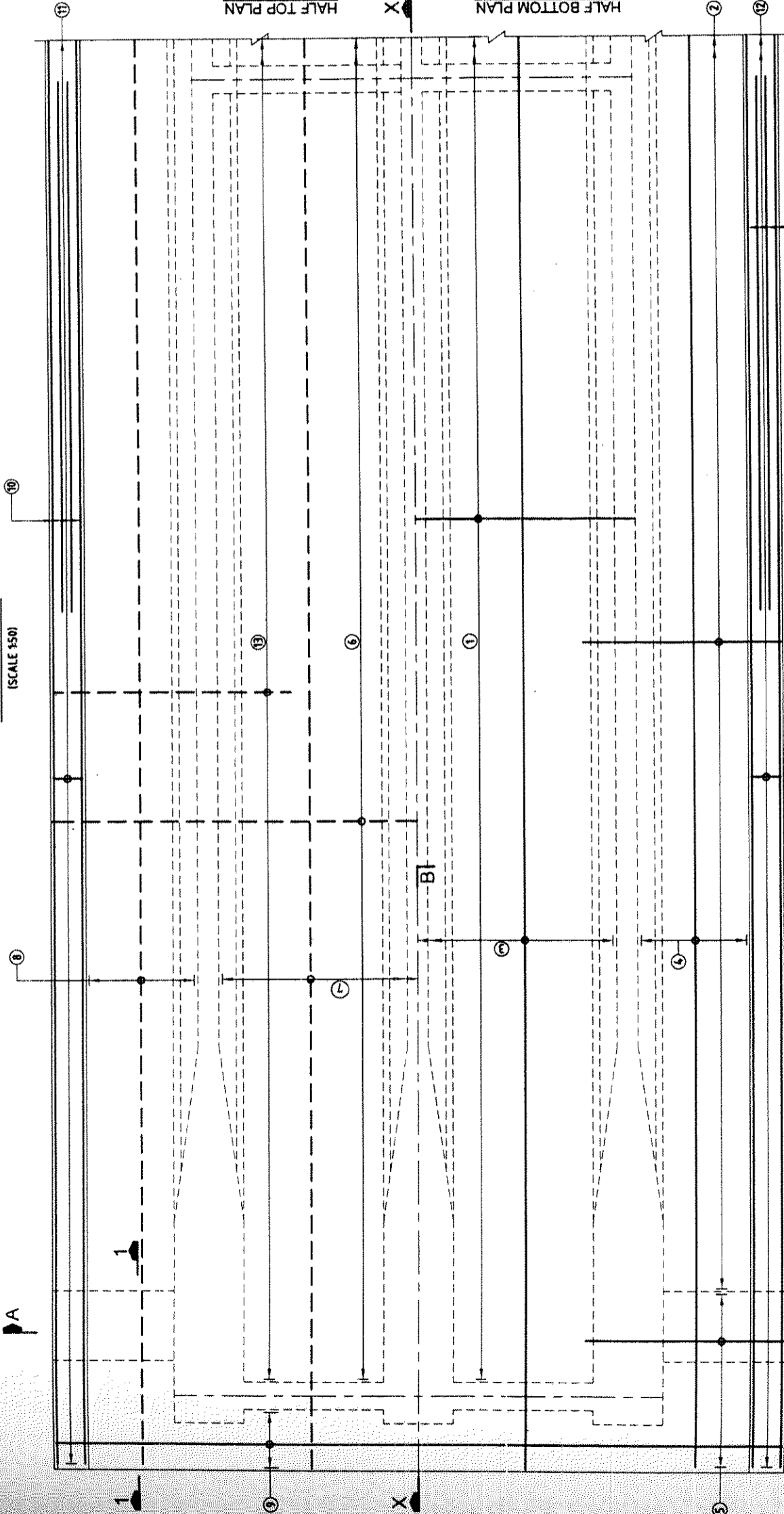
BAR MKD.	DIA (mm)	SPACING/Nos.	SHAPE
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2	12	200	—
3	10	150	—
4	10	150	—
5	12	200	—
6	16	125	—
7	10	150	—
8	10	150	—
9	12	12 Nos.	—
10	16	4 Nos.	—
11	16	4 Nos.	—
12	12	150	—
13	12	125	—

