



**NATIONAL HIGHWAYS & INFRASTRUCTURE  
DEVELOPMENT CORPORATION LIMITED**

**Four Laning of Jhanjhi – Demow Section from Design km 490.800 To  
km 534.800 of NH-37, Assam under SARDP on EPC Mode**



## **Drawings**

(Design Ch. 490.000–505.000)

- Minor Bridge @ 492.360
- Minor Bridge @ 498.782
- VUP @ 491.225
- VUP @ 500.963
- PUP @ 502.578
- CD Structure @ 496.538
- CD Structure @ 497.300

April 2016

*Authority Engineer :*



**VOYANTS SOLUTIONS PVT LTD**

*Proof Checking Consultant :*



**GIFFORD INDIA PVT. LTD.**

*Contractor :*



**CORSAN CORVIAM CONSTRUCTION S.A.**

*Consultant :*



**Projects Consulting India (P) Ltd**  
(Formerly: Distinct Planning and Design Consult (P) Ltd.)  
**Engineers & Planners**

ISO 9001:2008

New Delhi, India  
Email: info@pciindia.co  
WWW.PCIINDIA.CO





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Date of Release	: 12.04.2016
Prepared	: KD/SPS
Checked	: BKG/AS
Approved	: RBS

DESIGN DIRECTOR  
  
Corsan Corviam Construction S.A.

Authority Engineer :



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Projects Consulting India (P) Ltd  
(Formerly: District Planning and Design Consult (P) Ltd)  
Engineers & Planners  
New Delhi, India  
Email: info@pcindia.co  
www.pcindia.co

FOUR LANING OF JHANJHI TO DEMOW SECTION FROM KM 491+050 TO KM 535+250 (DESIGN KM. 490+800  
TO 534+800) IN THE STATE OF ASSAM UNDER EPC MODE

DRAWINGS

- MINOR BRIDGE CH. - 492.360
- MINOR BRIDGE CH. - 498.782

S. NO.	DRAWING NO	DRAWING TITLE	DRG. REVISION
GAD BRIDGE CH.- 492.360		SHEET	
1	94-BR02-01-01	(SHEET 1 OF 2) GENERAL ARRANGEMENT DRAWING	R1
2	94-BR02-01-01	(SHEET 2 OF 2) GENERAL ARRANGEMENT DRAWING	R1
GAD BRIDGE CH.- 498.782			
1	94-BR04-01-01	(SHEET 1 OF 2) GENERAL ARRANGEMENT DRAWING	R1
2	94-BR04-01-01	(SHEET 2 OF 2) GENERAL ARRANGEMENT DRAWING	R1
REINF. - BOX (BRIDGE CH.- 492.360 & 498.782			
94-BR02-02-01		(SHEET 1 OF 2) REINFORCEMENT - BOX	R0
94-BR02-02-01		(SHEET 2 OF 2) REINFORCEMENT - BOX	R0
MISCELLANEOUS DETAILS			
1	94-BR02-03-01	(SHEET 1 OF 3) MISCELLANEOUS DETAILS	R0
2	94-BR02-03-01	(SHEET 2 OF 3) MISCELLANEOUS DETAILS	R0
3	94-BR02-03-01	(SHEET 3 OF 3) MISCELLANEOUS DETAILS	R0

DESIGN DIRECTOR  
Corsan Corviam Construction S.A.

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- Minor Bridge @ 492.360
  - Minor Bridge @ 498.782



DESIGN DIRECTOR  
  
Corsan Corvia Construcción S.A.







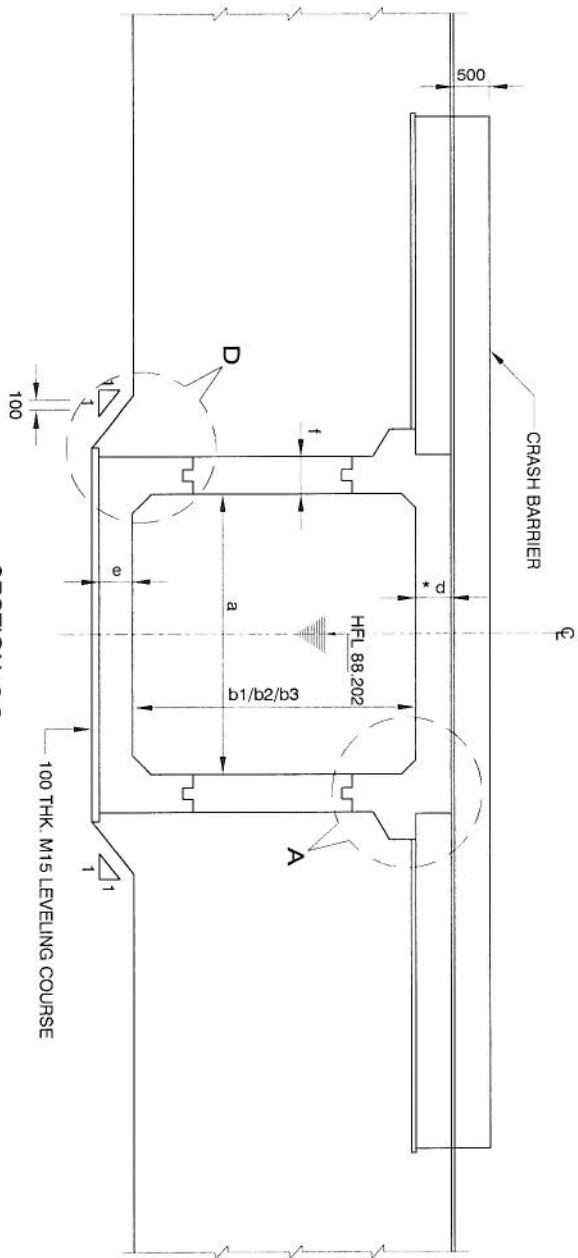








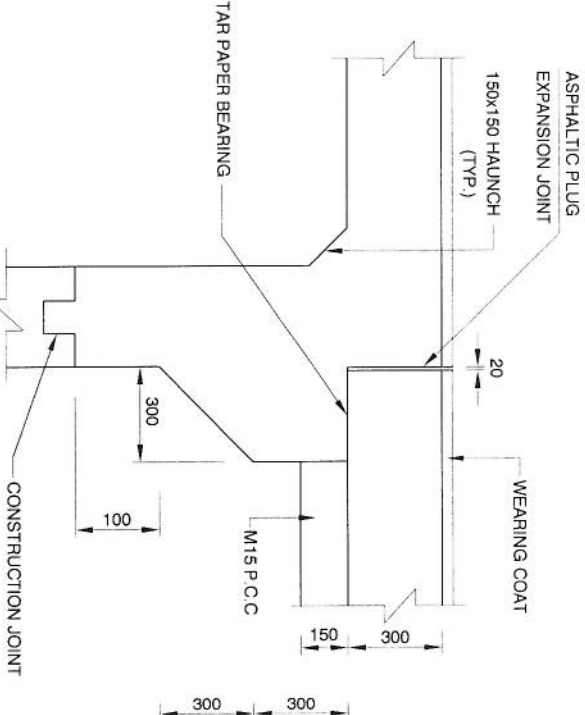




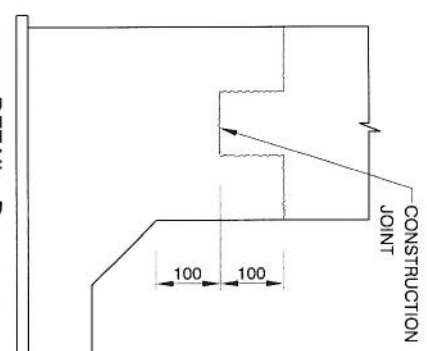
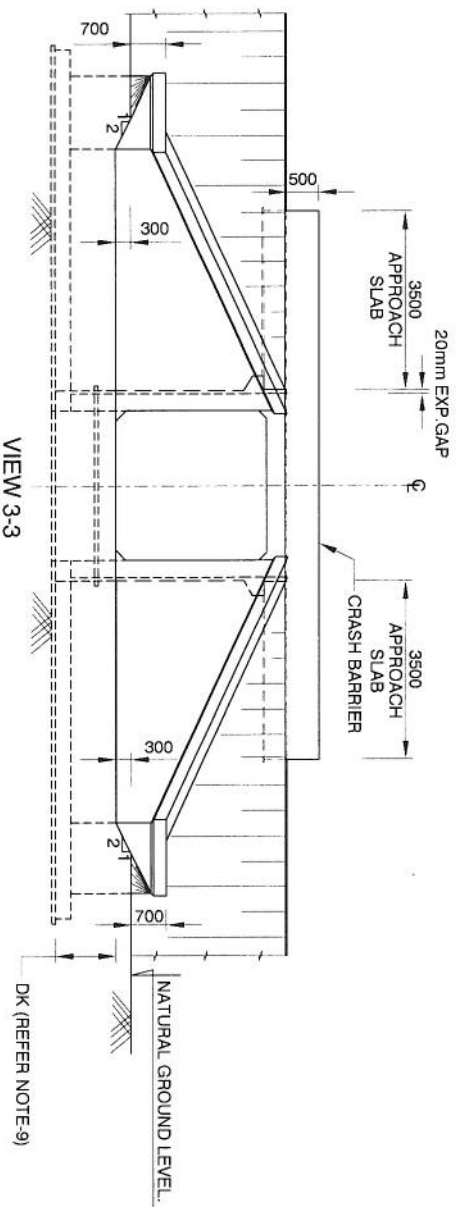
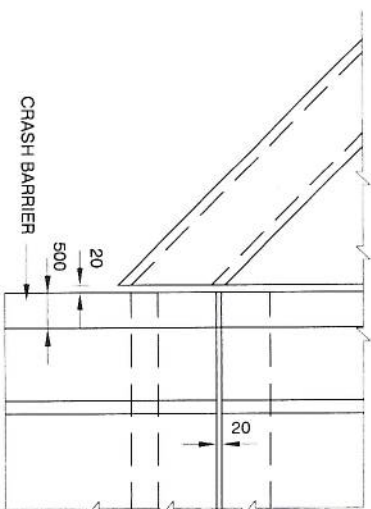
\*d DECK SLAB THICKNESS AT INNER EDGE OF KERB AS SHOWN IN SECTION 1-1

SECTION 2-2

DETAIL - A



DETAIL - B



DETAIL - D

Sno	Existing Chainage	Design Chainage	Type of Structure Proposed	No. of Spans	No. of span x span arrangement	Existing FRL	FRL at RME	FRL at LME	Invert level	Lowest bed Level	Span "a" (m)	clear height "b1" (m)	clear height "b2" (m)	clear height "b3" (m)	top slab 'd' thickness (m)	Bottom slab 'e' thickness (m)	Side wall 'f' thickness (m)	Direction of flow
1	499.100	498.782	box	1	1x6	90.367	90.367	90.367	84.965	85.265	6	4.220	4.5	4.194	0.55	0.700	0.500	Right to Left

## DESIGN DIRECTOR

Corsan Corviam Construction S.A.

REV	DATE	DESCRIPTION OF REVISIONS	DRAWN	AY	COMPLIANCE TO PC COMMENTS	22/03/2016
APPROVED:	FBS	CONSULTANT	PROJECTS CONSULTING INDIA (P) LTD	ENGINEERS AND PLANNERS	61/10/2 Sector - D6, Vasant Kunj New Delhi (India) 110070	61/10/2 Sector - D6, Vasant Kunj New Delhi (India) 110070
CHECKED:	BKS	DESIGNED	KDS	AUTHORITY ENGINEER	VOYANTS SOLUTIONS PVT LTD.	403, 4th Floor, BPT Park Centre, Sector-30, NH-8, Gurgaon, Haryana - 122001, India
CLIENT:	NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	Ministry of Road Transport & Highways, Government of India	Branch Office - House No. 1, Panipat, Ambekar Nagar, 200 Road, Gwalior - 24	CONTRACTOR:	CORSAN CORVIAM CONSTRUCTION S.A.	02nd Floor, Block Two, Vellia Business Park, Sector - 49, Sohna Road, Gurgaon, Haryana, India - 122001
PROOF CHECKING CONSULTANT:	Gifford	Gifford India Pvt Ltd (Rajiv Gandhi)	The Spillover Building No. 5, Tower B, Level - 1001F Cyber City Phase III, Gurgaon, Haryana-122002	SAFETY CONSULTANT:	L. R. KADIYALI & ASSOCIATES	RZ-44, Bhawanij Kunj, Behind D-2 Vasant Kunj, New Delhi 110 070
TITLE:	GENERAL ARRANGEMENT DRAWING	BRIDGE AT CH. 498.782	SHEET: A2	DATE:	March 2016	REV: 0
DRAWING NO:	94-BR04-01-01	SCALE: NTS	REV: 0	DATE:	March 2016	REV: 0

## NOTES:

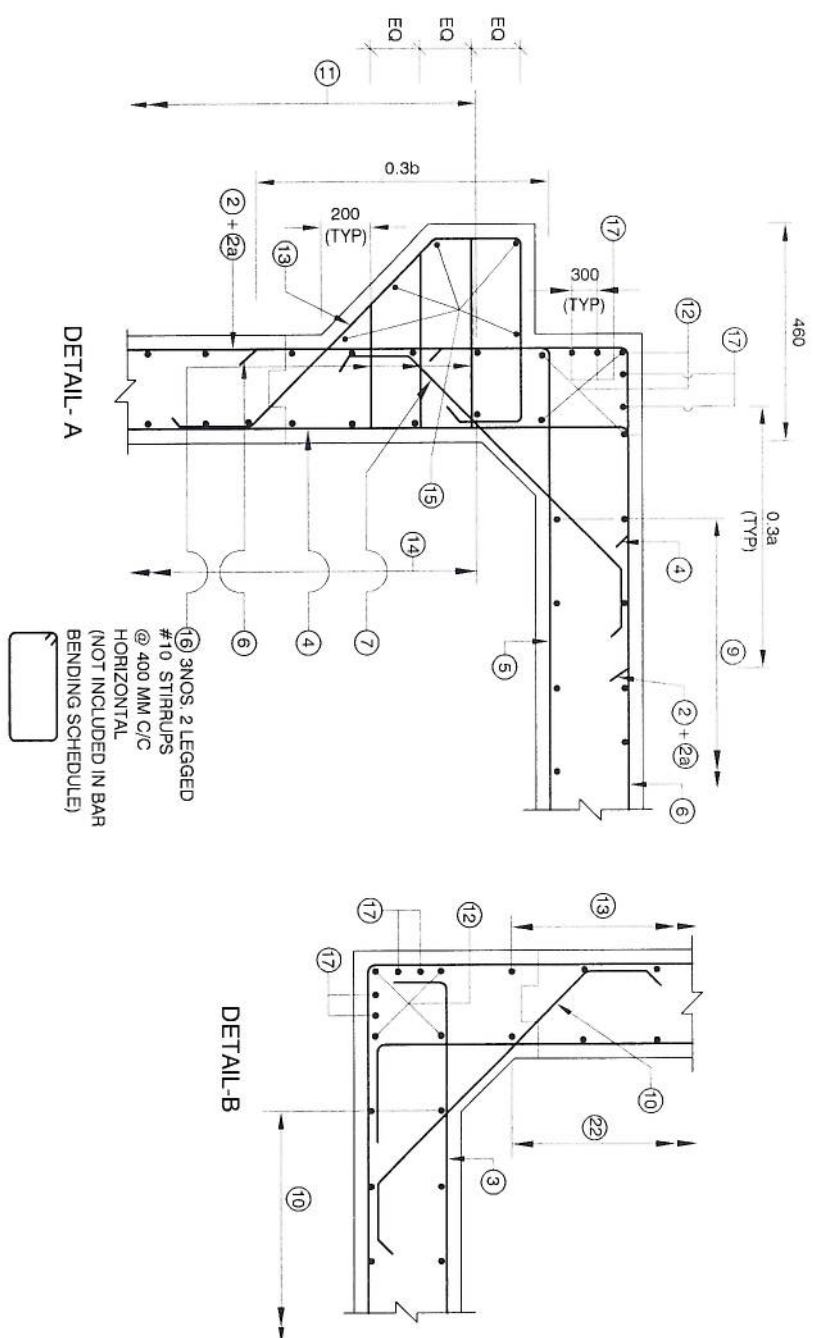
- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
- CONCRETE SHALL BE DESIGN MIX WITH A MINIMUM 28 DAYS CHARACTERISTIC STRENGTH ON 150MM CUBES AS FOLLOWS:
 

RCC BOX	M35
APPROACH SLAB	M30
LEVELLING COARSE	M15
PCC WING WALL	M20
CRASH BARRIER	M40
PCC CURTAIN WALL	M20
- THE REINFORCING STEEL SHALL BE CORROSION RESISTANT TMT HYSD BARS (GRADE DESIGNATION FE-500 CONFORMING TO IS: 1786-1985)
- DESIGNED FOR ONE LANE OF IRC CLASS 70R+ONE LANE OF IRC CLASS A LOADING OR 3 LANES OF CLASS A LOADING WHICHEVER GOVERNS.
- BACKFILLING BEHIND BOX SHALL CONSIST OF SELECTED EARTH CONFORMING TO APPENDIX 6 OF IRC 78-2014 HAVING PROPERTIES C=0, φ>30° & γD=20 KN/M²
- 65MM THK WEARING COURSE COMPRISING OF 40MM THK BITUMINOUS CONCRETE & 25MM THK ASPHALTIC SHALL BE PROVIDED
- NET SAFE BEARING CAPACITY AT FDN LEVEL 9.1 T/M²
- DESIGN DISCHARGE AS PER HYDROLOGY REPORT IS 24 CUM/SEC.
- GROUND IMPROVEMENT TO BE DONE WHERE BASE PRESSURE EXCEEDS ALLOWABLE SBC
- THE VARIOUS LEVELS (FRL, INVERT LEVELS) & SUPER ELEVATION SHOWN IN DRAWINGS SHALL BE VERIFIED PRIOR TO EXECUTION AT SITE AND IF ANY DISCREPANCY FOUND, SHALL BE INFORMED TO ENGINEER
- SOFT AND LOOSE PATCHES IN THE BEARING AREA ARE TO BE REPLACED BY BY COMPACTED GRANULAR FILLS WITH LAYERS NOT EXCEEDING 300mm.
- FOR REINFORCEMENT DETAILS REFER DRG NO. 94-BR02-02-01
- FOR RETAINING WALL/WING WALL, PARAPET WALL, CURTAIN WALL & GUARD STONE DETAILS REFER DRG NO. 94-BR02-03-01





