almondz
the game changer
Almondz Global Infra-Consultant Limited
Head Office – F-33/3, Okhla Industrial Area, Phase II, New Delhi – 110020, Delhi, India

JV with

AYOLEEZA
Blue Print Of Engineering Dreams
Ayoleeza Consultants Private Limited
Head Office – B-901 | 9th Floor | Urbtech Trade Centre | Sector-132 | NOIDA-201304 (DELHI NCR) | India

Ref: AGICL/A.E/PKG-05/2024/322

Date- 12/06/2024

To,
The Authorized Signatory/ Project Manager
M/S KAMAC Engineers Pvt. Ltd.
F0201, City Centre Office Block,
Uttrayon Matigara, Siliguri,
Dist: Darjeeling, West Bengal.
PIN: 734010
E-Mail- **kamacengineers.ledobypass@gmail.com**

SUB: *Strengthening/Improvement to 2- Lane with Paved Shoulder from KM 27+150 (Golai Gaon) to KM 47+628 (Ledo) on existing Dibrugarh to Ledo section with proposed Digboi Bypass (Green Field and Brown Field) (2-Lane+PS) of NH-315 (Old NH-38) in Tinsukia District in the State of Assam on EPC mode.* ***(Pkg. 5)*:** **Reg._ Approval of Box Culverts .**

Ref: i) Our letter No. AGICL/AE/PKG-05/2024/219, Dated. 01/05/2024.
ii) Your letter No. KEPL/NHIDCL/D-L/2024/064, Dated. 08/04/2024.
iii) Our letter No. AGICL/AE/PKG-05/2024/116, Dated. 20/03/2024.
iv) Your letter No. KEPL/NHIDCL/D-L/2024/034, Dated. 13/03/2024.

Dear Sir,

The EPC Contractor has re-submitted with compliance the Design & Drawing of Box culvert vide letter dated 08-04-2024 for review and Approval at Ch . 46+009. Ch. 47+ 298 and 47+ 487.

The same has been reviewed & found in order. The EPC contractor has advised to submit 3 sets of Drawing for GFC.

This is for your kind information and further action.

Thanking you and assuring our best services at all times

With Regards

For, Almondz Global Infra Consultant Limited In JV with Ayoleeza Consultant Private Limited.

Pramod Kumar
Team Leader
(Authority Engineer)

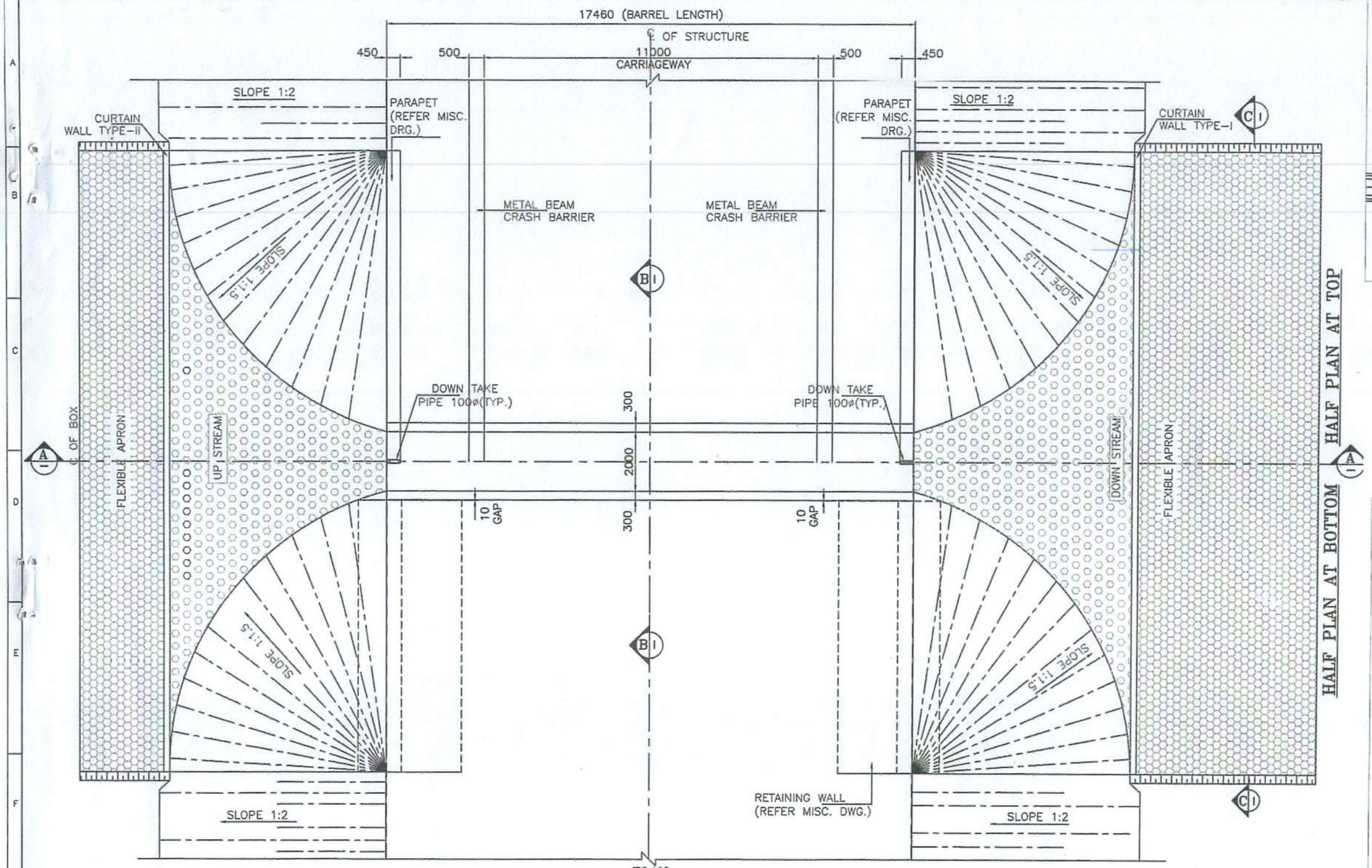
Copy to:
i) GM. (P) PMU, Dibrugarh (Assam) for kind information please.
ii) The Almondz Global infra consultant Ltd, HO, for kind information.

NATIONAL HIGHWAYS & INFRASTRUCTURE
DEVELOPMENT CORPORATION LTD.

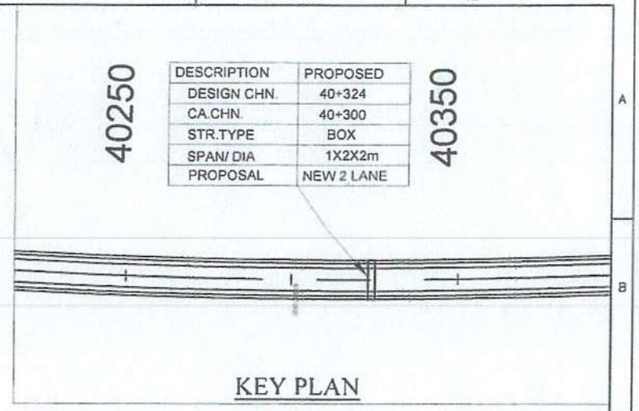
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE.(PACKAGE-5)

STRUCTURE DRAWING
BOX CULVERT

CLIENT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	**A.V. CONSTRUCTION** 1ST FLOOR, WZ-1240, PALAM EXTENSION, BOSCO ASHRAM WALI GALI,NEW DELHI 110045
	WINST INFRA SOLUTION PVT. LTD. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012



PLAN
(SCALE-1:100)



KEY PLAN

LEVELS

DESIGN CH.	FRL	GROUND LEVEL	INVERT LEVEL		VERTICAL CLEARANCE (MAX.)	EARTHFILL (MAX.)	EARTHFILL (MIN.)
			LHS	RHS			
40+324	146.582	140.760	140.477	140.460	2.017 m	3.805m	2.135m

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

REFERENCE DRAWINGS:-

1. REINFORCEMENT DETAIL OF BOX CULVERT AVC/NH-38/BC/REINF./40+324/01

LEGEND:-
FRL FINISHED ROAD LEVEL
IL INVERT LEVEL
LVL. LEVEL
EGL. EXISTING GROUND LEVEL

FRL CAMBER & LOCATION IS TO BE MATCHED WITH HIGHWAY ALIGNMENT DRAWING.

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETER, LEVELS ARE IN METER AND CHAINAGE ARE IN KILOMETERS UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. THIS DRAWING SHALL BE READ IN CONJUCTION WITH THE RELEVANT PLAN AND PROFILE DRAWING OF ROAD.
3. GRADE OF CONCRETE:-
   a. M30-FOR RCC BOX CELL STRUCTURE.
   b. M15-FOR PCC AND LEVELING COURSE.
   c. M30-PARAPET
4. GRADE OF STEEL - Fe 500.
5. THE CARRIAGEWAY OF PROPOSED CULVERT IS DESIGN AS PER 6-2017.
6. BACKFILL MATERIAL BEHIND END WALL SHALL BE SELECTED GRANULAR SOIL HAVING PROPERTIES
   MAX DRY DENSITY = 1850-2280kg/m³
   OPTIMUM MOISTURE CONTENT = 7-15
   AS PER IRC78-2014 AND MORTH SPECIFICATION.
7. THE FRL SHOWN IN THE DRAWING SHALL BE VERIFIED WITH CORRESPONDING PLAN AND PROFILE DRAWING BEFORE EXECUTION, IF THERE IS ANY VARIATION SHALL BE BROUGHT TO THE NOTICE OF ENGINEER.
8. THE DIMENSION AND LEVEL ARE SUBJECTED TO CHANGE AS PER SITE CONDITION AND DETAILED DESIGN.
9. BACKFILL TO BE DONE AND COMPACTED FROM BOTH SIDE SIMULTANEOUSLY.
10. 100MM DIA P.V.C. PIPE AT SPACING 1000MMc/c IN HORIZONTAL/VERTICAL DIRECTION SHALL BE PROVIDED UP TO 150MM ABOVE GROUND LEVEL FOR WEEP HOLES IN RETAINING WALL.
11. SBC SHALL BE 16t/m². AND SAME SHALL BE ENSURED AT SITE BY ANY SUITABLE METHOD.
12. AS PER MORTH SECTION-2500,WHERE THE REQUIRED SIZE OF BOULDERS ARE NOT AVAILABLE ECONOMICALLY.CEMENT CONCRETE BLOCKS OF EQUIVALENT WEIGHT SHALL BE USED.THE GRADE OF CONCRETE SHALL BE M15 NOMINAL MIX.CEMENT CONCRETE BLOCK SHALL BE PREFERRED WHERE PRACTICABLE.
13. CHOOSE ANY SUITABLE METHOD TO ACHIEVE THE REQUIRED SBC AS PER SITE.

CLIENT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

EPC CONTRACTOR:
KAMAC ENGINEERS PVT.LTD
F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010
Kamac Engineer's (P) Ltd
Authorised Signatory

AUTHORITY'S ENGINEER
ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED.
C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171

PROOF CONSULTANT:
CREATIVE ENGINEERING SERVICES
OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010

SAFETY CONSULTANT:
DESIGN AID
PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,

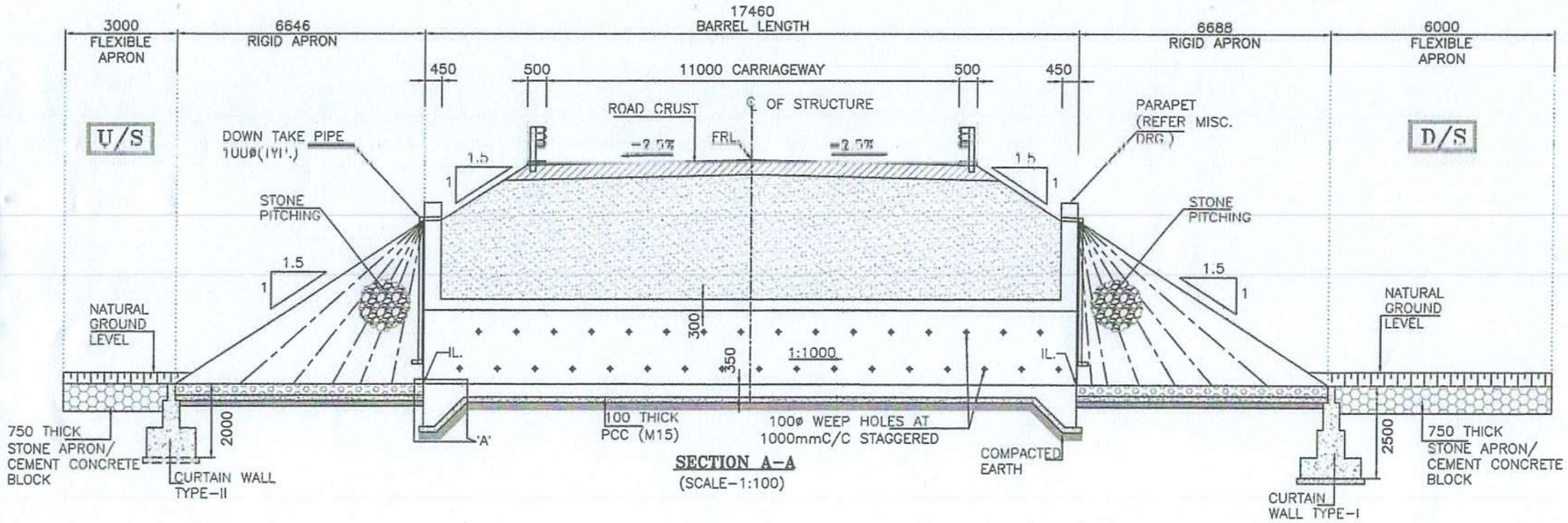
DESIGN CONSULTANT:
A.V. CONSTRUCTION
Winst Infra Solution Pvt. Ltd.
OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-D-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE.(PACKAGE-5)

DRAWING TITLE:
GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 40+324

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/40+324/01	01 OF 03	R0



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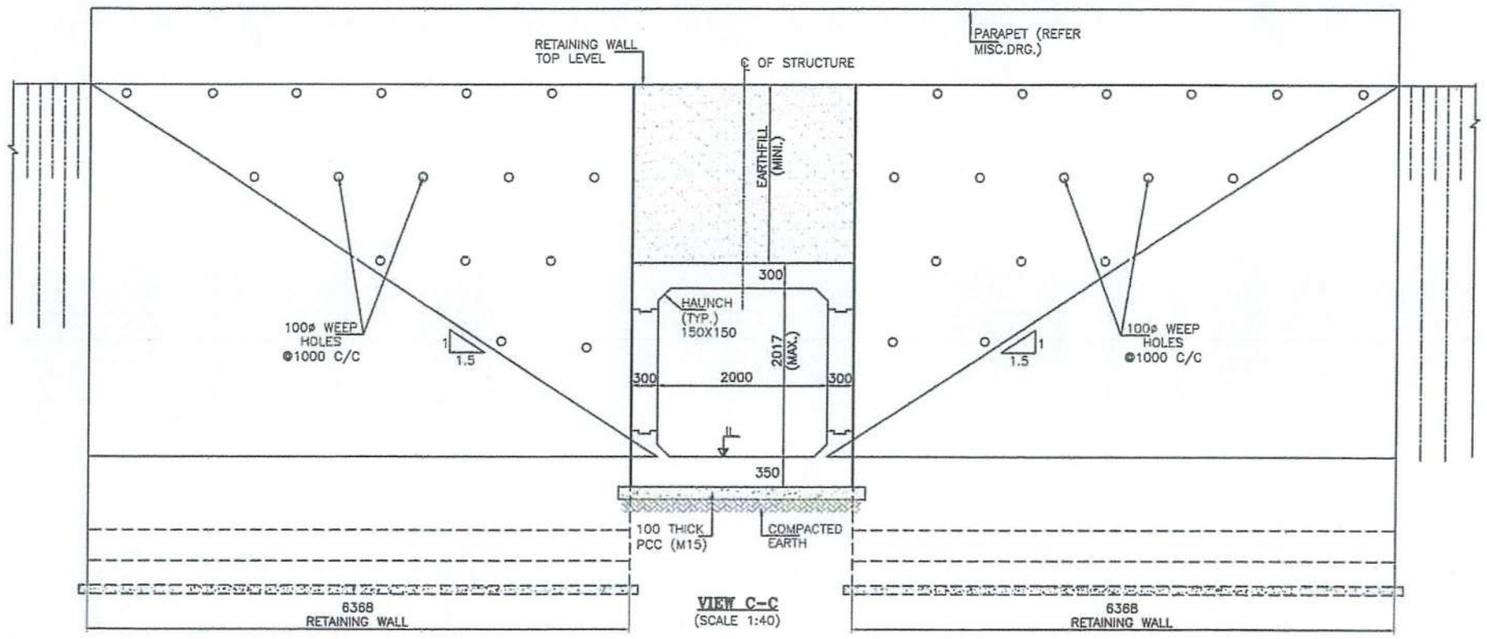

VIEW C-C
(SCALE 1:40)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0301, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1249, Palam Extension, Bosco Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT:
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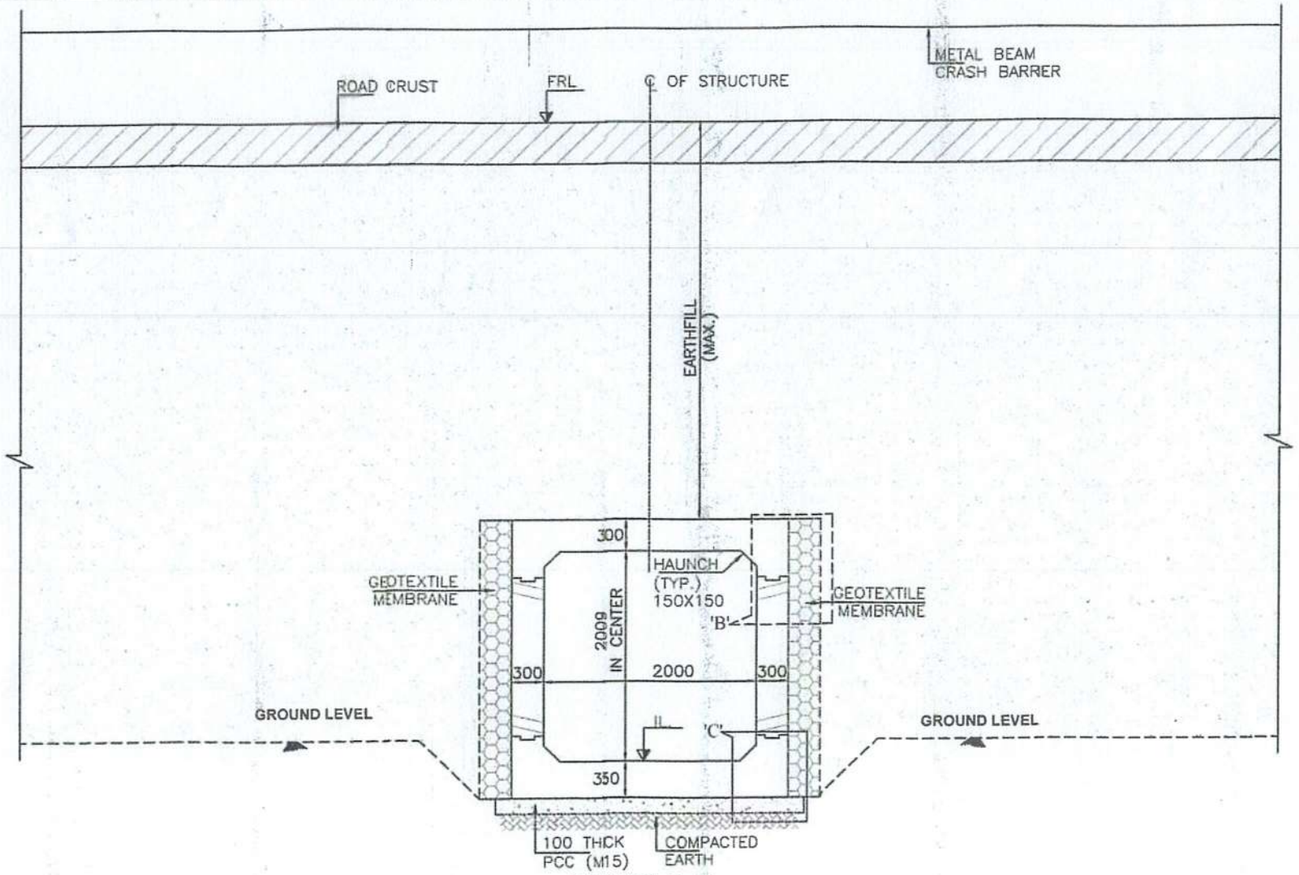
DRAWING TITLE:-
GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 40+324

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/40+324/01	01 OF 02	R0



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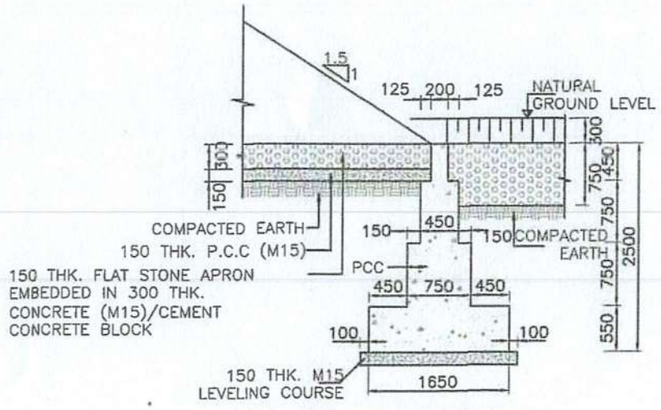
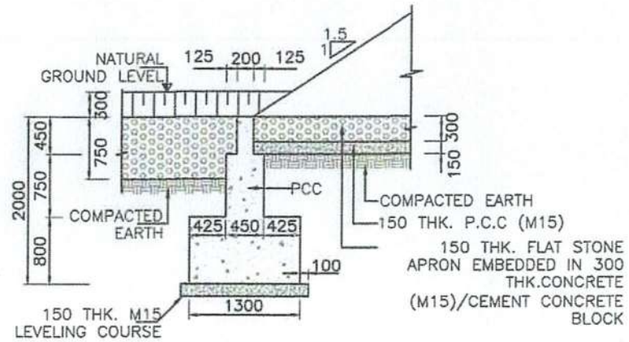
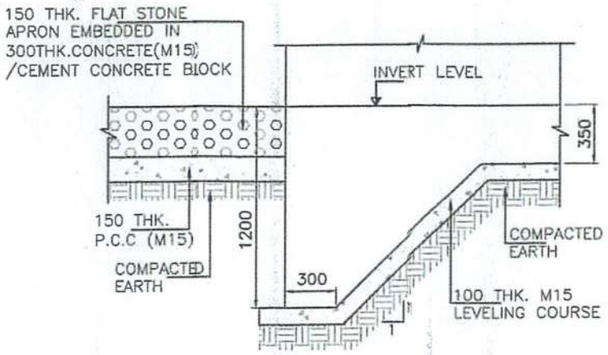


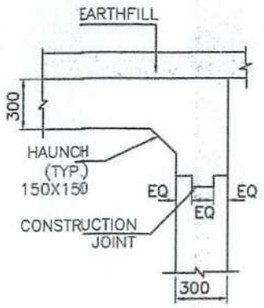
DETAIL OF CURTAIN WALL–I
(DOWN STREAM SIDE)
(SCALE 1:50)



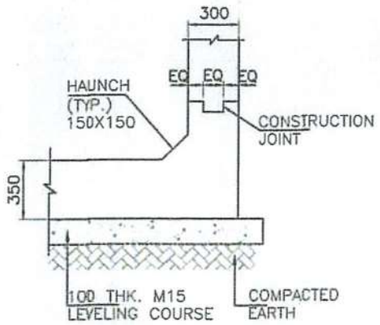
DETAIL OF CURTAIN WALL–II
(UP STREAM SIDE)
(SCALE 1:50)



DETAIL–'A'
(SCALE 1:25)



DETAIL–'B'
(SCALE 1:25)



DETAIL–'C'
(SCALE 1:25)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)

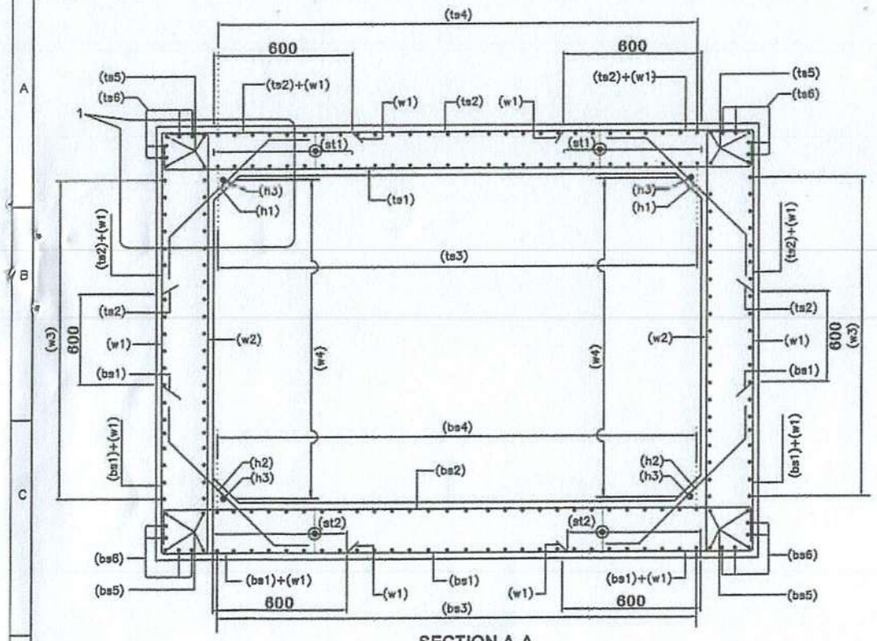
DESIGN AID, NEW DELHI

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD. Kamac Engineers (P) Ltd. Authorised Signatory FOUNDER CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010.	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM, VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240, Pasal Extension, Bodco Ashram Wali Gali, New Delhi-110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23, SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION W PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIE (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON E MODE (PACKAGE-5)

DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 40+324

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing St
JAN.2024	W.P	V.S	A.B		NTS	
Project No.	Drawing No. AVC/NH-38/BC/GAD/40+324/01					Sheet No. 03 OF 03



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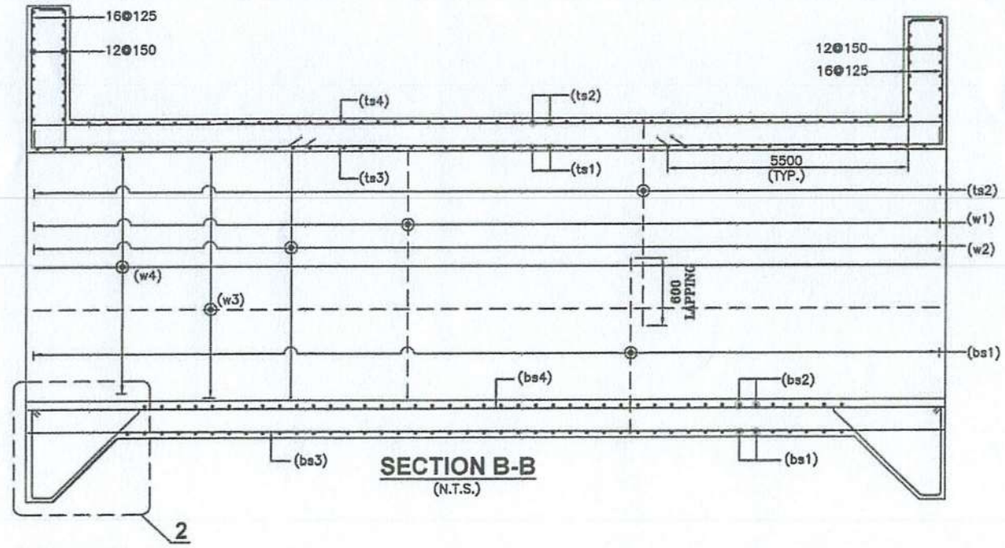
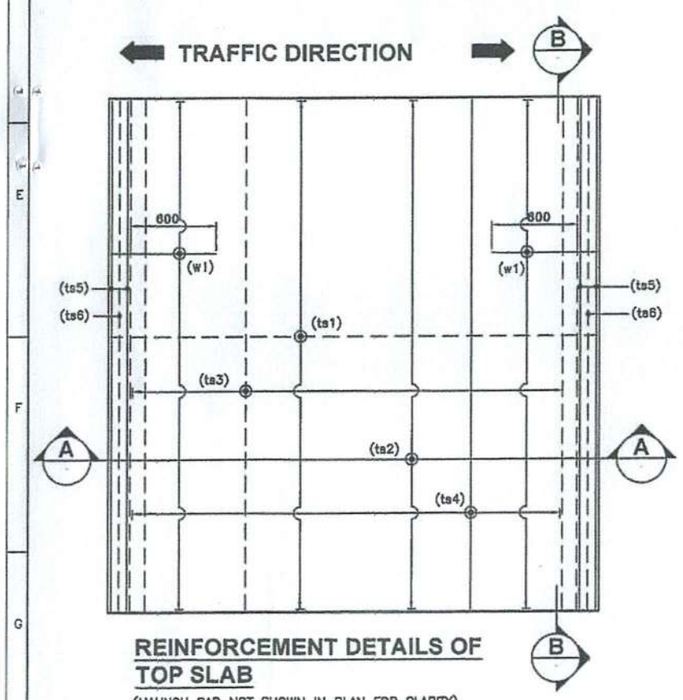
(NTS)

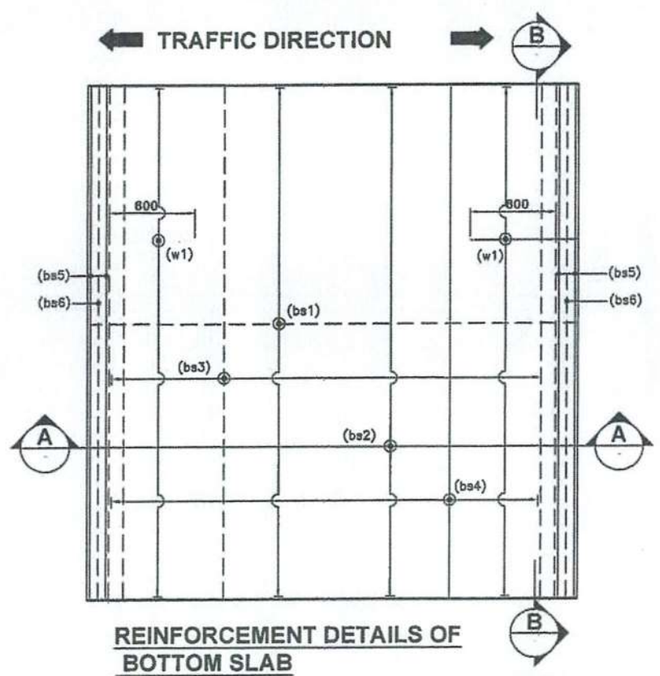


SECTION B-B
(N.T.S.)

