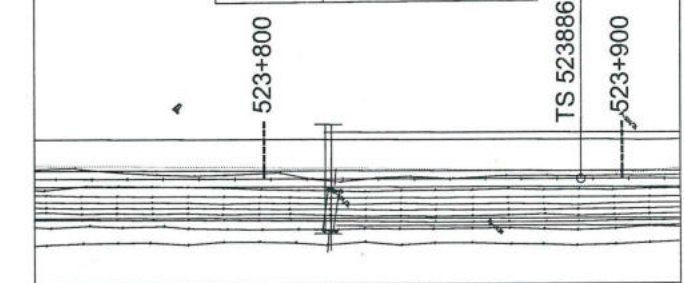


GOOD FOR CONSTRUCTION

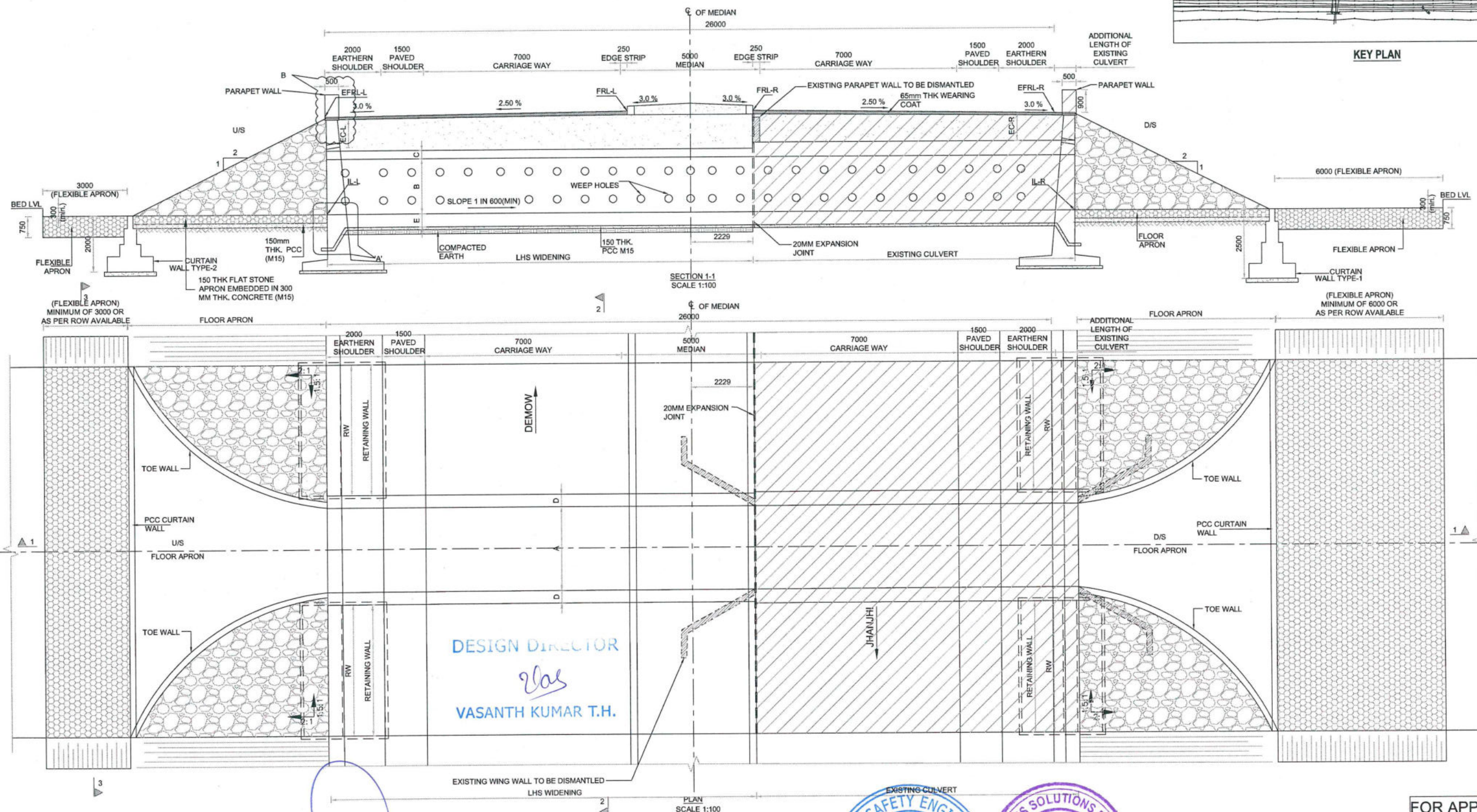
Details Of Box culvert:

EXISTING CHAINAGE	DESIGN CHAINAGE	SPAN	FRL-L	FRL-R	EFRL-L	EFRL-R	EC-L	EC-R	IL-L	IL-R	CLEAR WIDTH (A)	CLEAR HEIGHT (B)	TOP SLAB THICKNESS (C)	WALL THICKNESS (D)	BOTTOM RAFT THICKNESS (E)	RW	FLOW DIRECTION	LHS WIDENING
524+120	523+818	1X3.0X3.107	94.055	94.055	93.783	93.783	0.644	0.644	90.046	90.001	3.000	3.107	0.30	0.45	0.30	5.7	L-R	15.229