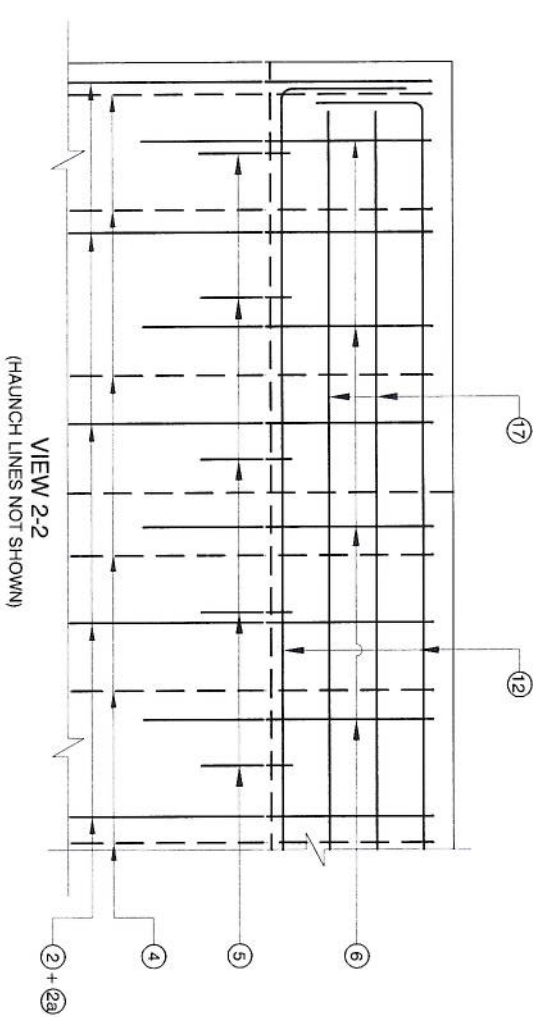




SCHEDULE OF REINFORCEMENT			
DESIGN CHAINAGE		492.360	498.782
OPENING		6 x 5.5	6x4.5
BAR MARKS	BARS SHAPE	TYPE 1	TYPE 2
1		#12 s200	#12 s200
2		#16 s200	#16 s200
2a		#16 s200	#16 s200
3		#16 s200	#16 s200
3a		#16 s200	#16 s200
4		#12 s200	#12 s200
5		#16 s200	#16 s200
5a		#12 s200	#12 s200
6		#12 s200	#12 s200
7		#10 s200	#10 s200
8		#10 s200	#10 s200
9		#10 s200	#10 s200
10		#12 s200	#12 s200
11		#12 s200	#12 s200
12		4 X 4 - #10	4 X 4 - #10
13		#12 s200	#12 s200
14		#12 s200	#12 s200
15		2 X 5 - #12	2 X 5 - #12
16		#10 s400 IN 3 LAYERS HORIZONTAL	#10 s400 IN 3 LAYERS HORIZONTAL
17		4 X 4 - #10	4 X 4 - #10




- NOTES:

1. ALL DIMENSIONS ARE IN MM AND LEVELS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
  2. DIMENSIONS SHALL NOT TO BE SCALED ONLY WRITTEN DIMENSIONS SHALL TO BE FOLLOWED.
  3. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS.
  4. ALL REINFORCING STEEL SHALL BE HIGH YIELD STRENGTH DEFORMED (CRS-TMT) BARS (GRADE - Fe 500). CONFORMING IS :1786.
  5. CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE FOLLOWS.
    - a. EARTH FACE - 75 mm
    - b. FOR OTHERS - 40 mm
  6. MINIMUM ANCHORAGE LENGTH SHALL BE 42D WHERE 'D' IS THE DIAMETER OF BAR.
  7. LAP LENGTH SHALL BE PROVIDED AS PER BELOW -  
(FOR GRADE OF CONC. M30 AND ABOVE)
- | LAP LENGTH | % LAP AT ANY SECTION IS |
|------------|-------------------------|
| 76 d       | BETWEEN 40 - 50%        |
| 68 d       | BETWEEN 25 - 40%        |
| 60 d       | - 25%                   |
- (WHERE 'D' IS THE DIAMETER OF THE BAR)
8. FOR UNFAVORABLE BOND CONDITIONS LAP LENGTH SHALL BE MULTIPLIED 1.4 AS PER IRC- 21-2000
  9. ALL LAP SHALL BE SUITABLY STAGGERED AND MINIMUM DISTANCE BETWEEN THE ADJACENT LAPS SHALL BE 1.3 TIMES OF LAP LENGTH.
  10. PARAPET REINFORCEMENT SHALL BE TIED TO SLAB REINFORCEMENT & SHALL BE CAST MONOLITHICALLY. FOR PARAPET REINFORCEMENT REFER DRG NO. 94-BR02-03-01

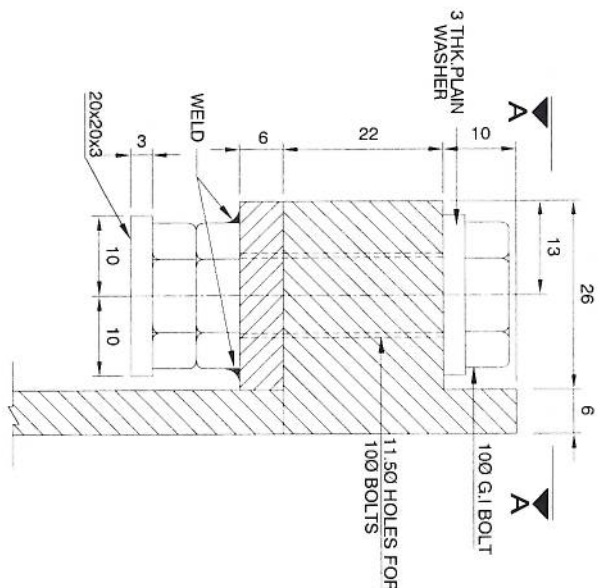
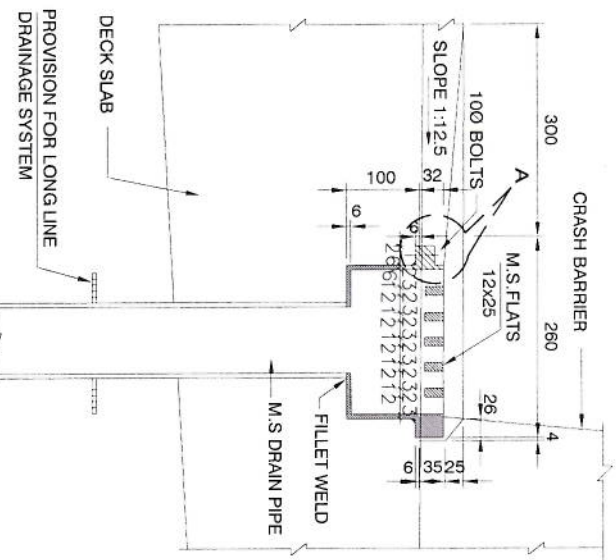


## DESIGN DIRECTOR

~~Corasan Construcción S.A.~~

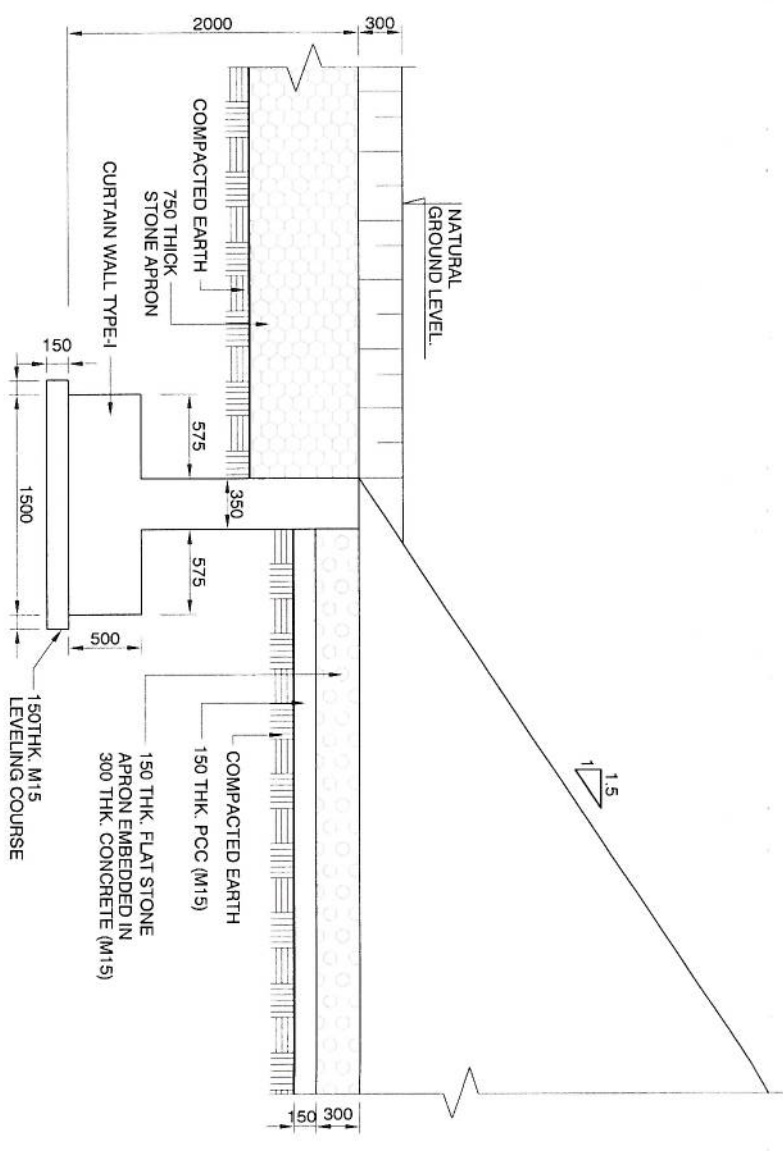
REV	DATE	DESCRIPTION OF REVISIONS	AY	DRAWN	DESIGNED	KDS	AUTHORITY ENGINEER:  VOYANTS SOLUTIONS PVT. LTD. 403, 4th Floor, GPTP Park Centre, Sector-30, NH-8, Gurgaon, Haryana - 122001, India	CONSULTANT  PCI PROJECTS CONSULTING INDIA (P) LTD Engineers and Planners 6110 / 2 Sector - D6, Vasant Kunj New Delhi (India) 110070	CLIENT:  NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD. Ministry of Road Transport & Highways, Government of India Branch Office : House No. 1, Panipath, Ambalga Nagar, Zoo Road, Gurgaon - 74	PROOF CHECKING CONSULTANT Gifford Ministry of Road Transport & Highways, Government of India Branch Office : House No. 1, Panipath, Ambalga Nagar, Zoo Road, Gurgaon - 74	PROJECT: FOUR LANEING OF JHANJHI TO DEMOW SECTION OF NH-37 FROM DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM UNDER EPC MODE	TITLE REINFORCEMENT - BOX	SHEET/SIZE: SHEET A2 02	DATE: March 2016	REV 0
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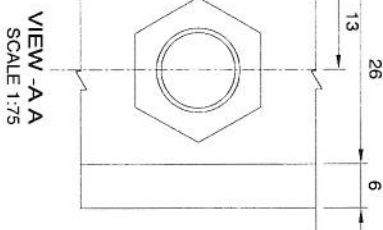


SECTION 1-1  
SCALE 1:100

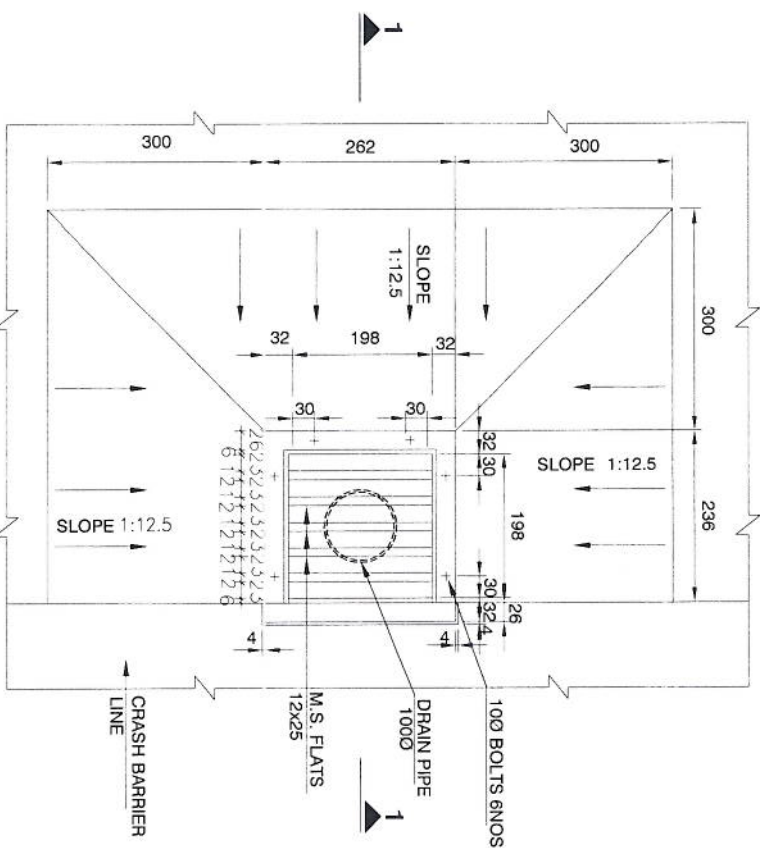
DETAIL-A  
SCALE 1:100



DETAIL OF CURTAIN WALL - II  
(UP STREAM SIDE)  
SCALE 1:50



VIEW - A-A  
SCALE 1:75



PLAN  
SCALE 1:100

# DETAILS OF DRAINAGE SPOUT AND COLLECTION

DETAIL OF CURTAIN WALL - I  
(DOWN STREAM SIDE)  
SCALE 1:50

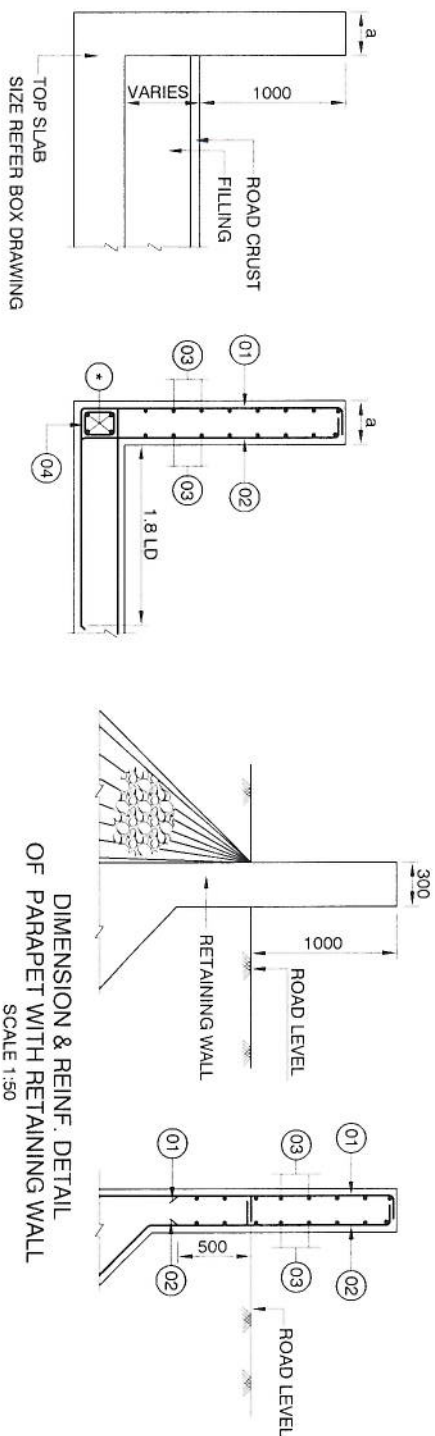
DETAIL OF CURTAIN WALL - II  
(UP STREAM SIDE)  
SCALE 1:50

## NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES, UNLESS OTHERWISE SPECIFIED.
2.  $H = H - 200\text{MM}$ , WHERE H IS THE HEIGHT OF THE RELATED ABUTMENT.
3. THE DETAIL OF WING WALL OF 3.8M HEIGHT HAS BEEN SHOWN IN THE DRAWING FOR ILLUSTRATION ONLY.
4. 80 DIA WEEP HOLES SHALL BE PROVIDED IN STAGGERED PATTERN STARTING FROM 0.5M ABOVE GROUND LEVEL WITH 1.0m C/C SPACING IN A SLOPE OF 1:20 TOWARDS OUTER SIDE.
5. ALL EXPOSED SURFACE OF PCC SHALL BE PROVIDED WITH REINFORCEMENT # 8 - 200 C/C.

APPROVED	CONSULTANT	CLIENT	PROOF CHECKING CONSULTANT	PROJECT
RBS	PROJECTS CONSULTING INDIA (P) LTD	NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	Gifford	FOUR LANE OF JHANUHI TO DEMOW SECTION OF NH-37 FROM DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM UNDER EPC MODE
CHECKED	ENGINEERS AND PLANNERS	Ministry of Road Transport & Highways, Government of India		
DESIGNED	6110/2 Sector - D6, Vasant Kunj New Delhi (India) 110070	Branch Office - House No. 1, Paripada, Anandapuri Nagar, 2nd Road, Gwalior - 24		
DRAWN	AS	CORSAN CORVAM CONSTRUCTION S.A.	L. R. KADIVALA & ASSOCIATES	MISCELLANEOUS DETAILS
	VOYANTS SOLUTIONS PVT LTD.	02nd Floor, Block Two, Vaidya Business Park, Sector - 48, Sohna Road, Gurugram, Haryana, India - 122001	RZ-44, Bhawanji Kunj, Behind D-2 Vasant Kunj, New Delhi 110 070	SCALE: A2 01
	Section-30, NH-8, Gurugram, Haryana - 122001, India			DATE: March 2016
REV	DATE	DESCRIPTION OF REVISIONS		REV
				0





DIMENSION & REINF. DETAIL  
OF PARAPET WITH BOX  
SCALE 1:50

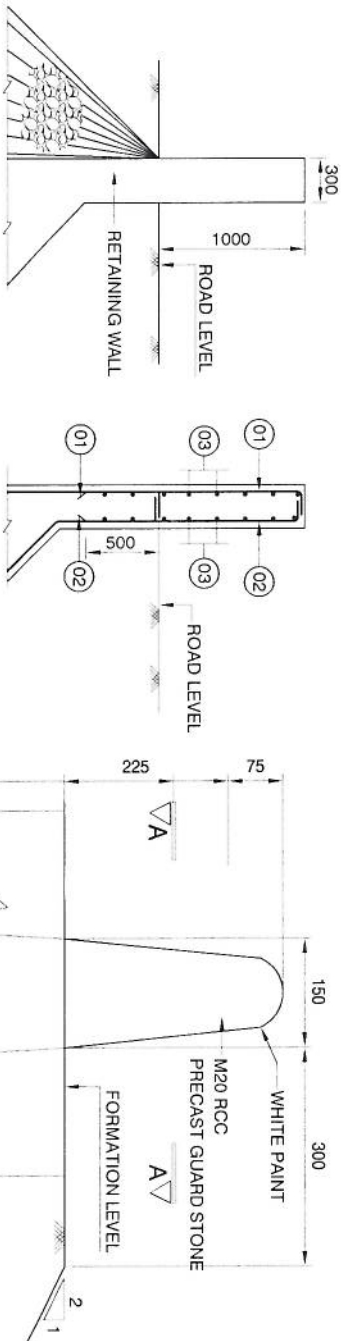
REINFORCEMENT SCHEDULE FOR PARAPET WALL

BAR MARK	SHAPE OF BARS	1.0m	1.5m	2.0m	2.5m
1		10	10	10	10
2		10	10	12	12
3		10	10	10	10
4		NOT IN USE	NOT IN USE	200 c/c	200 c/c