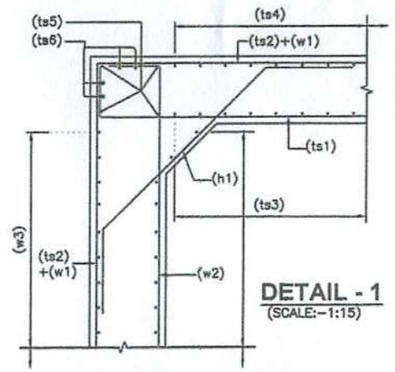
LEGEND:-	
TOP FACE BAR	———
BOTTOM FACE BAR	- - - - -



REINFORCEMENT DETAILS OF TOP SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)



REINFORCEMENT DETAILS OF BOTTOM SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)



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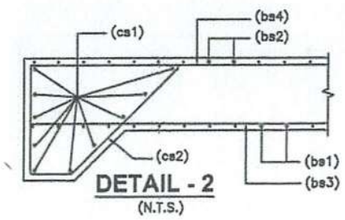


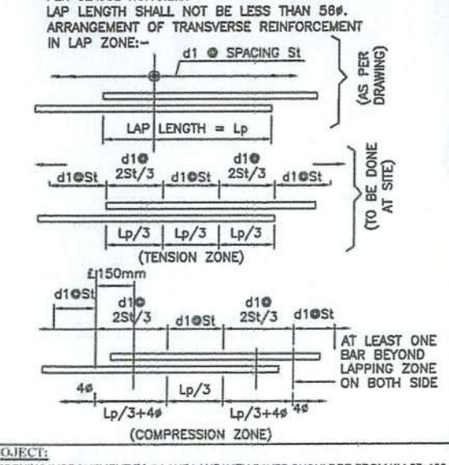
DETAIL - 2
(N.T.S.)

BOX REINF. SCHEDULE

SL.NO.	BAR MARK	BAR SHAPE	DIAMETER	SPACING
1	ts1		12	160
2	ts2		10	160
3	ts3		8	200
4	ts4		10	200
5	ts5		12	2x4 Nos.
6	ts6		12	2x4 Nos.
7	w1		10	160
8	w2		10	160
9	w3		10	200
10	w4		8	200
11	bs1		10	160
12	bs2		10+8	160
13	bs3		10	200
14	bs4		8	200
15	bs5		12	2x4 Nos.
16	bs6		12	2x4 Nos.
17	h1		10	160
18	h2		10	160
19	h3		10	1x4 Nos.
20	cs1		12	10 Nos.
21	cs2		10	200
22	st1		8	200 c/c (L-L) 160 c/c (T-T) DIRECTION
23	st2		8	200 c/c (L-L) 160 c/c (T-T) DIRECTION

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE MENTIONED.
2. DRAWING SHOULD NOT BE SCALED ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. ALL REINFORCING BARS SHALL BE THERMO MECHANICALLY TREATED (TMT) BARS (GRADE DESIGNATION Fe-500) CONFIRMING TO IS:1786 STANDARDS.
4. MINIMUM CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE AS FOLLOWS:-
   a) TOP SLAB - 45mm
   b) BOTTOM SLAB - 75mm
   c) SIDE WALL (EARTH SIDE) - 75mm
   d) SIDE WALL (INNER SIDE) - 45mm
5. OVERLAPPING FOR SPLICING OF REINFORCEMENT SHALL BE AS PER CLAUSE NO.15.2.5.
   LAP LENGTH SHALL NOT BE LESS THAN 56ø.
   ARRANGEMENT OF TRANSVERSE REINFORCEMENT IN LAP ZONE:-



6. ANCHOURAGE LENGTH OF BOX SHALL BE TAKEN AS 40ø AS PER IRC:112.
7. FOR UNFAVORABLE BOND CONDITIONS THE FACTOR 40 SHOULD BE MULTIPLIED BY FACTOR OF 1.43 .
8. CENTER LINE OF OVERLAPPING BAR bs1 & ts2 IN WALL & MID HEIGHT OF WALLS ARE AT SAME POINT.
9. BAR BENDING SCHEDULE SHOULD BE STRICTLY FOLLOW DURING THE TIME OF EXECUTION IF IN CASE ANY CHANGES AT SITE KINDLY DISCUSS IT WITH ENGINEER IN CHARGE.

SAFETY AUDIT
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

REFERENCE DRAWING:-

1. GENERAL ARRANGEMENT DRAWING.
   AVC/NH-38/BOX/GAD/40+324/01

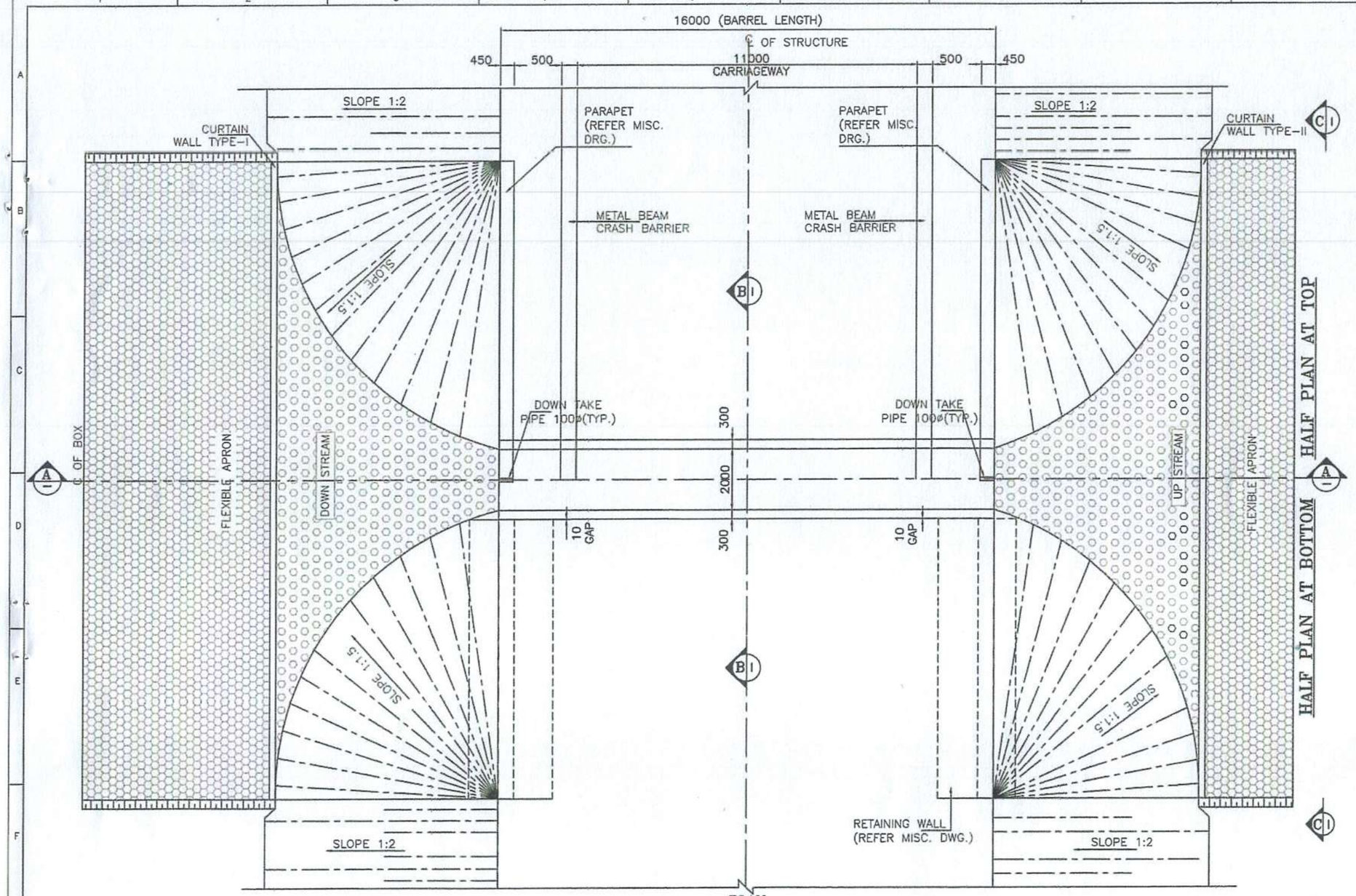
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD. Pvt.Ltd. Kamac Engineers (P) Ltd Authorised Signatory. F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR,. MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSULTANTS 1 Floor, WZ-1240, Palam Extension, Bosco Ashray Wali Gali, New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012 W I S P L

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

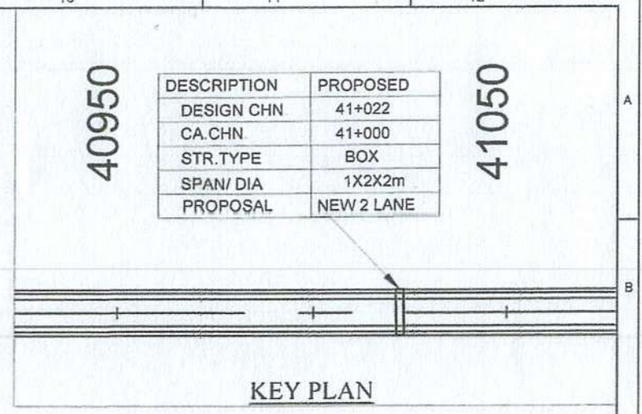
DRAWING TITLE:-
REINFORCEMENT DETAIL OF BOX CULVERT AT CH. 40+324

Date	Drw.	Dsg.	Chk.	App.	Scale	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/REIN./40+324/01	01 OF 01	R0



PLAN
(SCALE–1:100)



KEY PLAN

LEVELS

DESIGN CH.	FRL	GROUND LEVEL	INVERT LEVEL		VERTICAL CLEARANCE (MAX.)	EARTHFILL (MAX.)	EARTHFILL (MIN.)
			LHS	RHS			
41+022	146.264	140.691	140.391	140.407	2.016 m	3.557m	2.374m

REFERENCE DRAWINGS:–

1. REINFORCEMENT DETAIL OF BOX CULVERT AVC/NH–38/BC/REINF./41+022/01

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

LEGEND:-
FRL FINISHED ROAD LEVEL
IL INVERT LEVEL
LVL. LEVEL
EGL. EXISTING GROUND LEVEL

FRL CAMBER & LOCATION IS TO BE MATCHED WITH HIGHWAY ALIGNMENT DRAWING.

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETER, LEVELS ARE IN METER AND CHAINAGE ARE IN KILOMETERS UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. THIS DRAWING SHALL BE READ IN CONJUCTION WITH THE RELEVANT PLAN AND PROFILE DRAWING OF ROAD.
3. GRADE OF CONCRETE:–
   a. M30–FOR RCC BOX CELL STRUCTURE.
   b. M15–FOR PCC AND LEVELING COURSE.
   c. M30–PARAPET
4. GRADE OF STEEL – Fe 500.
5. THE CARRIAGEWAY OF PROPOSED CULVERT IS DESIGN AS PER 6–2017.
6. BACKFILL MATERIAL BEHIND END WALL SHALL BE SELECTED GRANULAR SOIL HAVING PROPERTIES
   MAX DRY DENSITY = 1850–2280kg/m³
   OPTIMUM MOISTURE CONTENT = 7–15
   AS PER IRC78–2014 AND MORTH SPECIFICATION.
7. THE FRL SHOWN IN THE DRAWING SHALL BE VERIFIED WITH CORRESPONDING PLAN AND PROFILE DRAWING BEFORE EXECUTION, IF THERE IS ANY VARIATION SHALL BE BROUGHT TO THE NOTICE OF ENGINEER.
8. THE DIMENSION AND LEVEL ARE SUBJECTED TO CHANGE AS PER SITE CONDITION AND DETAILED DESIGN.
9. BACKFILL TO BE DONE AND COMPACTED FROM BOTH SIDE SIMULTANEOUSLY.
10. 100MM DIA P.V.C. PIPE AT SPACING 1000MMc/c IN HORIZONTAL/VERTICAL DIRECTION SHALL BE PROVIDED UP TO 150MM ABOVE GROUND LEVEL FOR WEEP HOLES IN RETAINING WALL.
11. SBC SHALL BE 16t/m². AND SAME SHALL BE ENSURED AT SITE BY ANY SUITABLE METHOD.
12. AS PER MORTH SECTION–2500,WHERE THE REQUIRED SIZE OF BOULDERS ARE NOT AVAILABLE ECONOMICALLY.CEMENT CONCRETE BLOCKS OF EQUIVALENT WEIGHT SHALL BE USED.THE GRADE OF CONCRETE SHALL BE M15 NOMINAL MIX.CEMENT CONCRETE BLOCK SHALL BE PREFERRED WHERE PRACTICABLE.
13. CHOOSE ANY SUITABLE METHOD TO ACHIEVE THE REQUIRED SBC AS PER SITE.

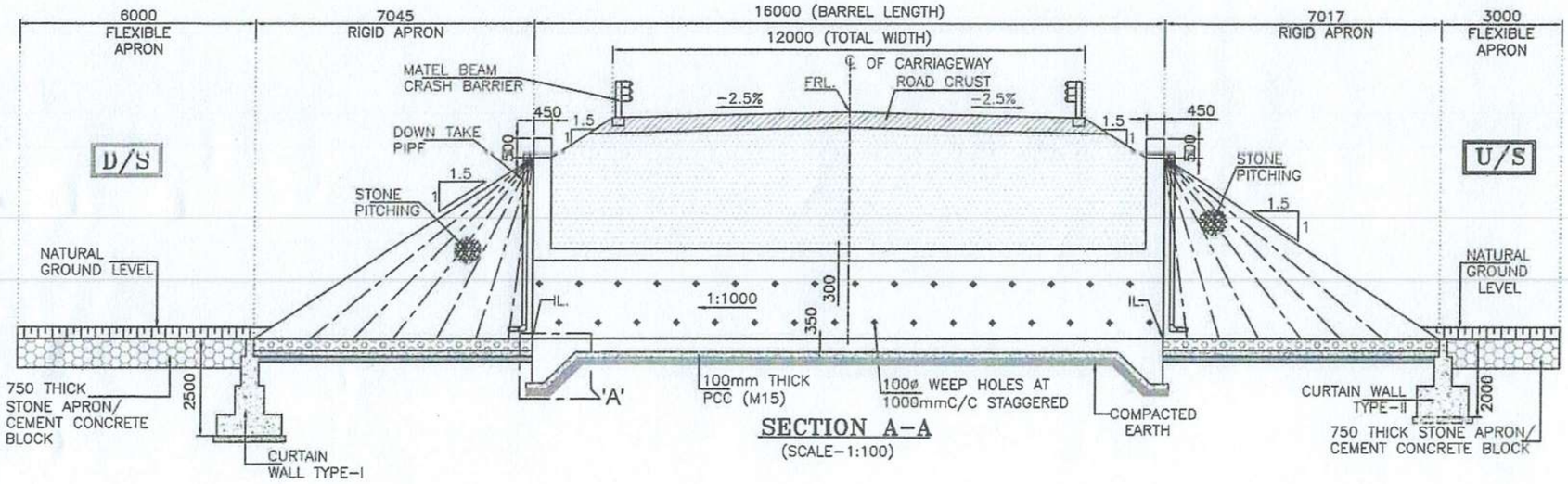
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD. F028, CORPORATE OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 (Kamac Engineers (P) Ltd. Authorised Signatory)	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 4th floor, WZ-1240, Palam Extension, Busco Ashram Walk Gali, New Delhi-110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

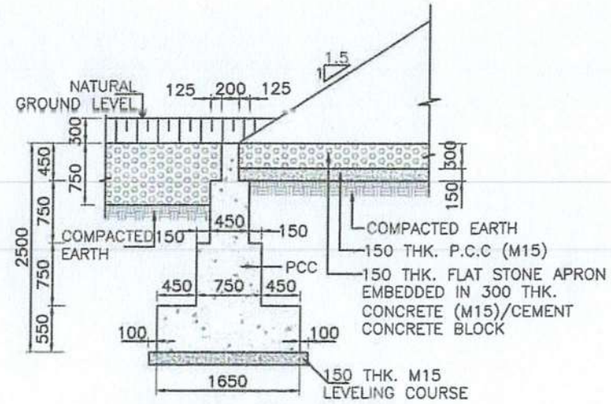
DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 41+022

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

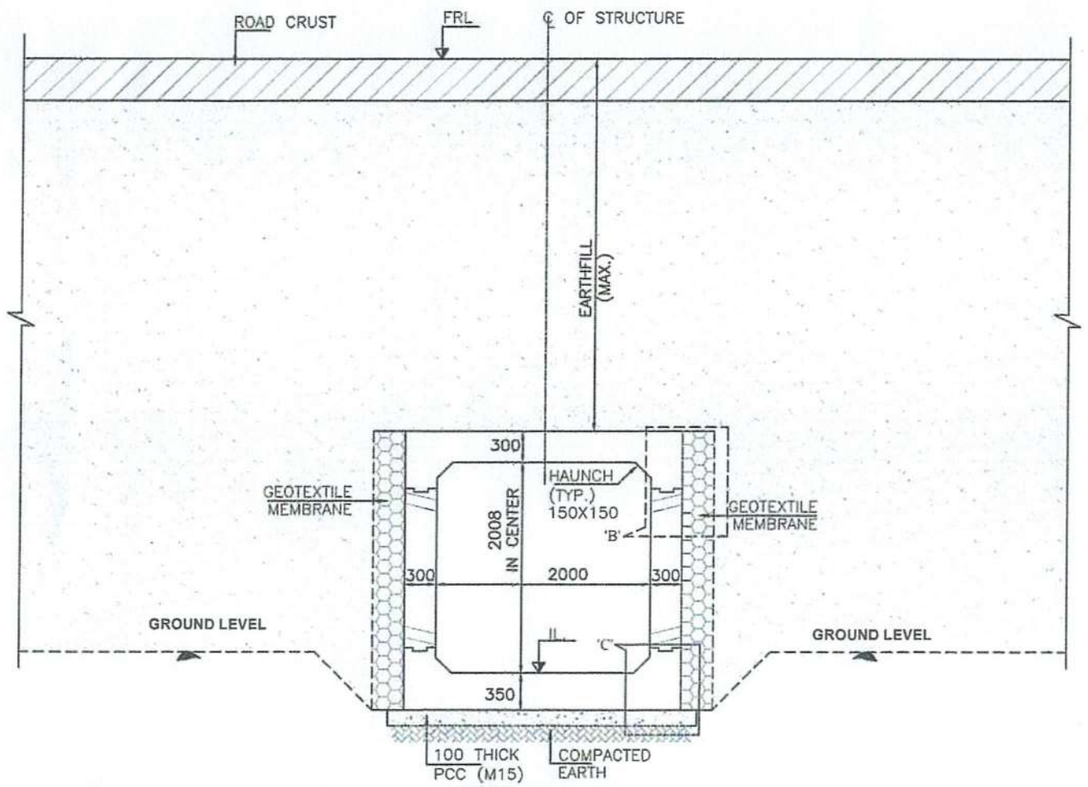
Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/41+022/01	01 OF 03	R0



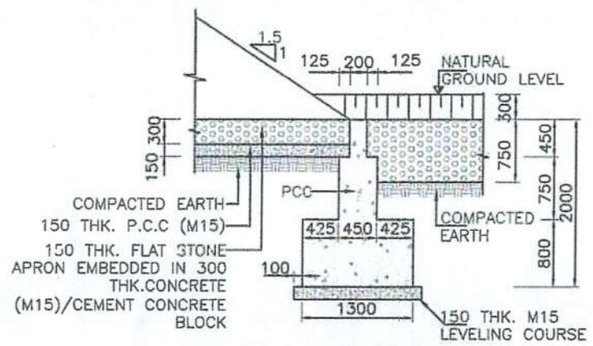
SECTION A-A
(SCALE-1:100)



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



SECTION B-B
(SCALE 1:40)



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

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

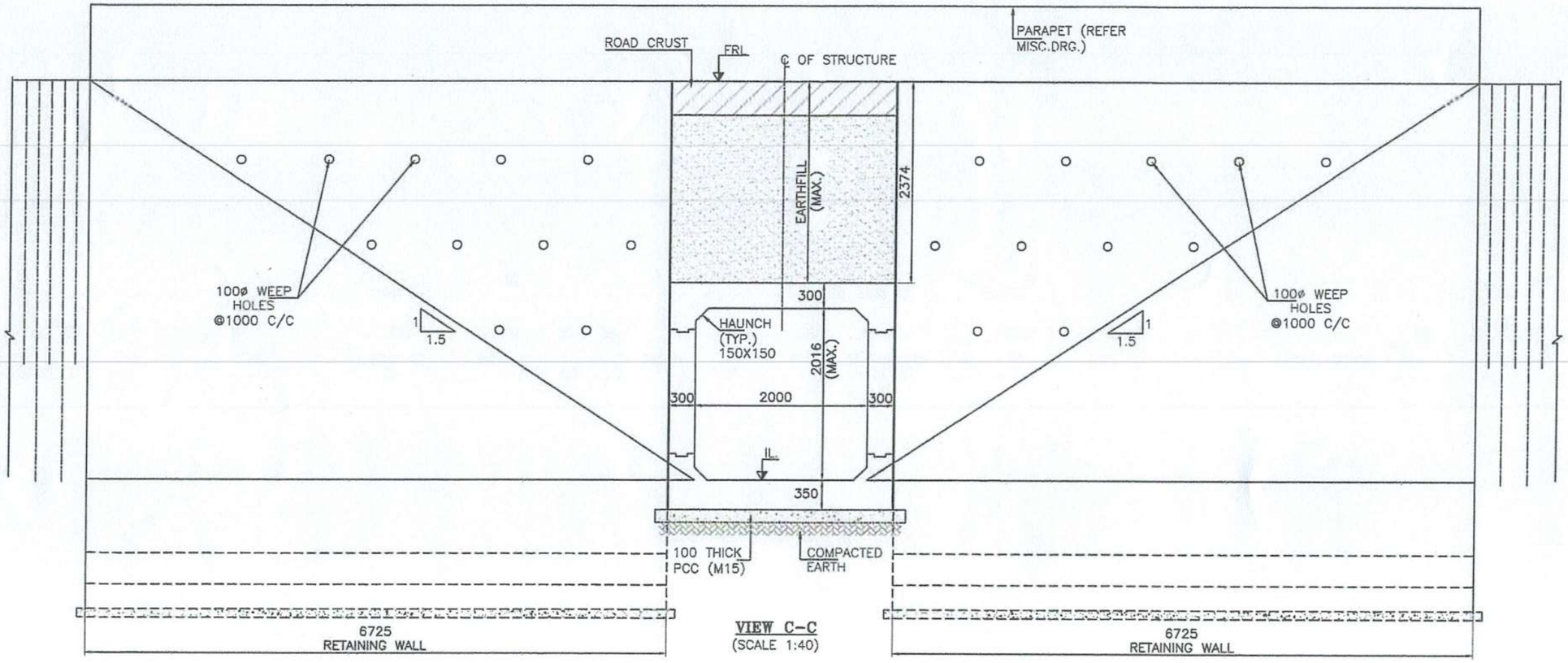
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F02 [illegible] BLOCK, 2ND FLOOR, MATIGARA 734010 Kamac Engineers (P) Ltd Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070.	A.V. CONSTRUCTION 1st Floor, WZ-1240, Palam Extension, Bodar Ashram Wali Gali, New Delhi-110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

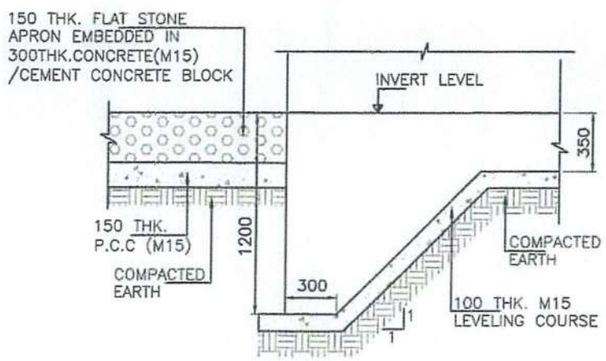
DRAWING TITLE:-
GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 41+022

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

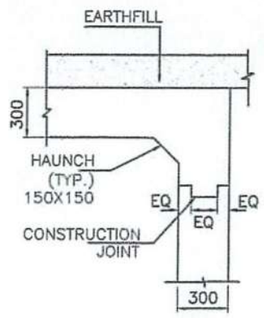
Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/41+022/01	02 OF 03	R0



VIEW C–C
(SCALE 1:40)



DETAIL–'A'
(SCALE 1:25)



DETAIL–'B'
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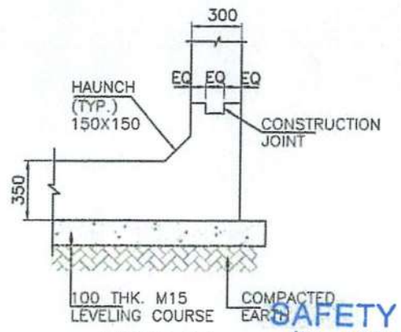


DETAIL–'C'
(SCALE 1:25)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

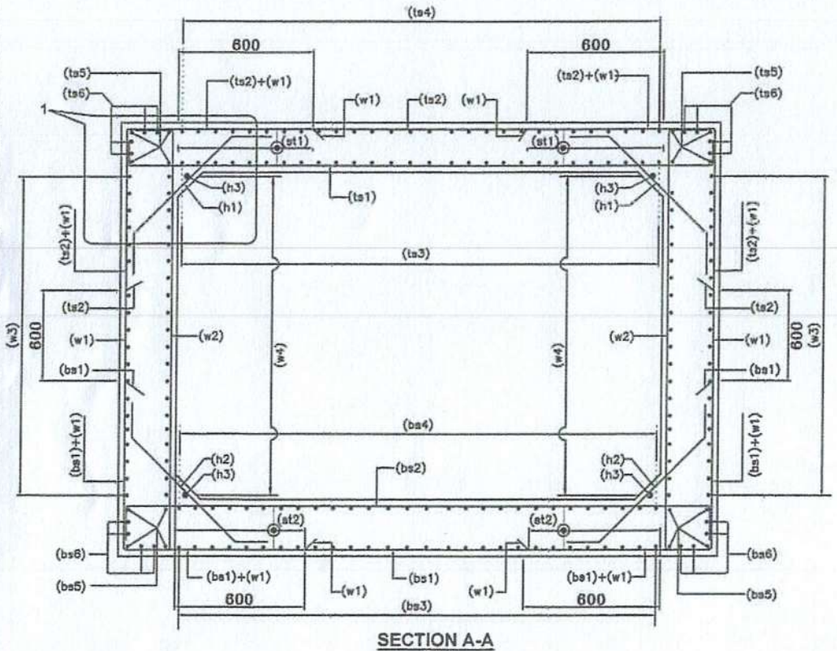
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:	PROJECT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE BLOCK AND FLOOR, MATIGARA 734010 Kamac Engineer's (P) Ltd Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240, Palam Extension, Bosco Ashram Wali Gali,New Delhi-110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

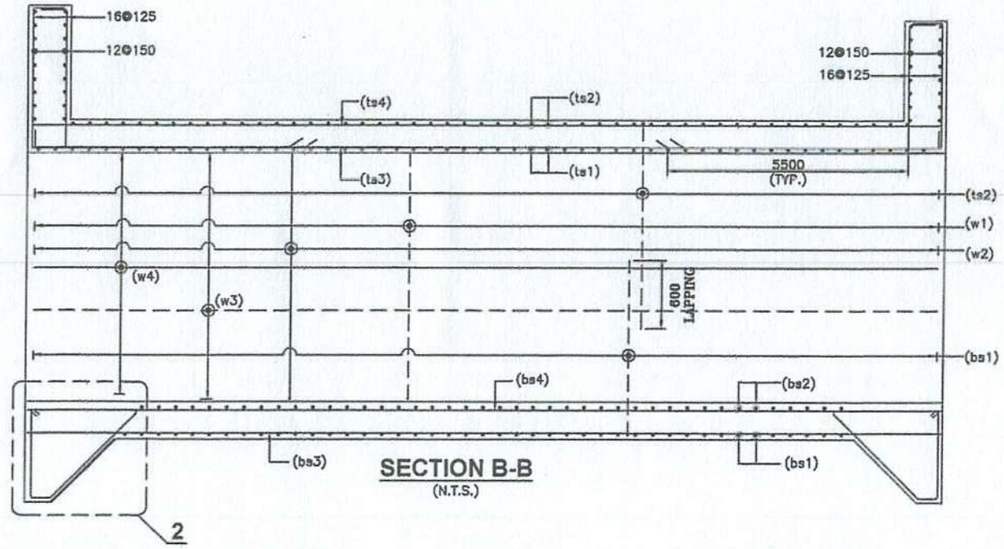
DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 41+022

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No:	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/41+022/01	03 OF 03	R0

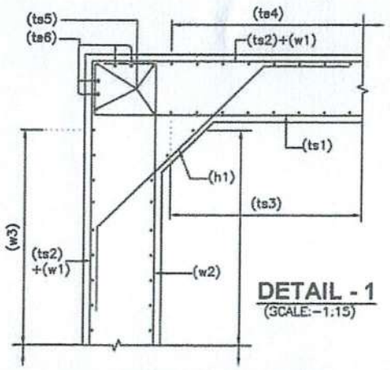


SECTION A-A
(NTS)

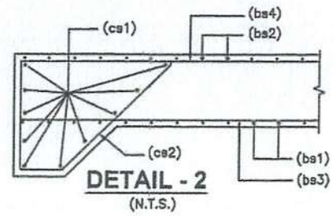


SECTION B-B
(N.T.S.)