STRUCTURE NO:	34
DESCRIPTION	EXISTING PROPOSED
CHAINAGE	524120 523818
SPAN	1X3.0X3.107 1X3.0X3.107
TYPE	BOX BOX
PROPOSAL	WIDENING



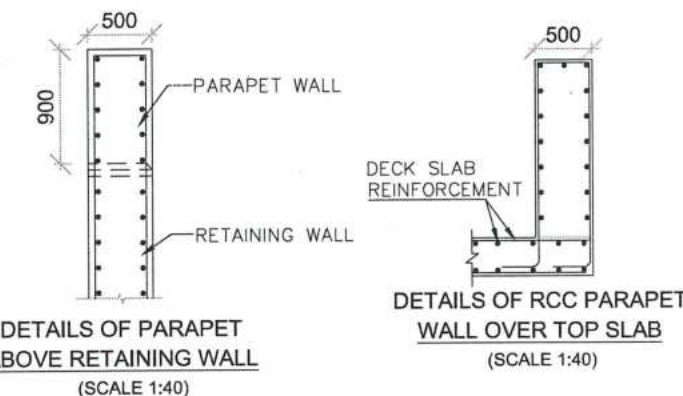
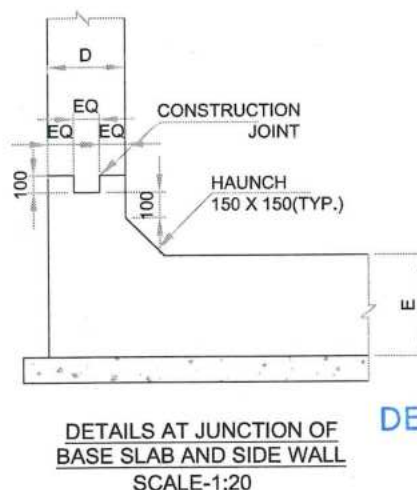
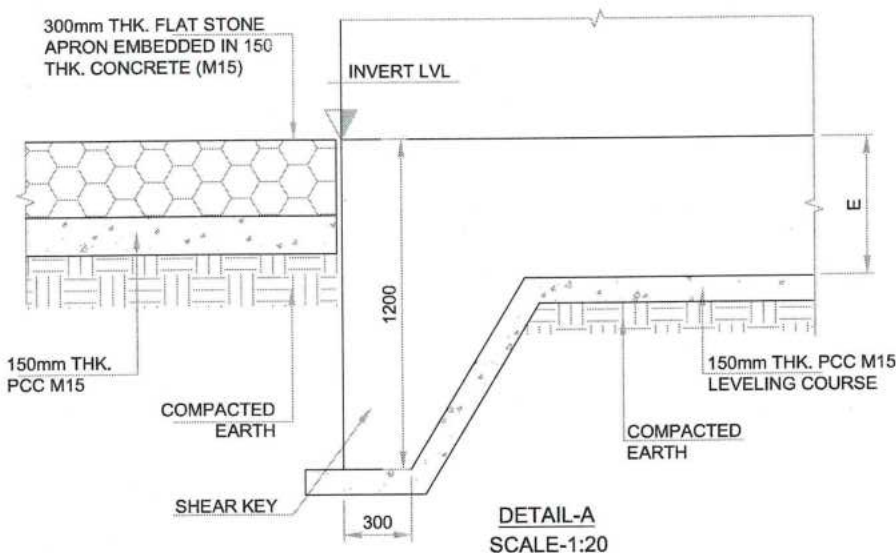
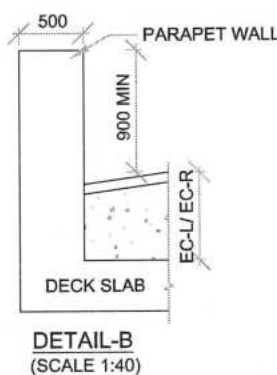
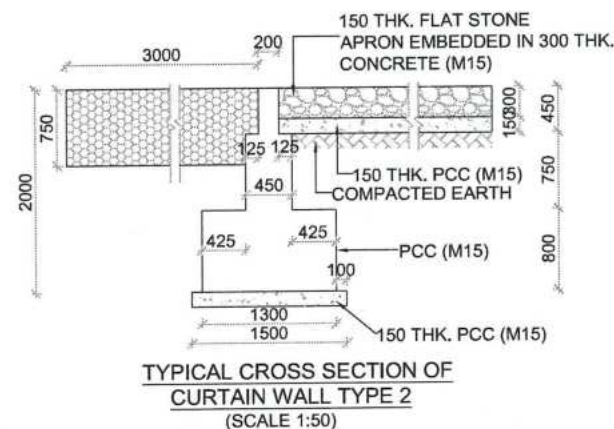
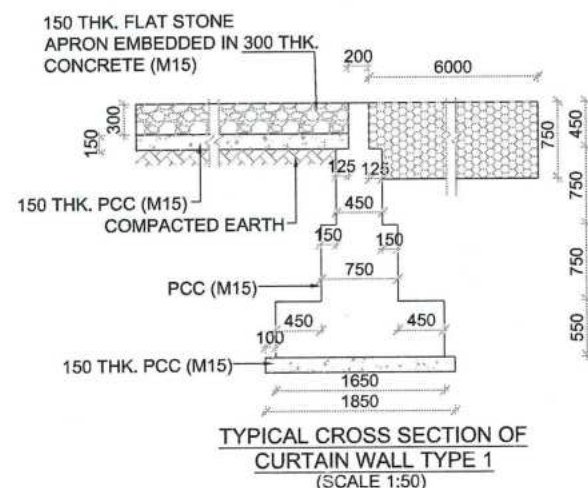
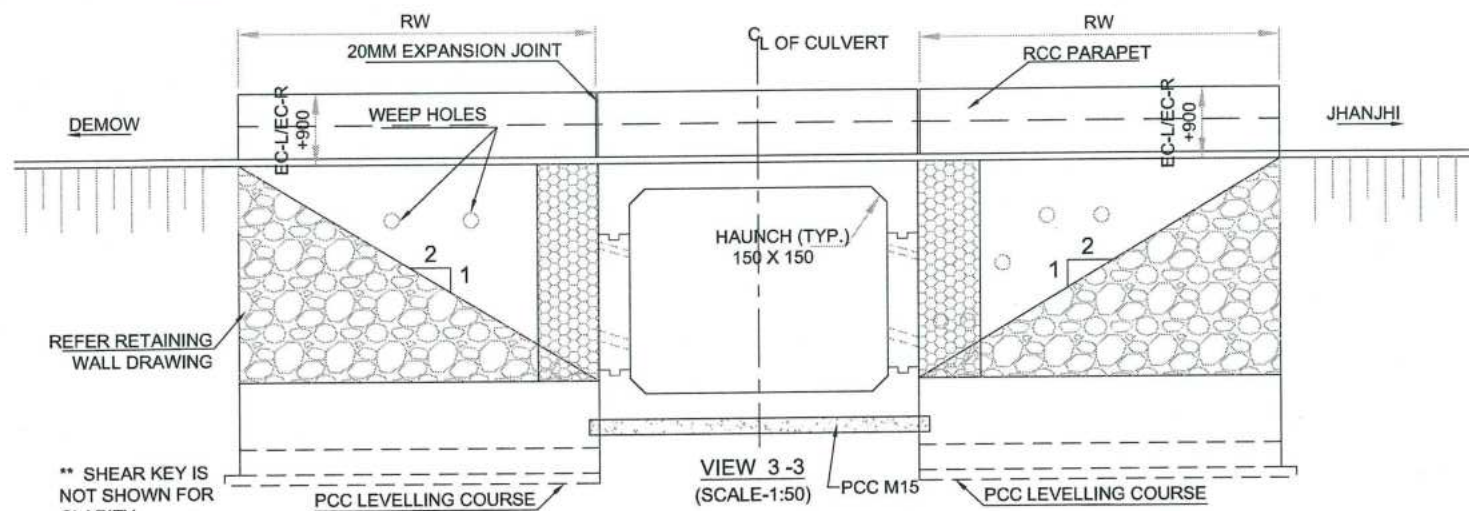
KEY PLAN