LEGENDS:
 --- BAR ON TOP FACE
 --- BAR ON BOTTOM FACE

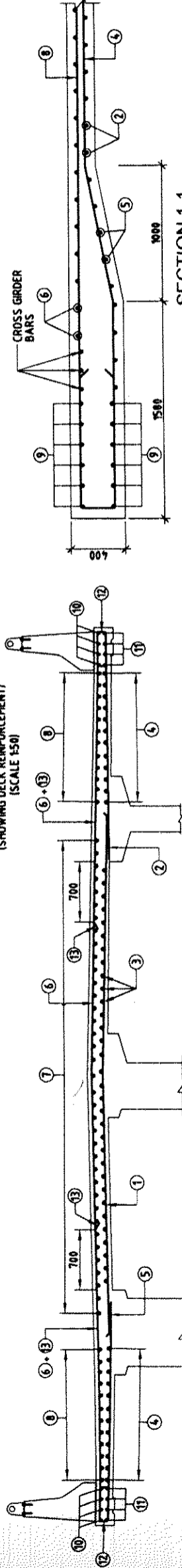
APPROVED FOR EXECUTION
 ISSUED
 [Signature]
 ASSISTANT ENGINEER
 CIVIL ENGINEERING
 [Signature]
 SUPERVISOR
 CIVIL ENGINEERING
 [Signature]



SECTION X-X
(SCALE 1:50)



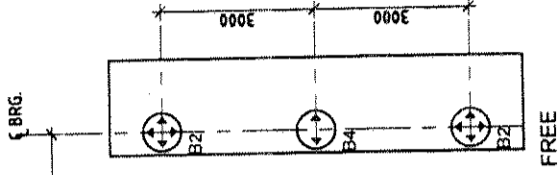
PLAN
(SHOWING DECK REINFORCEMENT)
(SCALE 1:50)



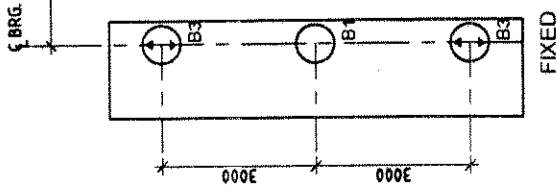
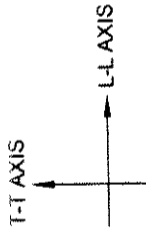
SECTION 1-1
(SCALE 1:25)

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CLIENT:	PIDB PUNJAB INFRASTRUCTURE DEVELOPMENT BOARD	CONSULTANT:	SMEC SMEC (INDIA) PVT. LTD. D/F BALKRISHNA, PHASE I (13TH FLOOR), CHANDER NAGAR, INDIA 121002 Tel: 9124-200042, 401100	PROJECT TITLE:	PREPARATION OF DETAILED PROJECT REPORT FOR UPGRADATION OF SOUTHERN BYE-PASS LUDHIANA	REV	DATE	DRAWN	DESIGN	CHECKED	APPROVED	DETAILS OF REVISION
SCALE:	AS SHOWN	SHEET SIZE:	A2	DPR	DRW							
<p>PREPARATION OF DETAILED PROJECT REPORT FOR LONGITUDINAL PSC GIRDERS (37.8m EFFECTIVE SPAN)</p>												
<p>1213/SMEC/LUDHIANA/SUP-68 R0</p>												



37800 C/C BRG.



PLAN SHOWING TYPE AND LOCATION OF BEARINGS
(SCALE 1:100)