LEGEND:–	
TOP FACE BAR	
BOTTOM FACE BAR	



DETAIL - 1
(SCALE:–1.15)



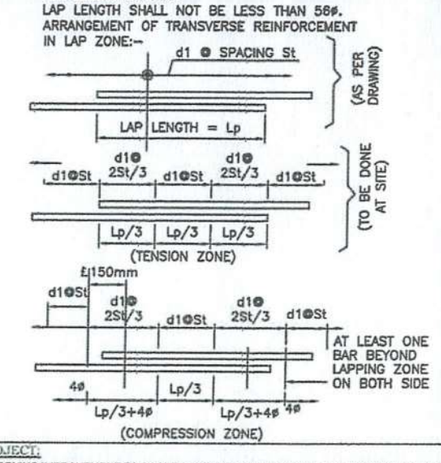
DETAIL - 2
(N.T.S.)

BOX REINF. SCHEDULE

SL.NO.	BAR MARK	BAR SHAPE	DIAMETER	SPACING
1	ts1		12	160
2	ts2		10	160
3	ts3		8	200
4	ts4		10	200
5	ts5		12	2x4 Nos.
6	ts6		12	2x4 Nos.
7	w1		10	160
8	w2		10	160
9	w3		10	200
10	w4		8	200
11	bs1		10	160
12	bs2		10+8	160
13	bs3		10	200
14	bs4		8	200
15	bs5		12	2x4 Nos.
16	bs6		12	2x4 Nos.
17	h1		10	160
18	h2		10	160
19	h3		10	1x4 Nos.
20	cs1		12	10 Nos.
21	cs2		10	200
22	st1		8	200 c/c (L–L) 160 c/c (T–T) DIRECTION
23	st2		8	200 c/c (L–L) 160 c/c (T–T) DIRECTION

NOTES:–

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE MENTIONED.
2. DRAWING SHOULD NOT BE SCALED ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. ALL REINFORCING BARS SHALL BE THERMO MECHANICALLY TREATED (TMT) BARS (GRADE DESIGNATION Fe–500) CONFIRMING TO IS:1786 STANDARDS.
4. MINIMUM CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE AS FOLLOWS:–
   a) TOP SLAB – 45mm
   b) BOTTOM SLAB – 75mm
   c) SIDE WALL (EARTH SIDE) – 75mm
   d) SIDE WALL (INNER SIDE) – 45mm
5. OVERLAPPING FOR SPLICING OF REINFORCEMENT SHALL BE AS PER CLAUSE NO.15.2.5.
   LAP LENGTH SHALL NOT BE LESS THAN 56ø.
   ARRANGEMENT OF TRANSVERSE REINFORCEMENT IN LAP ZONE:–

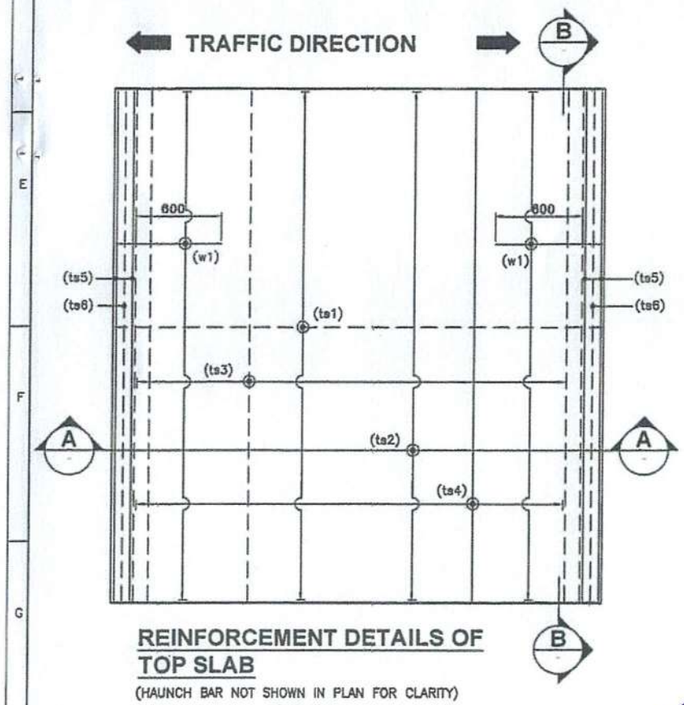


6. ANCHOURAGE LENGTH OF BOX SHALL BE TAKEN AS 40ø AS PER IRC:112.
7. FOR UNFAVORABLE BOND CONDITIONS THE FACTOR 40 SHOULD BE MULTIPLIED BY FACTOR OF 1.43 .
8. CENTER LINE OF OVERLAPPING BAR bs1 & ts2 IN WALL & MID HEIGHT OF WALLS ARE AT SAME POINT.
9. BAR BENDING SCHEDULE SHOULD BE STRICTLY FOLLOW DURING THE TIME OF EXECUTION IF IN CASE ANY CHANGES AT SITE KINDLY DISCUSS IT WITH ENGINEER IN CHARGE.

REFERENCE DRAWING:–

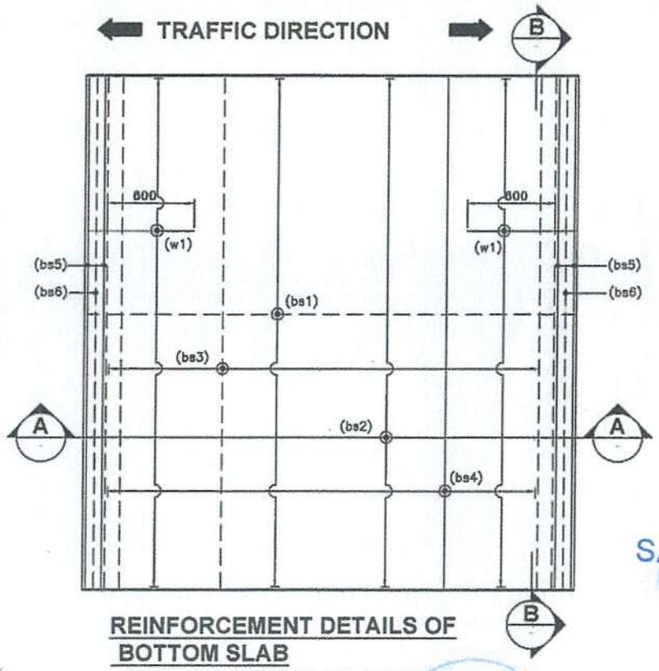
1. GENERAL ARRANGEMENT DRAWING.
   AVC/NH–38/BOX/GAD/41+022/01

TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF TOP SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF BOTTOM SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

SAFETY AUDIT OK
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:	PROJECT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD. HEAD OFFICE CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 3rd floor, WZ-1240 Pahim Extension, Bower Ashram Wali Gali,New Delhi-110015 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012

Authorised Signatory

WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:– REINFORCEMENT DETAIL OF BOX CULVERT AT CH. 41+022

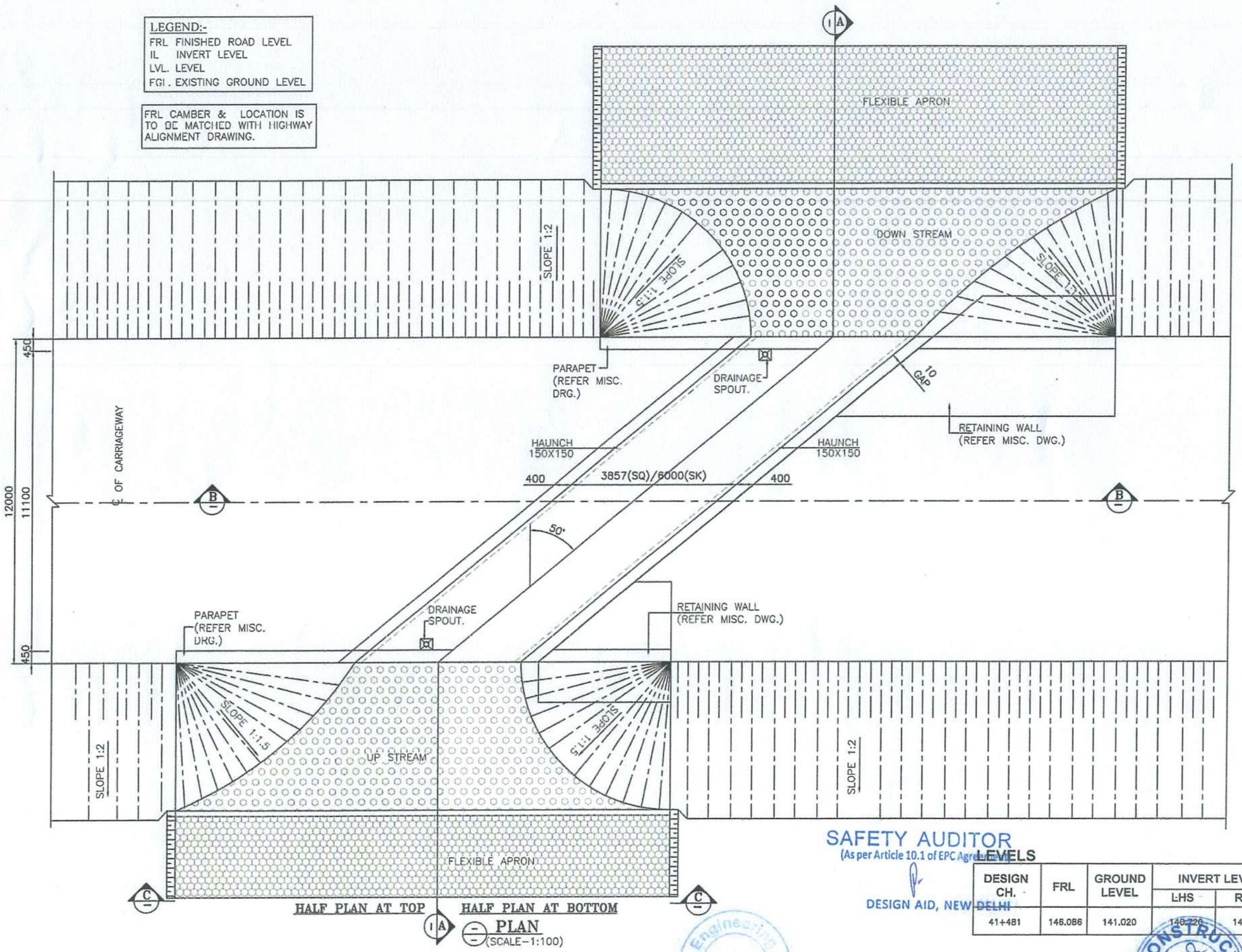
Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/REIN./41+022/01	01 OF 01	R0

LEGEND:-

FRL FINISHED ROAD LEVEL
IL INVERT LEVEL
LVL. LEVEL
FGL. EXISTING GROUND LEVEL

FRL CAMBER & LOCATION IS TO BE MATCHED WITH HIGHWAY ALIGNMENT DRAWING.



HALF PLAN AT TOP HALF PLAN AT BOTTOM

1 A **PLAN** (SCALE–1:100)

REFERENCE DRAWINGS:–

1. REINFORCEMENT DETAIL OF BOX CULVERT AVC/NH–38/BOX/REINF./41+481/02

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

LEVELS

DESIGN CH.	FRL	GROUND LEVEL	INVERT LEVEL		VERTICAL CLEARANCE (MAX.)	EARTH FILL (MAX.)	EARTH FILL (MIN.)
			LHS	RHS			
41+481	146.086	141.020	140.226	140.732	4.012m	0.954m	0.815m

CLIENT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

EPC CONTRACTOR
KAMAC ENGINEERS PVT LTD
F02, CORPORATE CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010
Kamac Engineers Pvt Ltd
Authorised Signatory

AUTHORITY'S ENGINEER
ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED.
C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171

PROOF CONSULTANT:
CREATIVE ENGINEERING SERVICES
OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010

SAFETY CONSULTANT:
DESIGN AID
PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,

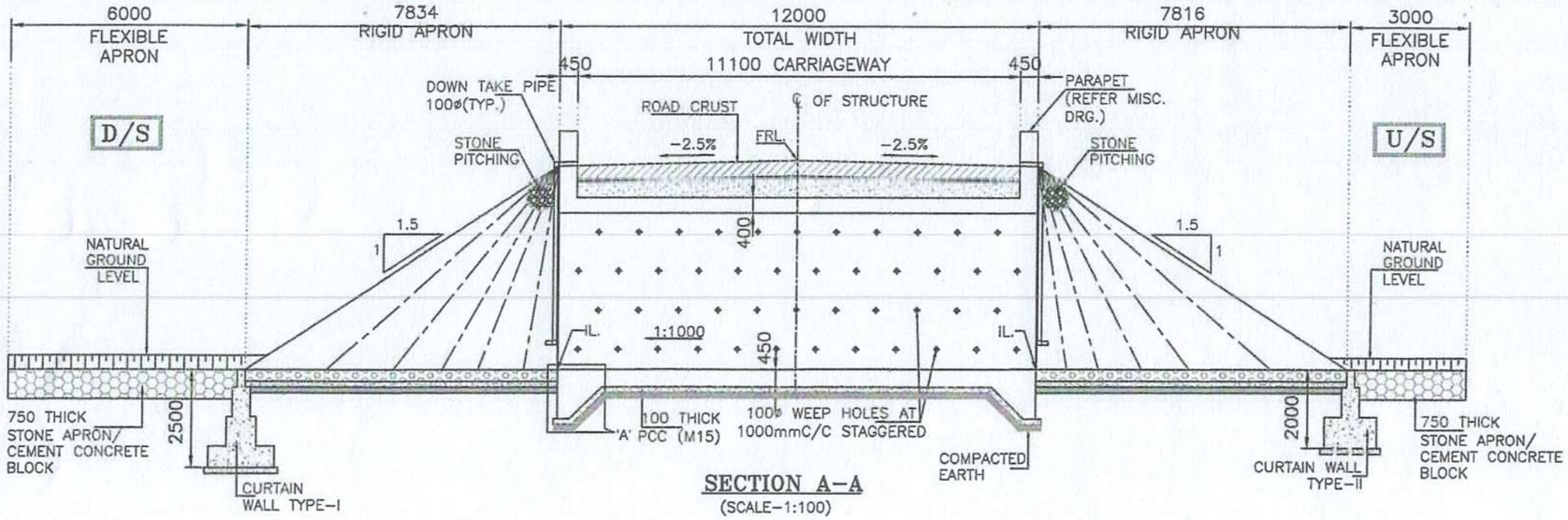
DESIGN CONSULTANT:
A.V. CONSTRUCTION
Floor, WZ-1240, Palam Extension, Bosco Ashram Wali Gali, New Delhi 110045
Winst Infra Solution Pvt. Ltd.
OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012
W I S P L

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

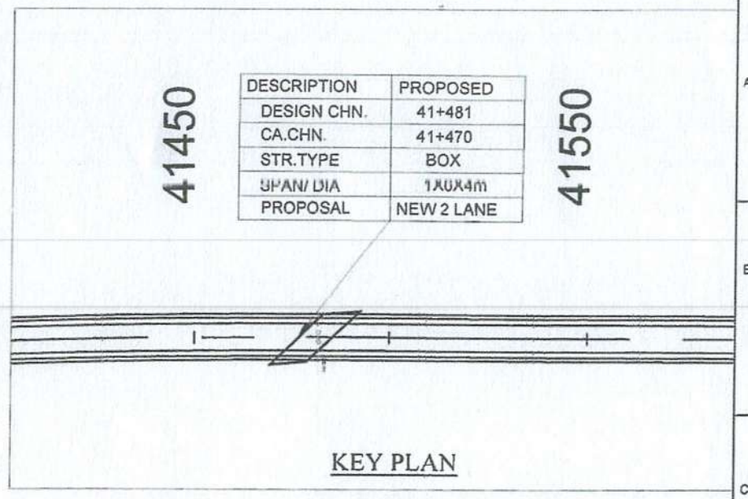
DRAWING TITLE:-
GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 41+481

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

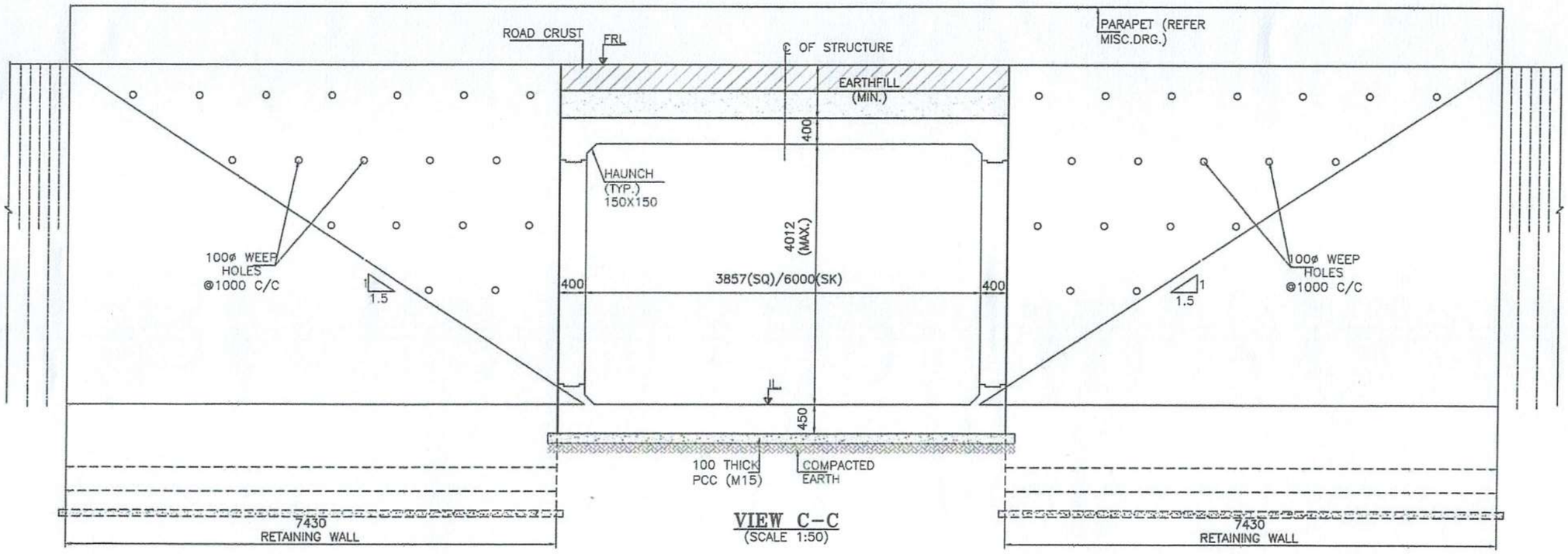
Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/GAD/41+481/01	1 OF 3	R0



SECTION A-A
(SCALE-1:100)



KEY PLAN



VIEW C-C
(SCALE 1:50)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

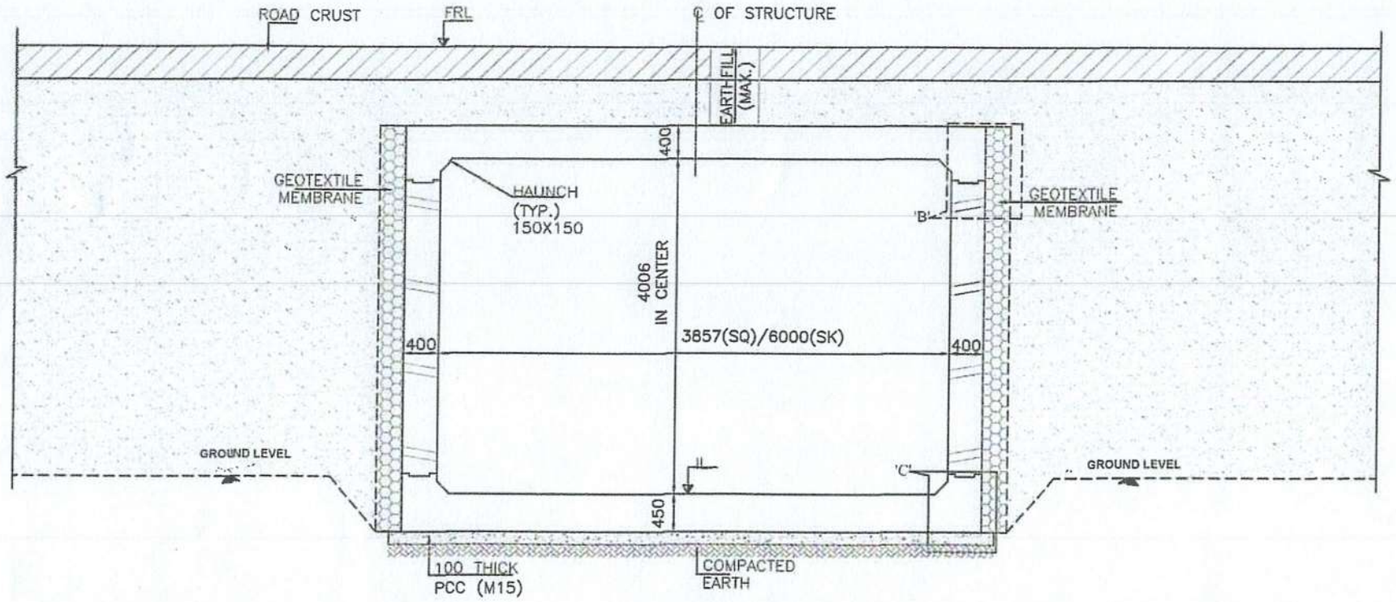
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 (Kamac Engineer's (P) Ltd Authorised Signatory)	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240, Palam Extension, Besco Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd, OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:-
GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 41+481

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/GAD/41+481/01	2 OF 3	R0



SECTION B–B
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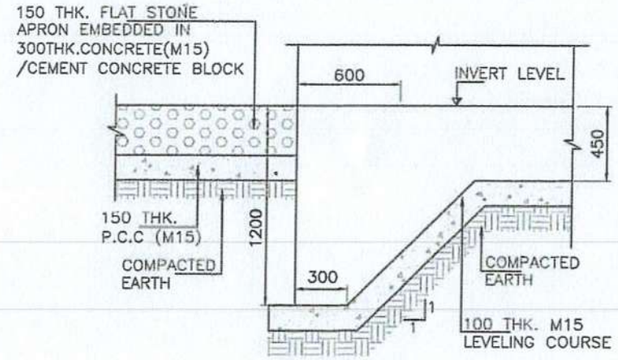

DETAIL–'A'
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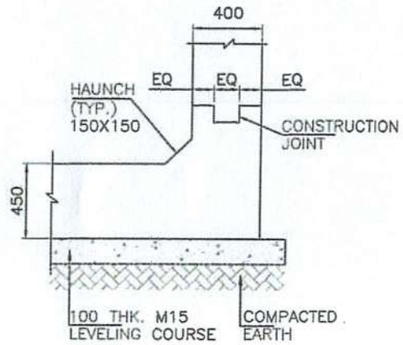
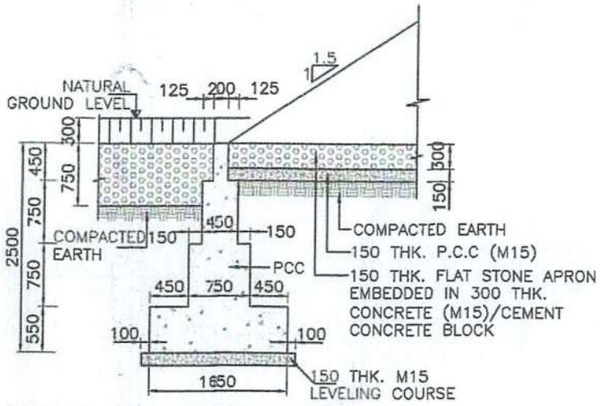
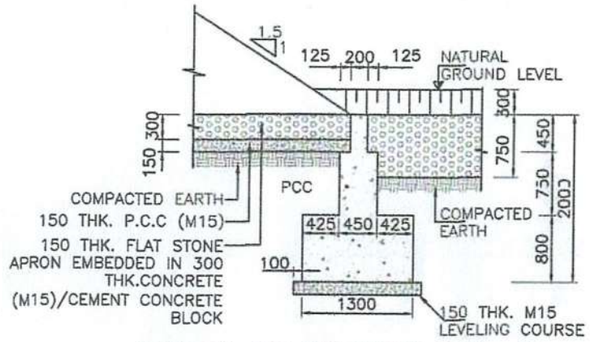


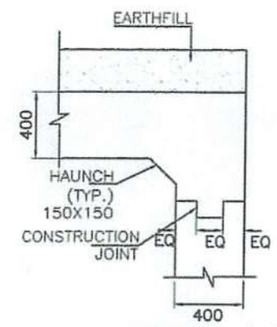
DETAIL–'C'
(SCALE 1:25)



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



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



DETAIL–'B'
(SCALE 1:25)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

NOTES:-

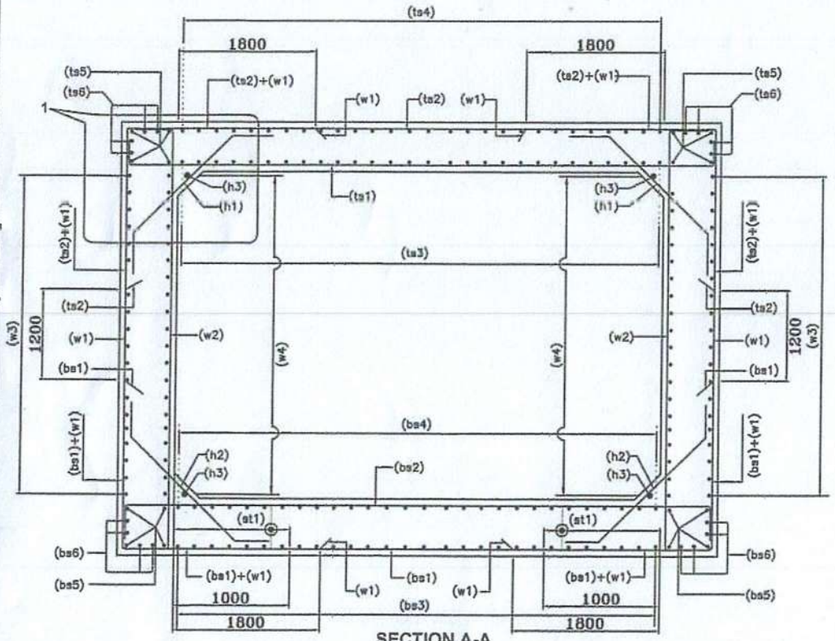
1. ALL DIMENSIONS ARE IN MILLIMETER, LEVELS ARE IN M AND CHAINAGE ARE IN KILOMETERS UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. THIS DRAWING SHALL BE READ IN CONJUCTION WITH TH RELEVANT PLAN AND PROFILE DRAWING OF ROAD.
3. GRADE OF CONCRETE:–
   a. M30–FOR RCC BOX CELL STRUCTURE.
   b. M15–FOR PCC AND LEVELING COURSE.
   c. M30–PARAPET
4. GRADE OF STEEL – Fe500.
5. THE FOLLOWING LOADS HAVE BEEN CONSIDERED IN THE DESIGN:–
   a. ONE LANE ,TWO LANE AND THREE LANE OF CLASS A
   b. ONE LANE OF CLASS A IN ADDITION OF ONE LANE OF 70R WHEEL OR ONE LANE OF 70R TRACKED WHICHEVE GOVERNS.
6. BACKFILL MATERIAL BEHIND END WALL SHALL BE SELEC GRANULAR SOIL HAVING PROPERTIES
   MAX DRY DENSITY = 1850–2280kg/m³
   OPTIMUM MOISTURE CONTENT = 7–15
   AS PER IRC78–2014 AND MORTH SPECIFICATION.
7. THE FRL SHOWN IN THE DRAWING SHALL BE VERIFIED W CORRESPONDING PLAN AND PROFILE DRAWING BEFORE EXECUTION, IF THERE IS ANY VARIATION SHALL BE BRO TO THE NOTICE OF ENGINEER.
8. THE DIMENSION AND LEVEL ARE SUBJECTED TO CHANGE PER SITE CONDITION AND DETAILED DESIGN.
9. BACKFILL TO BE DONE AND COMPACTED FROM BOTH SID SIMULTANEOUSLY.
10. 600MM THICK. FILTER MATERIAL BEHIND RETAINING WALL SHALL BE LAID AS PER APPENDIX 6 OF IRC 78–2014.
11. 50MM THICK CEMENT CONCRETE WEARING COAT SHALL BE PROVIDED.
12. 100MM DIA P.V.C. PIPE AT SPACING 1000MMc/c IN HORIZONTAL/VERTICAL DIRECTION SHALL BE PROVIDED U TO 150MM ABOVE GROUND LEVEL FOR WEEP HOLES IN RETAINING WALL.
13. SBC SHALL BE 10t/m². AND SAME SHALL BE ENSURED AT SITE BY ANY SUITABLE METHOD.
14. AS PER MORTH SECTION–2500,WHERE THE REQUIRED S BOULDERS ARE NOT AVAILABLE ECONOMICALLY.CEMENT C BLOCKS OF EQUIVALENT WEIGHT SHALL BE USED.THE GR OF CONCRETE SHALL BE M15 NOMINAL MIX.CEMENT CON BLOCK SHALL BE PREFERRED WHERE PRACTICABLE.
15. CHOOSE ANY SUITABLE METHOD TO ACHIEVE THE REQUIR SBC AS PER SITE.
16. THE EXPOSURE CONDITION IS MODERATE.