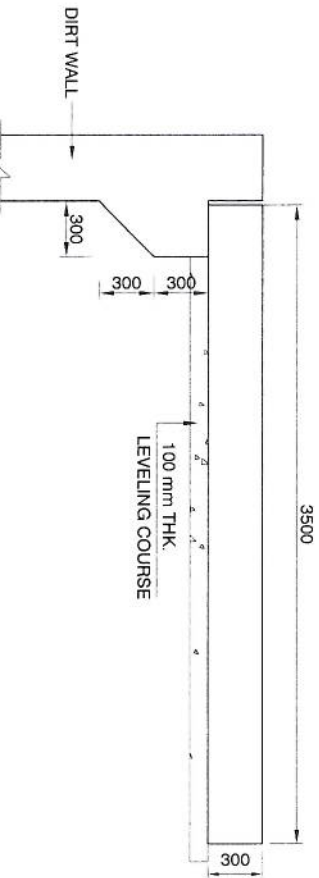
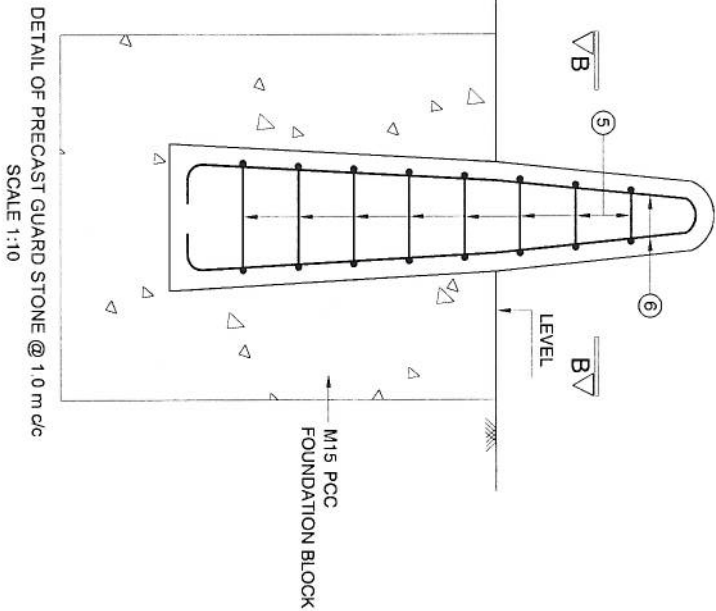
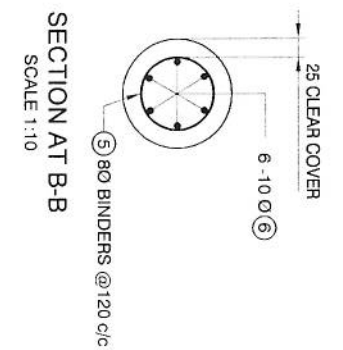
DIMENSION OF PARAPET WALL

HEIGHT	1.0m	1.5m	2.0m	2.5m
300	300	300	300	300

DIMENSION & REINF. DETAIL  
OF PARAPET WITH RETAINING WALL  
SCALE 1:50



DETAIL OF PRECAST GUARD  
STONE @ 1.0 m c/c  
SCALE 1:10



DETAIL OF APPROACH SLAB  
SCALE 1:40

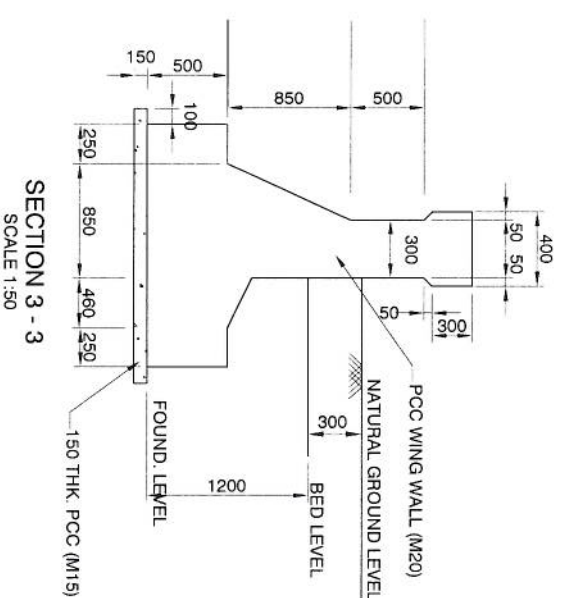
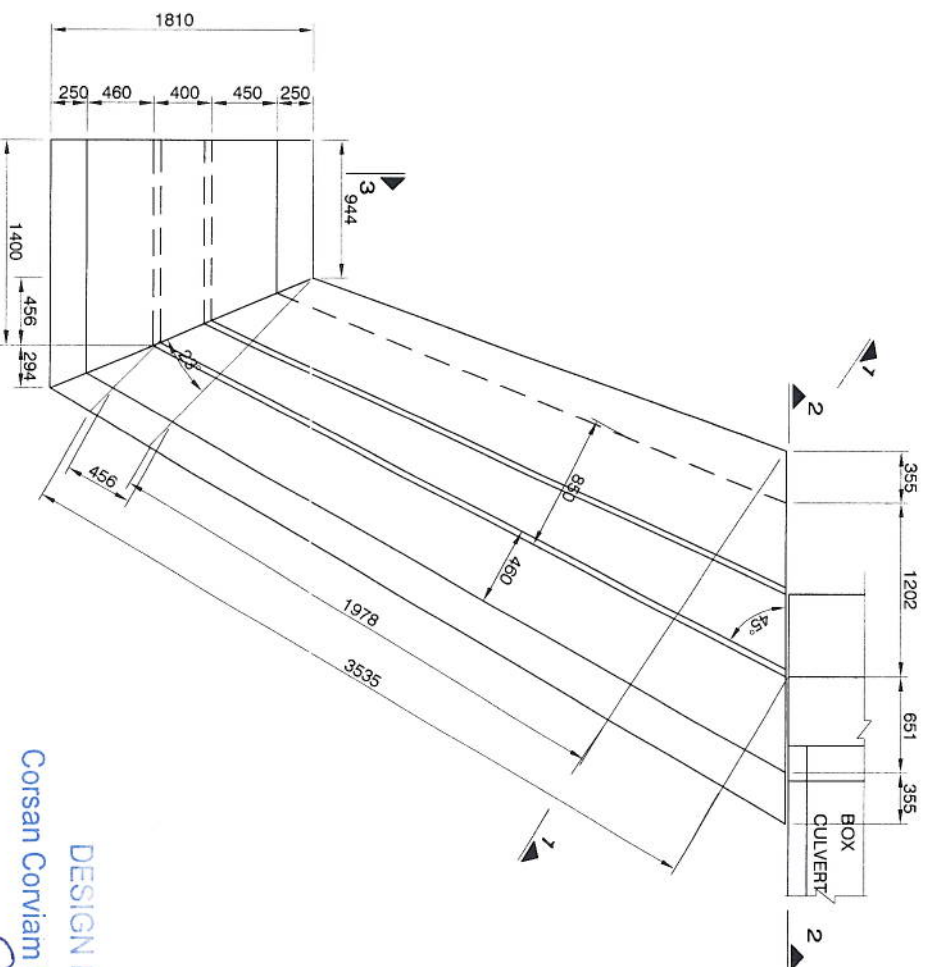
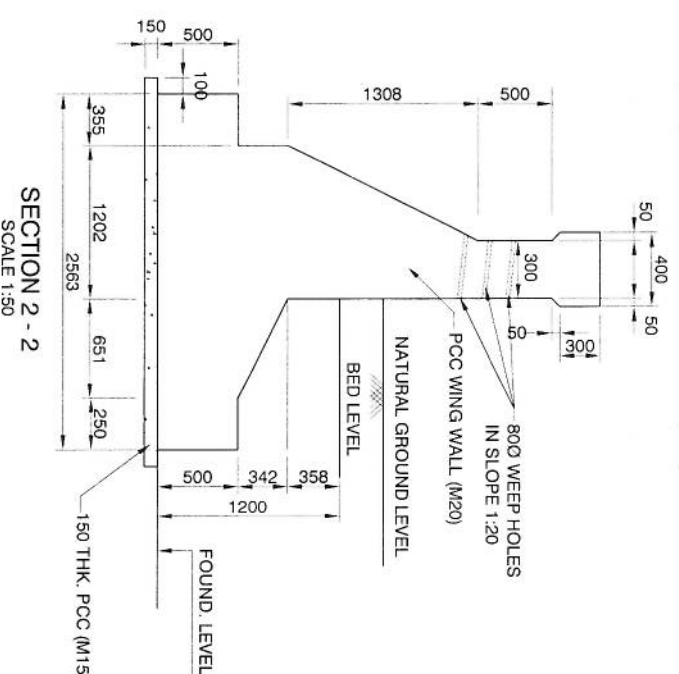
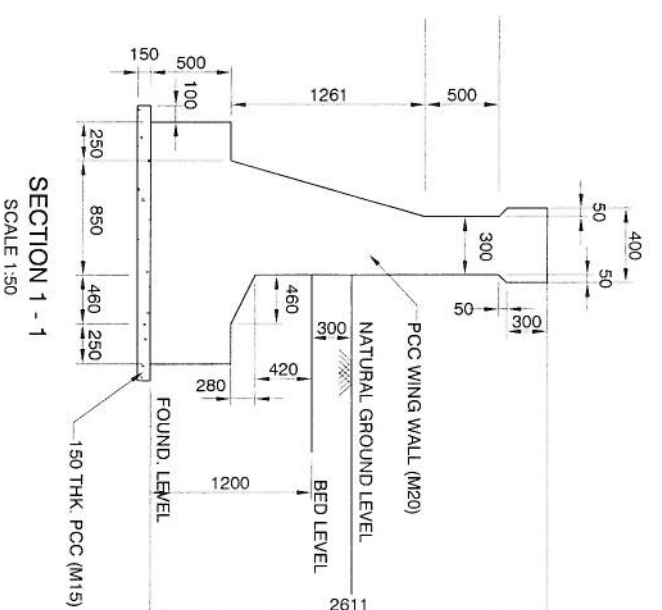
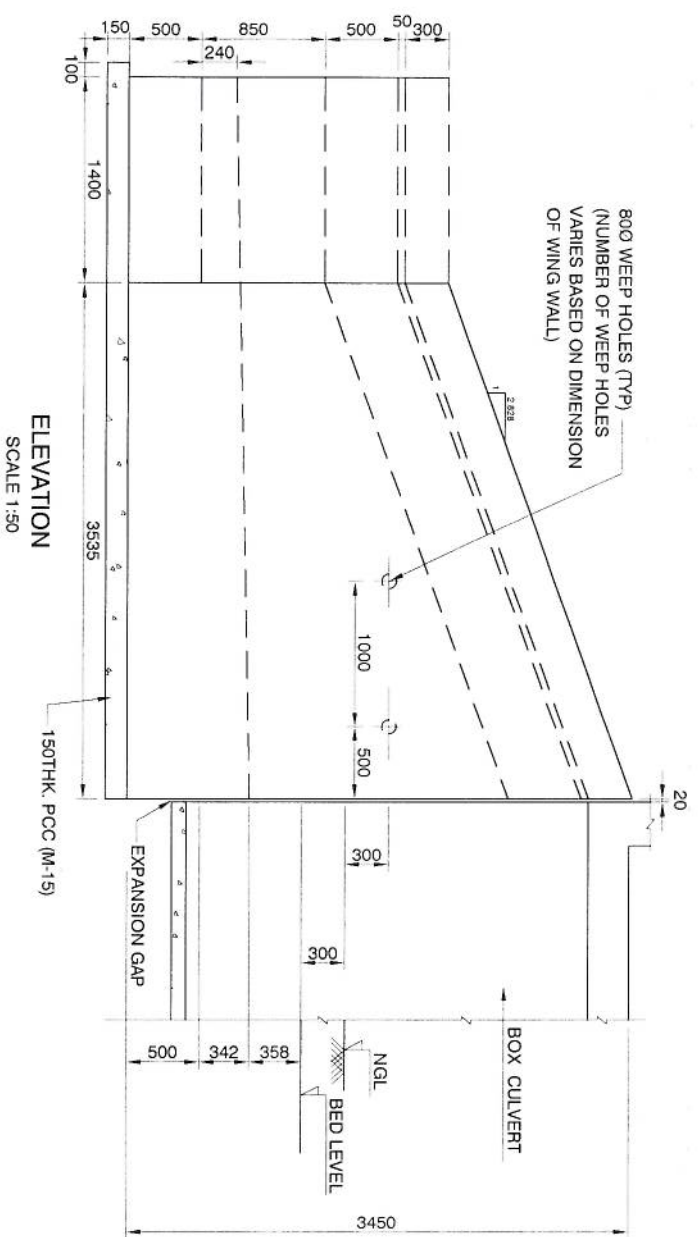
DESIGN DIRECTOR  
Corzan Construction S.A.

NOTES

- ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
- ALL REINFORCEMENT SHOWN IN THIS DRAWING ARE OF HIGH YIELD STRENGTH DEFORMED BARS CONFORMING TO IS-1786 GRADE OF STEEL - 500 (T.M.T BARS)
- MINIMUM DEVELOPMENT LENGTH LD SHALL BE 42 TIMES DIA OF THE BAR MINIMUM LAP LENGTH SHALL BE 18 TIMES LD WHERE 'D' IS DIA OF BAR. NOT MORE THAN 50% BARS TO BE LAPPED AT ONE LOCATION.
- CLEAR COVER
- WALL EARTH FACE 50MM
- WALL NON EARTH FACE 40MM
- ADEQUATE LINKS / SPACER BARS SHALL BE PROVIDED FOR PROPER POSITIONING OF REINFORCEMENT.

APPROVED:	RBS	CONSULTANT	PROJECTS CONSULTING INDIA (P) LTD Engineers and Planners 6110 / 2 Sector - D6, Vasant Kunj New Delhi (India) 110070	CLIENT:	NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD. Ministry of Road Transport & Highways, Government of India Branch Office - House No. 1, Panchsheel, New Delhi - 110002	PROOF CHECKING CONSULTANT:	Gifford India Pvt. Ltd. (Part of Gifford India Pvt. Ltd.) The EPC Building, Block 1, Phase 1B, Level - IV, DDA, 27th Floor, Phase-III, Gurgaon, Haryana - 122002	PROJECT:	FOUR LANE OF JHANJI TO DEMOW SECTION OF NH-37 FROM DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM UNDER EPC MODE	TITLE:	MISCELLANEOUS DETAILS	SHEET/NO. SHEET:	A2	DATE:	March 2016
CHECKED:	BKG	DESIGNED:	AS	CONTRACTOR:	CORSAN CORVAM CONSTRUCTION S.A. 02nd Floor, Block Two, Vaita Business Park, Sector - 49, Sohna Road, Gurgaon, Haryana, India - 122001	SAFETY CONSULTANT:	L. R. KADIVALI & ASSOCIATES RZ-44, Bhawan Kunj, Behind D-2 Vasant Kunj, New Delhi 110 070	DRAWING NO.	94-BR02-03-01	SCALE:	AS SHOWN	REV.	0		





## NOTES

1. SURFACE REINFORCEMENT AT THE RATE OF 2.5 kg/m<sup>2</sup> SHALL BE PROVIDED IN EACH DIRECTION, I.E. BOTH HORIZONTALLY AND VERTICALLY SPACING SHALL NOT EXCEED 200MM.
2. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE MENTIONED. DIMENSIONS ARE NOT TO BE SCALED.
3. SOFT AND LOOSE PATCHES IN THE BEARING AREA ARE TO BE REPLACED BY COMPACTED GRANULAR FILLS WITH LAYERS NOT EXCEEDING 300mm.
4. IF THERE IS ANY LEVEL DIFFERENCE IN FOUNDING LEVEL OF WING WALL AND DOWNWARD PROJECTION
5. AT THE ADJACENT EDGE OF BOX STRUCTURE, PROPER GRANULAR PROTECTION IS TO BE PROVIDED IN THIS AREA TO COMPENSATE THE LEVEL DIFFERENCE.

PROJECT: FOUR LANING OF JHANJHI TO DEMOW SECTION OF NH-37 FROM DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM UNDER EPC MODE

## MISCELLANEOUS DETAILS

TITLE	SHEET/NO	SHEET	DATE
MISCELLANEOUS DETAILS	A2	03	March 2016
DRAWING NO	94-BR02-03-01	SCALE	AS SHOWN
REV		REV	0

APPROVED:	RBS	CONSULTANT	PROJECTS CONSULTING INDIA (P) LTD Engineers and Planners 6110/2 Sector - D6, Vasant Kunj New Delhi (India) 110070
CHECKED:	BKG	DESIGNED:	AS
DRAWN:	KDS		VOYANTS SOLUTIONS PVT LTD. 403, 4th Floor, BPTP Park Centre, Sector-30, NH-8, Gurgaon, Haryana - 122001, India
REV	DATE	DESCRIPTION OF REVISIONS	

CLIENT:	NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD. Ministry of Road Transport & Highways, Government of India Branch Office: House No. 1, Panchsheel Park, New Delhi - 110017
CONTRACTOR:	CORSAN CORVAM CONSTRUCTION S.A. 02nd Floor, Block Two, Vastika Business Park, Sector - 49, Sohna Road, Gurgaon, Haryana, India - 122001

PROOF CHECKING CONSULTANT:	Gifford
SAFETY CONSULTANT:	L. R. KADIYALI & ASSOCIATES RZ-44, Bhawanji Kunj, Behind D-2 Vasant Kunj, New Delhi 110 070

Corsan Corviam Construcion S.A.

DESIGN DIRECTOR

*[Signature]*



FOUR LANING OF JHANUHI TO DEMOW SECTION FROM KM 491 + 050 TO KM 535 + 250 (DESIGN KM. 490 + 800  
TO 534+800) IN THE STATE OF ASSAM UNDER EPC MODE  
DRAWING LIST UNDERPASS AND CD STRUCTURES (CH. 490+000 TO CH. 505+000)

S. NO.	DRAWING NO	SHEET	DRAWING TITLE	DRG. REVISION
VUP CH.- 491.225				
1	94-31-01	(SHEET 1 OF 2)	GENERAL ARRANGEMENT DRAWING - VEHICULAR UNDERPASS(CH.- 491.225)	R1
2	94-31-01	(SHEET 2 OF 2)	GENERAL ARRANGEMENT DRAWING - VEHICULAR UNDERPASS(CH.- 491.225)	R1
VUP CH.- 500.963				
1	94-31-02	(SHEET 1 OF 2)	GENERAL ARRANGEMENT DRAWING - VEHICULAR UNDERPASS(CH.- 500.963)	R1
2	94-31-02	(SHEET 2 OF 2)	GENERAL ARRANGEMENT DRAWING - VEHICULAR UNDERPASS(CH.- 500.963)	R1
REINFORCEMENT VUP				
1	94-31-03	(SHEET 1 OF 2)	REINFORCEMENT - VEHICULAR UNDERPASS	RO
2	94-31-03	(SHEET 2 OF 2)	REINFORCEMENT - VEHICULAR UNDERPASS	RO
PUP CH.- 502.578				
1	94-31-04	(SHEET 1 OF 1)	GENERAL ARRANGEMENT DRAWING - PEDESTRIAN UNDERPASS(CH.- 502.578)	R1
REINFORCEMENT PUP				
1	94-31-05	(SHEET 1 OF 3)	REINFORCEMENT - PEDESTRAIN UNDERPASS	R1
2	94-31-05	(SHEET 2 OF 3)	REINFORCEMENT - PEDESTRAIN UNDERPASS	RO
3	94-31-05	(SHEET 3 OF 3)	REINFORCEMENT - PEDESTRAIN UNDERPASS	RO
CD STRUCTURES				
1	94-32-00	(SHEET 1 OF 1)	SCHEDULE	RO
CD STRUCTURES CH.-496.538				
1	94-32-01	(SHEET 1 OF 2)	GENERAL ARRANGEMENT DRAWING - RECONSTRUCTION SINGLE CELL RCC BOX CULVERT FOR WIDENING OF BOX CULVERT (CH.-496.538)	R1
2	94-32-01	(SHEET 2 OF 2)	GENERAL ARRANGEMENT DRAWING - RECONSTRUCTION SINGLE CELL RCC BOX CULVERT FOR WIDENING OF BOX CULVERT (CH.-496.538)	R1
CD STRUCTURES CH.-497.300				
1	94-32-02	(SHEET 1 OF 2)	GENERAL ARRANGEMENT DRAWING - RECONSTRUCTION SINGLE CELL RCC BOX CULVERT FOR WIDENING OF BOX CULVERT (CH.-497.300)	R1
2	94-32-02	(SHEET 2 OF 2)	GENERAL ARRANGEMENT DRAWING - RECONSTRUCTION SINGLE CELL RCC BOX CULVERT FOR WIDENING OF BOX CULVERT (CH.-497.300)	R1
REINFORCEMENT CD STRUCTURES				
1	94-32-03	(SHEET 1 OF 2)	REINFORCEMENT - SINGLE CELL RCC BOX CULVERT FOR WIDENING OF BOX CULVERT	R1
2	94-32-03	(SHEET 2 OF 2)	REINFORCEMENT - SINGLE CELL RCC BOX CULVERT FOR WIDENING OF BOX CULVERT	R1
MISCELLANEOUS DETAILS				
1	94-33-01	(SHEET 1 OF 3)	MISCELLANEOUS DETAILS	RO
2	94-33-01	(SHEET 2 OF 3)	MISCELLANEOUS DETAILS	RO
3	94-33-01	(SHEET 3 OF 3)	MISCELLANEOUS DETAILS	RO

DESIGN DIRECTOR  
Corasan Corviam Construction S.A.