DESIGN DIRECTOR  
VASANTH KUMAR T.H.

<div>PROJECT</div> <div>FOUR LANING OF JHANJHI TO DEMOW SECTION OF NH-37 FROM EXISTING CH. Km 491+050 TO Km 535+250 (DESIGN CH. Km 490+800 TO Km 534+800) IN THE STATE OF ASSAM UNDER EPC MODE.</div>	<div>CLIENT</div> <div>National Highways Infrastructure Development Corporation Ltd.  Ministry of Road Transport &amp; Highways, Government of India Branch office : House No.1, Panipath, Ambikagiri Nagar , Zoo road, Guwahati-24</div>	<div>CONTRACTOR</div> <div>Gannon Dunkerley &amp; Co. Ltd.  16A TOPSIA ROAD (SOUTH) ROUTE STREET, 7th FLOOR KOLKATA - 700046</div>	<div>DESIGN CONSULTANT</div> <div>PROFESSIONAL CIVIL INFRA PVT. LTD.  # 1838, GROUND FLOOR, SIR. M.VISVESWARAYA LAYOUT, NAGADEVANAHALLI, BANGALORE - 560 056</div>	<div>PROOF CONSULTANT</div> <div>CHETANNIPRA TECH CONSULTANTS (P) LTD.  7/11, 1ST FLOOR, 13TH MAIN, SRINAGAR, OPP.PES COLLEGE, BENGALURU-560050</div>	<div>SAFETY CONSULTANT</div> <div>SMART SAFETY SERVICES  # 3-26 &amp; 7, HARI HARA NIVAS GUMMAKONDA COLONY, HYDERABAD - 500046</div>	<div>AUTHORITY ENGINEER</div> <div>VOYANTS SOLUTIONS PVT. LTD.  403, 4th Floor, BRTS Park Centre, Block A, Jal Vayu Vihar, Sector-30, Gurgaon, Haryana 122001</div>	<table><tr><td>DESIGN DIRECTOR</td><td>NAME</td><td>SHEET SIZE</td><td rowspan="5">TITLE: GENERAL ARRANGEMENT DRAWING OF BOX CULVERT (WIDENING) AT DESIGN CH 523+818 (EXISTING CH 524+120)</td></tr><tr><td>PROOF CONSULTANT</td><td></td><td>A2</td></tr><tr><td>SAFETY CONSULTANT</td><td></td><td>SCALE</td></tr><tr><td>AUTHORITY CONSULTANT</td><td></td><td>AS SHOWN</td></tr><tr><td></td><td></td><td>SHEET No.</td></tr><tr><td></td><td></td><td>01 OF 02</td><td>DRAWING No. PCIPL/NH-37/J-D/STR/BC/18</td></tr><tr><td></td><td></td><td></td><td>REV. 00</td></tr></table>	DESIGN DIRECTOR	NAME	SHEET SIZE	TITLE: GENERAL ARRANGEMENT DRAWING OF BOX CULVERT (WIDENING) AT DESIGN CH 523+818 (EXISTING CH 524+120)	PROOF CONSULTANT		A2	SAFETY CONSULTANT		SCALE	AUTHORITY CONSULTANT		AS SHOWN			SHEET No.			01 OF 02	DRAWING No. PCIPL/NH-37/J-D/STR/BC/18				REV. 00
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			REV. 00																												