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	Kamac Engineers (P) Ltd KAMAC ENGINEERS PVT. LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240, Palam Extension, Bosco Ashram Well Gali New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012 W I S P L

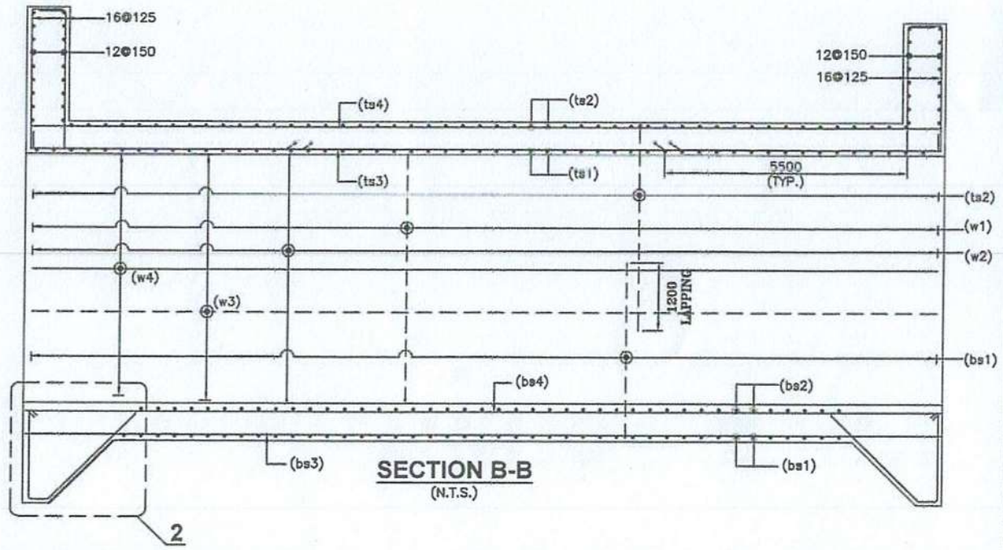
PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FRO (GOLAI GOAN) TO KM 47+882 (LEDO) ON DIBRUGARH TO LEDO SECT PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREE (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSA MODE.(PACKAGE-5)

DRAWING TITLE:-
GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 41+481

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawi
JAN.2024	W.P	V.S	A.B		NTS	
Project No.	Drawing No.					Sheet
	AVC/NH-38/BOX/GAD/41+481/01					3



SECTION A-A
(NTS)



SECTION B-B
(N.T.S.)

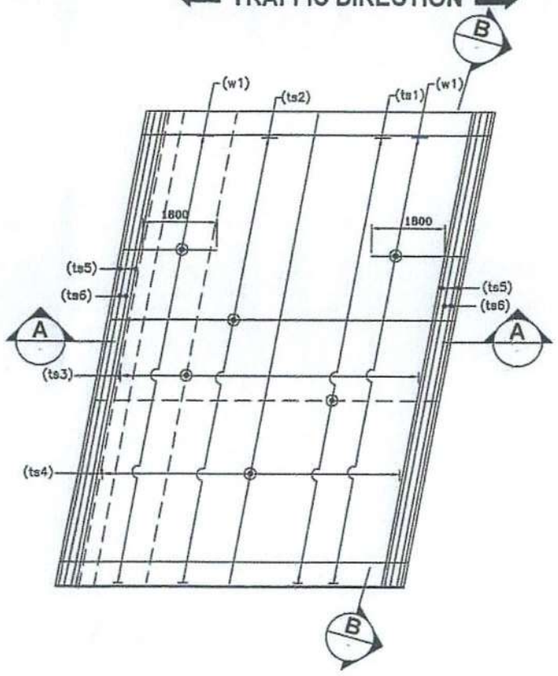
BOX REINF. SCHEDULE

SL.NO.	BAR MARK	BAR SHAPE	DIAMETER	SPACING
1	ts1		20+8	180
2	ts2		16	180
3	ts3		12	200
4	ts4		12	200
5	ts5		12	2x4 Nos.
6	ts6		12	2x4 Nos.
7	w1		16	180
8	w2		16	180
9	w3		12	200
10	w4		10	200
11	bs1		16	180
12	bs2		20+10	180
13	bs3		12	200
14	bs4		12	200
15	bs5		12	2x4 Nos.
16	bs6		12	2x4 Nos.
17	h1		10	180
18	h2		10	180
19	h3		10	1x4 Nos.
20	cs1		12	10 Nos.
21	cs2		10	200
22	st1		8	200 c/c (L–L) 180 c/c (T–T) DIRECTION

LEGEND:–

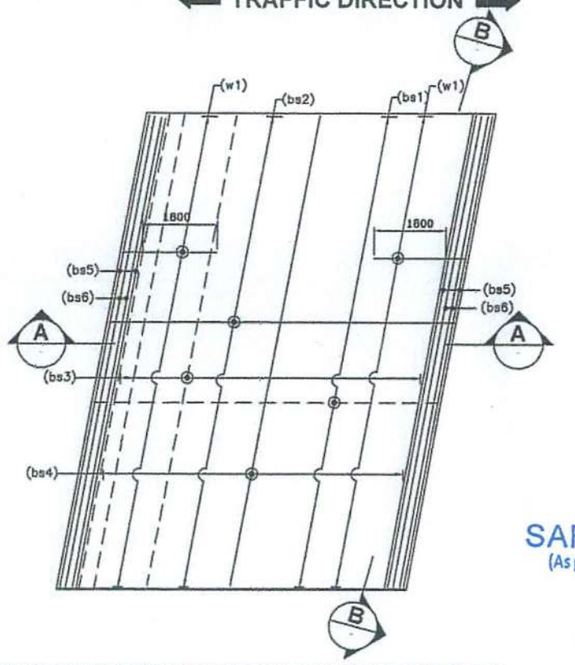
TOP FACE BAR	———
BOTTOM FACE BAR	- - - - -

TRAFFIC DIRECTION

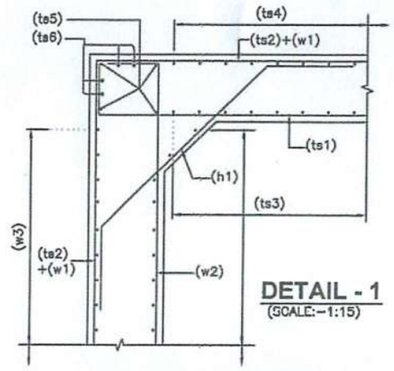


REINFORCEMENT DETAILS OF TOP SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

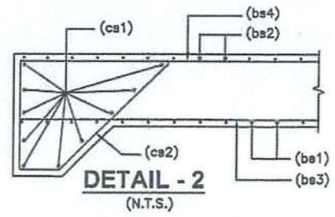
TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF BOTTOM SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)



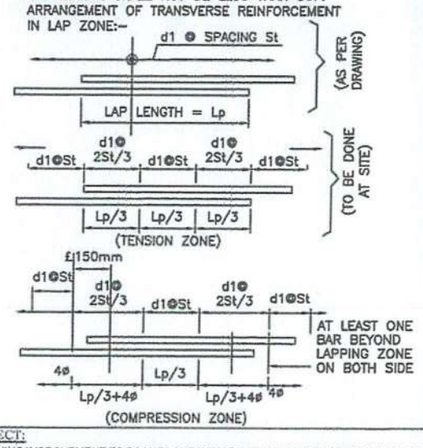
DETAIL - 1
(SCALE:–1:15)



DETAIL - 2
(N.T.S.)

NOTES:–

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE MENTIONED.
2. DRAWING SHOULD NOT BE SCALED ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. ALL REINFORCING BARS SHALL BE THERMO MECHANICALLY TREATED (TMT) BARS (GRADE DESIGNATION Fe–500) CONFIRMING TO IS:1786 STANDARDS.
4. MINIMUM CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE AS FOLLOWS:–
   a) TOP SLAB – 45mm
   b) BOTTOM SLAB – 75mm
   c) SIDE WALL (EARTH SIDE) – 75mm
   d) SIDE WALL (INNER SIDE) – 45mm
5. OVERLAPPING FOR SPLICING OF REINFORCEMENT SHALL BE AS PER CLAUSE NO.15.2.5.
   LAP LENGTH SHALL NOT BE LESS THAN 56ø.
   ARRANGEMENT OF TRANSVERSE REINFORCEMENT IN LAP ZONE:–



6. ANCHOURAGE LENGTH OF BOX SHALL BE TAKEN AS 40ø AS PER IRC:112.
7. FOR UNFAVORABLE BOND CONDITIONS THE FACTOR 40 SHOULD BE MULTIPLIED BY FACTOR OF 1.43 .
8. CENTER LINE OF OVERLAPPING BAR bs1 & ts2 IN WALL & MID HEIGHT OF WALLS ARE AT SAME POINT.
9. BAR BENDING SCHEDULE SHOULD BE STRICTLY FOLLOW DURING THE TIME OF EXECUTION IF IN CASE ANY CHANGES AT SITE KINDLY DISCUSS IT WITH ENGINEER IN CHARGE.

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

REFERENCE DRAWING:–

1. GENERAL ARRANGEMENT DRAWING.
   AVC/NH–38/BOX/GAD/41+481/01

CONSTRUCTION NEW DELHI

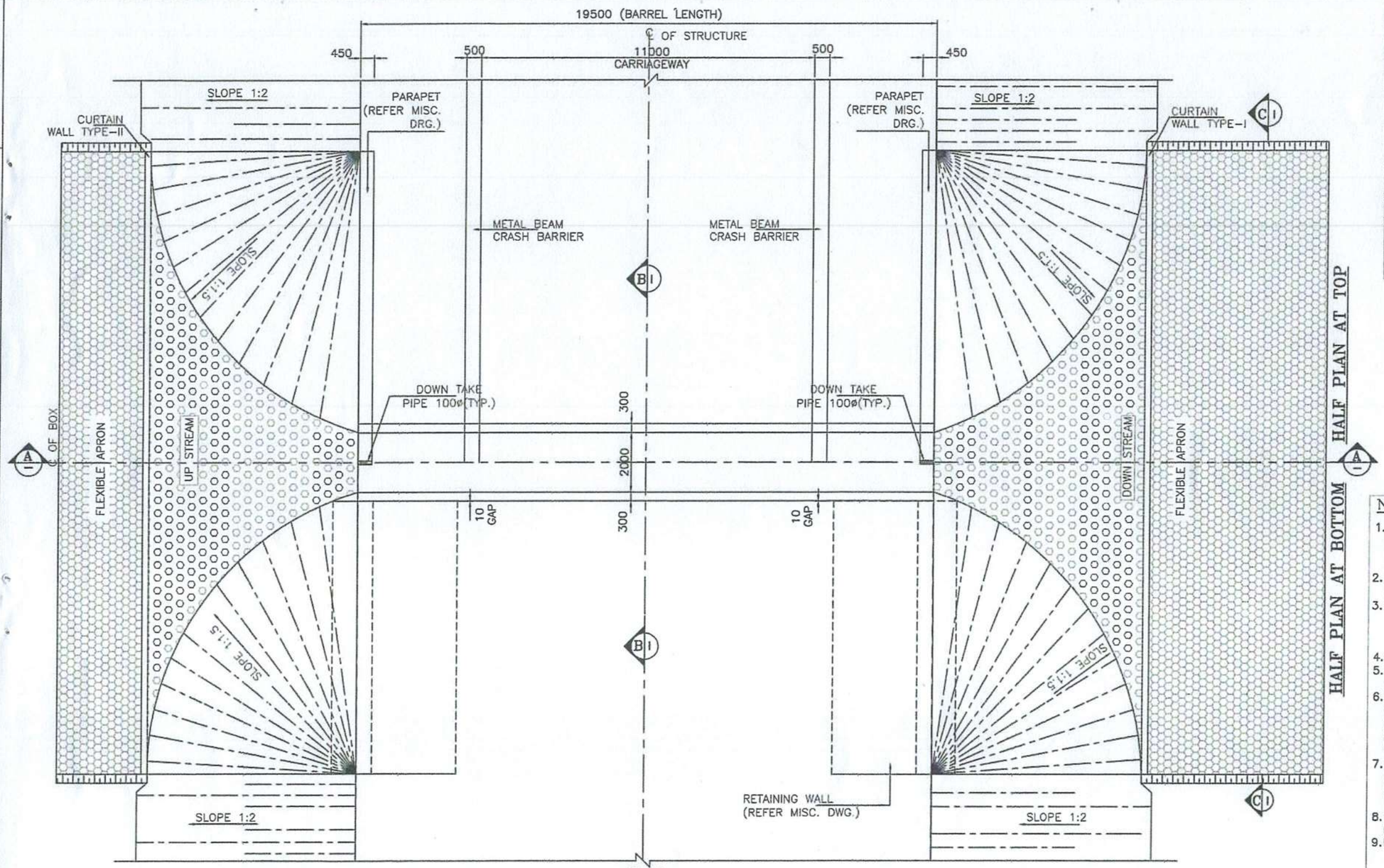
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD F-0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 Kamac Engineers (P) Ltd Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1040, Palam Extension, Based Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

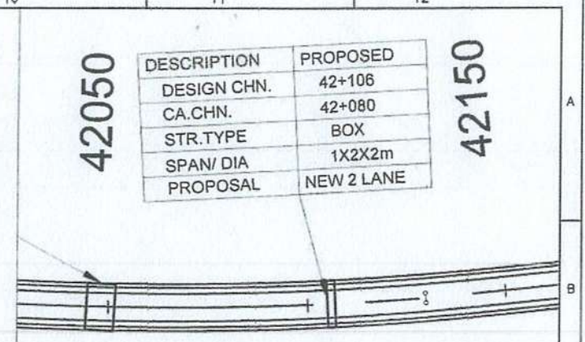
DRAWING TITLE:- REINFORCEMENT DETAIL OF BOX CULVERT AT CH. 41+481

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/REIN./41+481/01	01 OF 01	R0



PLAN
(SCALE–1:100)



DESCRIPTION	PROPOSED
DESIGN CHN.	42+106
CA.CHN.	42+080
STR.TYPE	BOX
SPAN/ DIA	1X2X2m
PROPOSAL	NEW 2 LANE

KEY PLAN

LEVELS

DESIGN CH.	FRL	GROUND LEVEL	INVERT LEVEL		VERTICAL CLEARANCE (MAX.)	EARTHFILL (MAX.)	EARTHFILL (MIN.)
			LHS	RHS			
42+106	147.277	140.692	140.411	140.392	2.019 m	4.566m	2.320m

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)

DESIGN AID, NEW DELHI

REFERENCE DRAWINGS:

1. REINFORCEMENT DETAIL OF BOX CULVERT AVC/NH–38/BC/REINF./42+106/01

LEGEND:-
FRL FINISHED ROAD LEVEL
IL INVERT LEVEL
LVL. LEVEL
EGL. EXISTING GROUND LEVEL

FRL CAMBER & LOCATION IS TO BE MATCHED WITH HIGHWAY ALIGNMENT DRAWING.

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETER, LEVELS ARE IN METER AND CHAINAGE ARE IN KILOMETERS UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. THIS DRAWING SHALL BE READ IN CONJUCTION WITH THE RELEVANT PLAN AND PROFILE DRAWING OF ROAD.
3. GRADE OF CONCRETE:–
   a. M30–FOR RCC BOX CELL STRUCTURE.
   b. M15–FOR PCC AND LEVELING COURSE.
   c. M30–PARAPET
4. GRADE OF STEEL – Fe 500.
5. THE CARRIAGEWAY OF PROPOSED CULVERT IS DESIGN AS PER 6–2017.
6. BACKFILL MATERIAL BEHIND END WALL SHALL BE SELECTED GRANULAR SOIL HAVING PROPERTIES
   MAX DRY DENSITY = 1850–2280kg/m³
   OPTIMUM MOISTURE CONTENT = 7–15
   AS PER IRC78–2014 AND MORTH SPECIFICATION.
7. THE FRL SHOWN IN THE DRAWING SHALL BE VERIFIED WITH CORRESPONDING PLAN AND PROFILE DRAWING BEFORE EXECUTION, IF THERE IS ANY VARIATION SHALL BE BROUGHT TO THE NOTICE OF ENGINEER.
8. THE DIMENSION AND LEVEL ARE SUBJECTED TO CHANGE AS PER SITE CONDITION AND DETAILED DESIGN.
9. BACKFILL TO BE DONE AND COMPACTED FROM BOTH SIDE SIMULTANEOUSLY.
10. 100MM DIA P.V.C. PIPE AT SPACING 1000MMc/c IN HORIZONTAL/VERTICAL DIRECTION SHALL BE PROVIDED UP TO 150MM ABOVE GROUND LEVEL FOR WEEP HOLES IN RETAINING WALL.
11. SBC SHALL BE 18t/m². AND SAME SHALL BE ENSURED AT SITE BY ANY SUITABLE METHOD.
12. AS PER MORTH SECTION–2500, WHERE THE REQUIRED SIZE OF BOULDERS ARE NOT AVAILABLE ECONOMICALLY. CEMENT CONCRETE BLOCKS OF EQUIVALENT WEIGHT SHALL BE USED. THE GRADE OF CONCRETE SHALL BE M15 NOMINAL MIX. CEMENT CONCRETE BLOCK SHALL BE PREFERRED WHERE PRACTICABLE.
13. CHOOSE ANY SUITABLE METHOD TO ACHIEVE THE REQUIRED SBC AS PER SITE.

CLIENT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

EPC CONTRACTOR
KAMAC ENGINEERS PVT.LTD
F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010

AUTHORITY'S ENGINEER
ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED.
C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171

PROOF CONSULTANT:
CREATIVE ENGINEERING SERVICES
OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010

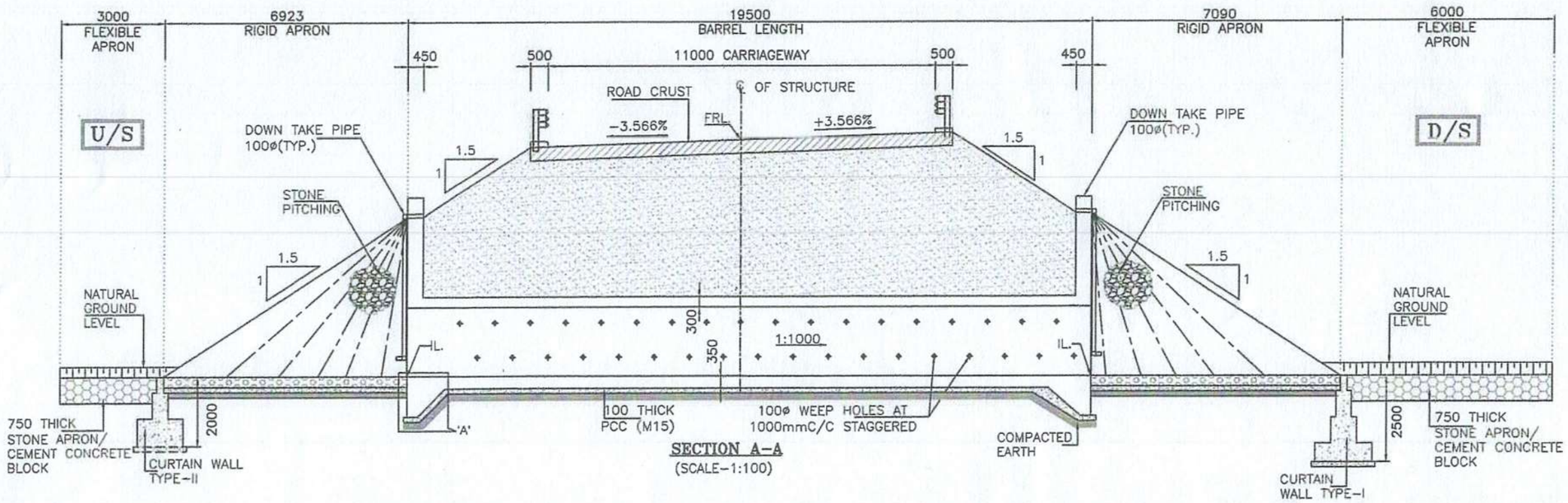
SAFETY CONSULTANT:
DESIGN AID
PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM, VASANT KUNJ, NEW DELHI-110070.

DESIGN CONSULTANT:
A.V. CONSTRUCTION
1st Floor, WZ-1240, Palam Extension Bosco Ashram Wali Gali, New Delhi 110045
Winst Infra Solution Pvt. Ltd.
OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23, SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012

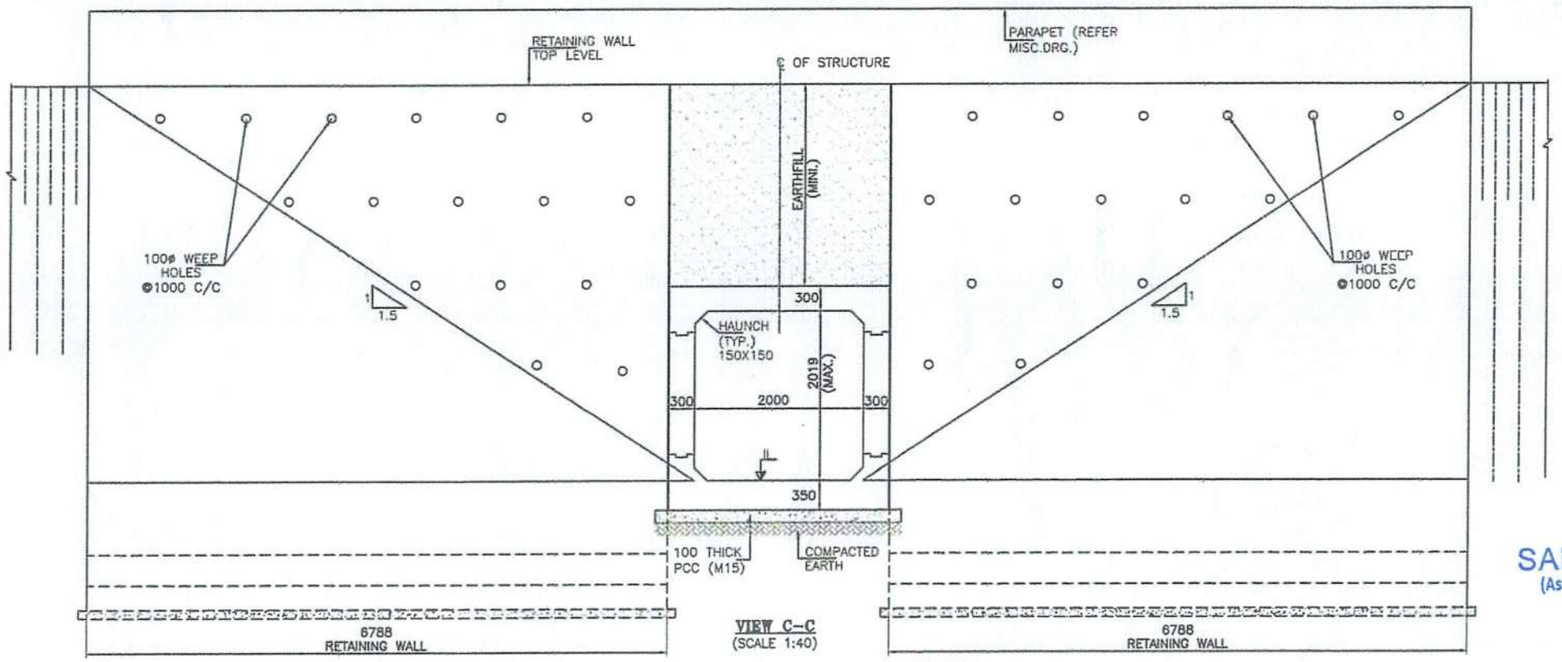
PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+662 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 42+106

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	
Project No.	Drawing No. AVC/NH-38/BC/GAD/42+106/01				Sheet No. 01 OF 03	Rev. R0



SECTION A-A
(SCALE-1:100)



VIEW C-C
(SCALE 1:40)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD. F0201, PITC CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240, Palam Extension, Bosco Ashram Wali Gali, New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

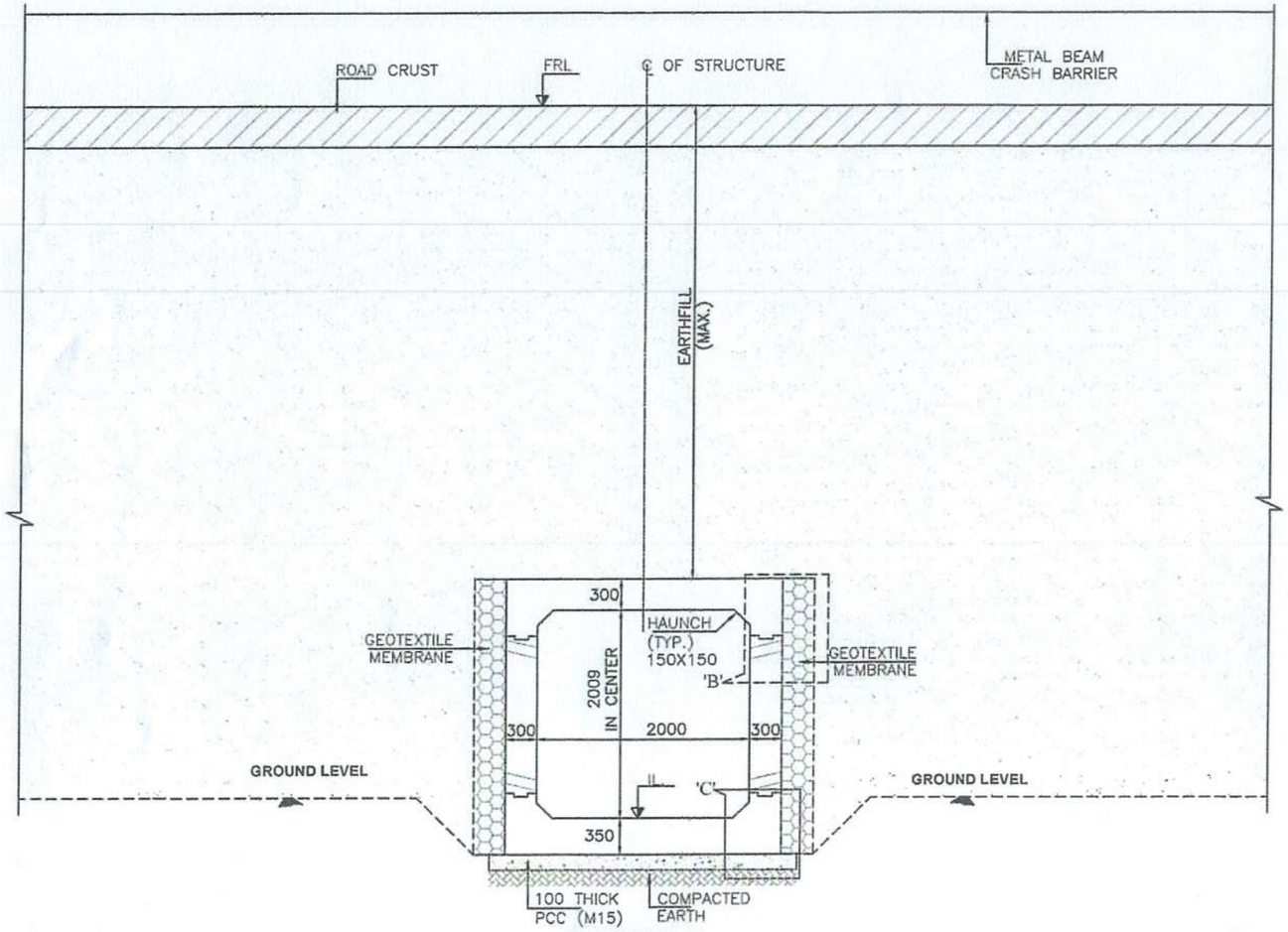
Kamac Engineers (P) Ltd
Authorised Signatory