APPROVED	CONSULTANT	CLIENT	PROJECT	TITLE	SHEETSIZE	SHEET	DATE
RBS	PROJECTS CONSULTING INDIA (P) LTD	NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	FOUR LANING OF JHANUHI TO DEMOW SECTION OF NH-37 FROM DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM UNDER EPC MODE	INDEX	A3	01	March 2016
CHECKED	BKG	CONTRACTOR	PROOF CHECKING CONSULTANT	DRAWING NO.	SCALE	NTS	REV
DESIGNED	AS	ISOLUX CORSAN	Gifford India Pvt Ltd.	94-00-00			0
DRAWN	KDS	CORSAN CORVIAM CONSTRUCTION S.A.	L. R. KADIYALI & ASSOCIATES				
REV	DATE	DESCRIPTION OF REVISIONS					



- 
- VUP @ 491.225
  - VUP @ 500.963



Decorative  
Corsan Corviam Construcción S.A.  
*Decorative*



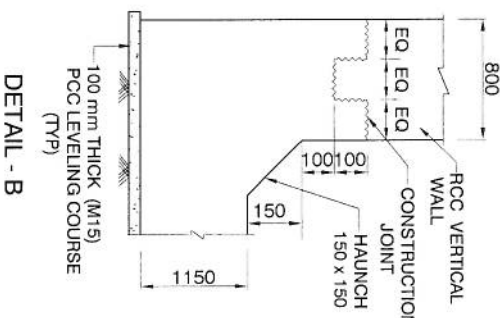








JOINING OF BOX BOTTOM WITH SERVICE ROAD IS PART OF JUNCTION DEVELOPMENT WILL BE SUBMITTED SEPARATELY.



DESIGN DIRECTOR  
Corisan Construcción S.A.

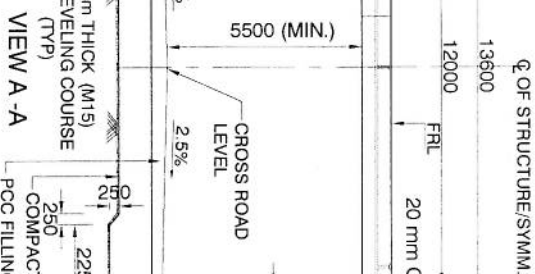
DESIGN DIRECTOR  
Corisan Construcción S.A.

REV	DATE	DESCRIPTION OF REVISIONS	APPROVED:	CONSULTANT	CLIENT:	PROOF CHECKING CONSULTANT:	PROJECT:
			RBS	PCJ PROJECTS CONSULTING INDIA (P) LTD Engineers and Planners 6110 / 2 Sector - D6, Vasant Kunj New Delhi (India) 110070	NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD. Ministry of Road Transport & Highways, Government of India Branch Office : House No.1, Panchsri, Ambabaghi Nagar, 2nd Road, Gurgaon - 24	Gifford India Pvt Ltd (Part of Ramboll) The Edilume Building, 10th Floor 'B', Level 117, Belf Cyber City, Phase-III, Gurgaon, Haryana-122002	FOUR LANEING OF JHANJHI TO DEMOW SECTION OF NH-37 FROM DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM UNDER EPC MODE
			CHECKED	BKG	CONTRACTOR:	Gifford	TITLE
			DESIGNED:	AS	CORSAN CORVIAM CONSTRUCTION S.A.	L. R. KADIYALI & ASSOCIATES	GENERAL ARRANGEMENT DRAWING
			AS	VOYANTS SOLUTIONS PVT LTD. 403, 4th Floor, BPTP Park Central, Sector-30, NH-8, Gurgaon, Haryana - 122001, India	SAFETY CONSULTANT:	RZ-44, Bhawani Kunj, Behind D-2 Vasant Kunj, New Delhi 110 070	VEHICULAR UNDERPASS (CH -491.225)
			DRAWN	KDS	ISOLUX CORSAN	KADIYALI	DRAWING NO
							94-31-01
							SCALE:
							NTS
							REV
							0
							DATE
							March 2016
							SHEET/NO
							A3
							02





## BORE HOLE DETAILS



9. NET SAFE BEARING CAPACITY AT FOUNDING LEVEL ASSUMED 11.54 T/m<sup>2</sup>

REV	DATE	DESCRIPTION OF REVISIONS	APPROVED:	RBS
01	22-03-2016	COMPLIANCE TO PFC COMMENTS	DRAWN:	AS
			CHECKED:	BKG
			DESIGNED:	

**CLIENT:**

**NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.**  
Ministry of Road Transport & Highways, Government of India  
Branch Office - House No. 1, Purnagiri, Ambabagari Nagar, 2nd Road, Guwahati - 781001

**CONTRACTOR:**

**CORSAN CORVAM CONSTRUCTION S.A.**  
02nd Floor, Block Two, Vaitika Business Park, Sector - 49,  
Sohna Road, Gurgaon, Haryana, India - 122001

PROOF CHECKING CONSULTANT  
Gifford

SAFETY CONSULTANT:

 KADITAL

PROJECT:	FOUR LAINING OF JHAUMJI TO DE DESIGN CH. KM 490+800 TO KM 5 UNDER EPC MODE
TITLE:	GENERAL ARRANGEMENT DRAWING VEHICULAR UNDERPASS (CH-500.963)
DRAWING NO	94-31-02













- NOTES:

(WHERE 'd' IS THE DIAMETER OF THE BAR

- (WHERE 'd' IS THE DIAMETER OF THE BAR

### SCHEDULE OF REINFORCEMENT

Corsan Construcción S.A.

Corsan Construcción S.A.



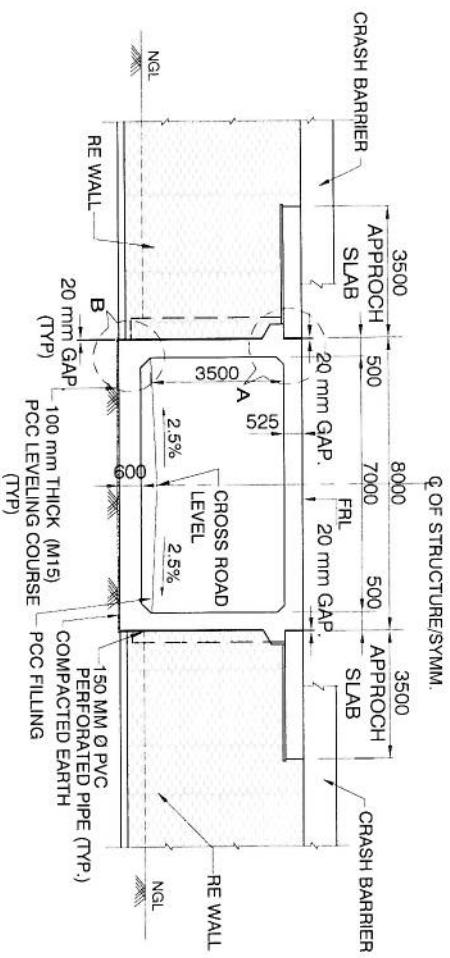
• PUP @ 502.578



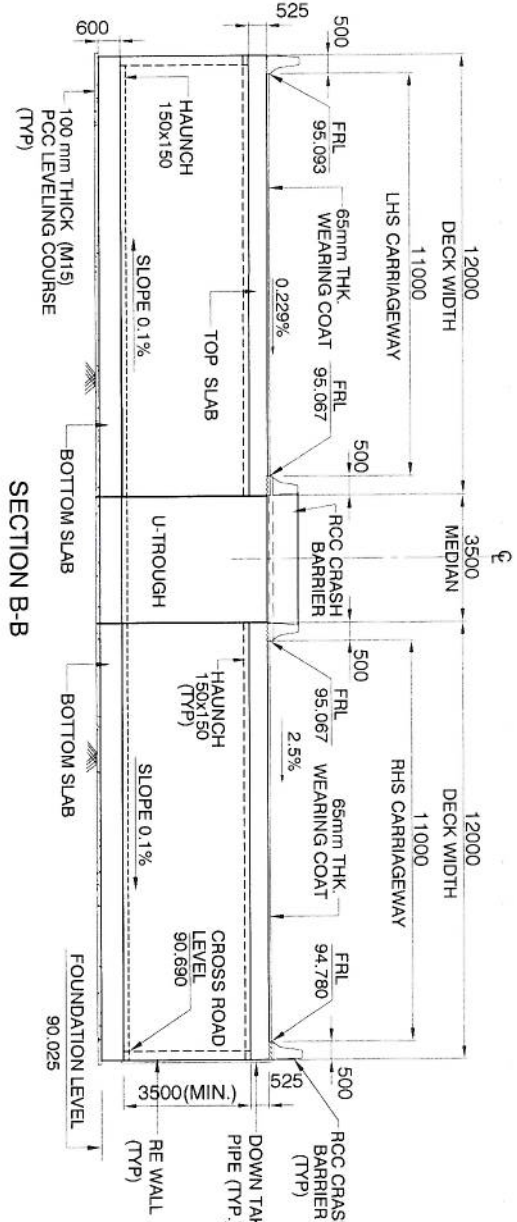
DESIGN DIRECTOR  
Corsan Corviam Construcción S.A.  
*[Signature]*



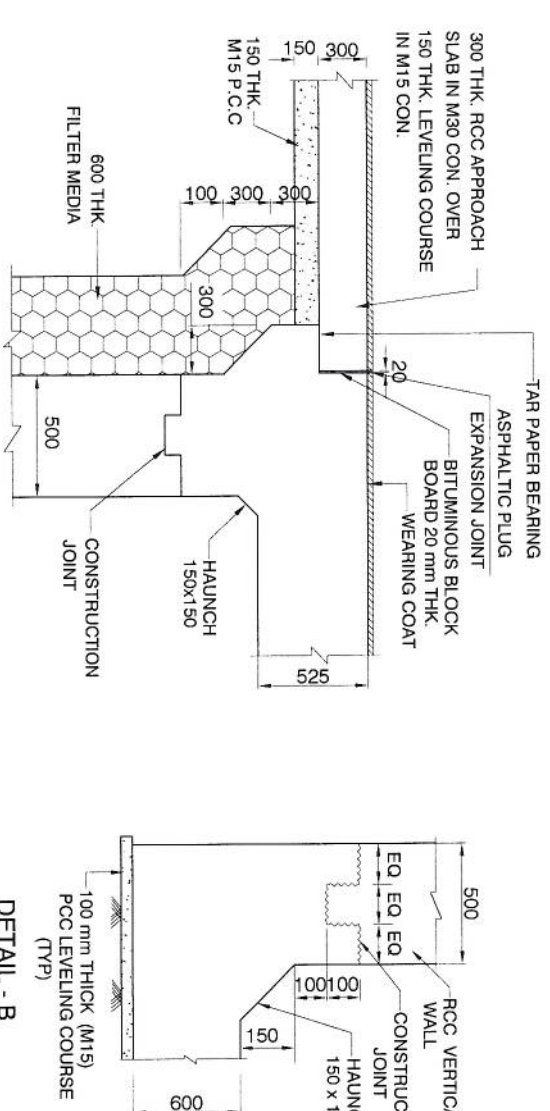




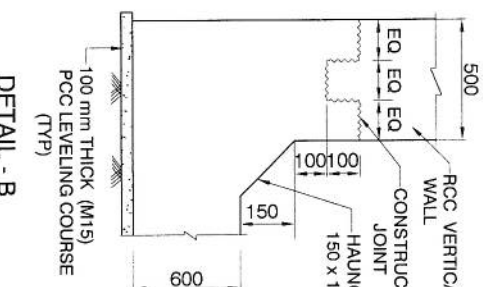
VIEW A - A  
C/O OF STRUCTURE/SYM.



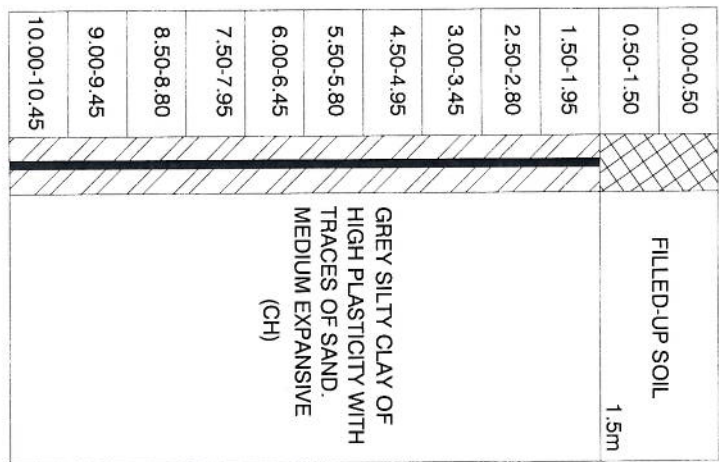
SECTION B-B



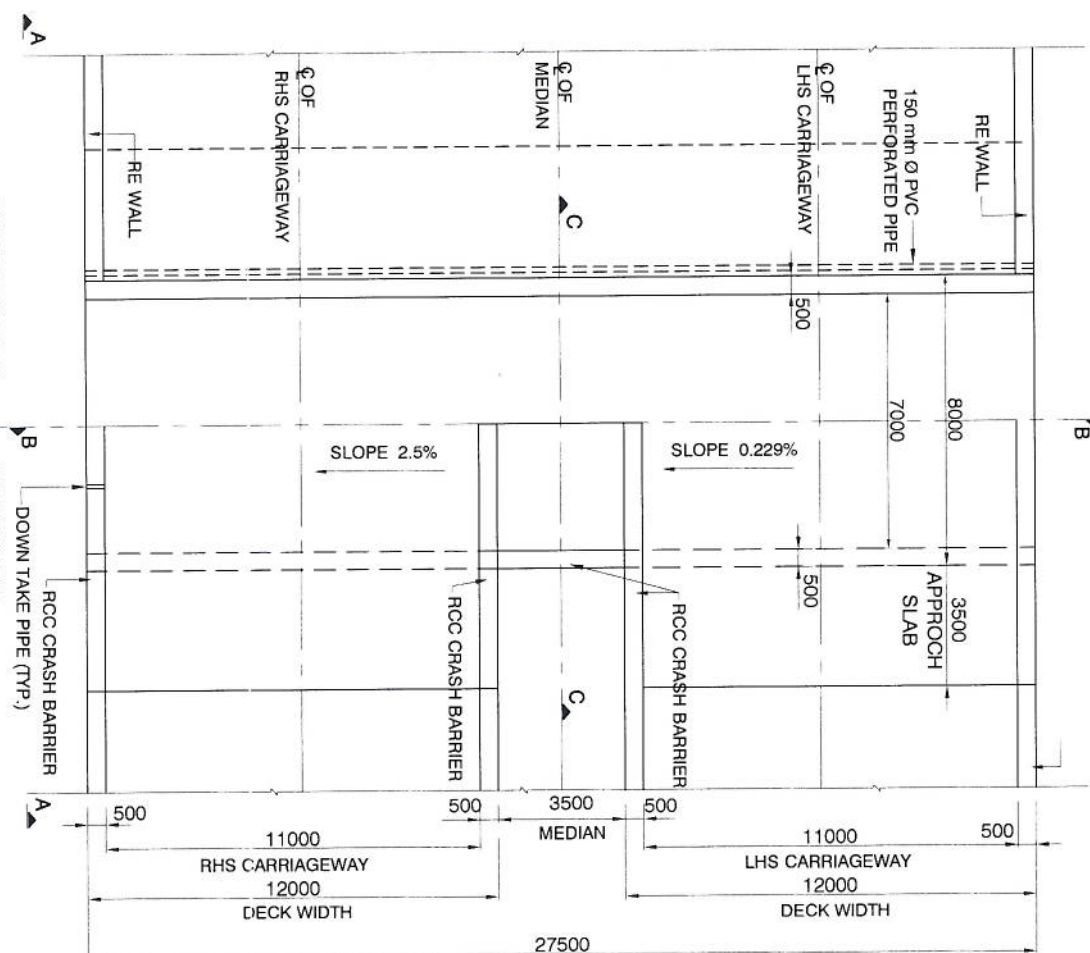
DETAIL - A



DETAIL - B



BORE HOLE DETAILS

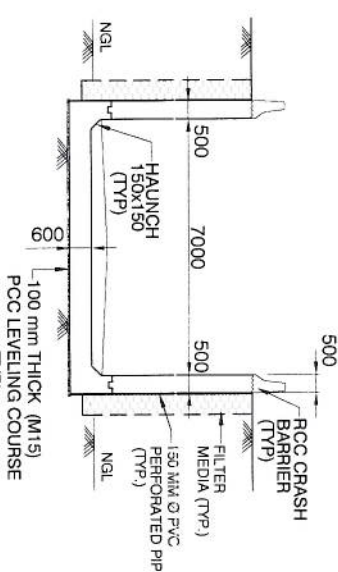


PLAN

Corisan Corviam Construction S.A.

Sno	Existing Chainage	Design Chainage	Type of Structure	No. of Spans	No. of span x span	Existing width	Widening	FRL at RME	FRL at LME	Span 'a' (m)	clear height 'b' (m)	top slab 'd' thickness (m)	Bottom slab 'e' thickness (m)	Side wall 'f' thickness (m)	Design Base Pressure (kN/m <sup>2</sup> )
1	502.910	502.578	Box	1	7	7	7	95.067	95.067	7	3.5	0.525	0.600	0.500	123.8

SECTION C-C



NOTES:

- ALL DIMENSIONS ARE IN mm AND LEVELS IN METRES UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
- THE 3 - LANE STRUCTURE IS DESIGNED FOR ONE LANE OF IRC CLASS 70R+ONE LANE OF IRC CLASS A LOADING OR 3 LANES OF CLASS A LOADING WHICHEVER GOVERNS.
- CONCRETE SHALL BE DESIGN MIX WITH A MINIMUM 28 DAYS CHARACTERISTIC STRENGTH ON 150mm CUBES AS FOLLOWS:-  
M - 35  
RCC BOX  
M - 40  
CRASH BARRIER  
APPROACH SLAB  
M - 30  
LEVELLING COURSE  
M - 15
- THE REINFORCING STEEL SHALL BE CORROSION RESISTANT TMT H.Y.S.D. BARS (GRADE DESIGNATION Fe - 500 CONFORMING TO IS:1786 - 1985.
- 600 THK.FILTER MEDIA SHALL BE PROVIDED BEHIND THE WALLS.
- BACK FILLING BEHIND BOX SHALL CONSIST OF SELECTED EARTH CONFORMING TO APPENDIX 6 OF IRC 7 - 2014 HAVING PROPERTIES C = 0, 30°, =20° & d = 20 KM / m<sup>2</sup>
- 65 mm THE WEARING COURSE COMPRISING OF 40mm. THK. BITUMINOUS CONCRETE & 25mm THK. MASTIC ASPHALT.
- NET SAFE BEARING CAPACITY AT FOUNDING LEVEL ASSUMED 12 T/m<sup>2</sup>.