(REFER MISCELLANEOUS DRAWINGS)

DESIGN DIRECTOR  
Vas  
VASANTH KUMAR T.H.

- PROPOSED SEQUENCE OF CONSTRUCTION:-**
1. EARTH WORK EXCAVATION
  2. CONFIRMATION OF FOUNDING LEVEL AS MENTIONED IN GFC DRAWING
  3. LAYING OF PCC LEVELLING COURSE
  4. CONSTRUCTION OF BOTTOM SLAB WITH A PORTION OF WEB
  5. CONSTRUCTION OF WEB
  6. CONSTRUCTION OF TOP SLAB WITH A PORTION OF TOP WEB
  7. BACK FILLING BEHIND THE SIDE WALL
  8. LAYING OF WEARING COAT
  9. PLACING OF SIDL

**LEGEND:**

IL - INVERT LEVEL  
EC - EARTH CUSHION  
FRL - FINISHED ROAD LEVEL  
EFRL - FINISHED ROAD LEVEL AT EDGE  
A - CLEAR WIDTH OF BOX  
B - CLEAR HEIGHT OF BOX  
C - TOP SLAB THICKNESS  
D - SIDE WALL THICKNESS  
E - BOTTOM RAFT THICKNESS  
RW - RETAINING WALL

- NOTES:**
01. ALL DIMENSIONS ARE IN mm AND LEVELS ARE IN METERS, UNLESS MENTIONED OTHERWISE.
  02. DIMENSIONS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
  03. CONCRETE MIX SHALL BE DESIGN MIX AND SHALL HAVE MAXIMUM 28 DAYS CHARACTERISTIC CUBE STRENGTH AS FOLLOWS:
    - (i) BOX.....M30
    - (ii) PARAPET.....M40
    - (iii) RETURN WALL.....M30
    - (iv) LEVELING COURSE.....M15
    - (v) CURTAIN WALL.....M20
    - (vi) TOE WALL.....M20
    - (vii) GUARD STONE.....M20
  04. GRADE OF UNTENSIONED STEEL SHALL BE Fe 500D, CONFORMING TO IS: 1786.
  05. 600mm FILTER MEDIA SHALL BE PROVIDED BEHIND RCC BOX AND RETURN WALL.
  06. THE BACK FILL MATERIAL BEHIND RCC BOX / RETAINING WALL SHALL HAVE FOLLOWING PROPERTIES  $\phi 30^\circ$ ,  $\gamma=2.0$  T/Cum.
  07. SEISMIC ZONE - V.
  08. SAFE BEARING CAPACITY AT FOUNDING LEVEL IS  $12t/m^2$ . THE SAME SHALL BE VERIFIED AT SITE BEFORE STARTING OF WORK.
  09. FLOW DIRECTION SHOWN IN THE PLAN IS INDICATIVE ONLY, BED PROTECTION FOR UPSTREAM AND DOWN STREAM SHALL BE BASED ON THE FLOW DIRECTION THE SITE.
  10. FLEXIBLE APRON SHALL BE PROVIDED BASED ON SITE CONDITION & SHALL BE DECIDED BY ENGINEER-IN-CHARGE WHEREVER ROCK IS AVAILABLE AT TOP LEVEL FLEXIBLE APRON SHALL BE DISPENSED.
  11. BACK FILLING SHALL BE DONE SIMULTANEOUSLY ON BOTH SIDE OF BOX.
  12. DRAWING SHALL BE READ IN CONJUNCTION WITH RELEVANT APPROVED HIGHWAY DRAWING FOR FRL, INVERT LEVEL, GL, CROSS SLOPE, LONGITUDINAL GRADIENT, ROAD WAY DETAILS ETC
  13. PITCHING / REVETMENT ON SLOPES TO BE PROVIDED AS PER MORTH SPECIFICATION.
  14. IF BC/CLAYEY SOIL ENCOUNTERED AS FOUNDING SOIL, THEN 900mm. DEPTH OF SOIL BELOW FOUNDATION TO BE REMOVED & FILLED BY METAL / BOULDERES WITH SAND AS PER SP-13.
  15. THE CLEAR OPENING SIZE AND EARTH CUSHION MENTIONED SHALL BE VERIFIED WITH EXISTING STRUCTURE / APPROVED PPD AND IN CASE OF ANY DISCREPANCY. IT SHOULD BE IMMEDIATELY REPORTED FOR SUITABLE ACTION PRIOR TO COMMENCEMENT OF THE WORK.
  16. SOFT AND LOOSE PATCHES IN THE BEARING AREA SHALL BE REPLACED BY COMPACTED GRANULAR FILLS AND SHALL BE PROPERLY COMPACTED WITH LAYERS NOT EXCEEDING 200mm BEFORE LAYING PCC OVER IT.
  17. PCC LEVELLING COURSE:
    - BELOW BOX STRUCTURE & TOE WALL - 150 THK.
    - BELOW FLOOR APRON - 150 THK.
  18. STRUCTURE HAS BEEN DESIGNED FOR
    - i) ONE LANE, TWO LANE AND THREE LANES OF CLASS A
    - ii) ONE LANE OF CLASS 70R + ONE LANE OF CLASS A
    - iii) ONE LANE OF 40R BOGIE + ONE LANE OF CLASS A.
  19. CONSTRUCTION JOINTS:-
    - i) THE LOCATION AND PROVISION OF CONSTRUCTION JOINTS SHALL BE AS PER THE DRAWING AND THE SAME SHALL BE APPROVED BY THE ENGINEER-IN-CHARGE.
    - ii) THE CONCRETE SURFACE AT THE JOINT SHALL BE BRUSHED WITH A STIFF BRUSH AFTER CASTING WHILE THE CONCRETE IS STILL FRESH AND IT HAS ONLY SLIGHTLY HARDENED.
    - iii) BEFORE NEW CONCRETE IS POURED THE SURFACE OF OLD CONCRETE SHALL BE PREPARED AS UNDER:
      - (a) FOR HARDENED CONCRETE, THE SURFACE SHALL BE THOROUGHLY CLEANED TO REMOVE DEBRIS / LAITANCE & MADE ROUGH SO THAT  $\frac{1}{4}$  OF THE SIZE OF THE AGGREGATE IS EXPOSED
      - (b) FOR PARTIALLY HARDENED CONCRETE, THE SURFACE SHALL BE TREATED BY WIRE BRUSH FOLLOWED BY AN AIR JET
      - (c) THE OLD SURFACE SHALL BE SOAKED WITH WATER WITHOUT LEAVING PUDDLES IMMEDIATELY, BEFORE STARTING CONCRETING TO PREVENT THE ABSORPTION OF WATER FROM NEW CONCRETE
    - iv) NEW JOINT SHALL BE THOROUGHLY COMPACTED IN THE REGION OF THE JOINT
  20. REFER TCS TYPE: TCS-1B