NOTES:-

1. MATERIAL SPECIFICATIONS, DESIGN OF BEARINGS, ACCEPTANCE CRITERIA AND INSTALLATION METHOD SHALL BE IN ACCORDANCE WITH IRC-83 (PART III-2002 AND MORTH SPECIFICATIONS (FOURTH REVISIONS) 2001.
2. AS THE BRIDGE IS LOCATED IN THE REGION WHERE SUB ZERO CONDITION MAY OCCUR MILD STEEL GRADE C AS PER IS : 2062 SHALL BE USED FOR MANUFACTURE OF STEEL COMPONENTS OF BEARINGS.
3. SPECIAL GRADE OF LOW TEMPERATURE RESISTANT ELASTOMER IN CONFORMITY WITH OPERATING AMBIENT TEMPERATURE CONDITION WILL BE USED SINCE THE BRIDGE IS LOCATED IN AN EXTREME COLD CLIMATES AREA. MATERIALS AND THE CORRESPONDING TESTS FOR ELASTOMER SHALL BE FURNISHED BY THE CONTRACTOR FOR APPROVAL OF THE ENGINEER. BEFORE USING IN MANUFACTURE OF BEARINGS.
4. BEARINGS SHALL BE OBTAINED FROM MANUFACTURERS APPROVED BY MORTH.
5. INSTALLATION OF BEARINGS SHALL BE UNDER THE SUPERVISION OF REPRESENTATIVE OF THE MANUFACTURER.
6. FOR DESIGN LOADS AND ROTATIONS REFER TABLE IN THE DRAWING.
7. FOR BEARINGS, DETAILED SHOP DRAWINGS SHALL BE PREPARED BY THE SUPPLIER AND BE DULY APPROVED BEFORE MANUFACTURE AND INSTALLATION.
8. THE GROUT/BEDDING MORTAR SHALL BE HIGH STRENGTH FREE FLOWING NON SHRINK GROUT (80 MPa STRENGTH)
9. ALL BEARING SHALL BE PLACED IN TRULY HORIZONTAL PLANE ONLY.
10. FOR DESIGN OF POT BEARINGS, THE DESIGN HORIZONTAL FORCE SHALL, IN NO CASE BE LESS THAN 10% OF DESIGN VERTICAL LOAD.
11. A MINIMUM TROUBLE FREE WARRANTY OF 10 YEARS AFTER OPENING OF THE BRIDGE/FLYOVER TO THE TRAFFIC SHALL BE FURNISHED BY CONTRACTOR AND SUPPLIER OF BEARINGS.

REFERENCE DRAWINGS:-

- i) 1213/SPEC/LUDHIANA/2-025/G-91 (SHEET 1 OF 7 TO 7 OF 7)
- ii) 1213/SPEC/LUDHIANA/SUP-63

APPROVED FOR EXECUTION

Assistant Engineer Design (P)	Executive Engineer Design (P)	Chief Engineer (P)
PUNJAB P.W.D. (B & R)		

DESIGN LOADS FOR POT-POT/PTFE BEARINGS

BRG. TYPE	SHOWN THUS	MAXIMUM VERTICAL REACTION (t)	HORIZONTAL LOAD/BRG. (t)		LONGITUDINAL MOVEMENT mm	TRANSVERSE MOVEMENT mm	ROTATION °	REMARKS
			LONGITUDINAL NORMAL	TRANSVERSE SEISMIC				
B1		183.9	11.01	44.76	-	-	0.01	FIXED
B2		183.9	-	-	25.0	10.0	0.01	ALLOWING MOVEMENT IN ALL DIRECTIONS
B3		183.9	11.01	44.76	-	10.0	0.01	ALLOWING MOVEMENT IN T-T AXIS ONLY
B4		183.9	-	-	25.0	15.0	0.01	ALLOWING MOVEMENT IN L-L AXIS ONLY

THE DRAWING HAS NOT BEEN PUBLISHED AND IS THE SOLE PROPERTY OF SMEC INDIA PVT. LTD. AND IS ISSUED TO THE PARTY FOR THE SPECIFIC PURPOSE AS STATED IN THE AGREEMENT AND IT SHALL NOT BE REPRODUCED, COPIED, LENT OR OTHERWISE DISPOSED OFF DIRECTLY OR INDIRECTLY, NOR USED FOR ANY OTHER PURPOSE OTHER THAN FOR WHICH IT IS FURNISHED.

 PIDB PUNJAB INFRASTRUCTURE DEVELOPMENT BOARD		 SMEC SMEC (INDIA) PVT. LTD. 07 BUILDING NO. 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, 100 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000		PREPARATION OF DETAILED PROJECT REPORT FOR UPGRADATION OF SOUTHERN BYPASS LUDHIANA		SCALE: AS SHOWN SHEET SIZE: A2 FIRST ISSUE DETAILS OF REVISION		DETAILED PROJECT REPORT (FINAL) DETAILS OF POT/PTFE BEARINGS (37.8m EFFECTIVE SPAN)		CLIENT: PUNJAB INFRASTRUCTURE DEVELOPMENT BOARD	CONSULTANT: SMEC INDIA PVT. LTD.	PROJECT TITLE: PREPARATION OF DETAILED PROJECT REPORT FOR UPGRADATION OF SOUTHERN BYPASS LUDHIANA	APPROVED: S. L. HIRI Chief Engineer	CHECKED: V. M. S. HIRI Executive Engineer	DESIGN: P. K. S. HIRI Assistant Engineer	DRAWN: M. K. S. HIRI Assistant Engineer	DATE: 15/06/2008	REV: R0	DPR	DRW	1213/SMEC/LUDHIANA/SUP-69	R0
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