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 42+106

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/42+106/01	02 OF 03	R0



SECTION B–B
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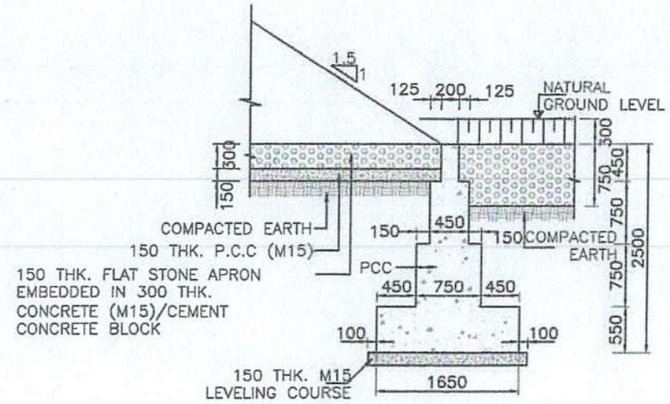
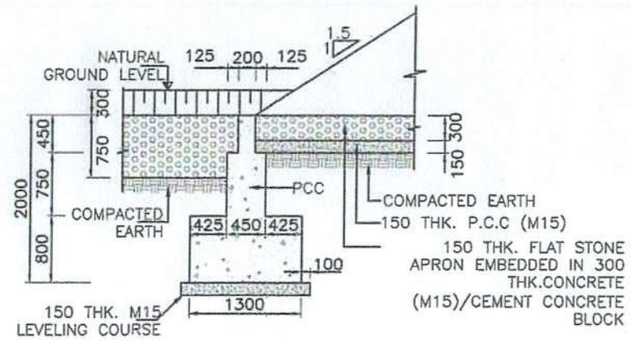
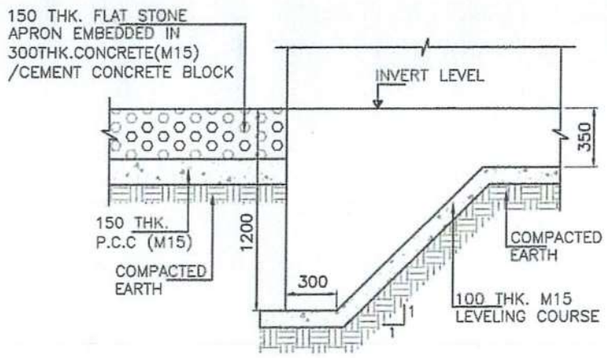


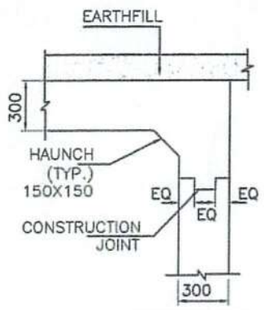
DETAIL OF CURTAIN WALL–I
(DOWN STREAM SIDE)
(SCALE 1:50)



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



DETAIL–'A'
(SCALE 1:25)



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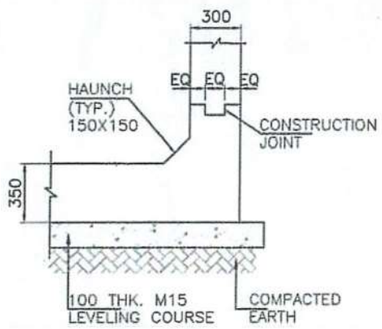
(SCALE 1:25)



DETAIL–'C'
(SCALE 1:25)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

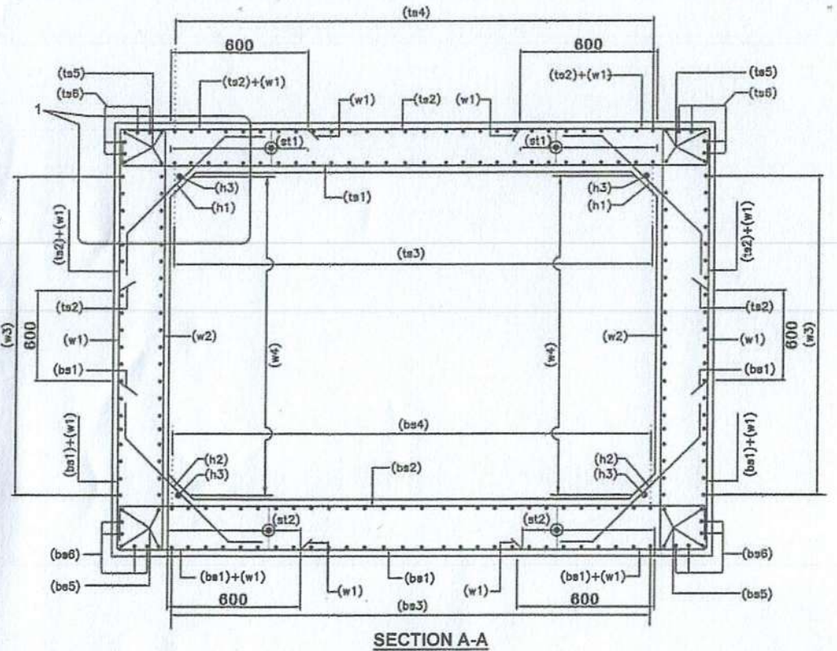
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS Pvt.Ltd Kamac Engineers (P) Ltd Authorised Signatory KAMAC ENGINEERS (P) LTD FOREST CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240, Palam Extension, Roeco Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

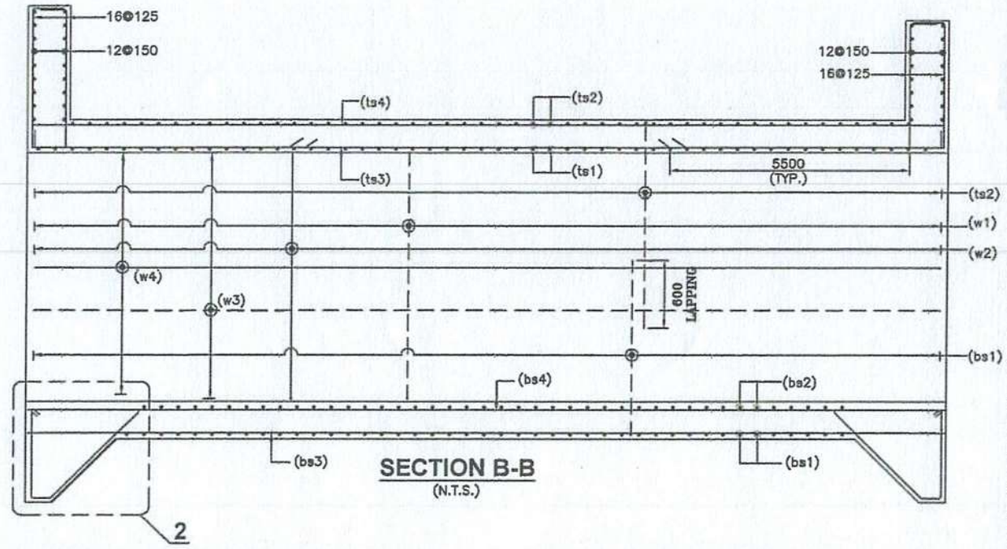
DRAWING TITLE:-
GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 42+106

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/42+106/01	03 OF 03	R0



SECTION A-A
(NTS)

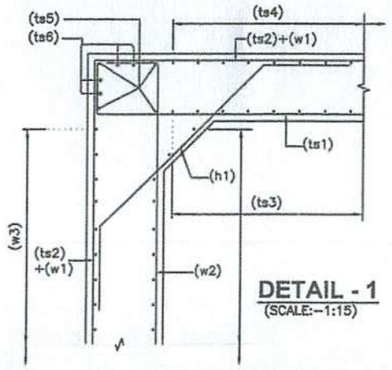


SECTION B-B
(N.T.S.)

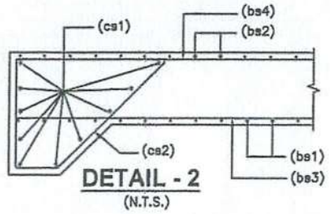
BOX REINF. SCHEDULE

SL.NO.	BAR MARK	BAR SHAPE	DIAMETER	SPACING
1	ts1		12+8	150
2	ts2		10	150
3	ts3		10	200
4	ts4		10	200
5	ts5		12	2x4 Nos.
6	ts6		12	2x4 Nos.
7	w1		10	150
8	w2		12	150
9	w3		10	200
10	w4		8	200
11	bs1		10	150
12	bs2		12+10	150
13	bs3		10	200
14	bs4		10	200
15	bs5		12	2x4 Nos.
16	bs6		12	2x4 Nos.
17	h1		10	150
18	h2		10	150
19	h3		10	1x4 Nos.
20	cs1		12	10 Nos.
21	cs2		10	200
22	st1		10	200 c/c (L–L) 150 c/c (T–T) DIRECTION
23	st2		10	200 c/c (L–L) 150 c/c (T–T) DIRECTION

LEGEND:–	
TOP FACE BAR	————
BOTTOM FACE BAR	- - - - - -

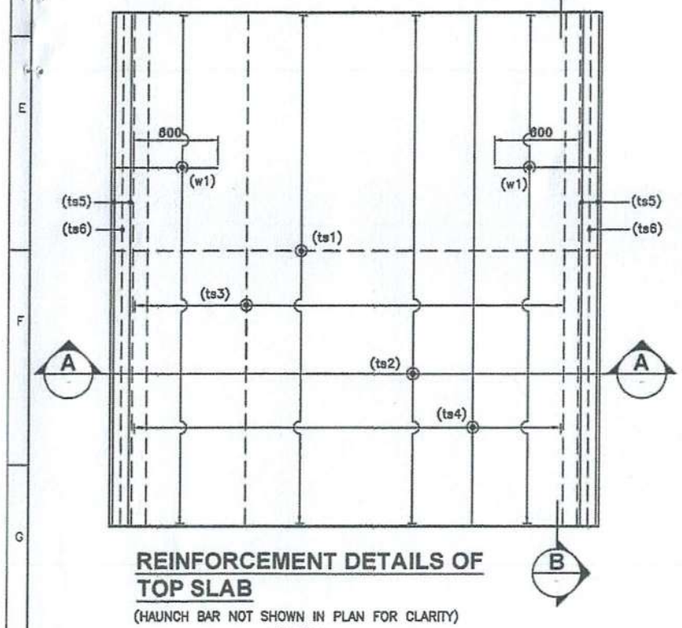


DETAIL - 1
(SCALE:–1:15)



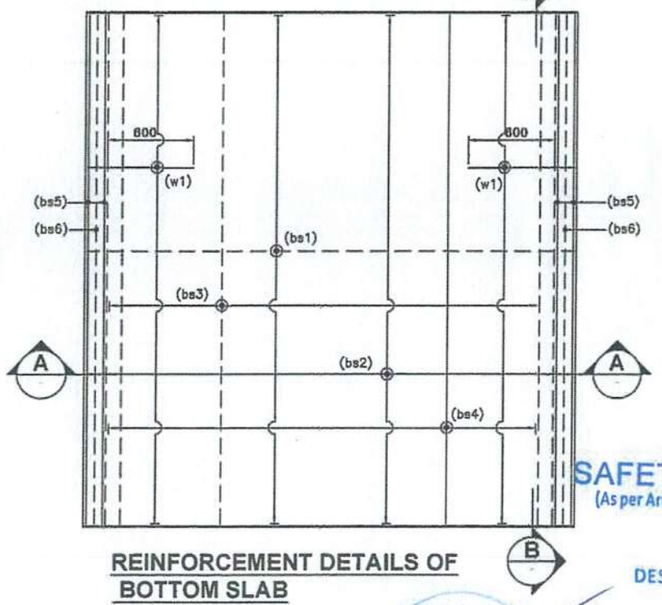
DETAIL - 2
(N.T.S.)

TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF TOP SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

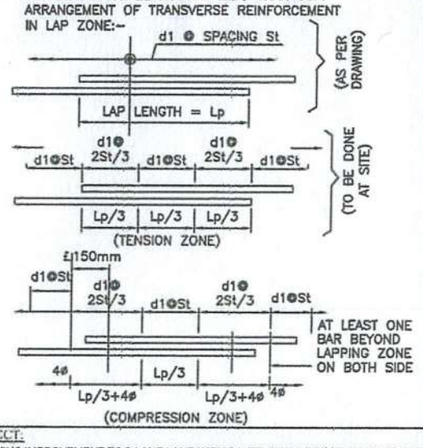
TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF BOTTOM SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

NOTES:–

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE MENTIONED.
2. DRAWING SHOULD NOT BE SCALED ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. ALL REINFORCING BARS SHALL BE THERMO MECHANICALLY TREATED (TMT) BARS (GRADE DESIGNATION Fe–500) CONFIRMING TO IS:1786 STANDARDS.
4. MINIMUM CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE AS FOLLOWS:–
   a) TOP SLAB – 45mm
   b) BOTTOM SLAB – 75mm
   c) SIDE WALL (EARTH SIDE) – 75mm
   d) SIDE WALL (INNER SIDE) – 45mm
5. OVERLAPPING FOR SPLICING OF REINFORCEMENT SHALL BE AS PER CLAUSE NO.15.2.5.
   LAP LENGTH SHALL NOT BE LESS THAN 56ø.
   ARRANGEMENT OF TRANSVERSE REINFORCEMENT IN LAP ZONE:–



6. ANCHOURAGE LENGTH OF BOX SHALL BE TAKEN AS 40ø AS PER IRC:112.
7. FOR UNFAVORABLE BOND CONDITIONS THE FACTOR 40 SHOULD BE MULTIPLIED BY FACTOR OF 1.43 .
8. CENTER LINE OF OVERLAPPING BAR bs1 & ts2 IN WALL & MID HEIGHT OF WALLS ARE AT SAME POINT.
9. BAR BENDING SCHEDULE SHOULD BE STRICTLY FOLLOW DURING THE TIME OF EXECUTION IF IN CASE ANY CHANGES AT SITE KINDLY DISCUSS IT WITH ENGINEER IN CHARGE.

REFERENCE DRAWING:–

1. GENERAL ARRANGEMENT DRAWING. AVC/NH–38/BOX/GAD/42+106/01

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

CONSTRUCTIONS NEW DELHI

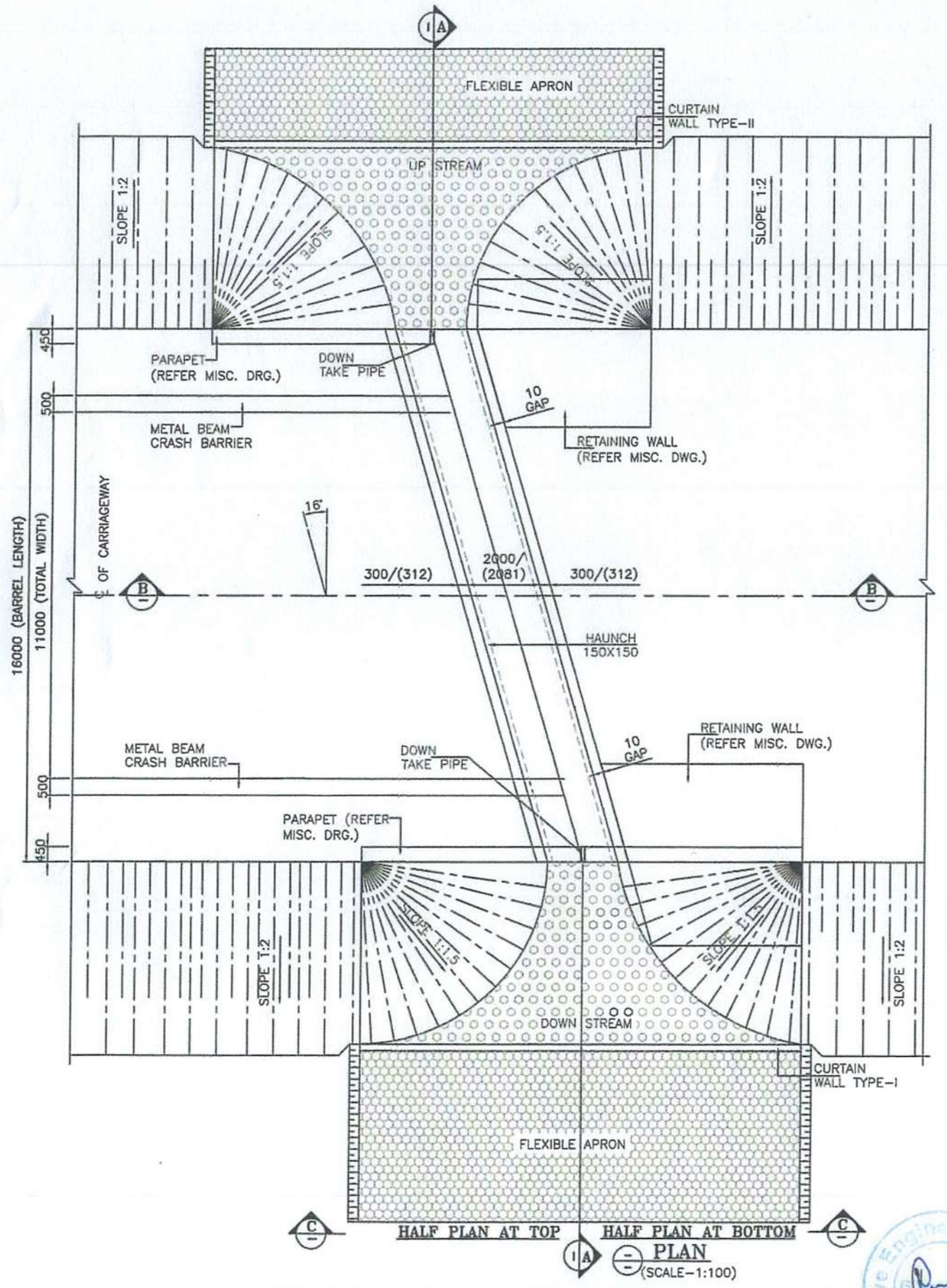
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD. FOUNDRY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 (Kamac Engineers (P) Ltd — Authorised Signatory)	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240, Palam Extension, Bosco Ashram Wali Gali,New Delhi 110045; Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012 (W I S P L)

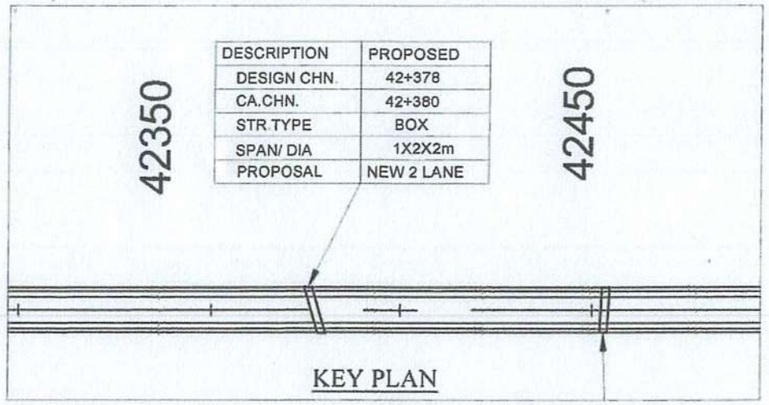
PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:– REINFORCEMENT DETAIL OF BOX CULVERT AT CH. 42+106

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/REIN./42+106/01	01 OF 01	R0





DESCRIPTION	PROPOSED
DESIGN CHN.	42+378
CA.CHN.	42+380
STR.TYPE	BOX
SPAN/ DIA	1X2X2m
PROPOSAL	NEW 2 LANE

LEVELS

DESIGN CH.	FRL	GROUND LEVEL	INVERT LEVEL		VERTICAL CLEARANCE (MAX.)	EARTH FILL (MAX.)	EARTH FILL (MIN.)
			LHS	RHS			
42+378	145.650	140.585	140.297	140.285	2.016m	3.049m	1.863m

LEGEND:-
FRL FINISHED ROAD LEVEL
IL INVERT LEVEL
LVL. LEVEL
EGL. EXISTING GROUND LEVEL

FRL CAMBER & LOCATION IS TO BE MATCHED WITH HIGHWAY ALIGNMENT DRAWING.

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETER, LEVELS ARE IN METER AND CHAINAGE ARE IN KILOMETERS UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. THIS DRAWING SHALL BE READ IN CONJUCTION WITH THE RELEVANT PLAN AND PROFILE DRAWING OF ROAD.
3. GRADE OF CONCRETE:–
   a. M30–FOR RCC BOX CELL STRUCTURE.
   b. M15–FOR PCC AND LEVELING COURSE.
   c. M30–PARAPET
4. GRADE OF STEEL – Fe500.
5. THE FOLLOWING LOADS HAVE BEEN CONSIDERED IN THE DESIGN:–
   a. ONE LANE ,TWO LANE AND THREE LANE OF CLASS A
   b. ONE LANE OF CLASS A IN ADDITION OF ONE LANE OF CLASS 70R WHEEL OR ONE LANE OF 70R TRACKED WHICHEVER IS GOVERNS.
6. BACKFILL MATERIAL BEHIND END WALL SHALL BE SELECTED GRANULAR SOIL HAVING PROPERTIES
   MAX DRY DENSITY – 1850–2280kg/m³
   OPTIMUM MOISTURE CONTENT = 7–15
   AS PER IRC78–2014 AND MORTH SPECIFICATION.
7. THE FRL SHOWN IN THE DRAWING SHALL BE VERIFIED WITH CORRESPONDING PLAN AND PROFILE DRAWING BEFORE EXECUTION, IF THERE IS ANY VARIATION SHALL BE BROUGHT TO THE NOTICE OF ENGINEER.
8. THE DIMENSION AND LEVEL ARE SUBJECTED TO CHANGE AS PER SITE CONDITION AND DETAILED DESIGN.
9. BACKFILL TO BE DONE AND COMPACTED FROM BOTH SIDE SIMULTANEOUSLY.
10. 600MM THICK. FILTER MATERIAL BEHIND RETAINING WALL SHALL BE LAID AS PER APPENDIX 6 OF IRC 78–2014.
11. 50MM THICK CEMENT CONCRETE WEARING COAT SHALL BE PROVIDED.
12. 100MM DIA P.V.C. PIPE AT SPACING 1000MMc/c IN HORIZONTAL/VERTICAL DIRECTION SHALL BE PROVIDED UP TO 150MM ABOVE GROUND LEVEL FOR WEEP HOLES IN RETAINING WALL.
13. SBC SHALL BE 14t/m². AND SAME SHALL BE ENSURED AT SITE BY ANY SUITABLE METHOD.
14. AS PER MORTH SECTION–2500,WHERE THE REQUIRED SIZE OF BOULDERS ARE NOT AVAILABLE ECONOMICALLY.CEMENT CONCRETE BLOCKS OF EQUIVALENT WEIGHT SHALL BE USED.THE GRADE OF CONCRETE SHALL BE M15 NOMINAL MIX.CEMENT CONCRETE BLOCK SHALL BE PREFERRED WHERE PRACTICABLE.
15. CHOOSE ANY SUITABLE METHOD TO ACHIEVE THE REQUIRED SBC AS PER SITE.
16. THE EXPOSURE CONDITION IS MODERATE.

REFERENCE DRAWINGS:–

1. REINFORCEMENT DETAIL OF BOX CULVERT AVC/NH–38/BOX/REINF./42+378/02

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD. 5TH, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V CONSTRUCTION F.No. WZ-1240, Palam Extension, Bodo, Ashram Wali Gali,New Delhi-110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA, GHAZIABAD, U.P-201012

Kamac Engineers (P) Ltd
Authorised Signatory

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 42+378

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
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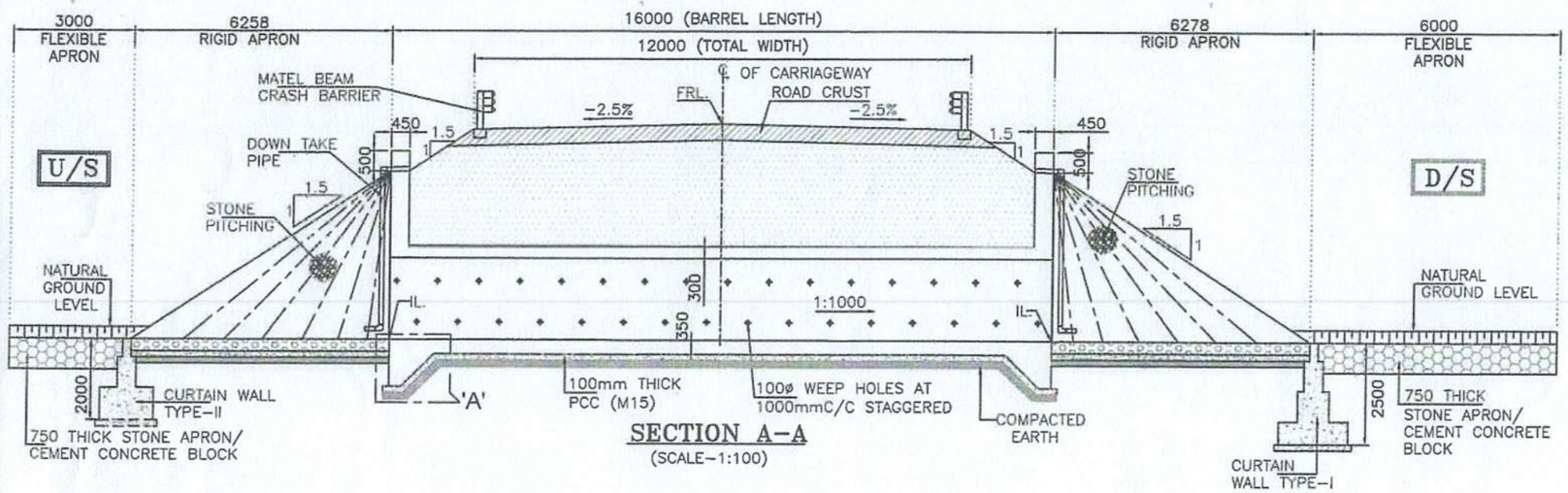
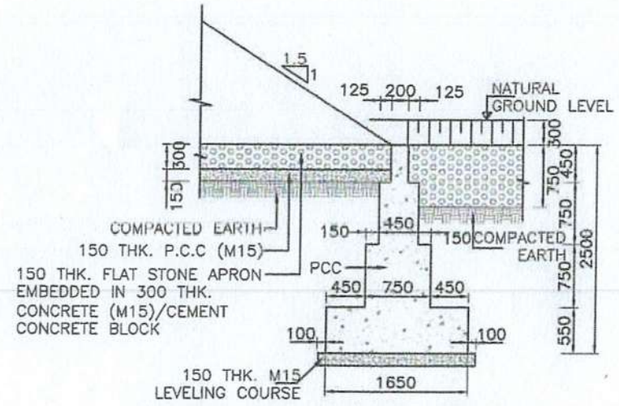
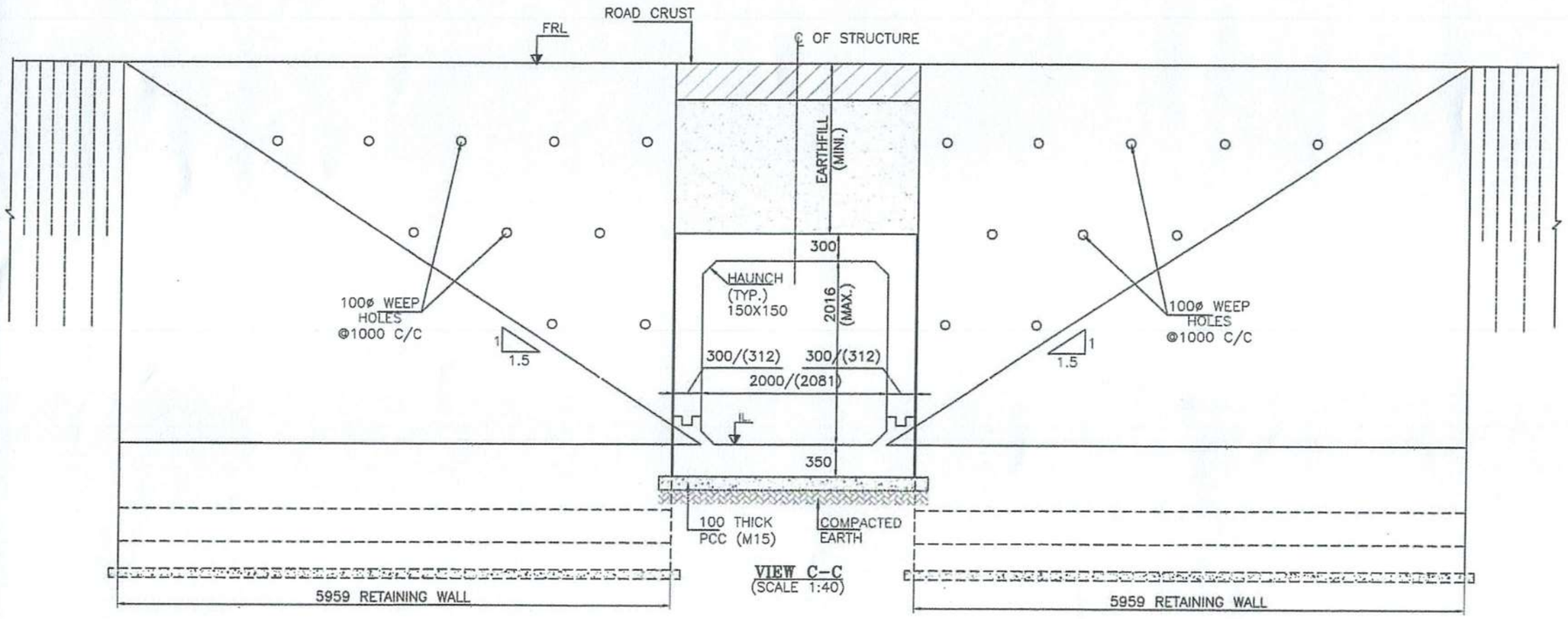