FOR APPROVAL

REFERENCE DRAWINGS:	
DETAILS OF RCC BOX	PCIPL/NH-37/JD/BC/STR/REIN/18
MISCELLANEOUS DETAILS	PCIPL/NH-37/JD/STR/RCC-MIS/01
DETAILS OF RETAINING WALL	PCIPL/NH-37/JD/STR/RW/01

**PROJECT**  
FOUR LANE OF JHANJHI TO DEMOW  
SECTION OF NH-37 FROM EXISTING CH. Km  
491+050 TO Km 535+250 (DESIGN CH. Km  
490+800 TO Km 534+800) IN THE STATE OF  
ASSAM UNDER EPC MODE.

**CLIENT**  
National Highways Infrastructure  
Development Corporation Ltd.  
Ministry of Road Transport &  
Highways, Government of India  
Branch office : House No.1, Panipath,  
Ambikagiri Nagar, Zoo road,  
Guwahati-24

**CONTRACTOR**  
Sanjiv Dunderley & Co. Ltd.  
B-1A, TOPSIA ROAD (SOUTH)  
HAUTE STREET, 7th FLOOR  
KOLKATA - 700048

**DESIGN CONSULTANT**  
PROFESSIONAL CIVIL INFRA PVT. LTD.  
# 1838, GROUND FLOOR,  
SIR. M VISVESWARAYA LAYOUT,  
NAGADEVANAHALLI,  
BANGALORE - 560 056

**PROOF CONSULTANT**  
CHETAN INFRA-TECH  
CONSULTANTS (P) LTD.,  
17th 1st FLOOR,  
13TH MAIN, SRINAGAR,  
OPP. PES COLLEGE,  
BANGALURU-560050

