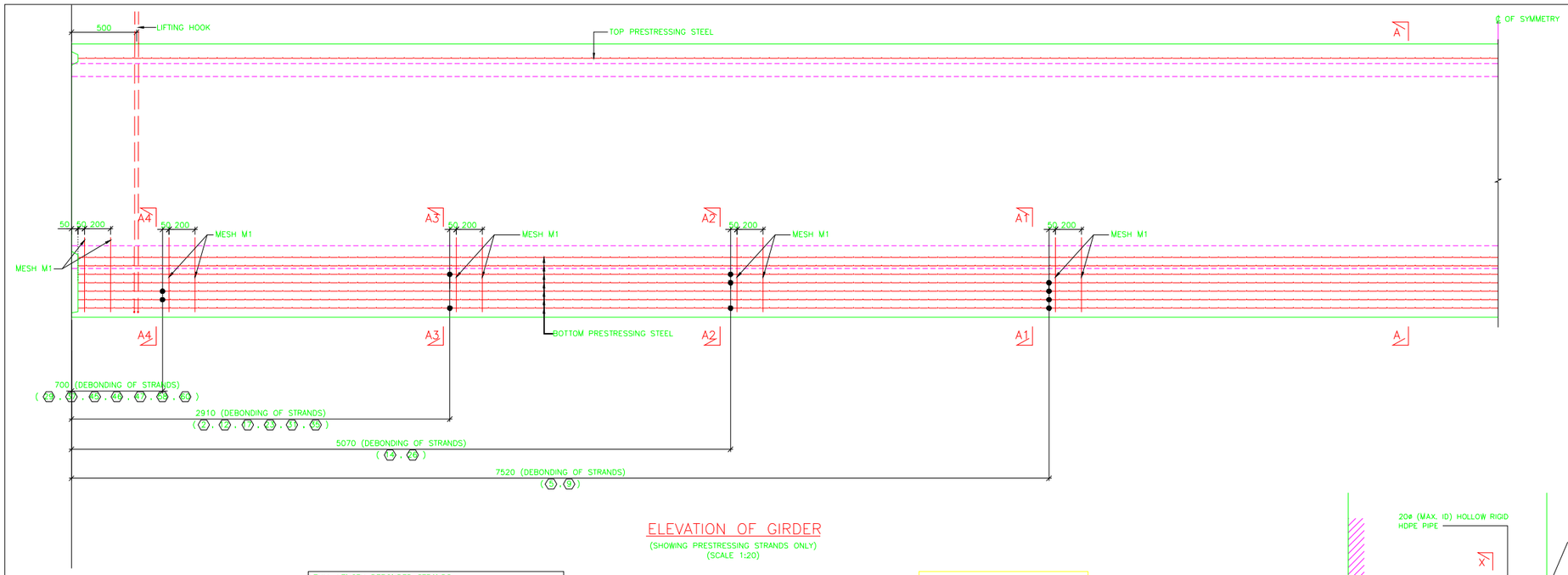


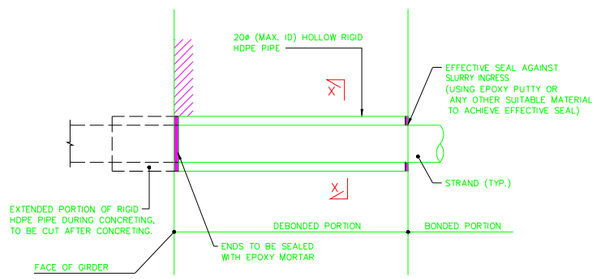
ELEVATION OF GIRDER

(SHOWING PRESTRESSING STRANDS ONLY)
(SCALE 1:20)

FULL LENGTH DEBONDED STRANDS.

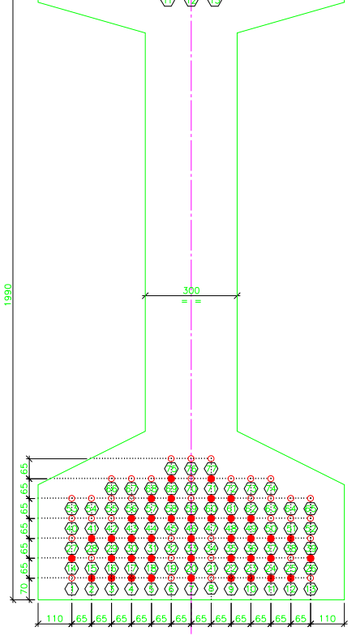
(72 , 1 , 6 , 6 , 13 , 13 , 13 , 23 , 23 , 23 , 33)
(43 , 53 , 10 , 41 , 42 , 43 , 51 , 52 , 53 , 63)
(63 , 63 , 72 , 73 , 73 , 73 , 63 , 63 , 63 , 73 , 73)
(73 , 73)