APPROVED:	RBS	CONSULTANT	PROJECTS CONSULTING INDIA (P) LTD Engineers and Planners 6110 / 2 Sector - D6, Vasant Kunj New Delhi (India) 110070	CHECKED:	BKG	DESIGNED:	AS	COMPLIANCE TO THE COMMENTS	DRAWN:	KDS
DATE	22-03-2016	DESCRIPTION OF REVISIONS								

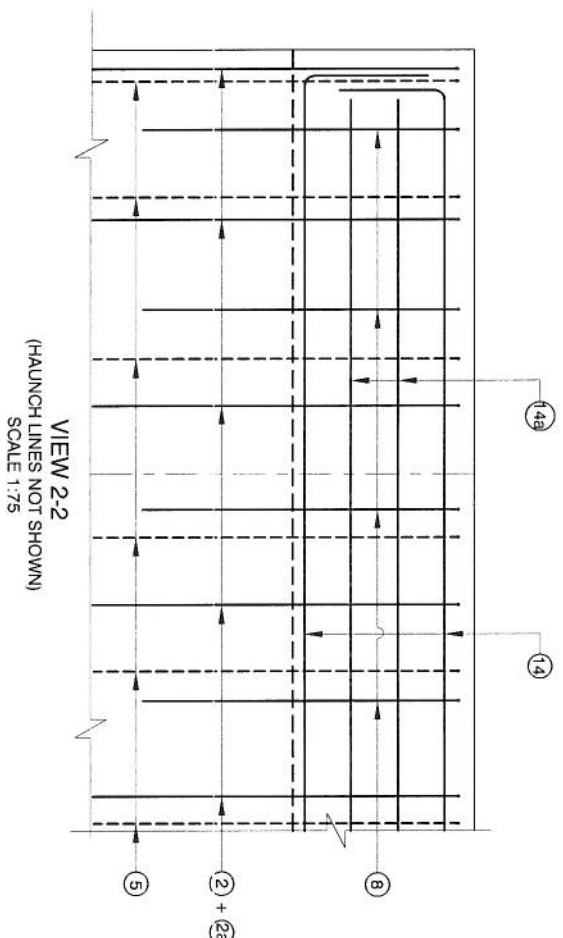
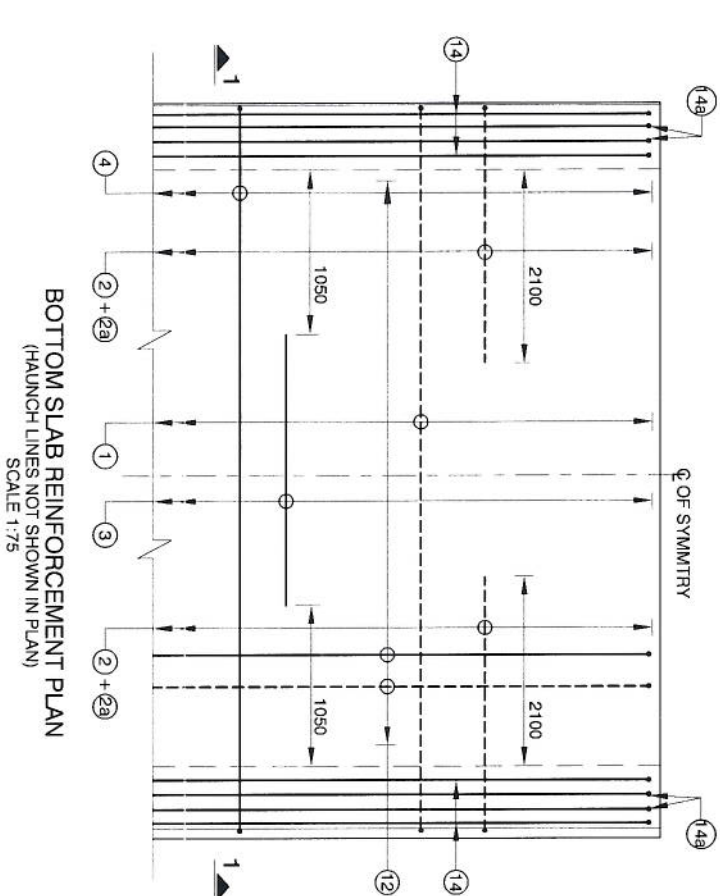
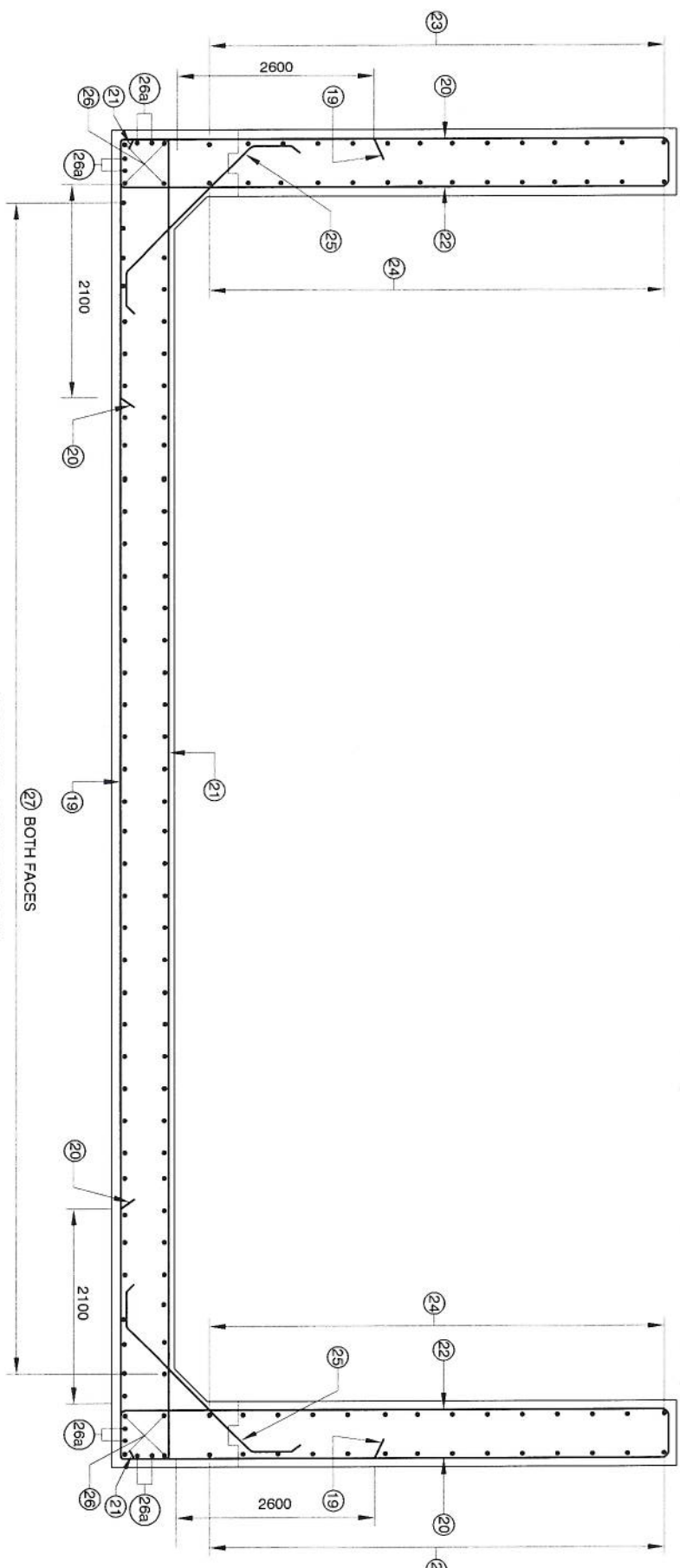
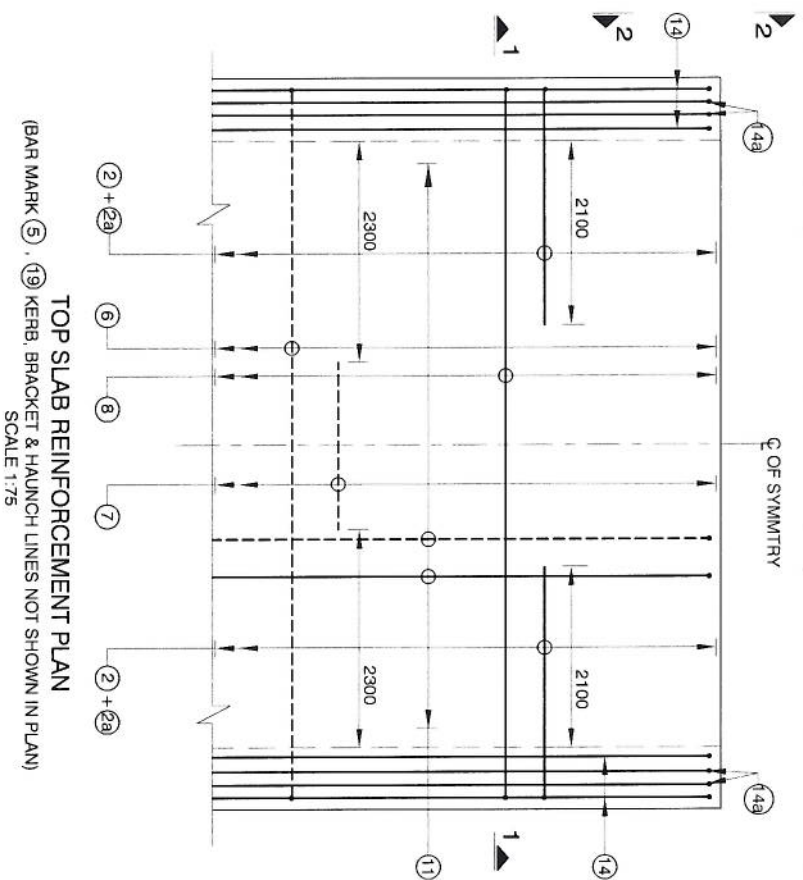
CLIENT:	NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD. Ministry of Road Transport & Highways, Government of India Branch Office - House No. 1, Panchsheel Park, Connaught Place, New Delhi - 110002	CONTRACTOR:	CORISAN CORVIAM CONSTRUCTION S.A. 02nd Floor, Block Two, Vellu Business Park, Sector - 48, Scheme Road, Gurgaon, Haryana, India - 122001
PROOF-CHECKING CONSULTANT:	Gifford	SAFETY CONSULTANT:	L. R. KADIVALA & ASSOCIATES RZ-44, Bhawanji Kunj, Behind D-2 Vasant Kunj, New Delhi 110 070

PROJECT:	FOUR LANE OF JHANJHI TO DEMOW SECTION OF NH-37 FROM DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM UNDER EPC MODE
TITLE:	GENERAL ARRANGEMENT DRAWING PEDESTRIAN UNDERPASS (CH-502.578)
DRAWING NO.	94-31-04
SHEET/NO.	01
DATE:	March 2016
REV	0









#### NOTES:

- ALL DIMENSIONS ARE IN mm AND LEVELS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
- DIMENSIONS SHALL NOT TO BE SCALED ONLY WRITTEN DIMENSIONS SHALL TO BE FOLLOWED.
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS.
- ALL REINFORCING STEEL SHALL BE HIGH YIELD STRENGTH DEFORMED (CRS-TMT) BARS (GRADE - Fe 500). CONFORMING IS :1786.
- CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE FOLLOWS.
  - EARTH FACE 75 mm
  - FOR OTHERS 40 mm
- MINIMUM ANCHORAGE LENGTH SHALL BE 42D, WHERE 'D' IS THE DIAMETER OF BAR. LAP LENGTH SHALL BE PROVIDED AS PER BELOW.  
(FOR GRADE OF CONC. M35 AND ABOVE)
- | LAP LENGTH | % LAP AT ANY SECTION IS |
|------------|-------------------------|
| 76 d       | BETWEEN 40 - 50%        |
| 68 d       | BETWEEN 25 - 40%        |
| 60 d       | - 25%                   |

  
(WHERE 'd' IS THE DIAMETER OF THE BAR)
- FOR UNFAVORABLE BOND CONDITIONS LAP LENGTH SHALL BE MULTIPLIED 1.4 AS PER IRC-21-2000
- ALL LAP SHALL BE SUITABLY STAGGERED AND MINIMUM DISTANCE BETWEEN THE ADJACENT LAPS SHALL BE 130 TIMES OF LAP LENGTH.

LEGEND	
———	TOP FACE BARS/ OUTER FACE BARS
-----	BOTTOM FACE BARS/ INNER FACE BARS

DESIGN DIRECTOR  
Corsan Corviam Construction S.A.

APPROVED		CONSULTANT		CLIENT		PROOF CHECKING CONSULTANT		PROJECT	
	RBS		PCII		NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.		Gifford		REINFORCEMENT DETAILS DRAWING
	CHECKED:		Engineers and Planners		Ministry of Road Transport & Highways, Government of India				SHEET SIZE: A3
	DESIGNED:		6110 / 2 Sector - 06, Vasant Kunj New Delhi (India) 110070		Branch Office: House No.1, 7th Phase, Ambikapur Nagar, 200 Road, Guwahati - 24				SHEET: 02
	AS		VOYANTS SOLUTIONS PVT LTD.		CORSAN CORVIAM CONSTRUCTION S.A.				DATE: March 2016
	DRAWN:		403, 4th Floor, BPTP Park Centre, Sector-30, NH-8, Gurgaon, Haryana - 122001, India		02nd Floor, Block Two, Vaila Business Park, Sector - 49, Sohna Road, Gurgaon, Haryana, India - 122001				REV. 0
REV	DATE	DESCRIPTION OF REVISIONS		SAFETY CONSULTANT		DRAWING NO.		SCALE AS SHOWN	
		KOS		KADIVYALU		94-31-05		AS SHOWN	



SCHEDULE OF REINFORCEMENT

BAR MARKS	BARS SHAPE	BAR DIA.	SPACING / NOS.	REMARKS
1		12	200	Lapping
2		16	200	Alternate + Lapping
2a		12	200	Alternate + Lapping
3		20	200	Alternate
4		16	200	Alternate
5		16	200	
6		16	200	Alternate
7		12	200	Alternate
8		12	200	Lapping
9		10	200	
10		10	200	
11		10	200	
12		12	250	
13		12	200	
14		10	4 x 4 Nos	
14a		10	4 x 4 Nos	
15		12	200	
16		10	200	
17		12	2 x 5 Nos	
18		10	3 LAYERS 2 LEGGED STIRRUPS @ 400 c/c	
19		20	200	

SCHEDULE OF REINFORCEMENT

BAR MARKS	BARS SHAPE	BAR DIA.	SPACING / NOS.	REMARKS
20		20	200	
21		20	200	
22		16	200	
23		10	100	
24		10	100	
25		10	200	
26		10	2x4 Nos.	
26a		12	2x4 Nos.	
27		12	150	

DESIGN BY  
Corisan Corviam Construction S.A.

APPROVED:	CONSULTANT	CLIENT	PROOF CHECKING CONSULTANT	PROJECT
RBS	PCI	NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	Gifford India Pvt. Ltd. (Part of Ramboll)	FOUR LANE OF JHANJI TO DEMOW SECTION OF NH-37 FROM
CHECKED:	PROJECTS CONSULTING INDIA (P) LTD	Ministry of Road Transport & Highways, Government of India	Gifford	DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM
BKG	Engineers and Planners	Branch Office - Huda A-1, Panchsheel Nagar, New Delhi - 110070		UNDER EPC MODE
DESIGNED:	6110 / 2 Sector - D6, Vasant Kunj New Delhi (India) 110070	CORISAN CORVIAM CONSTRUCTION S.A.	L. R. KADIVALLA & ASSOCIATES	REINFORCEMENT DETAILS DRAWING
AS	VOYANTS SOLUTIONS PVT LTD.	02nd Floor, Block Two, Vastika Business Park, Sector - 49, Sohna Road, Gurgaon, Haryana, India - 122001	RZ-44, Bhawan Kunj, Behind D-2 Vasant Kunj, New Delhi 110 070	PEDESTRIAN UNDERPASS
DRAWN:	403, 4th Floor, BPTP Park Centre, Sector-30, NH-8, Gurgaon, Haryana - 122001, India			
KDS				
REV	DATE	DESCRIPTION OF REVISIONS		

TITLE:	SHEET/NO.	SHEET:	DATE:
REINFORCEMENT DETAILS DRAWING	A3	03	March 2016
DRAWING NO.	94-31-05	SCALE: NTS	REV
			0



- 
- CD Structure @ 496.538
  - CD Structure @ 497.300

Corsan Corvia  Construcción S.A.





SCHEDULE OF CD WORKS																						
										Detail of Widening				Existing Detail				Proposed Details				
S.no	Existing CD No	Proposed CD No	Existing Chainage	Proposed Chainage	Invert Level	HFL	Lowest bed level	Existing width (E)	LHS Widening (A)	RHS Widening (B)	Length Of culvert	FRL at RME	FRL at LME	Existing FRL	RFP opening	Type of Proposal	No. of Spans	Proposal	Type of Structure	Opening Proposal (MAX)	Ref. Dwg No.	
1	497/1	497/1	496.863	496.538	85.577	87.750	85.877	11.5	-	-	26	89.630	89.630	89.630	1x4.5x3	BOX	1	Reconstruction	BOX	1x4.5x4.326	94-32-01	
2	498/1	498/1	497.641	497.300	86.945	87.653	87.245	11.5	-	-	26	89.998	89.998	89.998	1x4.5x2	BOX	1	Reconstruction	BOX	1x4.5x3.326	94-32-02	

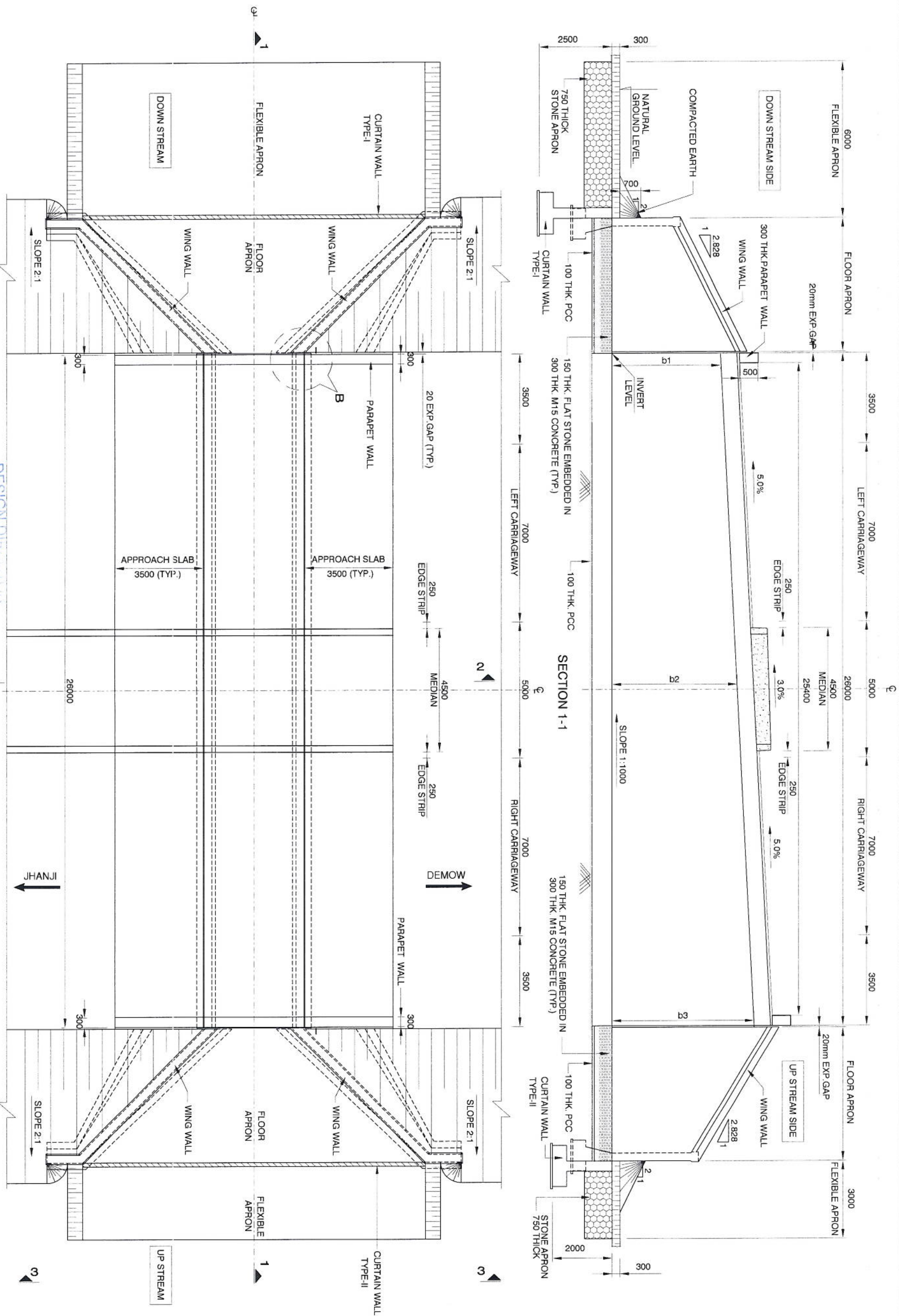
\* Refers to maximum culvert opening height

Corsan Corvia Construction S.A.