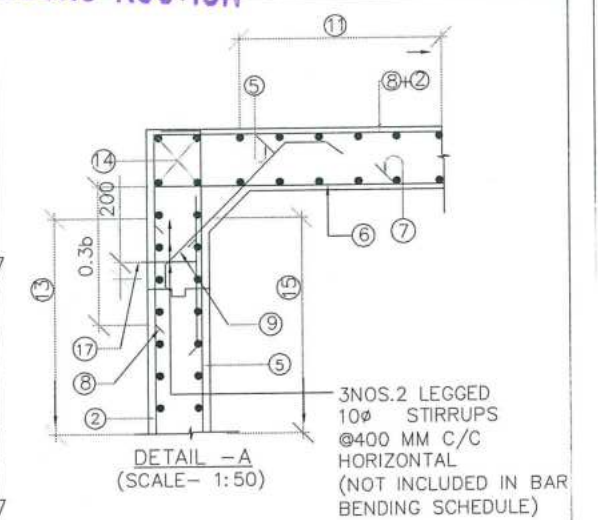
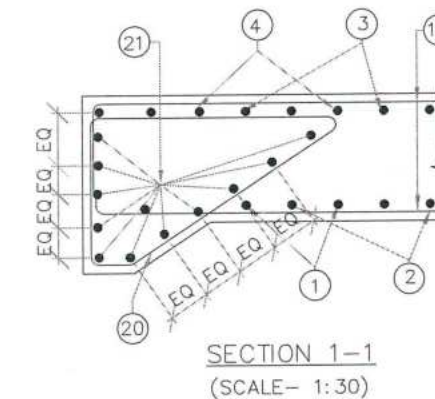
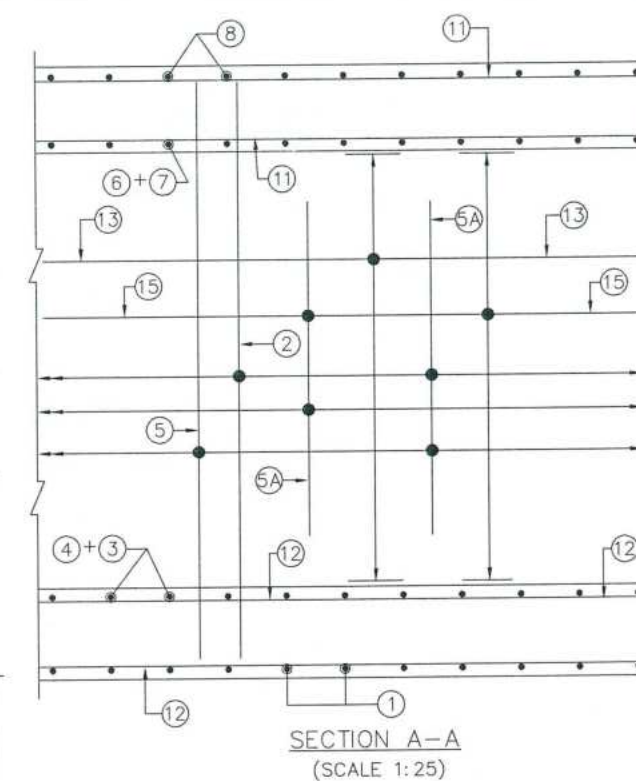
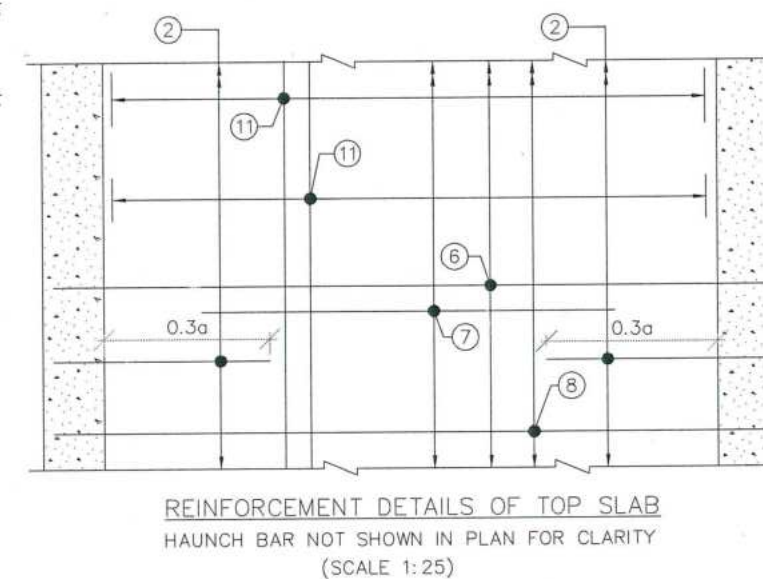
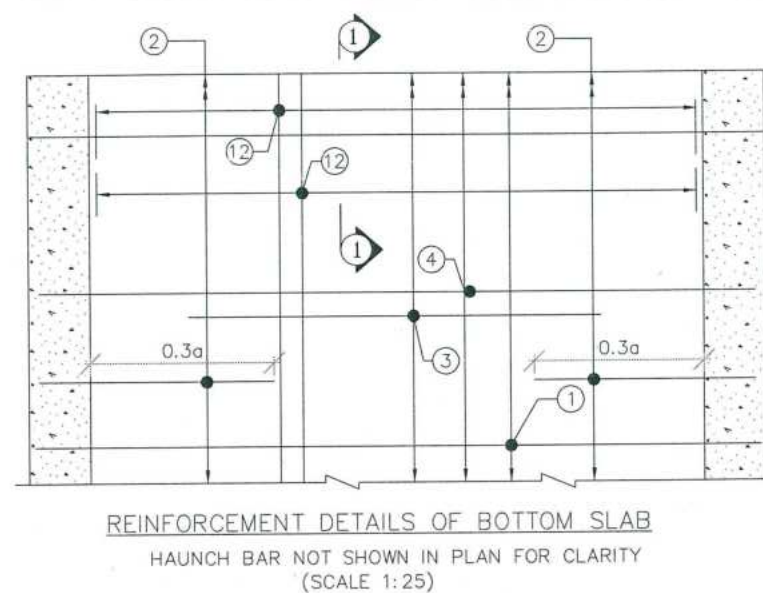
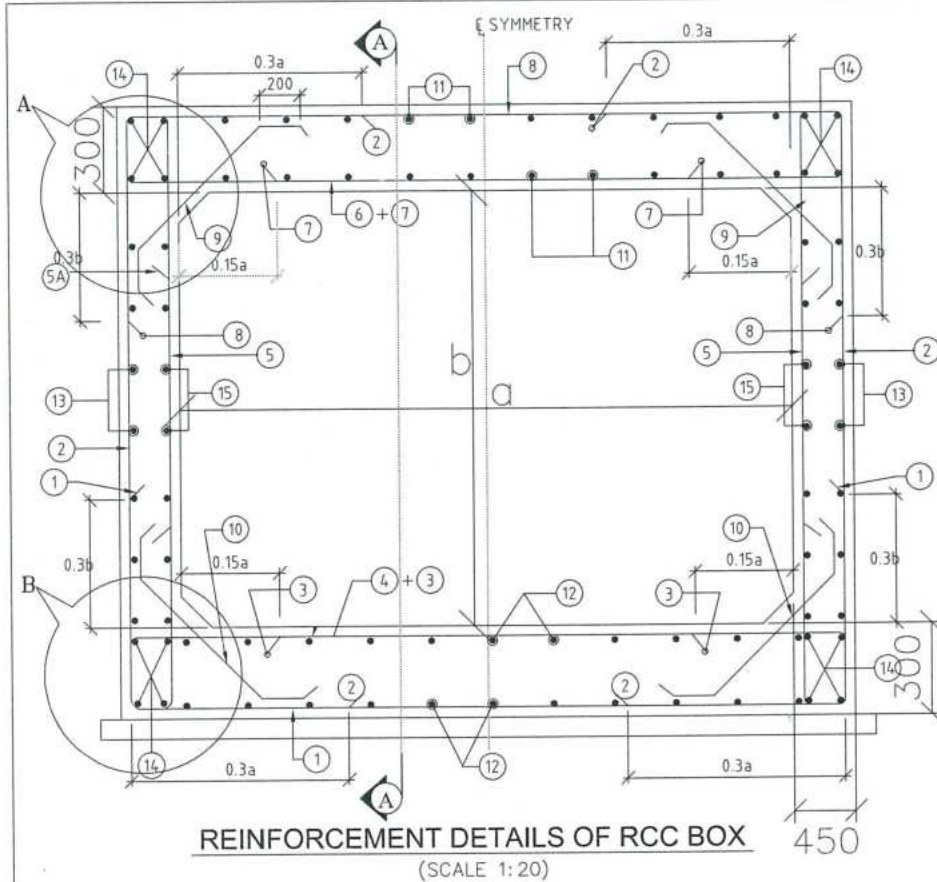
**SAFETY CONSULTANT**  
SMART SAFETY SERVICES  
# 3-5-6 & 7, HARI HARA NIVAS,  
GUMMAKONDA COLONY,  
HYDERGUDA,  
HYDERABAD - 500048