TOTAL ACTIVE STRANDS	= 42
TOTAL INACTIVE STRANDS	= 38
TOTAL STRANDS	= 80



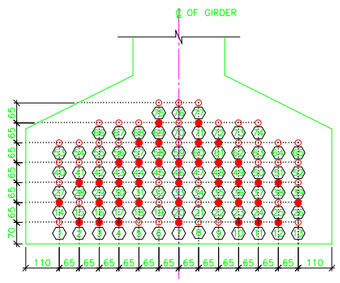
DETAIL OF DEBONDED STRAND

(SCALE 1:10)



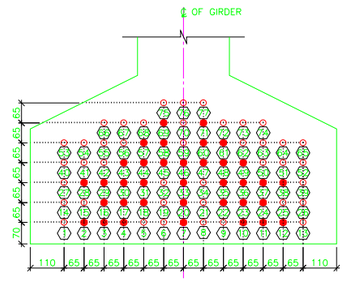
SECTION A–A

(SCALE 1:10)



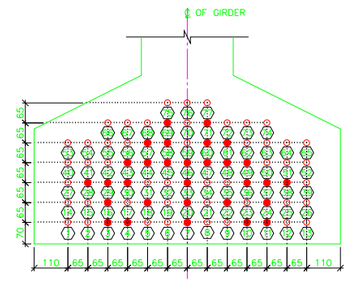
SECTION A1–A1

(SCALE 1:10)



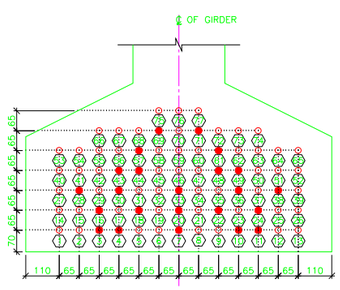
SECTION A2–A2

(SCALE 1:10)



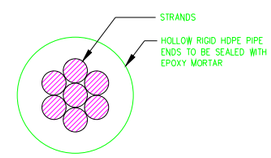
SECTION A3–A3

(SCALE 1:10)



SECTION A4–A4

(SCALE 1:10)



SECTION X–X

(SCALE 1:5)