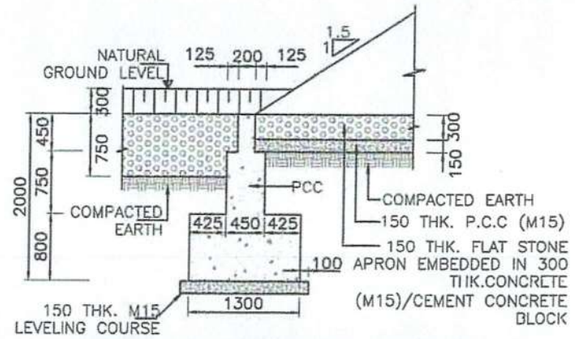
SECTION A-A
(SCALE-1:100)



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



VIEW C-C
(SCALE 1:40)



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

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD. F02, MAIN CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 (Kamac Engineers (P) Ltd Authorised Signatory)	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION Floor, WZ-12 Palam Extension, Bosco Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012

PROJECT: WIDENING/MPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 42+378

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

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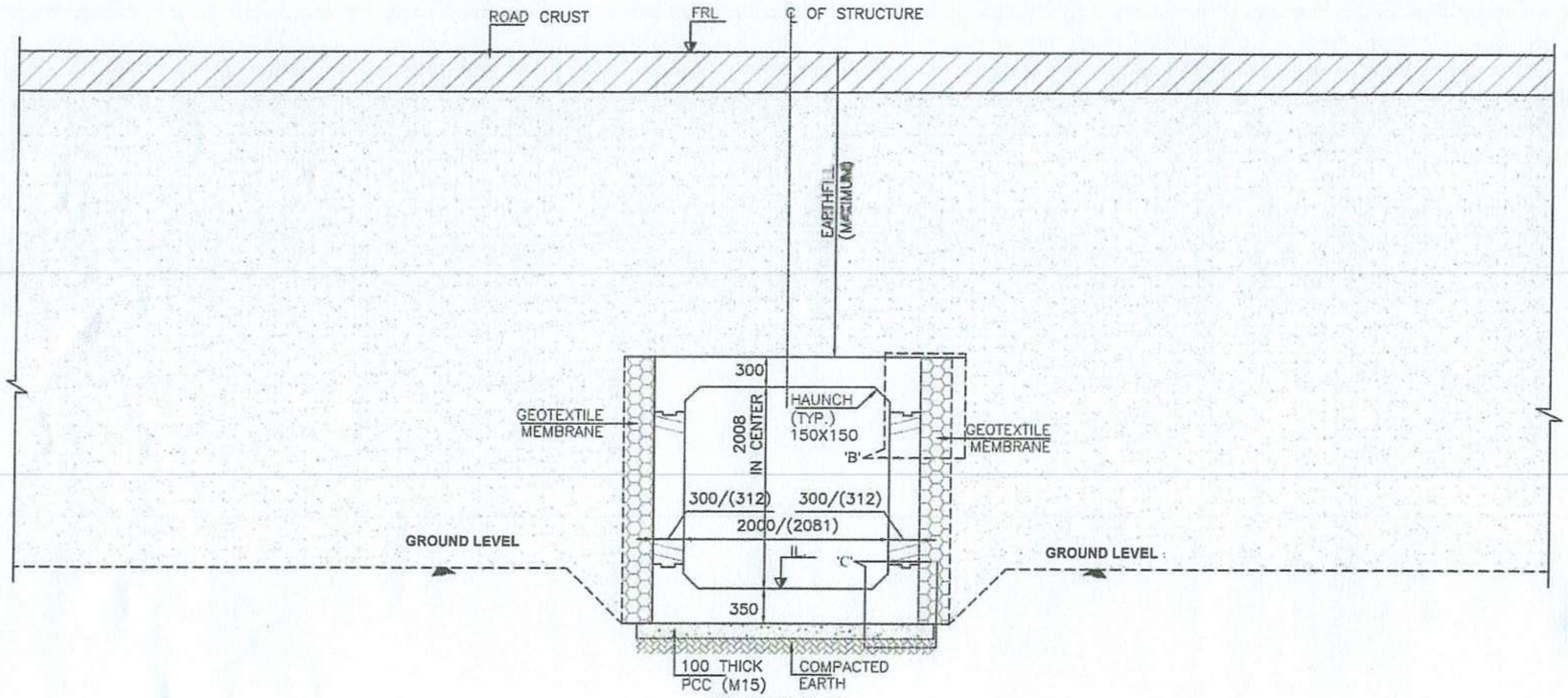
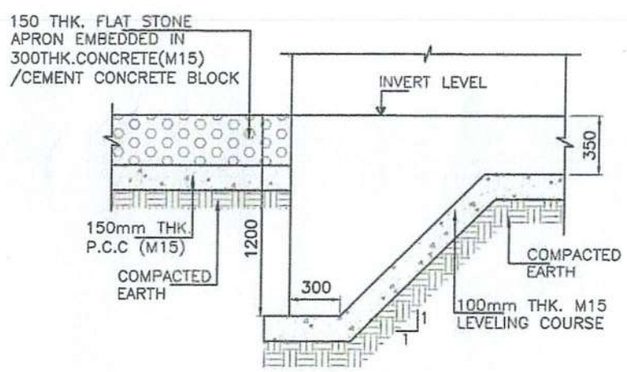
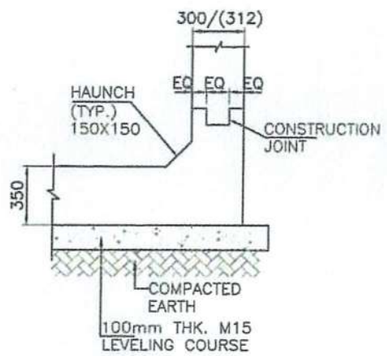


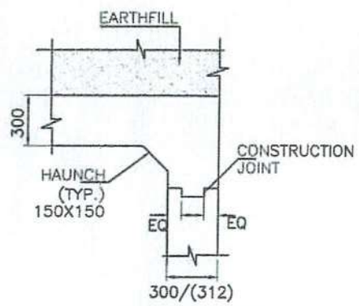
SECTION B–B
(SCALE 1:40)



DETAIL–'A'
(SCALE 1:25)



DETAIL–'C'
(SCALE 1:25)



DETAIL–'B'
(SCALE 1:25)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)

DESIGN AID, NEW DELHI

Kamac Engineer's (P) Ltd
Authorised Signatory

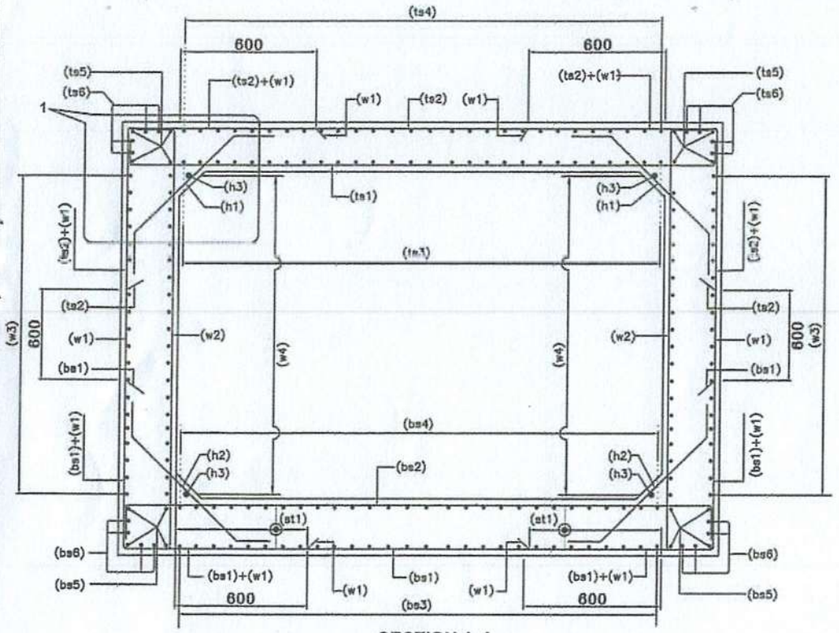
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, W2-1440, Palam Extension, Bosco Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

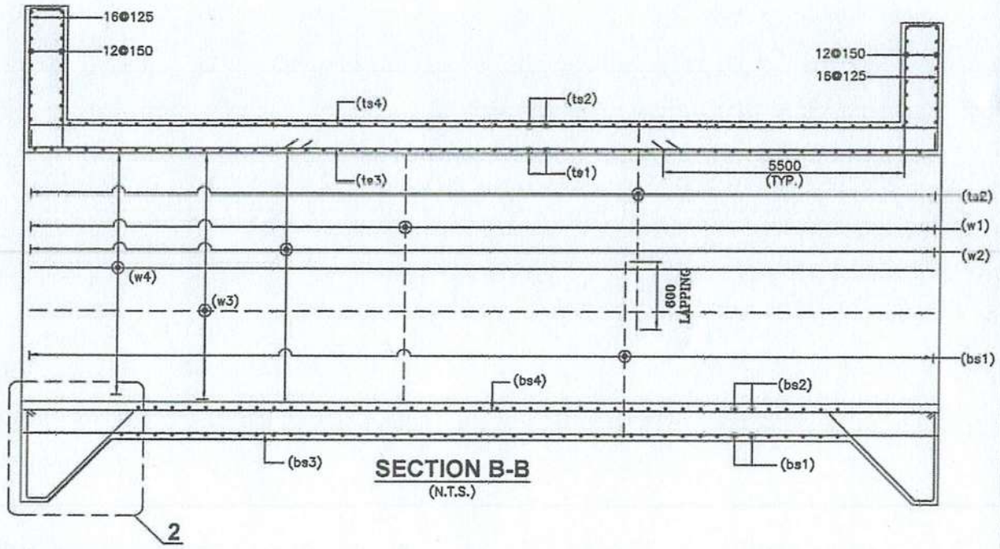
DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 42+378

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/42+378/01-	03 OF 03	R0



SECTION A-A
(NTS)

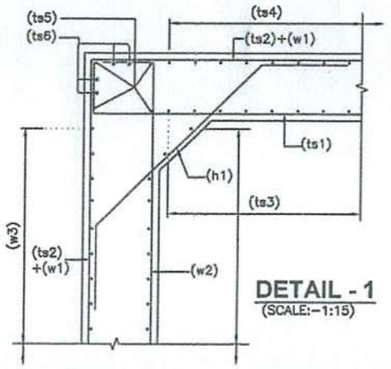


SECTION B-B
(N.T.S.)

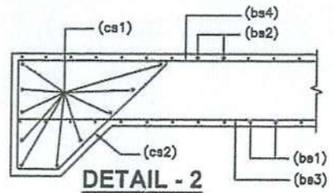
BOX REINF. SCHEDULE

SL.NO.	BAR MARK	BAR SHAPE	DIAMETER	SPACING
1	ts1		12	170
2	ts2		10	170
3	ts3		8	200
4	ts4		10	200
5	ts5		12	2x4 Nos.
6	ts6		12	2x4 Nos.
7	w1		10	170
8	w2		10	170
9	w3		10	200
10	w4		8	200
11	bs1		10	170
12	bs2		10+8	170
13	bs3		10	200
14	bs4		8	200
15	bs5		12	2x4 Nos.
16	bs6		12	2x4 Nos.
17	h1		10	170
18	h2		10	170
19	h3		10	1x4 Nos.
20	cs1		12	10 Nos.
21	cs2		10	200
22	st1		8	200 c/c (L–L) 170 c/c (T–T) DIRECTION

LEGEND:–	
TOP FACE BAR	————
BOTTOM FACE BAR	- - - - - -

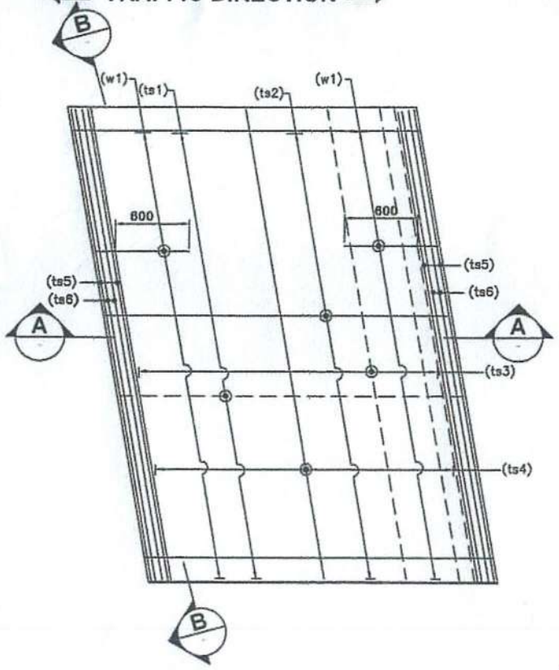


DETAIL - 1
(SCALE:–1:15)



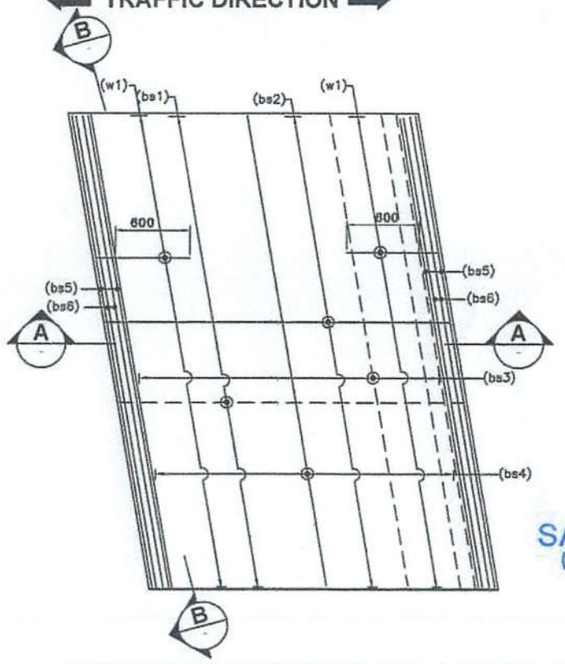
DETAIL - 2
(N.T.S.)

TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF TOP SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

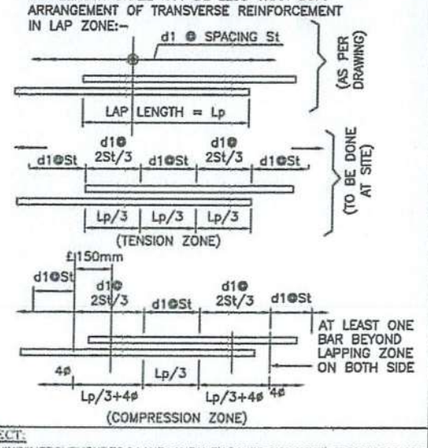
TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF BOTTOM SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

NOTES:–

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE MENTIONED.
2. DRAWING SHOULD NOT BE SCALED ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. ALL REINFORCING BARS SHALL BE THERMO MECHANICALLY TREATED (TMT) BARS (GRADE DESIGNATION Fe–500) CONFIRMING TO IS:1786 STANDARDS.
4. MINIMUM CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE AS FOLLOWS:–
   a) TOP SLAB – 45mm
   b) BOTTOM SLAB – 75mm
   c) SIDE WALL (EARTH SIDE) – 75mm
   d) SIDE WALL (INNER SIDE) – 45mm
5. OVERLAPPING FOR SPLICING OF REINFORCEMENT SHALL BE AS PER CLAUSE NO.15.2.5.
   LAP LENGTH SHALL NOT BE LESS THAN 56ø.
   ARRANGEMENT OF TRANSVERSE REINFORCEMENT IN LAP ZONE:–



6. ANCHOURAGE LENGTH OF BOX SHALL BE TAKEN AS 40ø AS PER IRC:112.
7. FOR UNFAVORABLE BOND CONDITIONS THE FACTOR 40 SHOULD BE MULTIPLIED BY FACTOR OF 1.43 .
8. CENTER LINE OF OVERLAPPING BAR bs1 & ts2 IN WALL & MID HEIGHT OF WALLS ARE AT SAME POINT.
9. BAR BENDING SCHEDULE SHOULD BE STRICTLY FOLLOW DURING THE TIME OF EXECUTION IF IN CASE ANY CHANGES AT SITE KINDLY DISCUSS IT WITH ENGINEER IN CHARGE.

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

REFERENCE DRAWING:–

1. GENERAL ARRANGEMENT DRAWING.
   AVC/NH–38/BOX/GAD/42+378/01

Kamac Engineers (P) Ltd
Authorised Signatory

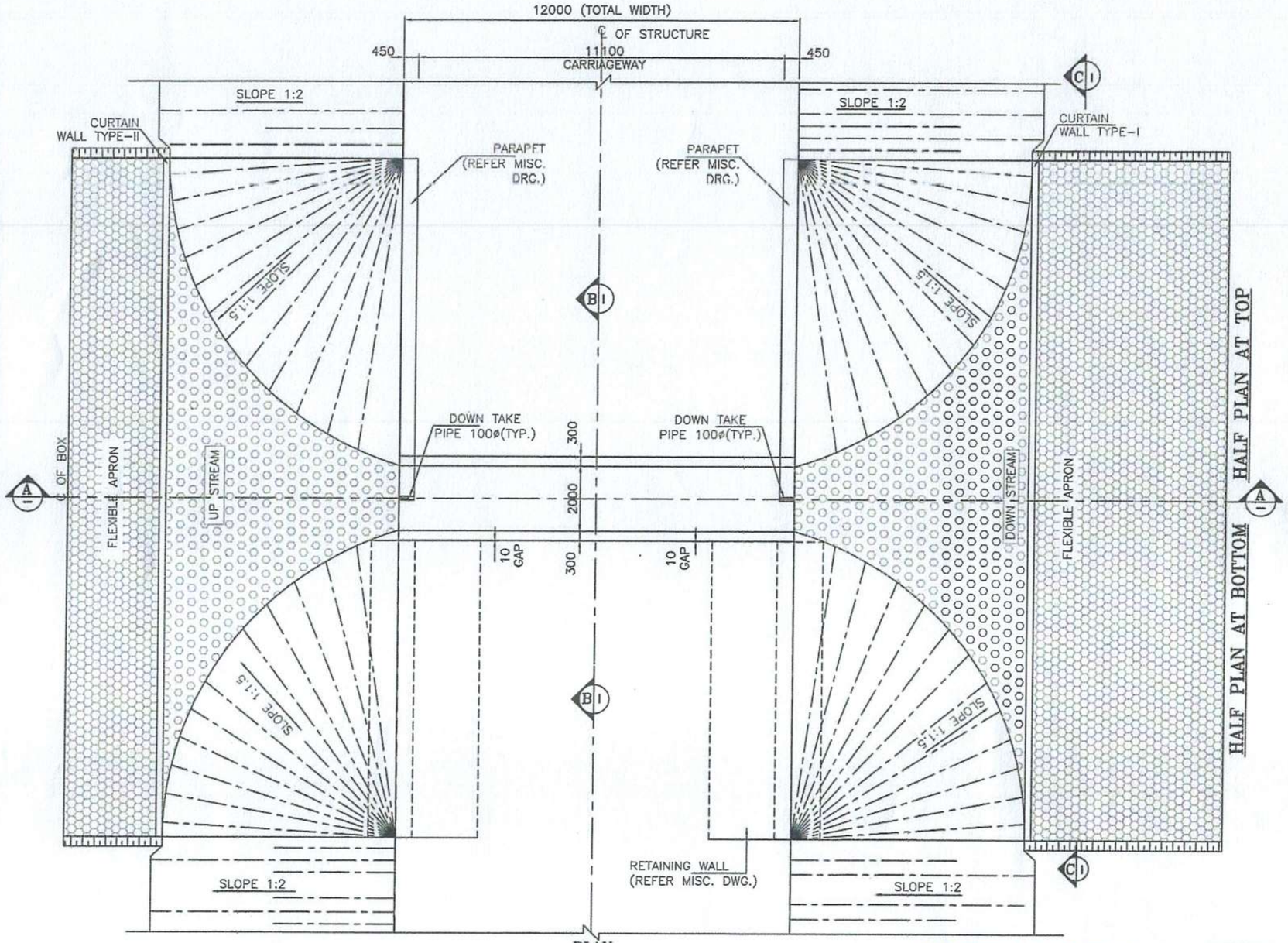
CLIENT:	EPC CONTRACTOR:	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTIONS 1st Floor, WZ-1240, Palam Extension, Bisco Ashram Wali Gali, New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

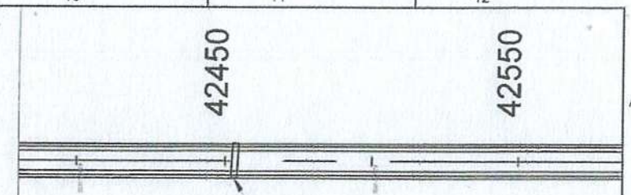
DRAWING TITLE: REINFORCEMENT DETAIL OF BOX CULVERT AT CH. 42+378

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.H		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/REIN./42+378/01-	01 OF 01	R0



PLAN
(SCALE–1:100)



DESCRIPTION	PROPOSED
DESIGN CHN	42+454
CA CHN	42+425
STR TYPE	BOX
SPAN/ DIA	1X2X2m
PROPOSAL	NEW 2 LANE

KEY PLAN

LEVELS

DESIGN CH.	FRL	GROUND LEVEL	INVERT LEVEL		VERTICAL CLEARANCE (MAX.)	EARTHFILL (MAX.)	EARTHFILL (MIN.)
			LHS	RHS			
42+454	145.753	141.200	140.912	140.900	2.012m	2.541m	2.391m

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

REFERENCE DRAWINGS:–

1. REINFORCEMENT DETAIL OF BOX CULVERT AVC/NH–38/BC/REINF./42+454/01

LEGEND:-
FRL FINISHED ROAD LEVEL
IL INVERT LEVEL
LVL. LEVEL
EGL. EXISTING GROUND LEVEL

FRL CAMBER & LOCATION IS TO BE MATCHED WITH HIGHWAY ALIGNMENT DRAWING.

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETER, LEVELS ARE IN METER AND CHAINAGE ARE IN KILOMETERS UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. THIS DRAWING SHALL BE READ IN CONJUCTION WITH THE RELEVANT PLAN AND PROFILE DRAWING OF ROAD.
3. GRADE OF CONCRETE:–
   a. M30–FOR RCC BOX CELL STRUCTURE.
   b. M15–FOR PCC AND LEVELING COURSE.
   c. M30–PARAPET
4. GRADE OF STEEL – Fe 500.
5. THE CARRIAGEWAY OF PROPOSED CULVERT IS DESIGN AS PER 6–2017.
6. BACKFILL MATERIAL BEHIND END WALL SHALL BE SELECTED GRANULAR SOIL HAVING PROPERTIES
   MAX DRY DENSITY = 1850–2280kg/m³
   OPTIMUM MOISTURE CONTENT = 7–15
   AS PER IRC78–2014 AND MORTH SPECIFICATION.
7. THE FRL SHOWN IN THE DRAWING SHALL BE VERIFIED WITH CORRESPONDING PLAN AND PROFILE DRAWING BEFORE EXECUTION, IF THERE IS ANY VARIATION SHALL BE BROUGHT TO THE NOTICE OF ENGINEER.
8. THE DIMENSION AND LEVEL ARE SUBJECTED TO CHANGE AS PER SITE CONDITION AND DETAILED DESIGN.
9. BACKFILL TO BE DONE AND COMPACTED FROM BOTH SIDE SIMULTANEOUSLY.
10. 100MM DIA P.V.C. PIPE AT SPACING 1000MMc/c IN HORIZONTAL/VERTICAL DIRECTION SHALL BE PROVIDED UP TO 150MM ABOVE GROUND LEVEL FOR WEEP HOLES IN RETAINING WALL.
11. SBC SHALL BE 13t/m². AND SAME SHALL BE ENSURED AT SITE BY ANY SUITABLE METHOD.
12. AS PER MORTH SECTION–2500,WHERE THE REQUIRED SIZE OF BOULDERS ARE NOT AVAILABLE ECONOMICALLY.CEMENT CONCRETE BLOCKS OF EQUIVALENT WEIGHT SHALL BE USED.THE GRADE OF CONCRETE SHALL BE M15 NOMINAL MIX.CEMENT CONCRETE BLOCK SHALL BE PREFERRED WHERE PRACTICABLE.
13. CHOOSE ANY SUITABLE METHOD TO ACHIEVE THE REQUIRED SBC AS PER SITE.