**AUTHORITY ENGINEER**  
VOYANTS SOLUTIONS PVT. LTD.  
403, 4th Floor, BPTP Park  
Central, Block A, Jal Vayu  
Vihar, Sector 30,  
Gurgaon, Haryana 122001

NAME	SHEET SIZE	TITLE:
DESIGN DIRECTOR	A2	GENERAL ARRANGEMENT DRAWING OF BOX CULVERT (WIDENING) AT DESIGN CH 523+818 (EXISTING CH 524+120)
PROOF CONSULTANT	SCALE	DRAWING No.
SAFETY CONSULTANT	AS SHOWN	PCIPL/NH-37/J-D/STR/BC/18
AUTHORITY CONSULTANT	SHEET No.	REV.
	02 OF 02	00



GOOD FOR CONSTRUCTION



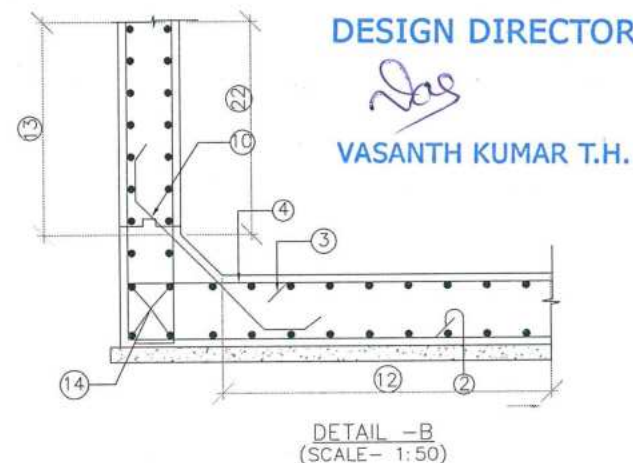
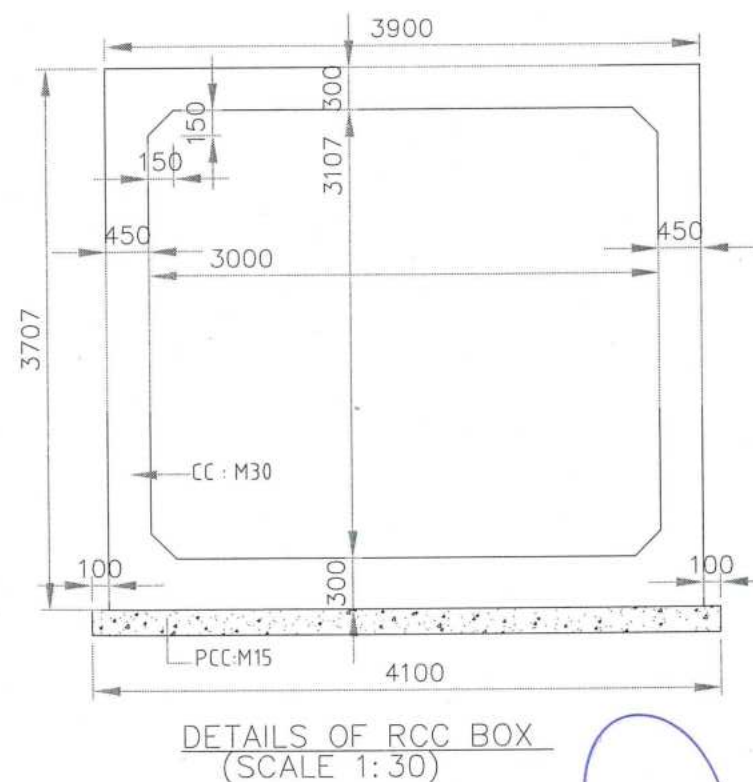
DESIGN CH: 523+818