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS, UNLESS OTHERWISE MENTIONED.
2. THIS DRAWING SHALL NOT BE SCALED, ONLY WRITTEN DIMENSIONS SHOULD BE FOLLOWED.
3. MATERIALS:
   (a) CONCRETE : GRADE OF CONCRETE IN PSC GIRDER = M60
   (b) PRESTRESSING STEEL
   - PRESTRESSING STEEL SHALL BE STRESS RELIEVED LOW RELAXATION CLASS II STRANDS CONFIRMING TO IS: 14268 WITH MINIMUM ULTIMATE STRENGTH OF 1862 Mpa.
   - NOMINAL DIA OF STRANDS SHALL BE 15.2mm 7 PLY WITH A CROSS SECTION AREA OF 140sqmm.
   - MODULUS OF ELASTICITY = 1.95×10^6 Mpa.
   - JACKING FORCE FOR EACH STRAND SHALL BE 195.510 kN 7 PLY WITH A CROSS SECTION AREA OF 140sqmm.
4. DEBONDING OF STRANDS SHALL BE DONE WITH 20mm DIA HOLLOW RIGID HDPE PIPE.
5. MINIMUM CLEAR COVER TO PRESTRESSING STEEL SHALL BE 35mm.
6. ALL PRECAUTION ARE TO BE TAKEN AS PER IRC–SP–71–2018 & IRC CBC–1997 DURING CASTING & ERECTION.
7. PRESTRESS SHALL BE RELEASED SYMMETRICAL TO VERTICAL AXIS OF GIRDER.
8. ADJUSTMENT FOR ACTUAL AREA & MODULUS OF ELASTICITY SHALL BE DONE AS PER STANDARD PRACTICE.
9. CONSTRUCTION:
   (a) THE GIRDER SHALL BE CAST IN ONE CONCRETING OPERATION WITHOUT ANY CONSTRUCTION JOINT.
   (b) OPERATION TO BE FOLLOWED DURING CASTING OF GIRDER:
      i) PLACE UNTENSIONED REINFORCEMENT CAGE (PRE–FORMED).
      ii) INSERT THE PRE–STRESSING STRANDS THROUGH THE REINFORCEMENT CAGE.
      iii) PRE–TENSION THE STRAND.
      iv) PLACE THE MOULDS AFTER APPLYING THE MOULD RELEASE AGENT.
      v) POUR THE CONCRETE & COMPACT AS PER THE STANDARD & ACCEPTED PRACTICE.
      vi) RELEASE THE STRANDS BY RELEASING THE HYDRAULIC JACKS MINIMUM CONCRETE STRENGTH AT TRANSFER SHALL BE 45MPa & MINIMUM AGE OF CONCRETE IS 8 DAYS, WHICHEVER IS LATER.
      vii) REMOVE THE MOULDS & LIFT THE BEAMS FROM SPECIFIC LIFTING POINTS & SHIFT IT TO THE STACKING YARD.
   (c) SUDDEN CUTTING OF STRANDS PROHIBITED THIS OPERATION SHALL BE DONE CAREFULLY & GRADUALLY.
   (d) COMPACTION OF CONCRETE AT GIRDER ENDS (WHERE REINFORCEMENT IS CONGESTED) IS TO BE DONE CAREFULLY.
   (e) THE END SURFACES OF GIRDERS SHALL BE HACKED TO REMOVE LAITANCE BEFORE ERECTION.
   (f) SLAB & DIAPHRAGM TO BE CASTED ON 21st DAY OF CONCRETING OF I–GIRDER
   (g) SIDL CAN BE APPLIED WHEN 100% OF STRENGTH OF DECK SLAB IS ACHIEVED OR AFTER 28 DAYS OF CONCRETING OF DECK SLAB WHICHEVER IS LATER.
10. ELONGATION:
    THE ELONGATION SHOULD BE MEASURED AT A RATE (0.75x1862x1000/1.95E5) =7.161mm/m SUITABLE CORRECTION SHALL BE APPLIED BASED ON DIFFERENT MATERIAL PROPERTIES GIVEN AGAINST 3b ABOVE.
11. ELONGATION GIVEN SHALL BE MODIFIED AT SITE IN CASE ACTUAL AREA VALUE OF STRAND 'A' AND MODULUS OF ELASTICITY 'E' VARIES FROM THOSE ASSURED IN DESIGN, REVISED EXTENSION SHALL BE CALCULATED AS UNDER
    REVISED EXTENSION= $\frac{\text{EXT.x } (140\text{mm}2\text{X}1.95\text{X}10^5)}{(\text{NEW AREA X NEW MODULUS})}$
12. STRAND CUTTING SEQUENCE SHALL BE SYMMETRIC WITH RESPECTIVE CENTER LINE OF GIRDER AT A TIME THERE SHALL NOT BE ECCENTRICITY OF MORE THAN 1 STRAND.
13. AFTER PRETENSIONING THE STRANDS AND BEFORE CONCRETING, A RECHECK SHALL BE MADE TO ENSURE THAT THE DEBONDING TUBES ARE PLACED AT THE INTENDED LOCATIONS. BOTH ENDS OF THE DEBONDING TUBES SHALL BE EFFECTIVELY SEALED AGAINST INGRESS OF ANY CEMENT SLURRY USING EPOXY PUTTY OR ANY OTHER SUITABLE MATERIAL.
14. DIAMOND BIT SAW OR GRINDER WITH CUTTING WHEEL SHALL BE USED TO CUT THE STRANDS.
15. PRE–TENSIONING OF STRANDS MAY BE CARRIED OUT USING MULTI PULL JACK. ELONGATION AT THE PRESTRESSING END SHALL BE CHECKED AS PER CL. NO. 4.2 OF IRS–CBC:71.
16. RECOMMENDED DIMENSIONAL TOLERANCES FOR PRECAST GIRDERS:
    (a) LENGTH : ±10mm
    (b) FLANGE WIDTH & THICKNESS : ±5mm
    (c) DEPTH : ±5mm
    (d) WEB THICKNESS : ±3mm
    (e) POSITION OF TENDONS : ±3mm
    (f) MAXIMUM SURFACE ROUGHNESS : 1.5mm ON 3.0m TEMPLATE
17. WHILE CALCULATING EFFECTIVE ELONGATION OF PRESTRESSING STRANDS, ACTUAL DEFORMATION OF THE BUTTRECESSES SHALL BE ACCOUNTED AND SUBTRACTED FROM THE ELONGATION OF THE PRESTRESSING STRANDS MEASURED AT SITE DURING STRESSING.
18. DEVELOPMENT LENGTH REPRESENTED BY Ld SHALL BE EQUAL TO 41 TIMES THE DIA OF THE BAR.
19. LAP LENGTH SHALL BE EQUAL TO 58 TIMES THE DIA. OF BAR AND NOT MORE THAN 50% OF THE BARS SHALL BE LAPPED AT A SECTION.
20. ALL LAPS SHALL BE STAGGERED, NOT MORE THAN 50% OF REINFORCEMENT SHALL BE LAPPED AT ANY SECTION.
21. ADEQUATE LINKS/SPACER BARS SHALL BE PROVIDED FOR PROPER POSITIONING OF REINFORCEMENT.
22. DOWEL BARS FOR DIAPHRAGM SHALL BE LEFT BEFORE CONCRETING.