REV	DATE	DESCRIPTION OF REVISIONS	APPROVED: RBS	CHECKED: BKG	DESIGNED: AS	DRAWN: KDS	CONSULTANT <b>PCI</b> PROJECTS CONSULTING INDIA (P) LTD Engineers and Planners 6/110 / 2 Sector - D6, Vasant Kunj New Delhi (India) 110070 AUTHORITY ENGINEER: <b>VOYANTS SOLUTIONS PVT LTD.</b> 403, 4th Floor, BPTP Park Centre, Sector-30, NH-8, Gurgaon, Haryana - 122001, India	CLIENT: <b>NATIONAL HIGHWAYS &amp; INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.</b> Ministry of Road Transport & Highways, Government of India Branch Office - House No. 1, Transport, Jhilmurga Nagar, 200 Road, Gurgaon - 24 <b>CORSAN CORVIA CONSTRUCTION S.A.</b> 02nd Floor, Block Two, Vatika Business Park, Sector - 49, Sohna Road, Gurgaon, Haryana, India - 122001	PROOF CHECKING CONSULTANT: Gifford <b>Gifford India Pvt Ltd</b> (Pvt. Ltd. Panjab) The Epsilon Building No. 1, Sector 'B', Level 12, DLF Cyber City Phase-III, Gurgaon, Haryana-122002	SAFETY CONSULTANT: <b>L. R. KADIYAL &amp; ASSOCIATES</b> RZ-44, Bhawani Kunj, Behind D-2 Vasant Kunj, New Delhi 110 070	PROJECT: FOUR LANING OF JHANJHI TO DEMOW SECTION OF NH-37 FROM DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM UNDER EPC MODE	TITLE: CD STRUCTURES (CH. - 490.00 TO 505.00)	SHEET/NO. SHEET: A3 01	DATE: March 2016
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REV	DATE	DESCRIPTION OF REVISIONS
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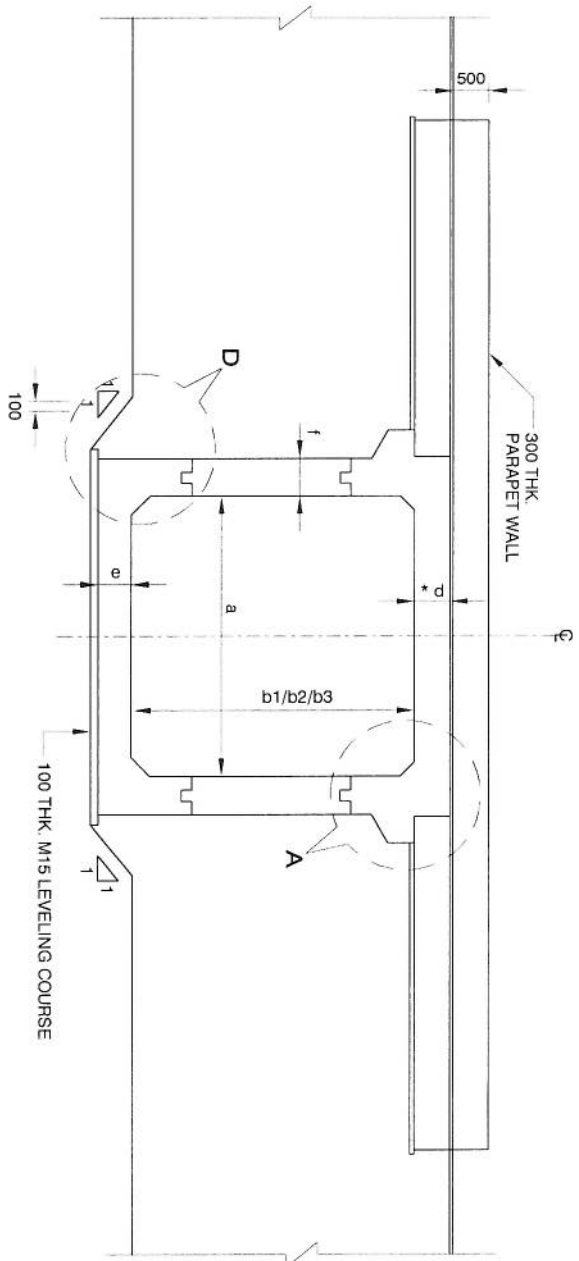




DESIGN DIRECTOR  
Corsan Construction S.A. PLAN

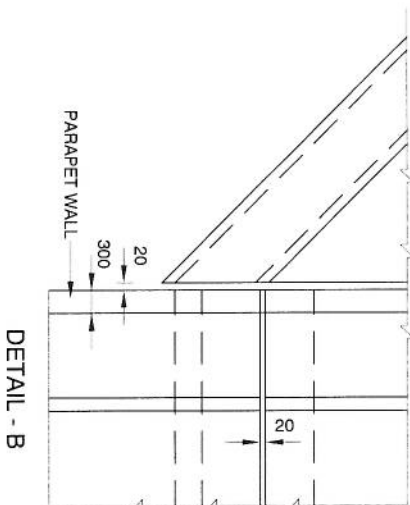
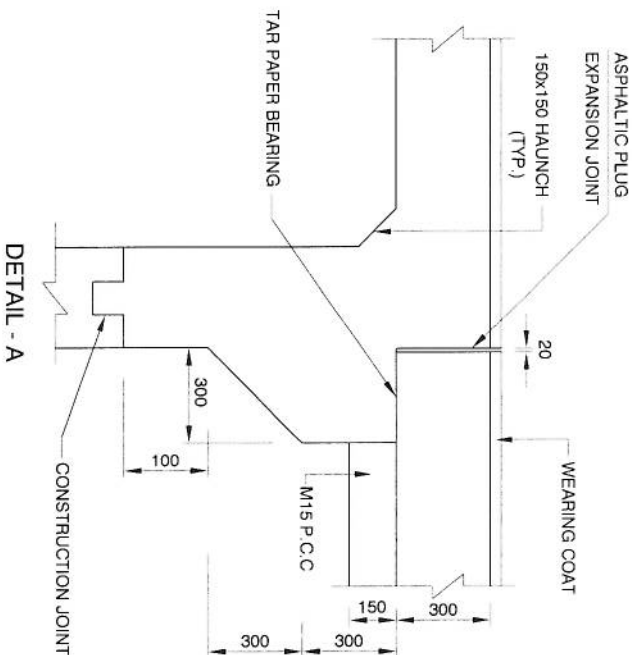
REV	DATE	DESCRIPTION OF REVISIONS	DRAWN:	KDS
01	22-03-2016	COMPLIANCE TO HPC COMMENTS	AS	
02			DESIGNED:	BKG
03			CHECKED:	RBS
04			APPROVED:	
CONSULTANT				
PROJECTS CONSULTING INDIA (P) LTD				
Engineers and Planners				
61/10/2 Sector - D6, Vasant Kunj New Delhi (India) 110070				
AUTHORITY ENGINEER:				
VOYANTS SOLUTIONS PVT LTD.				
403, 4th Floor, BPTP Park Centre,				
Sector-30, NH-8, Gurgaon, Haryana - 122001, India				
CLIENT				
NATIONAL HIGHWAYS & INFRASTRUCTURE				
DEVELOPMENT CORPORATION LTD.				
Ministry of Road Transport & Highways, Government of India				
Branch Office: House No. 1, Panchsheel, Ambikapur Nagar, 200 Road, Gwalior - 24				
CONTRACTOR				
CORSAN CORVAM CONSTRUCTION S.A.				
02nd Floor, Block Two, Vellia Business Park, Sector - 49,				
Sohna Road, Gurgaon, Haryana, India - 122001				
PROOF CHECKING CONSULTANT:				
Gifford				
SAFETY CONSULTANT:				
L. R. KADYALL & ASSOCIATES				
R2-44, Bhawanji Kunj, Behind D-2 Vasant Kunj,				
New Delhi 110 070				
PROJECT: FOUR LANE OF JHANJHI TO DEMOW SECTION OF NH-37 FROM				
DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM				
UNDER EPC MODE				
TITLE: GENERAL ARRANGEMENT DRAWING				
RECONSTRUCTION SINGLE CELL				
RCC BOX CULVERT FOR WIDENING				
OF BOX CULVERT (CH:496.538)				
DRAWING NO. 94-32-01				
SHEET SIZE: SHEET: DATE:				
A3 01 March 2016				
SCALE: NTS REV: 0				



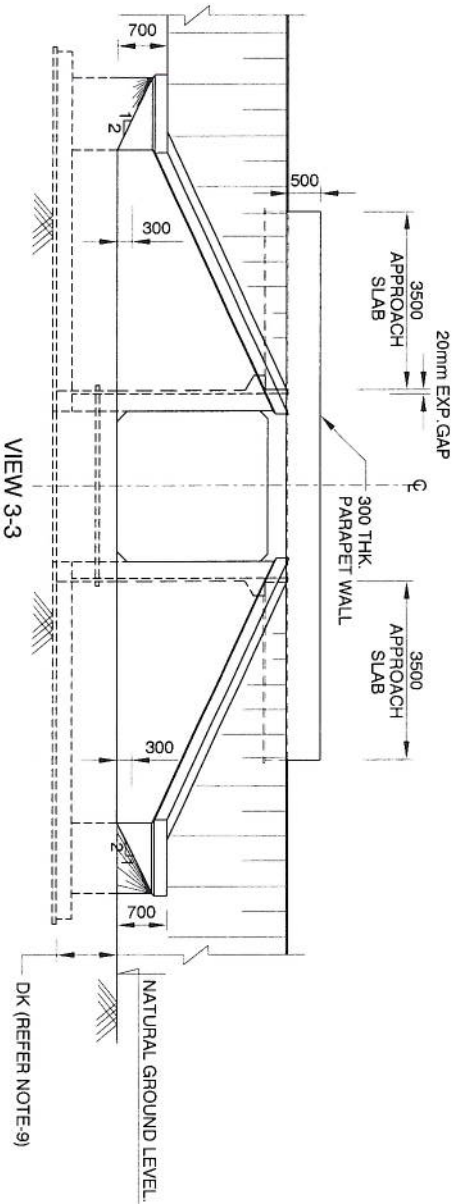


SECTION 2-2

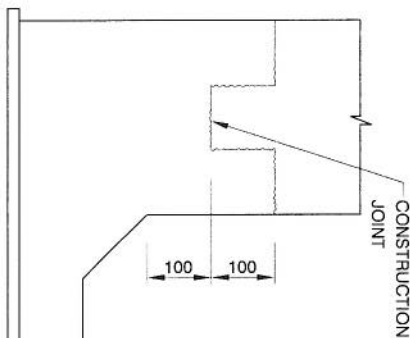
\*d DECK SLAB THICKNESS AT INNER EDGE OF KERB AS SHOWN IN SECTION 1-1



DETAIL - B



VIEW 3-3



DETAIL - D

S.no	Existing Chainage	Design Chainage	Proposed			Details of widening				FRL at R/L	FRL at L/M	Invert level	Lowest bed level	Span "a" (m)	clear height "b1" (m)	clear height "b2" (m)	clear height "b3" (m)	Top slab 'd' thickness (m)	Bottom slab 'e' thickness (m)	Side wall 'f' thickness (m)	Design Base Pressure (kN/m <sup>2</sup> )	Direction of flow
			Type of Structure Proposed	No. of Spans	No. of span x span arrangement	Existing FRL	Existing width	LHS Widening	RHS Widening													
1	496.863	496.538	BOX	1.000	1x4.5x4.326	89.630	11.5	-	-	89.630	89.630	85.577	85.877	4.500	3.000	3.663	4.326	0.450	0.550	0.475	76	Right to Left

DESIGN DIRECTOR

Corsan Corviam Construction S.A.

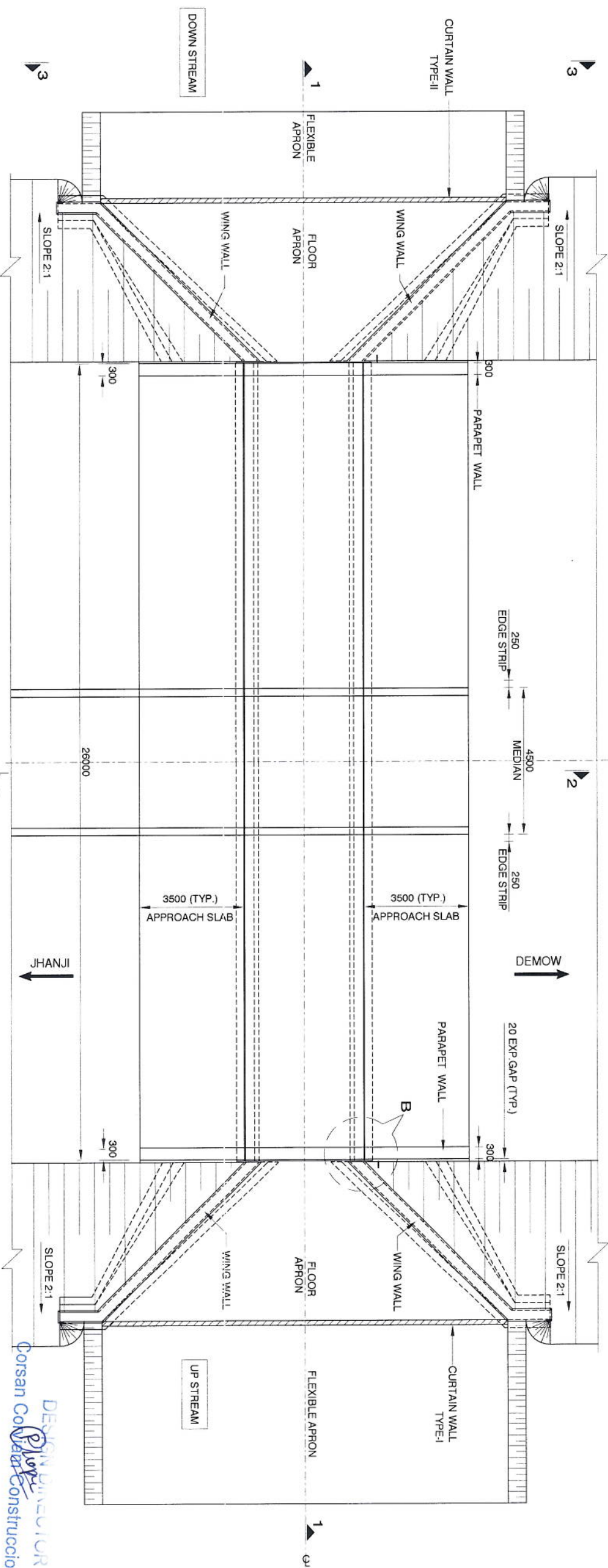
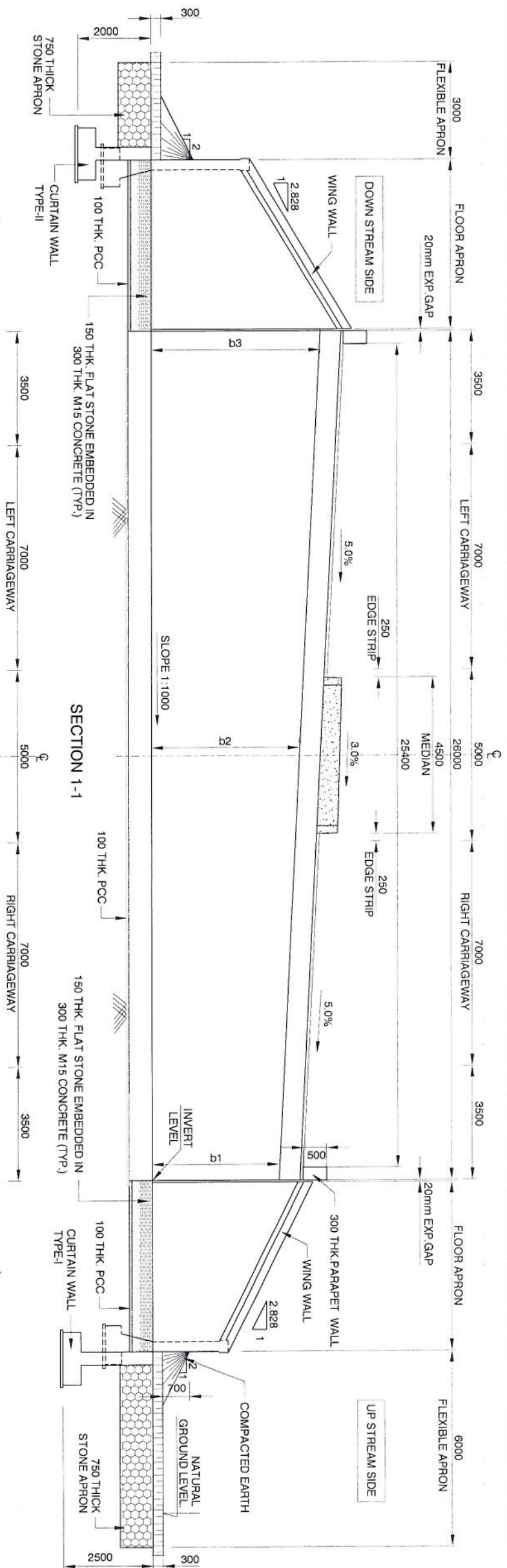
APPROVED:			CONSULTANT			CLIENT			PROOF CHECKING CONSULTANT			SAFETY CONSULTANT			PROJECT		
RBS			PROJECTS CONSULTING INDIA (P) LTD			NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.			Gifford India Pvt Ltd			L. R. KADIVYAL & ASSOCIATES			FOUR LANE OF JHANJI TO DEMOW SECTION OF NH-37 FROM DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM UNDER EPC MODE		
CHECKED:			BKG			Ministry of Road Transport & Highways, Government of India			The Engineer, Building No.5, Tower 'B', Level 3, GOLF Cyber City Phase-III, Gurgaon, Haryana-122002			RZ-44, Bhawanji Kunj, Behind D-2 Vasant Kunj, New Delhi 110 070			GENERAL ARRANGEMENT DRAWING		
DESIGNED:			AS			VOYANTS SOLUTIONS PVT LTD.			RZ-44, Bhawanji Kunj, Behind D-2 Vasant Kunj, New Delhi 110 070			RZ-44, Bhawanji Kunj, Behind D-2 Vasant Kunj, New Delhi 110 070			RECONSTRUCTION SINGLE CELL BOX CURVE FOR WIDENING OF BOX CULVERT (CH.496.538)		
DRAWN:			KDS			Sector-30, NH-8, Gurgaon, Haryana - 122001, India			Sector-30, NH-8, Gurgaon, Haryana - 122001, India			Sector-30, NH-8, Gurgaon, Haryana - 122001, India			SCALE: NTS		
DATE			22-03-2016			DISCUSSION OF REVISIONS			REV			0			0		