SCHEDULE OF REINFORCEMENT

BAR MARK	SHAPE OF BARS (NOT TO SCALE)	BAR DIA IN mm	SPACING OR NO. OF BAR
1		12	200 C/C
2		12	200 C/C
3		10	175 C/C
4		12	175 C/C
5		12	200 C/C
5A		10	150 C/C
6		12	200 C/C
7		10	200 C/C
8		12	200 C/C
9		10	200
10		10	200
11		10	200
12		10	200
13		10	200
14		10	16 NOS.
15		10	200
16		NOT USED	
17		10	250
18		NOT USED	
19		NOT USED	
20		10	150
21		10	20 NOS.

# NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS & LEVELS ARE IN METERS.
- DIMENSIONS ARE NOT TO BE SCALED, ONLY WRITTEN DIMENSIONS TO BE FOLLOWED.
- GRADE OF CONCRETE : M30 FOR BOX.
- GRADE OF STEEL : Fe500.
- CLEAR COVER TO REINFORCEMENT SHALL BE AS FOLLOWS.  
TOP SLAB = 75mm (TOP FACE); 50mm (BOTTOM FACE)  
BOTTOM SLAB = 50mm (TOP FACE); 75mm (BOTTOM FACE)  
OUTER WALL = 75mm (EARTH FACE); 50mm (WATER FACE).
- ANCHORAGE LENGTH SHALL BE 40x BAR DIA (Ø)
- LAP LENGTH OF THE STEEL SHALL BE PROVIDED AS BELOW.  
LAP LENGTH = K x l  
K = 1.00 (<25% LAPPED BAR RELATIVE TO TOTAL CROSS SECTIONAL AREA.)  
K = 1.15 (33% LAPPED BAR RELATIVE TO TOTAL CROSS SECTIONAL AREA.)  
K = 1.40 (50% LAPPED BAR RELATIVE TO TOTAL CROSS SECTIONAL AREA.)  
ALTERNATIVELY BAR SPLICE COUPLER CAN BE USED FOR REBAR LAPPING AND SPLICING.
- NOT MORE THAN 50% OF BARS CAN BE LAPPED AT A SECTION AND LAPS SHALL BE STAGGERED.
- FOR DETAILS OF APPROACH SLAB, HAND RAILING RETAINING WALL, REFER SEPARATE MISCELLANEOUS DRAWINGS.
- SBC OF SOIL BELOW THE BOX STRUCTURE SHALL NOT BE LESS THAN 12.0 T/Sq.m



DESIGN DIRECTOR  
VASANTH KUMAR T.H.

FOR APPROVAL

PROJECT FOUR LANING OF JHANJHI TO DEMOW SECTION OF NH-37 FROM EXISTING CH. Km 491+050 TO Km 535+250 (DESIGN CH. Km 490+800 TO Km 534+800) IN THE STATE OF ASSAM UNDER EPC MODE.	CLIENT National Highways Infrastructure Development Corporation Ltd. Ministry of Road Transport & Highways, Government of India Branch office : House No.1, Panipath, Ambikagiri Nagar, Zoo road, Guwahati-24	CONTRACTOR Gannon Dunkley & Co. Ltd. 66A, TOPSIA ROAD (SOUTH) HAUTE STREET, 7th FLOOR KOLKATA - 700046	DESIGN CONSULTANT PROFESSIONAL CIVIL INFRA PVT. LTD. 1639, GROUND FLOOR, SIR. M. VISVESWARAYA LAYOUT, NAGADEVANAHALLI, BANGALORE - 560068	PROOF CONSULTANT CHETAN INFRA-TECH CONSULTANTS (P) LTD. 7/11, 1ST FLOOR, WITH MAIN SRINAGAR, APES COLLEGE, BENGALURU - 560050	SAFETY CONSULTANT SMART SAFETY SERVICES 403, 4th Floor, BPT Park Centra, Block 2, Jal Vayu Vihar, Sector 30, Gurgaon, Haryana 122001	AUTHORITY ENGINEER VOYANTS SOLUTIONS PVT. LTD. 403, 4th Floor, BPT Park Centra, Block 2, Jal Vayu Vihar, Sector 30, Gurgaon, Haryana 122001	NAME SHEET SIZE SCALE AS SHOWN SHEET No. 01 OF 01	TITLE: REINFORCEMENT DETAILS OF BOX CULVERT (1X3X3.107) AT DESIGN CHAINAGE 523+818 (EXISTING CHAINAGE 524+120) DRAWING No. PCIPL/NH-37/JD/BC/STR/REIN/18 REV. 00
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