DEFLECTION OF GIRDER AT MID SPAN

STAGE	STAGE	OUTER (mm)	INNER (mm)
1	DL+PSC	−10.342	−10.393
2	STAGE−1 + SLAB	−8.048	−7.997
3	STAGE−2 + SIDL	−6.129	−6.799
4	STAGE−3 + LL	−4.089	−5.195

NOTE: −Ve UPWARD, +Ve DOWNWARD
THE DEFLECTION HAS BEEN CHECKED AS PER UIC 776:3R TABLE 3 AND FOUND TO SAFE.

SR. NO.	ACTIVITY	DAYS	STRENGTH
1	PLACING OF REINFORCEMENT & STRANDS PRESTRESSING OF STRANDS.	0	–
2	PLACING MOULDS & POURING OF CONCRETE.	0	–
3	TRANSFER OF PRESTRESS	8 DAYS AFTER CONCRETING OF I–GIRDER	45 MPa
4	CASTING OF DECK SLAB & DIAPHRAGM	21 DAYS AFTER CONCRETING OF I–GIRDER	60 MPa
5	APPLICATION OF SIDL	28 DAYS AFTER CONCRETING OF DECK SLAB	100% STRENGTH OF CONCRETE OF DECK SLAB

1. ALL DIMENSIONS ARE IN MILLIMETERS LEVELS ARE IN METERS UNLESS SPECIFIED OTHERWISE.
2. FOLLOW FIGURED DIMENSIONS ONLY.
3. SUITABLE PROVISION TO BE MADE FOR ANCHORING ONE MAST.
4. GROUTING SHOULD BE DONE SOON AFTER STRESSING OF THE STRANDS WITH NEAT CEMENT GROUT (WITH APPROVED ADMIXTURES IF REQUIRED) AS PER SPECIFICATION.
5. CONCRETE GRADES FOR ALL SUPERSTRUCTURE COMPONENTS –
   GIRDER–M60
   DECK SLAB AND DIAPHRAGM–M40
   PARAPET–M40

⊠ — BEARING
⊗ — JACKING POSITION
↑ — JACKING POSITION
G — GIRDER
EF — EACH FACE
● — ACTIVE STRAND
○ — INACTIVE STRAND

022077–BSRP–CR4–C–VD–GEN–20–2431 — GENERAL ARRANGEMENT DETAILS OF 24M CURVED SPAN (R=871M) SUPERSTRUCTURE AT VIADUCT FOR CR4 FOR C2P10–1 TO C2P10–2–DOUBLE RACK
022077–BSRP–CR4–C–VD–GEN–20–2428 — REINFORCEMENT DETAILS OF 24M CURVED SPAN (R=871M) SUPERSTRUCTURE AT VIADUCT FOR CR4 FOR C2P10–1 TO C2P10–2–DOUBLE TRACK
022077–BSRP–CR4–C–VD–GEN–20–2430 — REINFORCEMENT DETAILS OF 24M CURVED SPAN (R=871M) SUPERSTRUCTURE AT VIADUCT FOR CR4 FOR C2P10–1 TO C2P10–2–DOUBLE TRACK (DECK SLAB AND DIAPHRAGM)

1. DOC–BSRP–CR4–EV–DGN–GEN–20–1362

CONCEPTUAL / TENDER DRAWING

EMPLOYER :
RAIL INFRASTRUCTURE DEVELOPMENT COMPANY (KARNATAKA) LIMITED

GENERAL CONSULTANTS :
AECOM-EGIS-WSP

PROJECT : BENGALURU SUBURBAN RAILWAY PROJECT (BSRP)
K-RIDE CORRIDOR - 4

DRAWING TITLE : TYPICAL GENERAL ARRANGEMENT DETAILS OF SUPERSTRUCTURE AT VIADUCT FOR CR4 - DOUBLE TRACK

DRAWING NO. : O22077-BSRP-CR4-C-VD-GEN-20-2429

SCALE : AS SHOWN

PRELIMINARY DWG (P), DEFINITIVE DWG (D), CONSTRUCTION DWG (C), AS BUILT DWG (B), SHOP DWG (S), MANUFACTURED DWG (M) SHEET SIZE - A1

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