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
- CONCRETE SHALL BE DESIGN MIX WITH A MINIMUM 28 DAYS CHARACTERISTIC STRENGTH ON 150MM CUBES AS FOLLOWS:

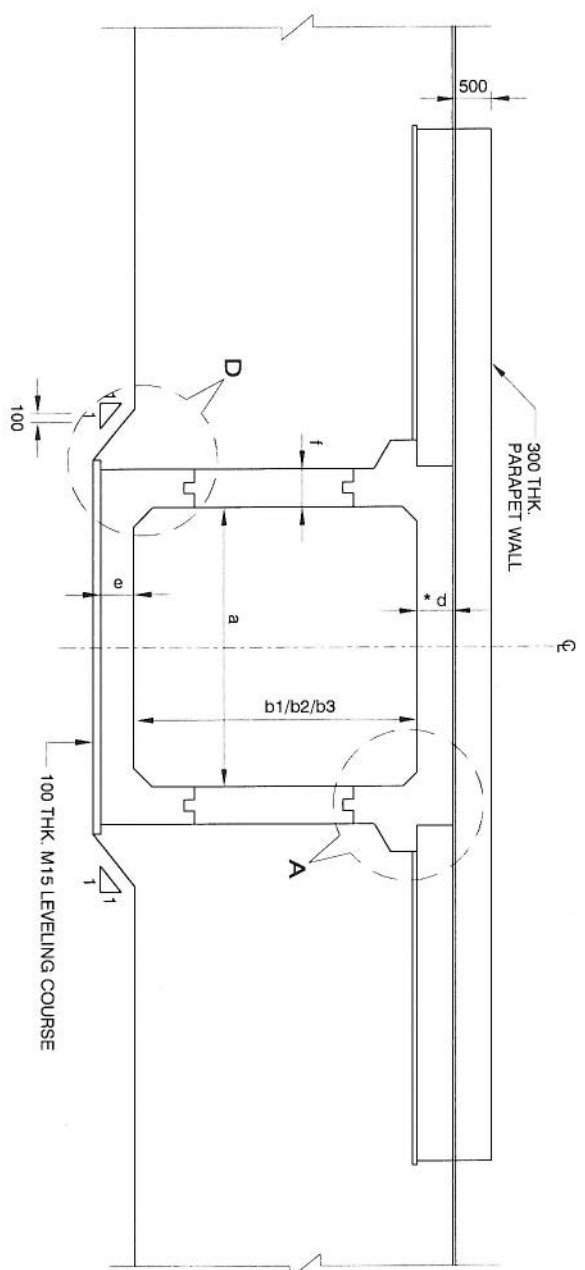
RCC BOX	M-30
APPROACH SLAB	M-30
LEVELLING COARSE	M15
PCC WING WALL	M20
PARAPET WALL	M-30
PCC CURTAIN WALL	M-20
- THE REINFORCING STEEL SHALL BE CORROSION RESISTANT TMT HYSD BARS (GRADE DESIGNATION FE-500 CONFORMING TO IS:1786-1985)
- PROPOSED CULVERT IS DESIGNED FOR ONE LANE OF IRC CLASS 70R TRACKED & 40 BOGIE LOAD WHICHEVER IS GOVERNING.
- BACKFILLING BEHIND BOX SHALL CONSIST OF SELECTED EARTH CONFORMING TO APPENDIX 6 OF IRC 78-2014 HAVING PROPERTIES C=0,  $\phi > 30^\circ$  &  $\gamma_D = 20 \text{ kN/m}^3$
- 65MM THK WEARING COURSE COMPRISING OF 40MM THK BITUMINOUS CONCRETE & 25MM THK ASPHALTIC SHALL BE PROVIDED
- NET SAFE BEARING CAPACITY AT FDN LEVEL ASSUMED 7.6 T/M<sup>2</sup>
- GROUND IMPROVEMENT TO BE DONE WHERE BASE PRESSURE EXCEEDS ALLOWABLE SBC
- THE VARIOUS LEVELS (FRL, INVERT LEVELS) & SUPER ELEVATION SHOWN IN DRAWINGS SHALL BE VERIFIED PRIOR TO EXECUTION AT SITE AND IF ANY DISCREPANCY FOUND SHALL BE INFORM TO ENGINEER
- SOFT AND LOOSE PATCHES IN THE BEARING AREA ARE TO BE REPLACED BY BY COMPACTED GRANULAR FILLS WITH LAYERS NOT EXCEEDING 300mm.
- FOR REINFORCEMENT DETAILS REFER DRG NO. 94-32-03
- FOR RETAINING WALL/WING WALL, PARAPET WALL, CURTAIN WALL & GUARD STONE DETAILS REFER DRG NO. 94-33-01





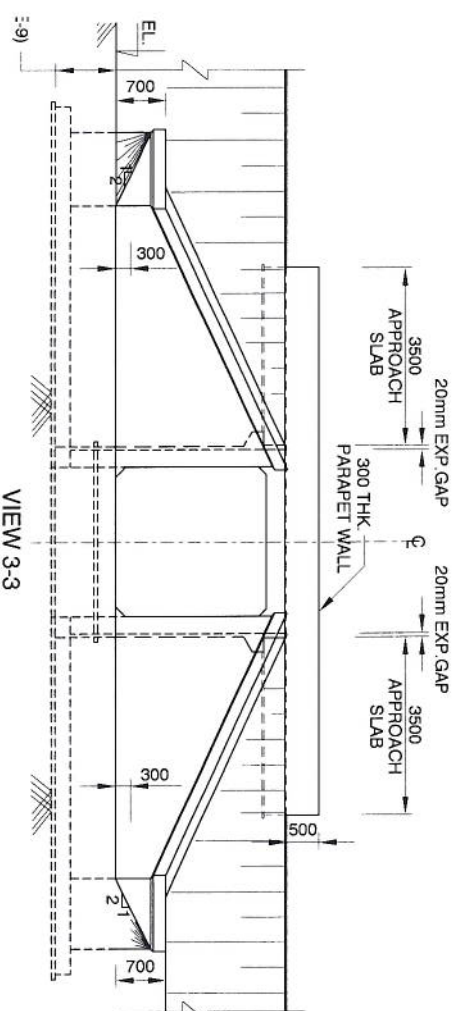
REV	DATE	DESCRIPTION OF REVISIONS	APPROVED	CONSULTANT	CLIENT	PROOF CHECKING CONSULTANT	PROJECT	SHEET SIZE	SHEET	DATE
R1	22/03/2016	COMPLIANCE TO HC COMMENTS	RBS	PROJECTS CONSULTING INDIA (P) LTD Engineers and Planners 6110/12 Sector - D6, Vasant Kunj New Delhi (India) 110070	NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD. Ministry of Road Transport & Highways, Government of India Branch Office : House No. 1, Pragathi, Anandapuri Nagar, 200 Road, Gurgaon - 24	Gifford India Pvt. Ltd. (Part of Ramboll) The Corporate Building No. 8, Tower 'B', Level: 12, DLF Cyber City Phase-III, Gurgaon, Haryana-122002	DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM UNDER EPC MODE	A3	01	March 2016
			DESIGNED	AS	VOYANTS SOLUTIONS PVT LTD. 403, 4th Floor, BPTP Park Centre, Sector-30, NH-8, Gurgaon, Haryana - 122001, India	CORSAN CORVIM CONSTRUCTION S.A. 02nd Floor, Block Two, Vaika Business Park, Sector - 49, Sohna Road, Gurgaon, Haryana, India - 122001	GENERAL ARRANGEMENT DRAWING RECONSTRUCTION SINGLE CELL RCC BOX CULVERT FOR WIDENING OF BOX CULVERT (CH.497/300)	SCALE	NTS	REV.
			DRAWN	KOS		L. R. KADIYALI & ASSOCIATES R2-44, Bhawanil Kunj, Behind D-2 Vasant Kunj, New Delhi 110 070				0



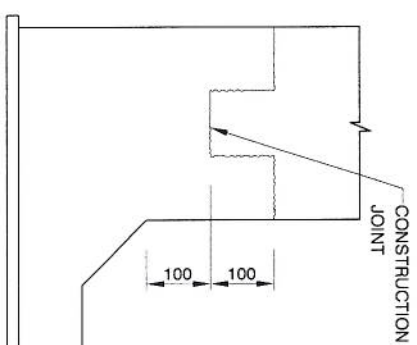


## SECTION 2-2

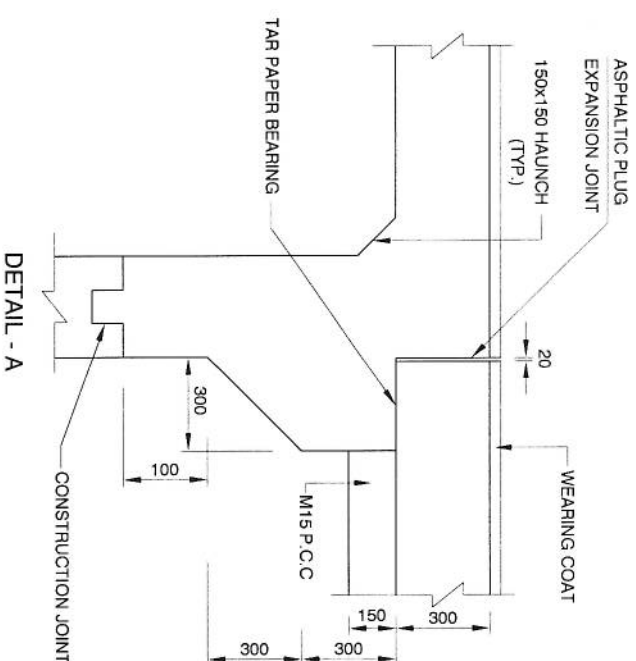
\*d DECK SLAB THICKNESS AT INNER EDGE OF KERB AS SHOWN IN SECTION 1-1



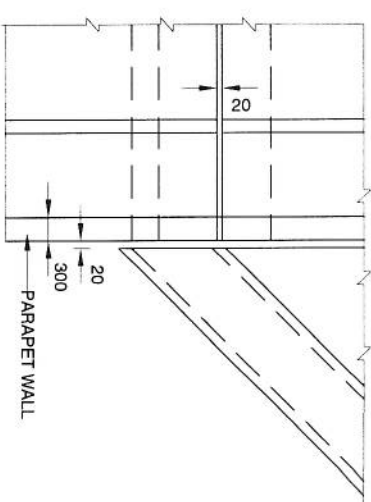
VIEW 3-3



DETAIL - D



DETAIL - A



DETAIL - B

S.no	Existing Chambers	Design Chambers	Proposed																	Design Base Pressure (kN/m <sup>2</sup> )	Direction of Flow				
			Details of widening										FRL at RWE	FRL at LWE	Invert level	Lowest Bed level	Span "a" (m)	clear height "b <sub>1</sub> " (m)	clear height "b <sub>2</sub> " (m)			clear height "b <sub>3</sub> " (m)	top slab 'd' thickness (m)	Bottom slab 'e' thickness (m)	Side wall 'f' thickness (m)
			Type of Structure Proposed	No. of Spans	No. of span x span arrangement	Existing FRL	Existing width	LHS Widening	RHS Widening																
1	497.641	497.300	BOX	1	1x4.5x3.326	89.998	11.5	-	-	89.998	89.998	86.945	87.245	4.500	2.000	2.663	3.326	0.425	0.525	0.450	70	Right to Left			

DESIGN DIRECTOR

Corsan Coviam Construction S.A.

		APPROVED	CONSULTANT	CIENT:	PROJECT:
RHS	BKS	CHECKED	PCT PROJECTS CONSULTING INDIA (P) LTD. Engineers and Planners 610 / 2 Sector - D6, Vasant Kunj New Delhi (India) 110070	NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD. Ministry of Road Transport & Highways, Government of India Branch Office : House No.1, Panagudi, Ambajogai Nagar, Zee Road , Coimbatore-24	FOUR LANE OF JHANUHI TO DEMOW SECTION OF NH-37 FROM DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM UNDER EPC MODE
DRAWN:	AS	DESIGNED	AUTHORITY ENGINEER :	SAFETY CONSULTANT:	TITLE
KDS			VOYANTS SOLUTIONS PVT.LTD., 403, 4th Floor, BPT Park Centre, Sector-30, NH-8, Gurgaon, Haryana – 122001, India	Gifford India Pvt Ltd. (Partly Ramboll) The Flagship Building NO-5, Tower-B, Level-12, OCF Cyber City Phase-Ill, Gurgaon, Haryana-122002	GENERAL ARRANGEMENT DRAWING RECONSTRUCTION SINGLE CELL RCC BOX CULVERT FOR WIDENING OF BOX CULVERT (CH 497.300)
REVISION DATE DESCRIPTION OF REVISIONS			ISOLUX CORSSAN	L. R. KADIYAL & ASSOCIATES RZ-44, Bhawani Kunji, Behind D-2 Vasanti Kunji, New Delhi 110 070	SHEET/SIZE: A3 SHEET: 02 DATE: March 201 REV: 0 SCALE: NTS

- NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE MENTIONED.  
ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
2. CONCRETE SHALL BE DESIGN MIX WITH A MINIMUM 28 DAYS CHARACTERISTIC STRENGTH ON 150MM CUBES AS FOLLOWS:-

RCC BOX	M-30
APPROACH SLAB	M-30
LEVELLING COARSE	M15
PCC WING WALL	M20
PARAPET WALL	M-30
PCC CURTAIN WALL	M-20
3. THE REINFORCING STEEL SHALL BE CORROSION RESISTANT THAT HYSD BARS (GRADE DESIGNATION FE-500 CONFORMING TO IS-1786-1985)
4. PROPOSED CULVERT IS DESIGNED FOR ONE LANE OF IRC CLASS 'VII' TRACKED & 40 BOGIE LOAD WHICHEVER IS GOVERNING.
5. BACKFILLING BEHIND BOX SHALL CONSIST OF SELECTED EARTH CONFORMING TO APPENDIX 6 OF IRC 78-2014 HAVING PROPERTIES  $C=0$ ,  $\phi > 30^\circ$  &  $\gamma_D = 20 \text{ KN/m}^2$
6. 65MM THK WEARING COURSE COMPRISING OF 40MM THK BITUMINOUS CONCRETE & 25MM THK ASPHALTIC SHALL BE PROVIDED
7. NET SAFE BEARING CAPACITY AT FDN LEVEL ASSUMED  $7.0 \text{ T/m}^2$
8. GROUND IMPROVEMENT TO BE DONE WHERE BASE PRESSURE EXCEEDS ALLOWABLE SBC
9. THE VARIOUS LEVELS (FRL, INVERT LEVELS) & SUPER ELEVATION SHOWN IN DRAWINGS SHALL BE VERIFIED PRIOR TO EXECUTION AT SITE, AND IF ANY DISCREPANCY FOUND SHALL BE INFORM TO ENGINEER
10. SOFT AND LOOSE PATCHES IN THE BEARING AREA ARE TO BE REPLACED BY COMPACTED GRANULAR FILLS WITH LAYERS NOT EXCEEDING 300mm.
11. FOR REINFORCEMENT DETAILS REFER DRG NO. 94-32-03
12. FOR RETAINING WALL/WING WALL, PARAPET WALL, CURTAIN WALL & GUARD STONE DETAILS REFER DRG NO. 94-33-01

PROJECT: FOUR LANING OF JHANJHI TO DEMOW SECTION OF NH-37 FROM

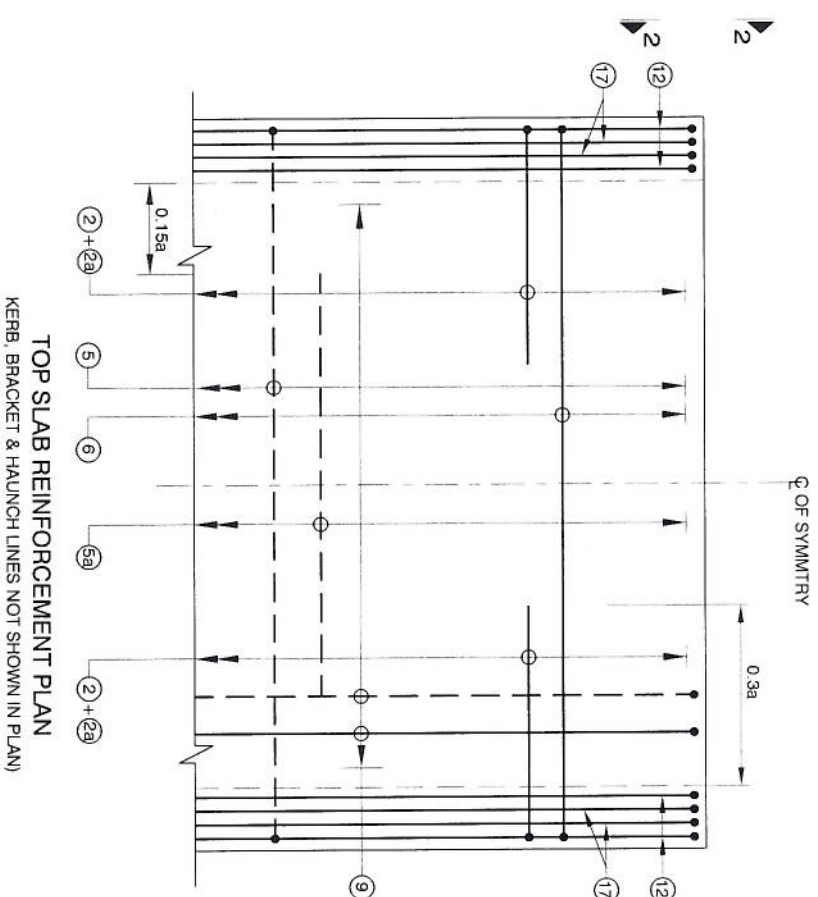
DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM  
UNDER EPC MODE

TITLE:	GENERAL ARRANGEMENT DRAWING RECONSTRUCTION SINGLE CELL	SHEET SIZE:	A3	SHEET:	09	DATE:	March 2014
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DRAWING NO.	RCC BOX CULVERT FOR WIDENING OF BOX CULVERT (CH.497.300)	
	AS	UC
SCALE:	NTS	REV

DRAWING NO. 94-32-02 0











DESIGN DIRECTOR  
Corsan Cormiam ~~Construction~~ S.A.