CLIENT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

EPC CONTRACTOR
KAMAC ENGINEERS PVT.LTD
F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010
Kamac Engineers (Pr) Ltd
Authorised Signatory

AUTHORITY'S ENGINEER
ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED.
C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171

PROOF CONSULTANT:
CREATIVE ENGINEERING SERVICES
OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010

SAFETY CONSULTANT:
DESIGN AID
PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,

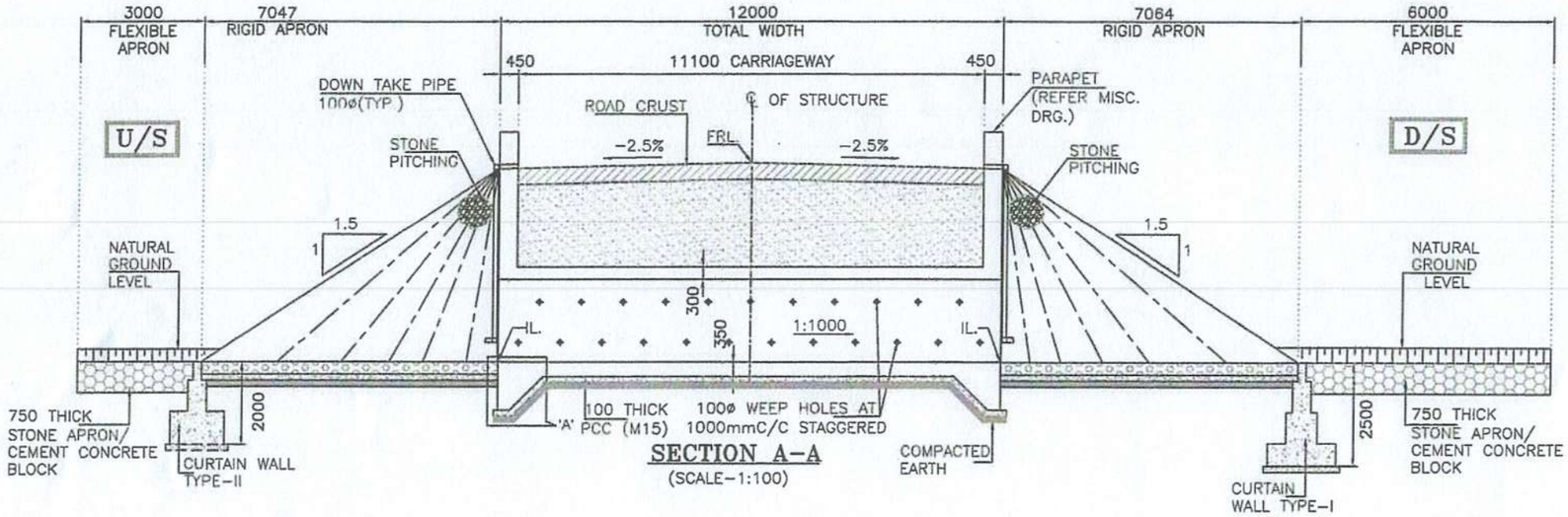
DESIGN CONSULTANT:
A.V. CONSTRUCTION
1st Floor, WZ-1240, Palam Extension, Bosco Ashram Wali Gali,New Delhi 110045
Winst Infra Solution Pvt. Ltd.
OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

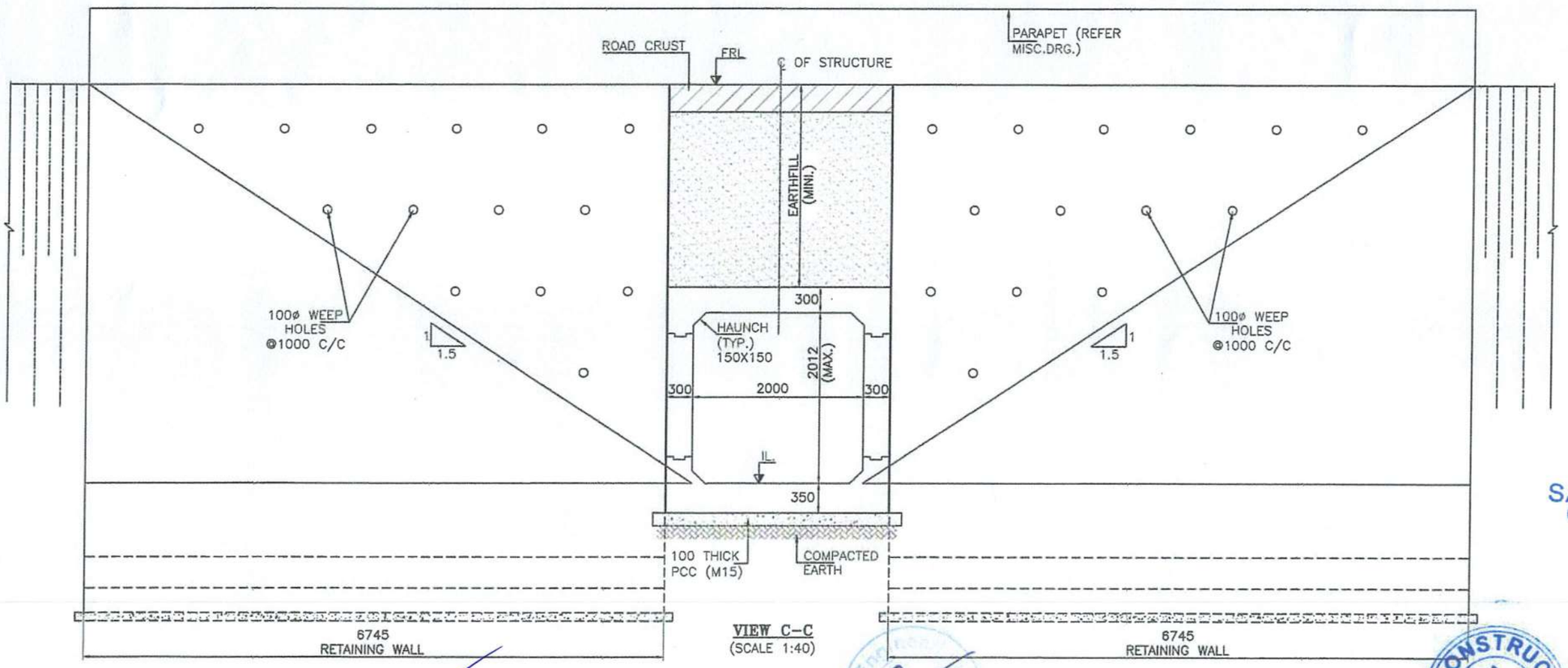
DRAWING TITLE:
GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 42+454

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/42+454/01-	01 OF 03	R0



SECTION A-A
(SCALE-1:100)



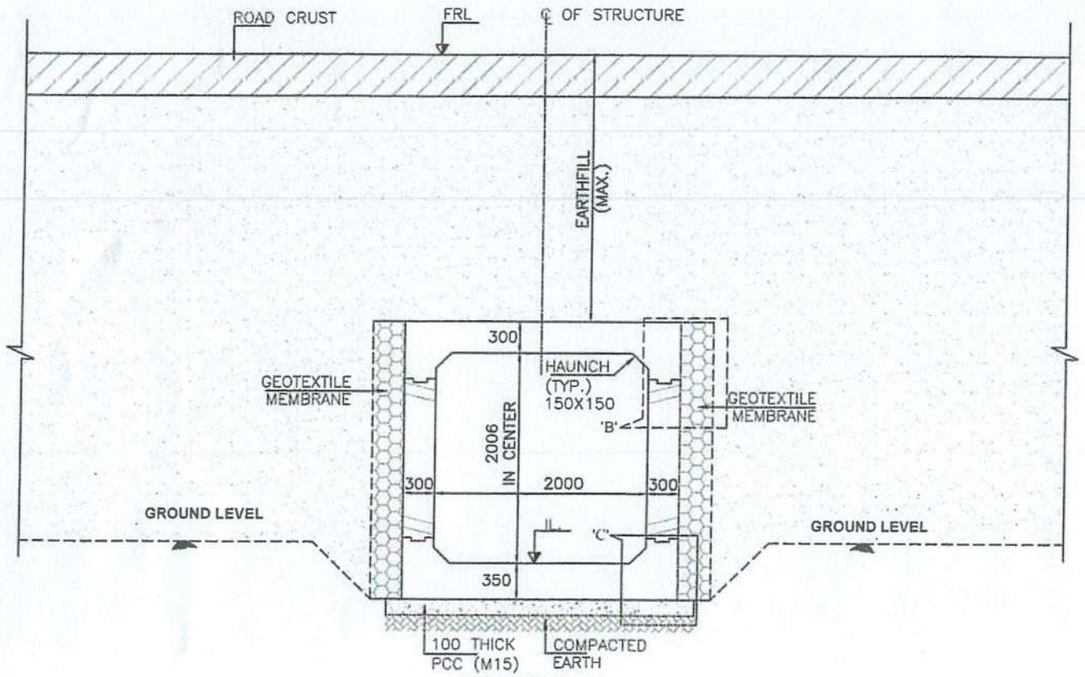
VIEW C-C
(SCALE 1:40)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

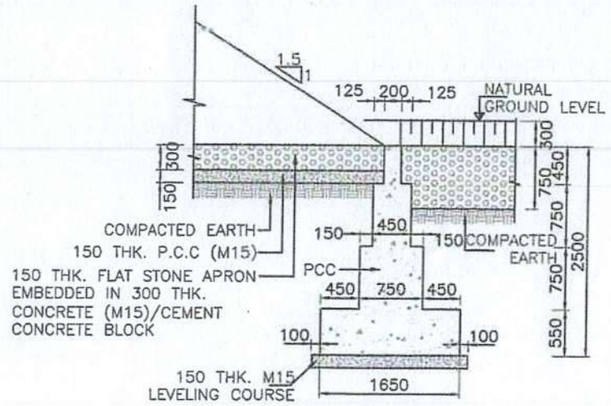
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:	PROJECT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 Kamac Engineers (P) Ltd Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171.	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.K. CONSTRUCTION 1st Floor, WZ-1149, Palam Extension, Bosco Ashram Wall Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012	WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+652 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 42+454

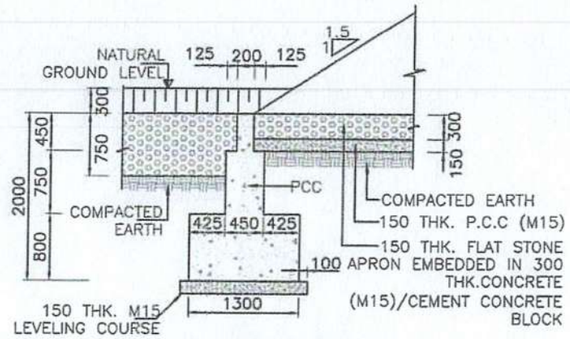
Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	
Project No.	Drawing No. AVC/NH-38/BC/GAD/42+454/01				Sheet No. 02 OF 03	Rev. R0



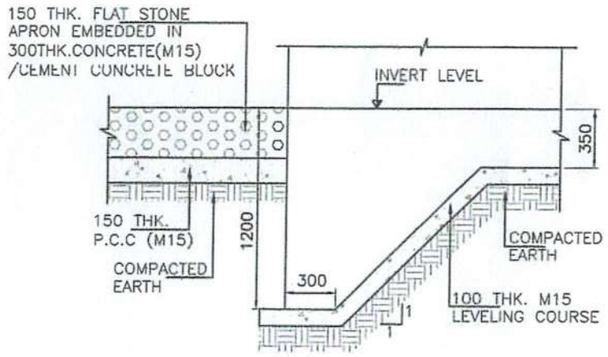
SECTION B–B
(SCALE 1:40)



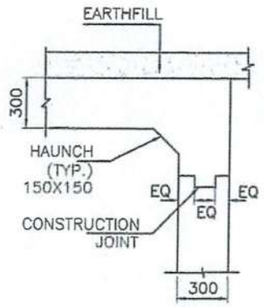
DETAIL OF CURTAIN WALL–I
(DOWN STREAM SIDE)
(SCALE 1:50)



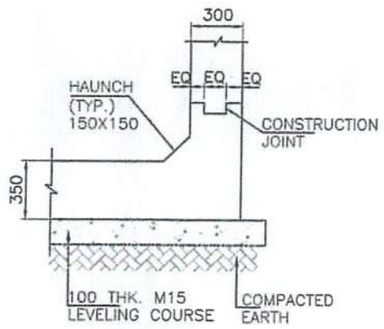
DETAIL OF CURTAIN WALL–II
(UP STREAM SIDE)
(SCALE 1:50)



DETAIL–'A'
(SCALE 1:25)



DETAIL–'B'
(SCALE 1:25)



DETAIL–'C'
(SCALE 1:25)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

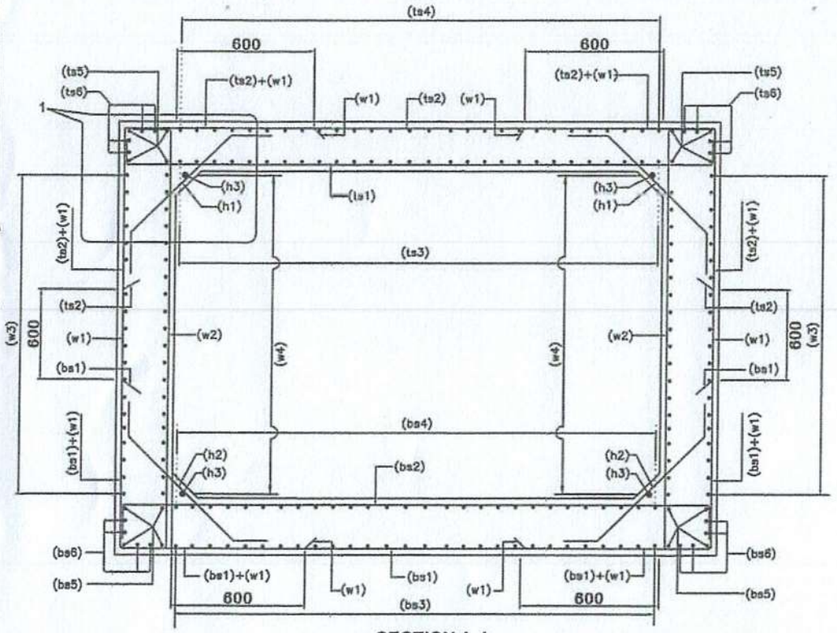
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE . BLOCK, 2ND FLOOR, MATIGARA 734010 (Kamac Engineers (P) Ltd Authorised Signatory)	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240, Palam Extension, Bagro Ashram Wali Gali,New Delhi-110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

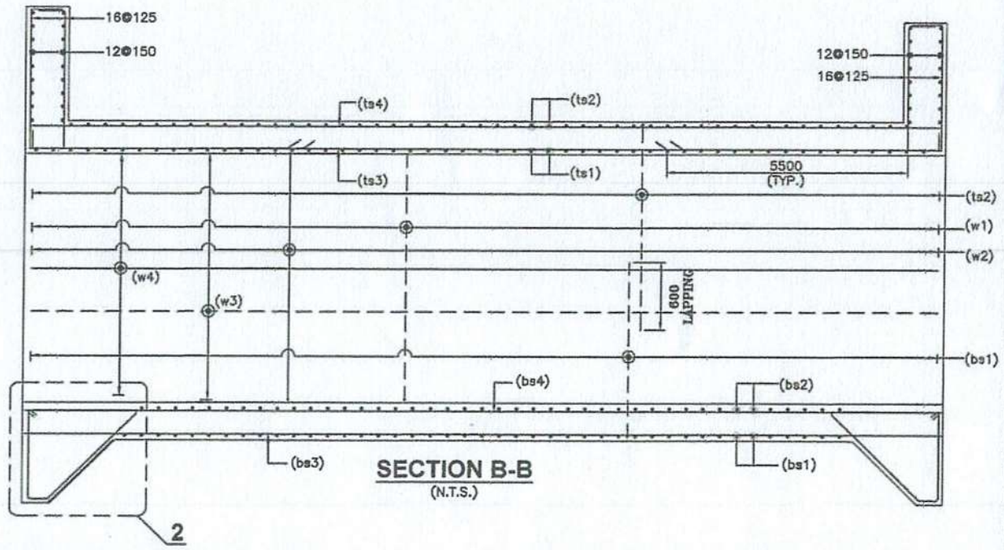
DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 42+454

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/42+454/01	03 OF 03	R0



SECTION A-A
(NTS)

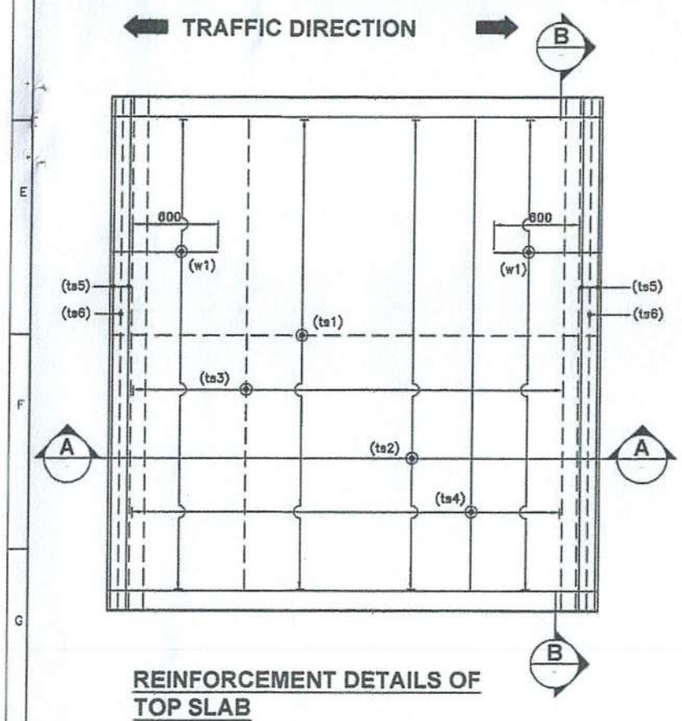


SECTION B-B
(N.T.S.)

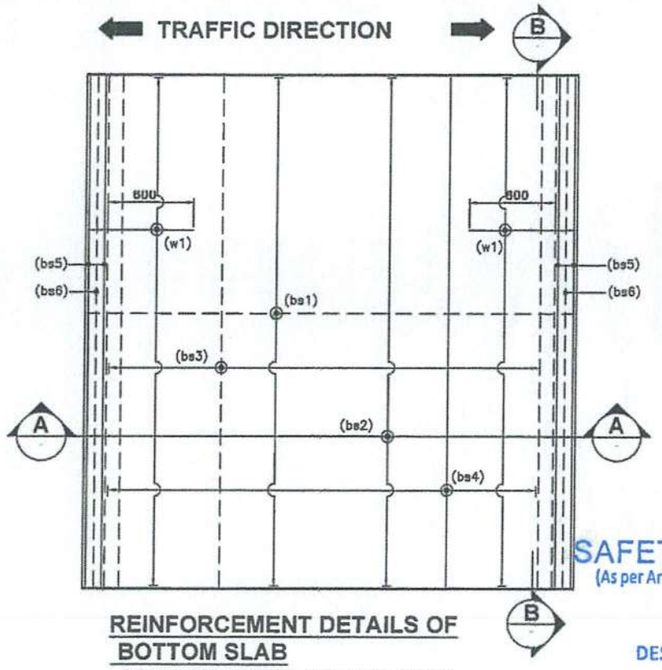
BOX REINF. SCHEDULE

SL.NO.	BAR MARK	BAR SHAPE	DIAMETER	SPACING
1	ts1		12	180
2	ts2		10	180
3	ts3		8	200
4	ts4		10	200
5	ts5		12	2x4 Nos.
6	ts6		12	2x4 Nos.
7	w1		10	180
8	w2		10	180
9	w3		10	200
10	w4		8	200
11	bs1		10	180
12	bs2		10+8	180
13	bs3		10	200
14	bs4		8	200
15	bs5		12	2x4 Nos.
16	bs6		12	2x4 Nos.
17	h1		10	180
18	h2		10	180
19	h3		10	1x4 Nos.
20	cs1		12	10 Nos.
21	cs2		10	200

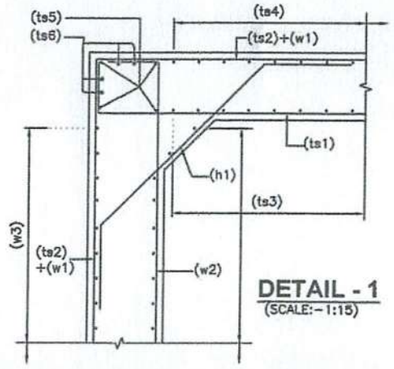
LEGEND:-	
TOP FACE BAR	———
BOTTOM FACE BAR	- - - - -



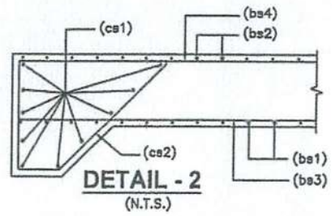
REINFORCEMENT DETAILS OF TOP SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)



REINFORCEMENT DETAILS OF BOTTOM SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)



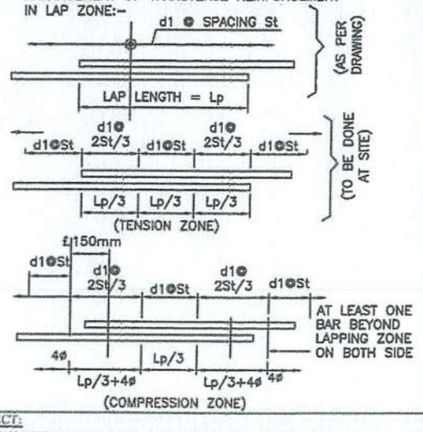
DETAIL - 1
(SCALE:- 1:15)



DETAIL - 2
(N.T.S.)

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE MENTIONED.
2. DRAWING SHOULD NOT BE SCALED ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. ALL REINFORCING BARS SHALL BE THERMO MECHANICALLY TREATED (TMT) BARS (GRADE DESIGNATION Fe-500) CONFIRMING TO IS:1786 STANDARDS.
4. MINIMUM CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE AS FOLLOWS:-
   a) TOP SLAB - 45mm
   b) BOTTOM SLAB - 75mm
   c) SIDE WALL (EARTH SIDE) - 75mm
   d) SIDE WALL (INNER SIDE) - 45mm
5. OVERLAPPING FOR SPLICING OF REINFORCEMENT SHALL BE AS PER CLAUSE NO.15.2.5.
   LAP LENGTH SHALL NOT BE LESS THAN 56ø.
   ARRANGEMENT OF TRANSVERSE REINFORCEMENT IN LAP ZONE:-



6. ANCHOURAGE LENGTH OF BOX SHALL BE TAKEN AS 40ø AS PER IRC:112.
7. FOR UNFAVORABLE BOND CONDITIONS THE FACTOR 40 SHOULD BE MULTIPLIED BY FACTOR OF 1.43 .
8. CENTER LINE OF OVERLAPPING BAR bs1 & ts2 IN WALL & MID HEIGHT OF WALLS ARE AT SAME POINT.
9. BAR BENDING SCHEDULE SHOULD BE STRICTLY FOLLOW DURING THE TIME OF EXECUTION IF IN CASE ANY CHANGES AT SITE KINDLY DISCUSS IT WITH ENGINEER IN CHARGE.

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

REFERENCE DRAWING:-

1. GENERAL ARRANGEMENT DRAWING.
   AVC/NH-38/BOX/GAD/42+454/01

CONSTRUCTION NEW DELHI

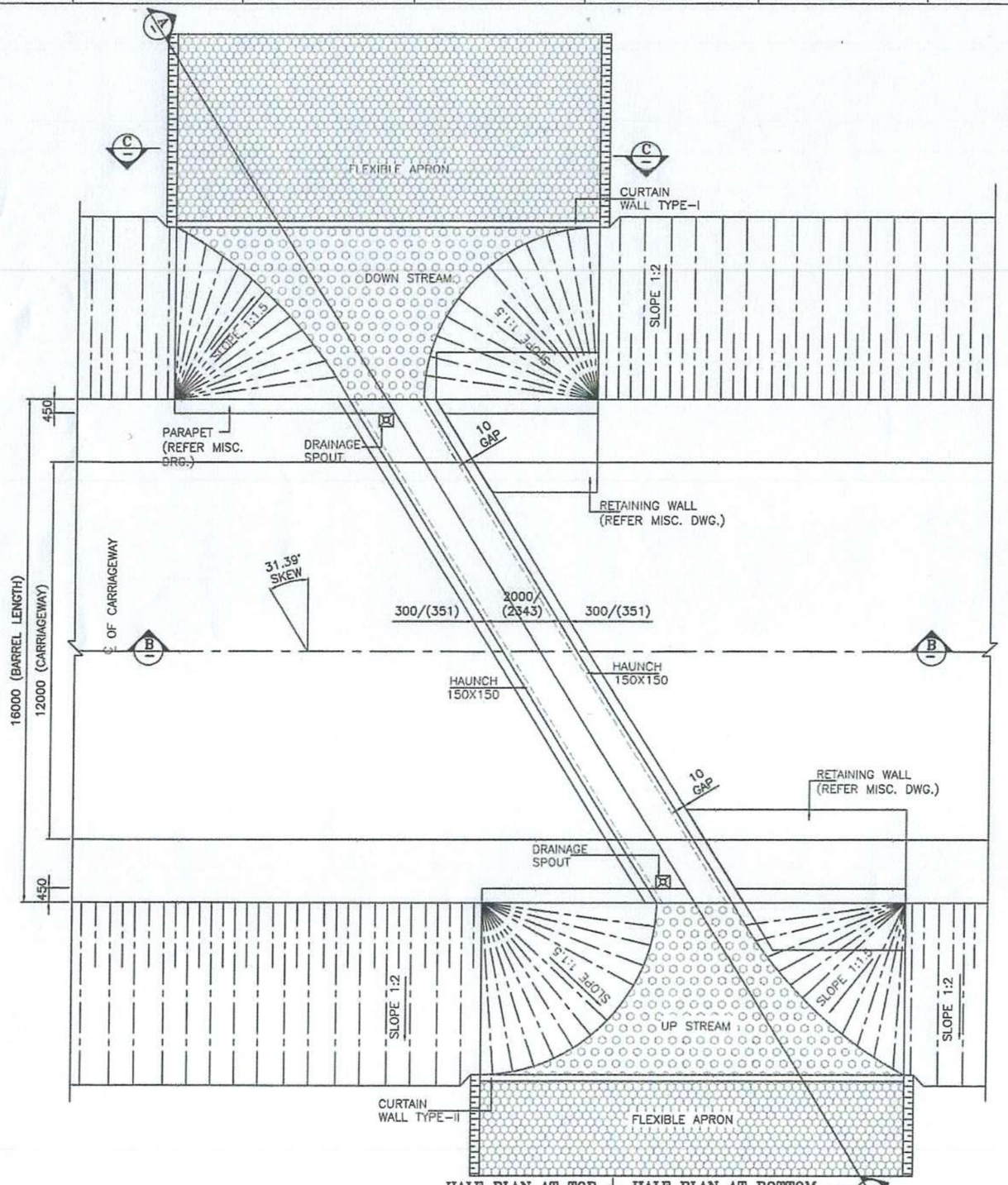
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 Kamac Engineers (P) Ltd Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1040, Palam Extension, Based Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-8, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- REINFORCEMENT DETAIL OF BOX CULVERT AT CH. 42+454

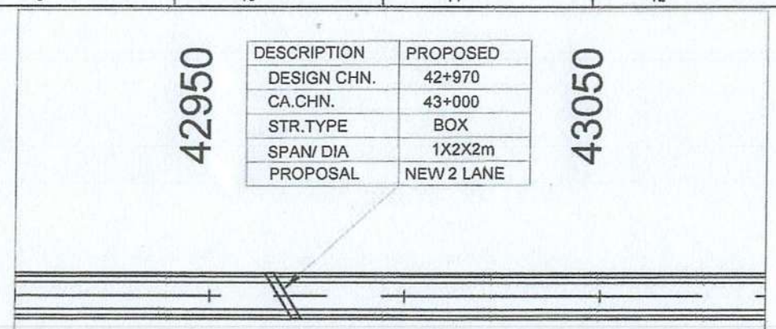
Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/REIN./42+454/01	01 OF 01	R0



HALF PLAN AT TOP ⌀ HALF PLAN AT BOTTOM

PLAN (SCALE-1:100)



DESCRIPTION	PROPOSED
DESIGN CHN.	42+970
CA.CHN.	43+000
STR.TYPE	BOX
SPAN/ DIA	1X2X2m
PROPOSAL	NEW 2 LANE

KEY PLAN

LEVELS

DESIGN CH.	FRL	GROUND LEVEL	INVERT LEVEL		VERTICAL CLEARANCE (MAX.)	EARTH FILL (MAX.)	EARTH FILL (MIN.)
			LHS	RHS			
42+970	146.155	141.108	140.808	140.820	2.016m	3.031m	1.847m

LEGEND:-
FRL FINISHED ROAD LEVEL
IL INVERT LEVEL
LVL. LEVEL
EGL. EXISTING GROUND LEVEL

FRL CAMBER & LOCATION IS TO BE MATCHED WITH HIGHWAY ALIGNMENT DRAWING.

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETER, LEVELS ARE IN METER AND CHAINAGE ARE IN KILOMETERS UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. THIS DRAWING SHALL BE READ IN CONJUCTION WITH THE RELEVANT PLAN AND PROFILE DRAWING OF ROAD.
3. GRADE OF CONCRETE:–
   a. M30–FOR RCC BOX CELL STRUCTURE.
   b. M15–FOR PCC AND LEVELING COURSE.
   c. M30–PARAPET
4. GRADE OF STEEL – Fe500.
5. THE FOLLOWING LOADS HAVE BEEN CONSIDERED IN THE DESIGN:–
   a. ONE LANE ,TWO LANE AND THREE LANE OF CLASS A
   b. ONE LANE OF CLASS A IN ADDITION OF ONE LANE OF CLASS 70R WHEEL OR ONE LANE OF 70R TRACKED WHICHEVER IS GOVERNS.
6. BACKFILL MATERIAL BEHIND END WALL SHALL BE SELECTED GRANULAR SOIL HAVING PROPERTIES
   MAX DRY DENSITY = 1850–2280kg/m³
   OPTIMUM MOISTURE CONTENT = 7–15
   AS PER IRC78–2014 AND MORTH SPECIFICATION.
7. THE FRL SHOWN IN THE DRAWING SHALL BE VERIFIED WITH CORRESPONDING PLAN AND PROFILE DRAWING BEFORE EXECUTION, IF THERE IS ANY VARIATION SHALL BE BROUGHT TO THE NOTICE OF ENGINEER.
8. THE DIMENSION AND LEVEL ARE SUBJECTED TO CHANGE AS PER SITE CONDITION AND DETAILED DESIGN.
9. BACKFILL TO BE DONE AND COMPACTED FROM BOTH SIDE SIMULTANEOUSLY.
10. 600MM THICK. FILTER MATERIAL BEHIND RETAINING WALL SHALL BE LAID AS PER APPENDIX 6 OF IRC 78–2014.
11. 50MM THICK CEMENT CONCRETE WEARING COAT SHALL BE PROVIDED.
12. 100MM DIA P.V.C. PIPE AT SPACING 1000MMc/c IN HORIZONTAL/VERTICAL DIRECTION SHALL BE PROVIDED UP TO 150MM ABOVE GROUND LEVEL FOR WEEP HOLES IN RETAINING WALL.
13. SBC SHALL BE 14t/m². AND SAME SHALL BE ENSURED AT SITE BY ANY SUITABLE METHOD.
14. AS PER MORTH SECTION–2500,WHERE THE REQUIRED SIZE OF BOULDERS ARE NOT AVAILABLE ECONOMICALLY.CEMENT CONCRETE BLOCKS OF EQUIVALENT WEIGHT SHALL BE USED.THE GRADE OF CONCRETE SHALL BE M15 NOMINAL MIX.CEMENT CONCRETE BLOCK SHALL BE PREFERRED WHERE PRACTICABLE.
15. CHOOSE ANY SUITABLE METHOD TO ACHIEVE THE REQUIRED SBC AS PER SITE.
16. THE EXPOSURE CONDITION IS MODERATE.