TOP FACE BARS/  
OUTER FACE BARS

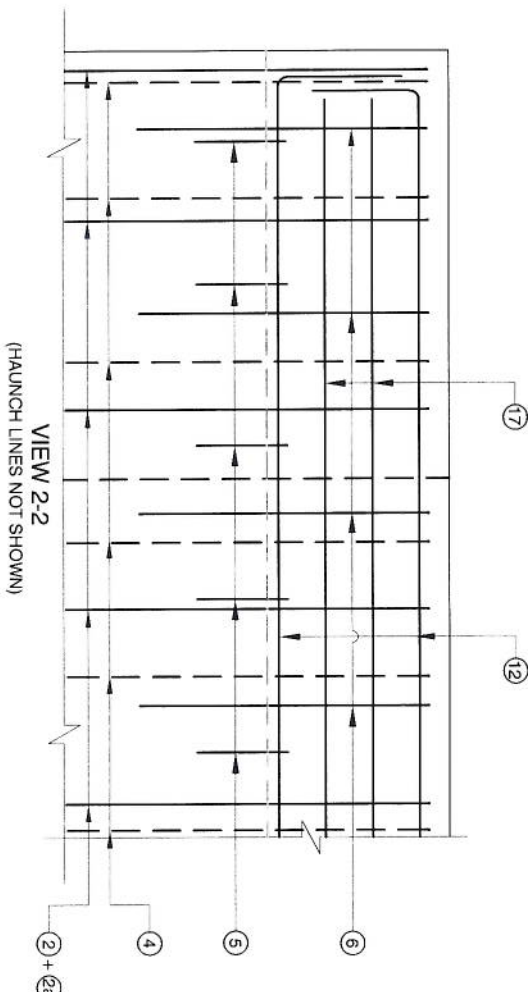
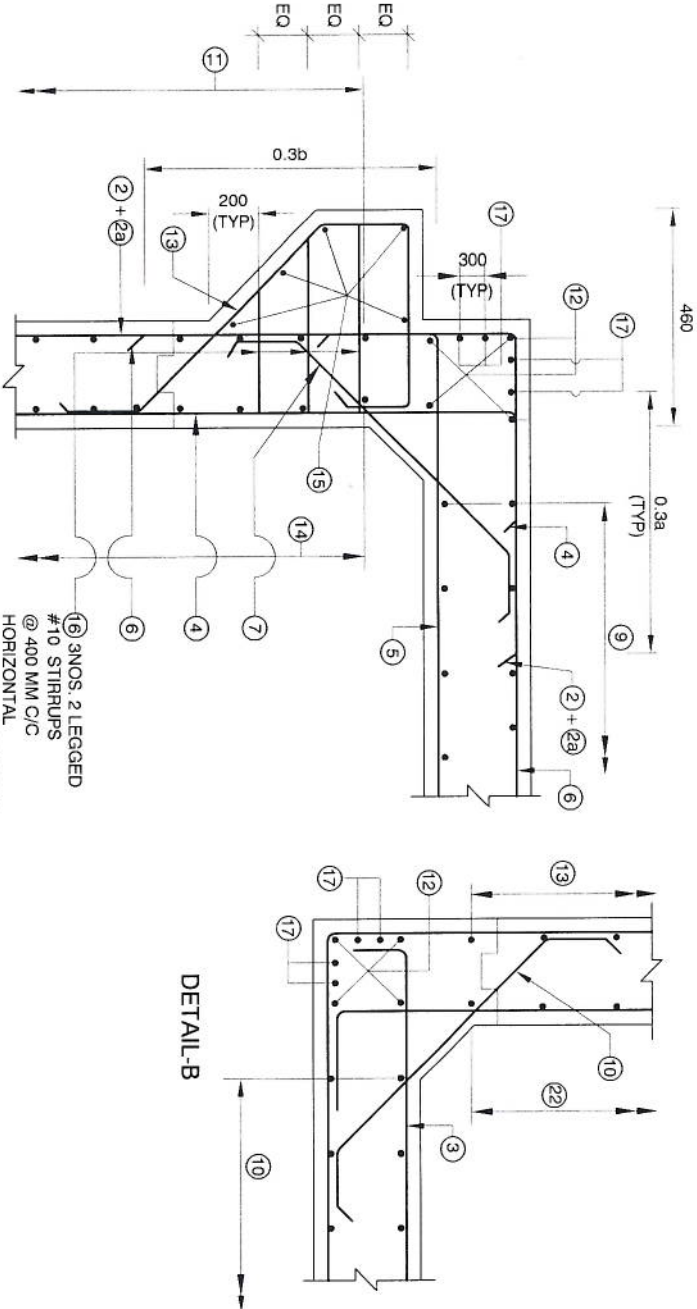
BOTTOM FACE BARS/  
INNER FACE BARS

REV	DATE	DESCRIPTION OF REVISIONS	APPROVED	CONSULTANT	<div><p><b>PCIL</b> PROJECTS CONSULTING INDIA (P) LTD. Engineers and Planners 81/10/2 Sector - D6, Vasant Kunj, New Delhi (India) 110070</p><p><b>AUTHORITY ENGINEER :</b> <b>VOYANTIS SOLUTIONS PVT. LTD.</b> 403, 4th Floor, BPTP Park Centre, Sector-30, NH-8, Gurgaon, Haryana - 122001, India</p></div>
			CHECKED	RBS	
			DESIGNED	BKG	
			AS	KDS	
H1	22-02-2016	COMPLIANCE TO HC COMMENTS	DRAWN:		
<div><p><b>CLIENT:</b></p><div><p><b>NATIONAL HIGHWAYS &amp; INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.</b> Ministry of Road Transport &amp; Highways, Government of India Branch Office : House No. 1, Pampin, Ambabai Nagar, 2nd Road, Gwalwari - 24</p><p><b>CONTRACTOR:</b></p><div><p><b>CORASAN CORVIAM CONSTRUCTION S.A.</b> 02nd Floor, Block Two, Vallia Business Park, Sector - 49, Sonina Road, Gurgaon, Haryana, India - 122001</p></div></div></div>					
<div><p><b>PROOF CHECKING CONSULTANT:</b></p><p>Gifford</p><div><p><b>Gifford India Pvt Ltd. (Part of Ramboll)</b> The Embassy Building No.5, Tower 'B', Level 10, DLF Cyber City, Phase-III, Gurgaon, Haryana - 122002</p></div></div>					
<div><p><b>SAFETY CONSULTANT:</b></p><p>L. R. KADIYALI &amp; ASSOCIATES</p><div><p><b>RZ-44, Bhawani Kunj, Behind D-2, Vasant Kunj, New Delhi 110 070</b></p></div></div>					
<div><p><b>PROJECT:</b> FOUR LAINING OF JHANJHI TO DEMOW SECTION OF NH-37 FROM DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM UNDER EPC MODE</p></div>					
<div><p><b>TITLE:</b> REINFORCEMENT SINGLE CELL RCC BOX CULVERT FOR WIDENING OF BOX CULVERT</p></div>					
<div><p><b>DRAWING NO:</b> 94-32-03</p></div>					
<div><p><b>SHEET/SIZE:</b> SHEET: A3 01 DATE: March 2016</p></div>					
<div><p><b>SCALE:</b> NTS REV 0</p></div>					



SCHEDULE OF REINFORCEMENT

DESIGN CHAINAGE		496.538	497.300
OPENING (MAXIMUM)		4.5 x 4.326	4.5 x 3.326
BAR MARKS	BARS SHAPE	TYPE 1	TYPE 2
1		#12 s200	#12 s200
2		#16 s200	#16 s200
2a		#12 s200	#12 s200
3		#16 s200	#16 s200
3a		#12 s200	#12 s200
4		#12 s200	#12 s200
5		#16 s200	#16 s200
5a		#12 s200	#12 s200
6		#12 s200	#12 s200
7		#10 s200	#10 s200
8		#10 s200	#10 s200
9		#10 s200	#10 s200
10		#10 s175	#10 s175
11		#10 s200	#10 s200
12		4 X 4 - #10	4 X 4 - #10
13		#12 s200	#12 s200
14		#10 s200	#10 s200
15		2 X 5 - #12	2 X 5 - #12
16		#10 s400 IN 3 LAYERS HORIZONTAL	#10 s400 IN 3 LAYERS HORIZONTAL
17		4 X 4 - #10	4 X 4 - #10



DESIGN DIRECTOR  
Corsan Construction S.A.

APPROVED:	CONSULTANT:	CLIENT:	PROOF CHECKING CONSULTANT:	PROJECT:
RBS	PCI	NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	Gifford	FOUR LANE OF JHANJH TO DEMOW SECTION OF NH-37 FROM DESIGN CH. KM 490+800 TO KM 534+800 IN THE STATE OF ASSAM UNDER EPC MODE
CHECKED:	PROJECTS CONSULTING INDIA (P) LTD	Ministry of Road Transport & Highways, Government of India		
BKG	Engineers and Planners	Barot Office - House No. 1, Pandey, Ambajogai Nagar, 2nd Stage, Gamastar - 24		
DESIGNED:	61/10/2 Sector - D6, Vasant Kunj New Delhi (India) 110070			
AS	AUTHORITY ENGINEER:			
KDS	VOYANTS SOLUTIONS PVT LTD.	02nd Floor, Block Two, Vaika Business Park, Sector - 49, Sakina Road, Gurgaon, Haryana, India - 122001		
22/02/2016	COMPLIANCE TO H/C COMMENTS			
DATE	DESCRIPTION OF REVISIONS			

NOTES:

- ALL DIMENSIONS ARE IN mm AND LEVELS IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
- DIMENSIONS SHALL NOT TO BE SCALED ONLY WRITTEN DIMENSIONS SHALL TO BE FOLLOWED.
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DRAWINGS.
- ALL REINFORCING STEEL SHALL BE HIGH YIELD STRENGTH DEFORMED (CRS-TMT) BARS (GRADE - Fe 500), CONFORMING IS : 1786.
- CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE FOLLOWS.  
a. EARTH FACE - 75 mm  
b. FOR OTHERS - 40 mm
- MINIMUM ANCHORAGE LENGTH SHALL BE 42D, WHERE 'D' IS THE DIAMETER OF BAR.
- LAP LENGTH SHALL BE PROVIDED AS PER BELOW -  
(FOR GRADE OF CONC. M30 AND ABOVE)  

LAP LENGTH	% LAP AT ANY SECTION IS
76 d	BETWEEN 40 - 50%
68 d	BETWEEN 25 - 40%
60 d	- 25%

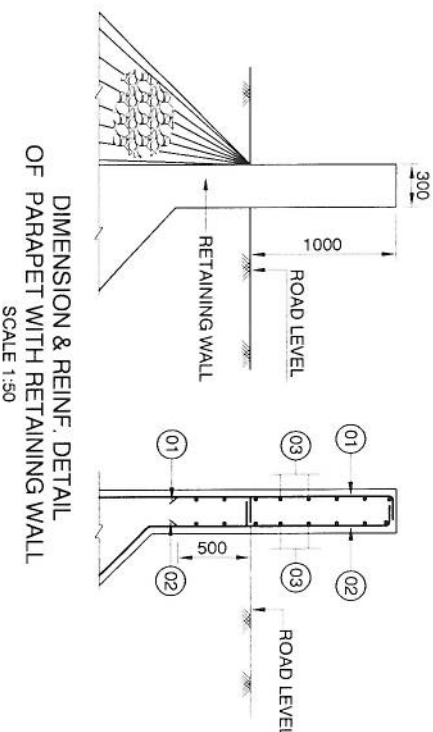
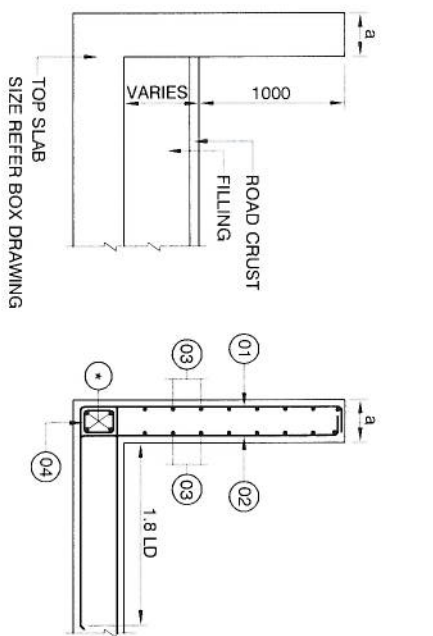
  
(WHERE 'd' IS THE DIAMETER OF THE BAR)
- FOR UNFAVORABLE BOND CONDITIONS LAP LENGTH SHALL BE MULTIPLIED 1.4 AS PER IRC: 21-2000
- ALL LAP SHALL BE SUITABLY STAGGERED AND MINIMUM DISTANCE BETWEEN THE ADJACENT LAPS SHALL BE 1.3 TIMES OF LAP LENGTH.
- PARAPET REINFORCEMENT SHALL BE TIED TO SLAB REINFORCEMENT & SHALL BE CAST MONOLITHICALLY. FOR PARAPET REINFORCEMENT REFER DRG NO. 94-33-01

TITLE:	SHEET SIZE:	SHEET:	DATE:
REINFORCEMENT	A3	02	March 2016
SINGLE CELL RCC BOX CULVERT FOR WIDENING OF BOX CULVERT	SCALE:	NTS	REV:
DRAWING NO: 94-32-03			0









DIMENSION & REINF. DETAIL  
OF PARAPET WITH BOX  
(BAR MARK NO. - REFER REINFORCEMENT DRAWING OF BOX)  
SCALE 1:50

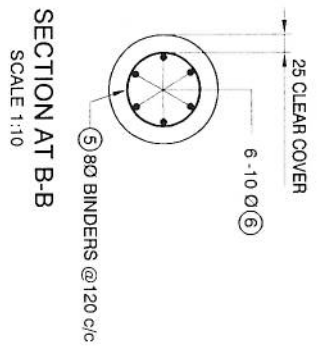
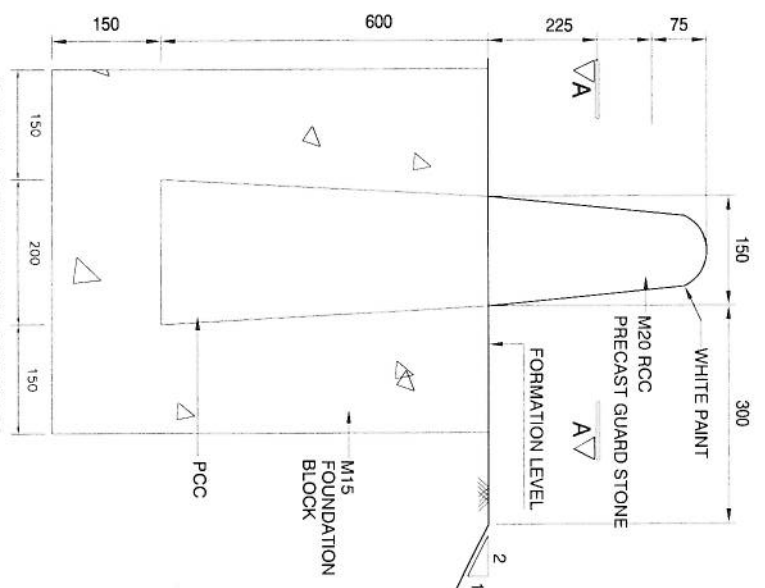
REINFORCEMENT SCHEDULE FOR PARAPET WALL

BAR MARK	SHAPE OF MARK	DIA #	NOS / SPACING	DIA #	NOS / SPACING	DIA #	NOS / SPACING	DIA #	NOS / SPACING
1	10	150 c/c	10	150 c/c	10	150 c/c	10	150 c/c	150 c/c
2	10	150 c/c	10	150 c/c	12	150 c/c	12	100 c/c	150 c/c
3	10	250 c/c	10	250 c/c	10	250 c/c	10	250 c/c	250 c/c
4	10	250 c/c	10	250 c/c	10	250 c/c	10	250 c/c	250 c/c

DIMENSION OF PARAPET WALL

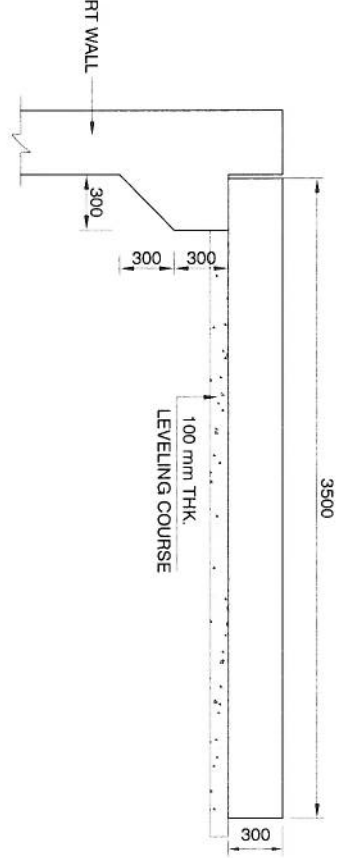
HEIGHT	1.0m	1.5m	2.0m	2.5m
300	300	300	300	300

DETAIL OF PRECAST GUARD  
STONE @ 1.0 m c/c  
SCALE 1:10

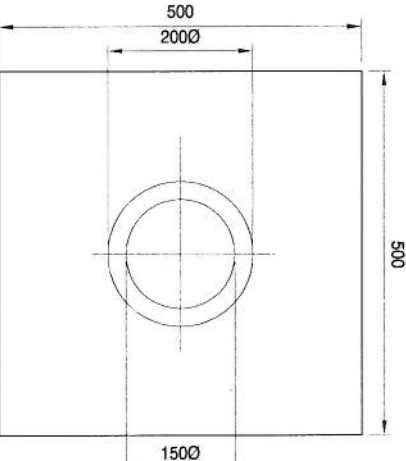


REINFORCEMENT SCHEDULE FOR PARAPET WALL

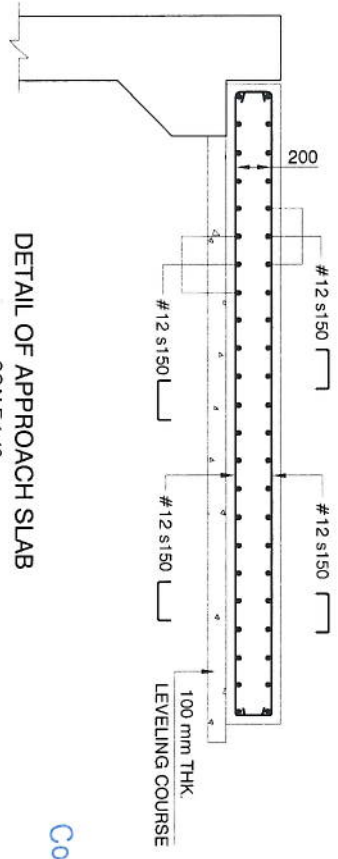
BAR MARK	SHAPE OF MARK	DIA #	NOS / SPACING	DIA #	NOS / SPACING	DIA #	NOS / SPACING	DIA #	NOS / SPACING
1	10	150 c/c	10	150 c/c	10	150 c/c	10	150 c/c	150 c/c
2	10	150 c/c	10	150 c/c	12	150 c/c	12	100 c/c	150 c/c
3	10	250 c/c	10	250 c/c	10	250 c/c	10	250 c/c	250 c/c
4	10	250 c/c	10	250 c/c	10	250 c/c	10	250 c/c	250 c/c



SECTION AT A-A  
SCALE 1:10



DETAIL OF APPROACH SLAB  
SCALE 1:40



DESIGN DIRECTION  
Corisan Construction S.A.

REV	DATE	DESCRIPTION OF REVISIONS	KDS	DRAWN	AS	DESIGNED	BKG	CHECKED	RBS	APPROVED	CONSULTANT	CLIENT	PROOF CHECKING CONSULTANT	PROJECT	TITLE	DRAWING NO	SCALE	SHEET	DATE			
											 PROJECTS CONSULTING INDIA (P) LTD Engineers and Planners 6110 / 2 Sector - D6, Vasant Kunj New Delhi (India) 110070 AUTHORITY ENGINEER	 NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD. Ministry of Road Transport & Highways, Government of India Branch Office - House No.1, Panchsri, Anandapuri Nagar, Zoo Road, Gurgaon - 24	 Gifford India Pvt Ltd, (P. No. 110070) The EPC Building, Phase III, Level - 17, D-2 Vasant Kunj, Gurgaon, Haryana-122002	MISCELLANEOUS DETAILS	94-33-01	AS SHOWN	March 2016					
											 CORSPAN CORVAM CONSTRUCTION S.A. 02nd Floor, Block Two, Vastika Business Park, Sector - 49, Sohna Road, Gurgaon, Haryana, India - 122001	 L. R. KADIVALI & ASSOCIATES RZ-44, Bhawanij Kunj, Behind D-2 Vasant Kunj, New Delhi 110 070										