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

REFERENCE DRAWINGS:–
1. REINFORCEMENT DETAIL OF BOX CULVERT AVC/NH–38/BOX/REINF./42+970/02

CLIENT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

EPC CONTRACTOR:
KAMAC ENGINEERS PVT.LTD
F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR,. MATIGARA 734010
Kamac Engineers (P) Ltd Authorised Signatory

AUTHORITY'S ENGINEER
ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED.
C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171

PROOF CONSULTANT:
CREATIVE ENGINEERING SERVICES
OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010

SAFETY CONSULTANT:
DESIGN AID
PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,

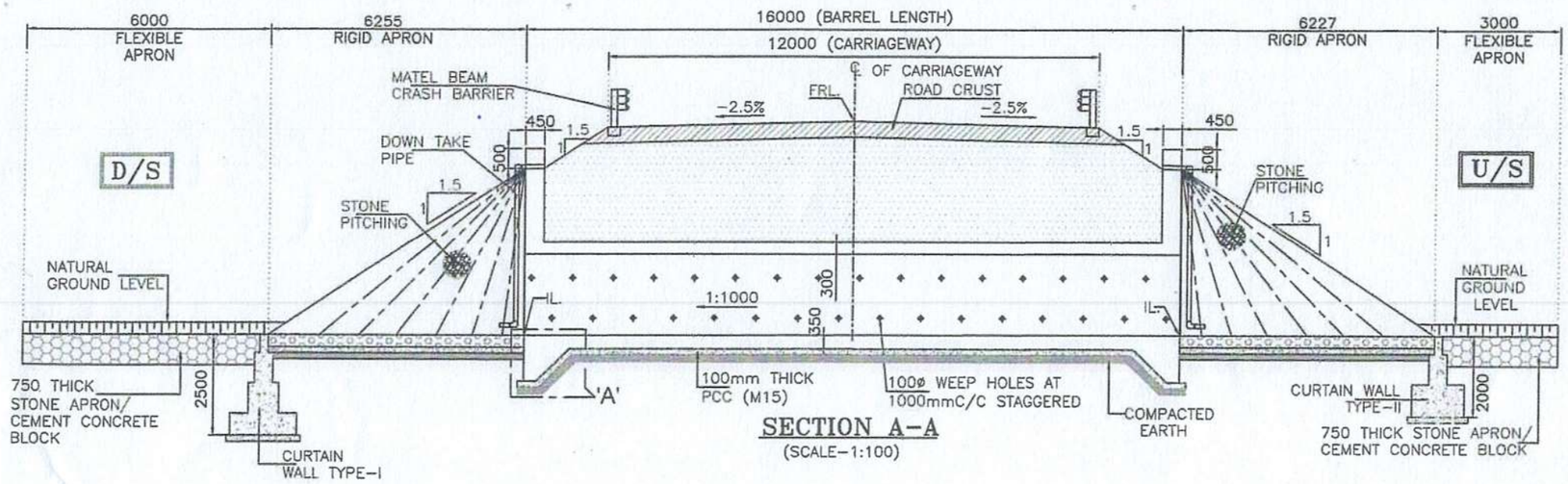
DESIGN CONSULTANT:
A.V. CONSTRUCTION
1st Floor, WZ-12C, Palam Extension, Sosco Ashram Gali Gali New Delhi 110045
Winst Infra Solution Pvt. Ltd.
OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-Ç-23,SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012
W I S P L

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE.(PACKAGE-5)

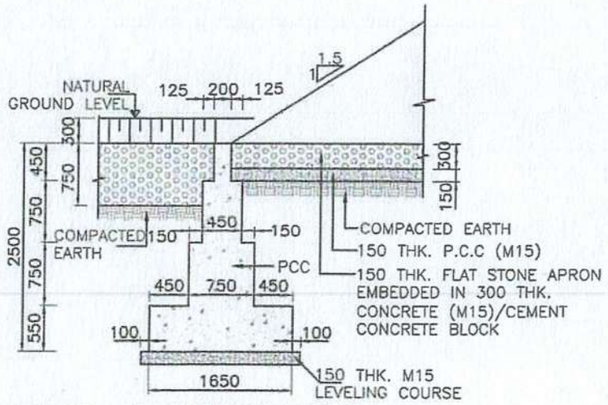
DRAWING TITLE:-
GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 42+970

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

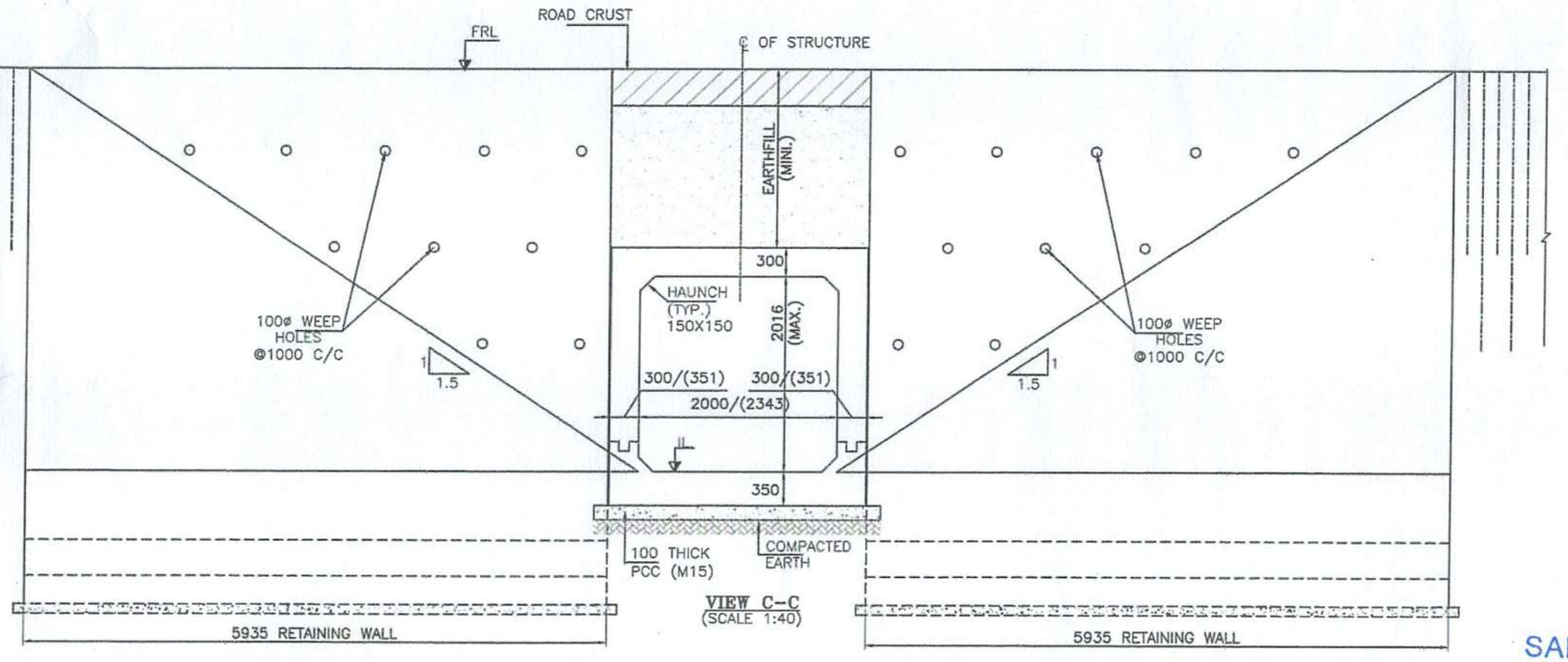
Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/42+970/01	01 OF 03	R0



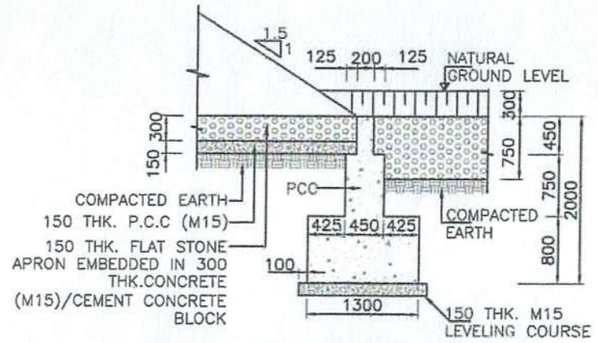
SECTION A-A
(SCALE-1:100)



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



VIEW C-C
(SCALE 1:40)



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

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)

DESIGN AID, NEW DELHI

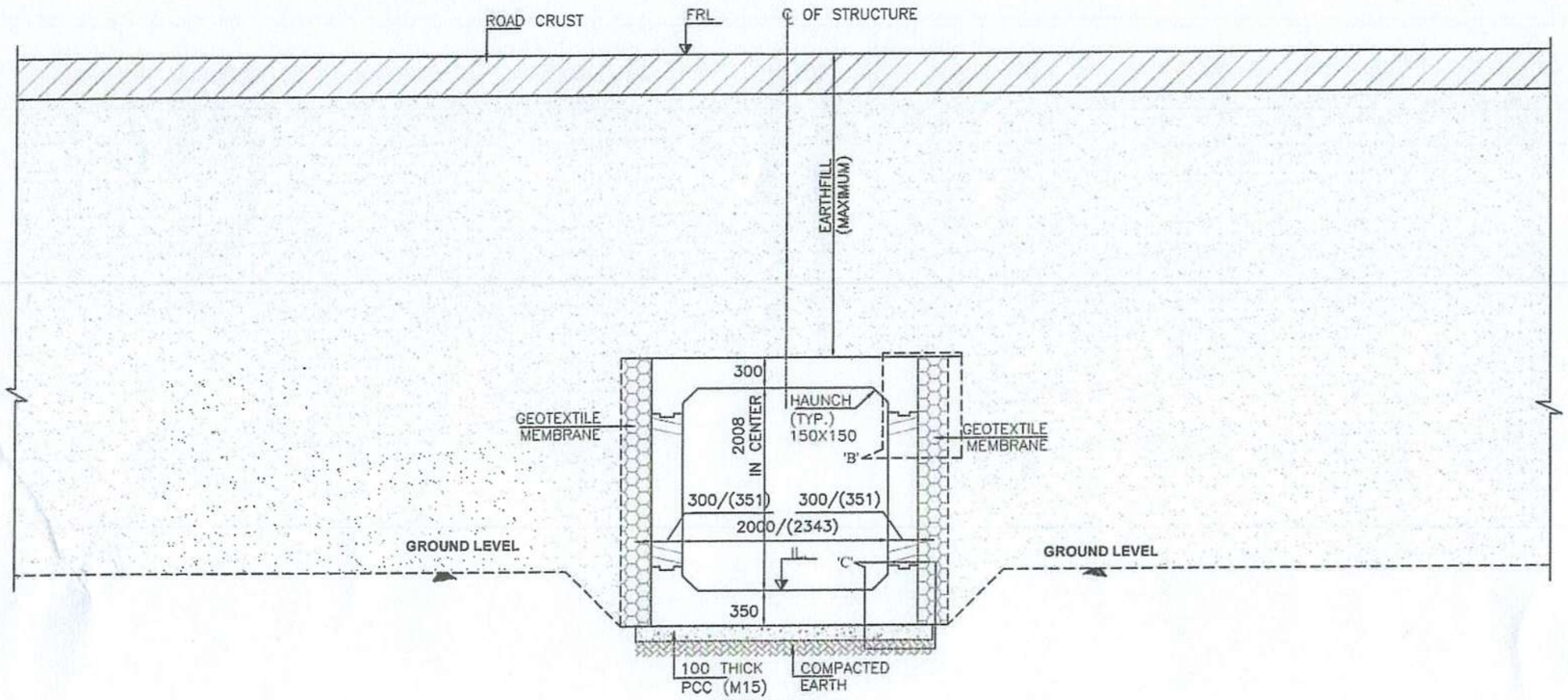
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD. F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240, Palam Extension, Bodo Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012

Kamac Engineers (P) Ltd
Authorised Signatory

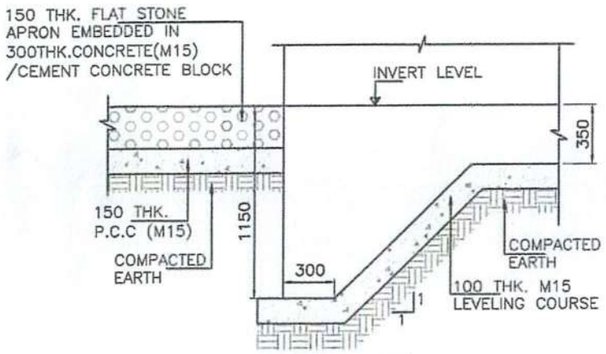
PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE: GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 42+970

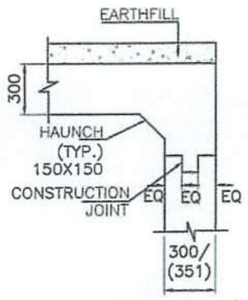
Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	
Project No.	Drawing No. AVC/NH-38/BC/GAD/42+970/01				Sheet No. 02 OF 03	Rev. R0



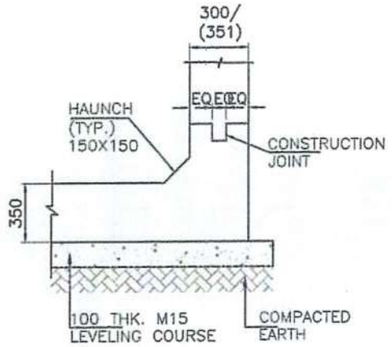
SECTION B–B
(SCALE 1:40)



DETAIL–'A'
(SCALE 1:25)



DETAIL–'B'
(SCALE 1:25)



DETAIL–'C'
(SCALE 1:25)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)

DESIGN AID, NEW DELHI

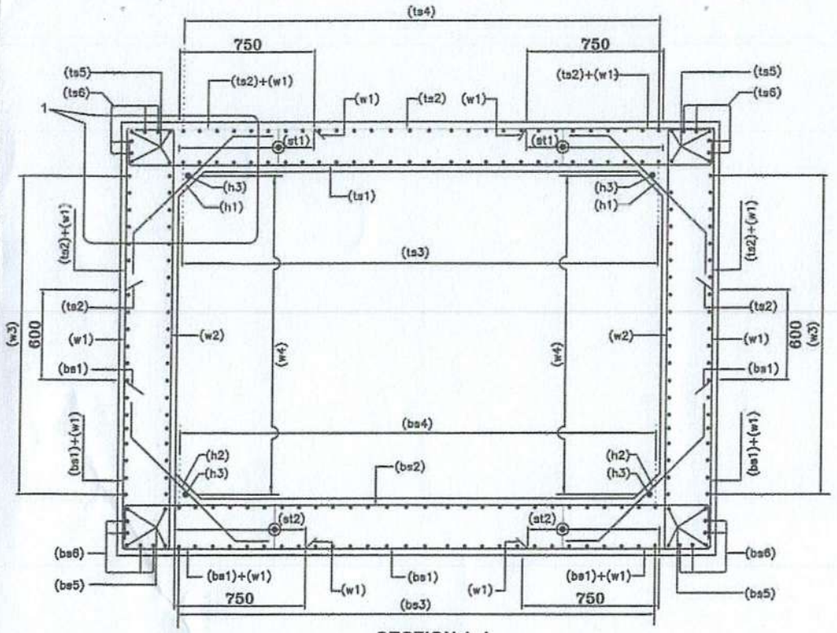
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:.	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 Kamac Engineers (P) Ltd Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-910, Palam Extension, Bosco Ashram Well Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

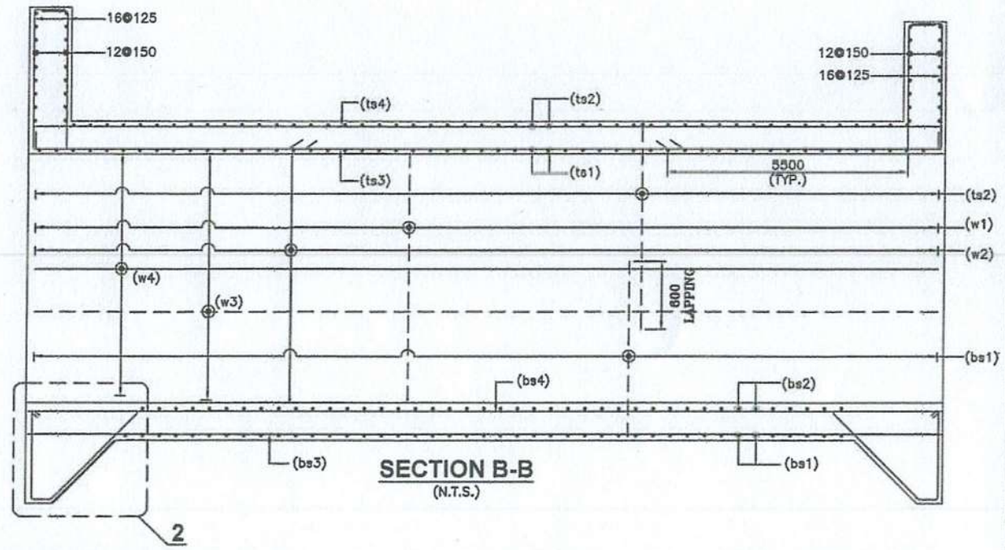
DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 42+970

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-68/BC/GAD/42+970/01	03 OF 03	R0



SECTION A-A
(NTS)

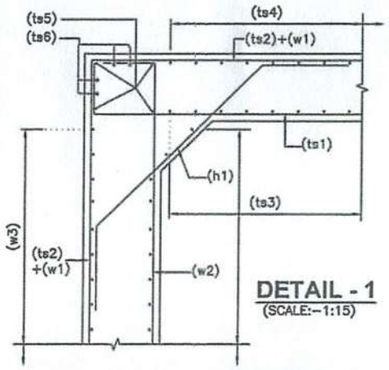


SECTION B-B
(N.T.S.)

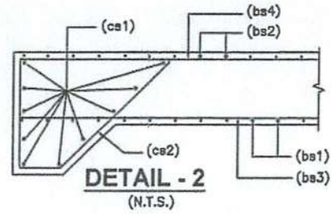
LEGEND:-	
TOP FACE BAR	———
BOTTOM FACE BAR	- - - - -

BOX REINF. SCHEDULE

SL.NO.	BAR MARK	BAR SHAPE	DIAMETER	SPACING
1	ts1		12	160
2	ts2		10	160
3	ts3		8	200
4	ts4		10	200
5	ts5		12	2x4 Nos.
6	ts6		12	2x4 Nos.
7	w1		10	160
8	w2		10	160
9	w3		10	200
10	w4		8	200
11	bs1		10	160
12	bs2		10+10	160
13	bs3		10	200
14	bs4		8	200
15	bs5		12	2x4 Nos.
16	bs6		12	2x4 Nos.
17	h1		10	160
18	h2		10	160
19	h3		10	1x4 Nos.
20	cs1		12	10 Nos.
21	cs2		10	200
22	st1		8	200 c/c (L-L) 160 c/c (T-T) DIRECTION
23	st2		8	200 c/c (L-L) 160 c/c (T-T) DIRECTION



DETAIL - 1
(SCALE:-1:15)



DETAIL - 2
(N.T.S.)

NOTES:-

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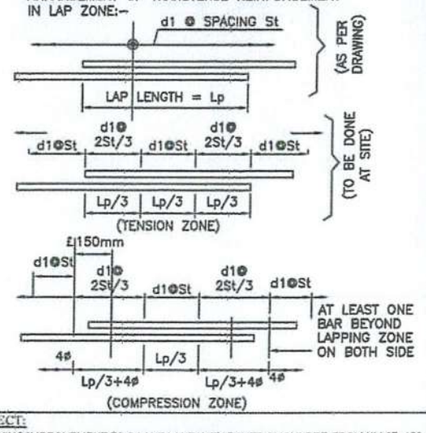
2. DRAWING SHOULD NOT BE SCALED ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. ALL REINFORCING BARS SHALL BE THERMO MECHANICALLY TREATED (TMT) BARS (GRADE DESIGNATION Fe-500) CONFIRMING TO IS:1786 STANDARDS.
4. MINIMUM CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE AS FOLLOWS:-
   a) TOP SLAB - 45mm
   b) BOTTOM SLAB - 75mm
   c) SIDE WALL (EARTH SIDE) - 75mm
   d) SIDE WALL (INNER SIDE) - 45mm
5. OVERLAPPING FOR SPLICING OF REINFORCEMENT SHALL BE AS PER CLAUSE NO.15.2.5.
   LAP LENGTH SHALL NOT BE LESS THAN 56ø.
   ARRANGEMENT OF TRANSVERSE REINFORCEMENT IN LAP ZONE:-

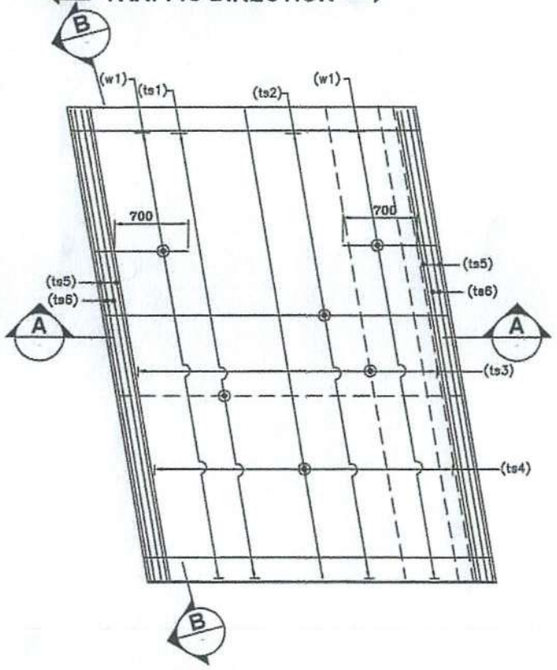


6. ANCHOURAGE LENGTH OF BOX SHALL BE TAKEN AS 40ø AS PER IRC:112.
7. FOR UNFAVOROABLE BOND CONDITIONS THE FACTOR 40 SHOULD BE MULTIPLIED BY FACTOR OF 1.43 .
8. CENTER LINE OF OVERLAPPING BAR bs1 & ts2 IN WALL & MID HEIGHT OF WALLS ARE AT SAME POINT.
9. BAR BENDING SCHEDULE SHOULD BE STRICTLY FOLLOW DURING THE TIME OF EXECUTION IF IN CASE ANY CHANGES AT SITE KINDLY DISCUSS IT WITH ENGINEER IN CHARGE.

REFERENCE DRAWING:-

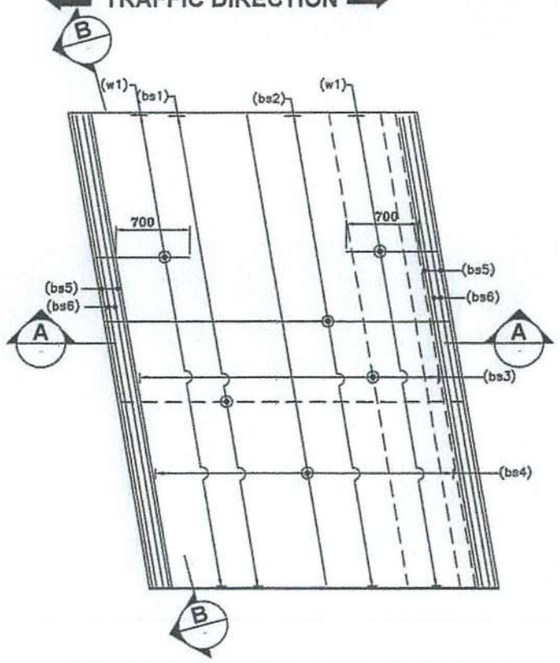
1. GENERAL ARRANGEMENT DRAWING.
   AVC/NH-38/BOX/GAD/42+970/01

TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF TOP SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF BOTTOM SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

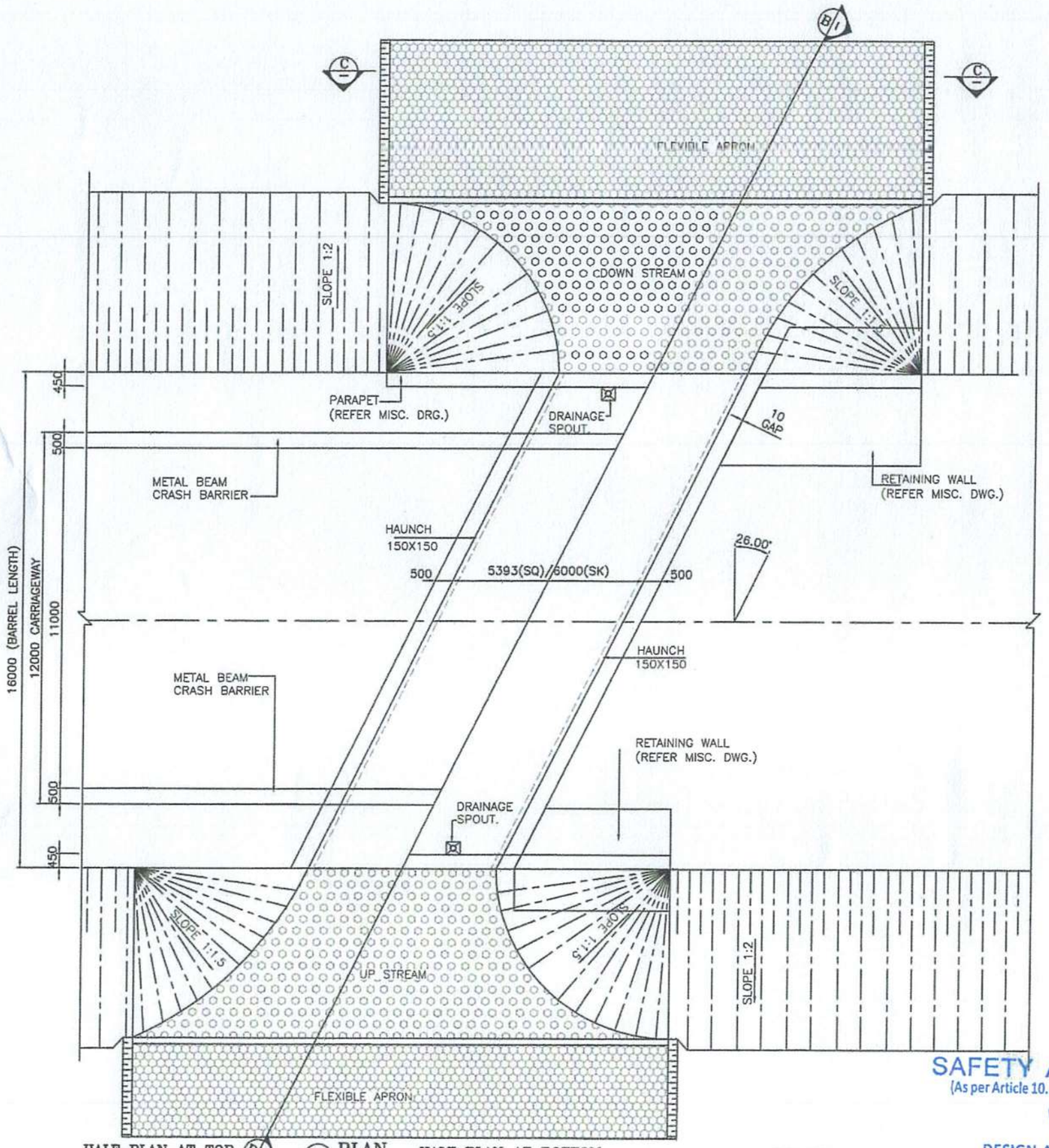
SAFETY AUDIT
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

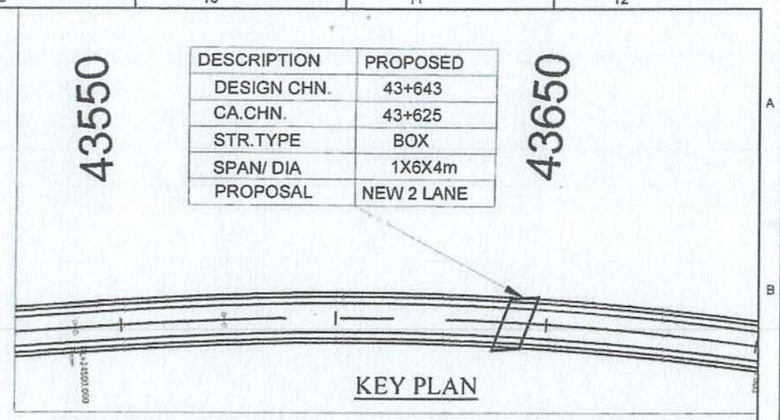
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:	PROJECT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD. F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 (Kamac Engineers (P) Ltd Authorised Signatory)	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240, Palam Extension, Bosco's Ashram Wali Gali, New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012 (WISPL)	WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- REINFORCEMENT DETAIL OF BOX CULVERT AT CH. 42+970

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/REINF/42+970/01	01 OF 01	R0





DESCRIPTION	PROPOSED
DESIGN CHN.	43+643
CA.CHN.	43+625
STR.TYPE	BOX
SPAN/ DIA	1X6X4m
PROPOSAL	NEW 2 LANE

LEVELS

DESIGN CH.	FRL	GROUND LEVEL	INVERT LEVEL		VERTICAL CLEARANCE (MAX.)	EARTH FILL (MAX.)	EARTH FILL (MIN.)
			LHS	RHS			
43+643	147.431	142.472	142.172	172.184	4.012m	2.697m	1.178m

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETER, LEVELS ARE IN METER AND CHAINAGE ARE IN KILOMETERS UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. THIS DRAWING SHALL BE READ IN CONJUCTION WITH THE RELEVANT PLAN AND PROFILE DRAWING OF ROAD.
3. GRADE OF CONCRETE:–
   a. M30–FOR RCC BOX CELL STRUCTURE.
   b. M15–FOR PCC AND LEVELING COURSE.
   c. M30–PARAPET
4. GRADE OF STEEL – Fe500.
5. THE FOLLOWING LOADS HAVE BEEN CONSIDERED IN THE DESIGN:–
   a. ONE LANE ,TWO LANE AND THREE LANE OF CLASS A
   b. ONE LANE OF CLASS A IN ADDITION OF ONE LANE OF CLASS 70R WHEEL OR ONE LANE OF 70R TRACKED WHICHEVER IS GOVERNS.
6. BACKFILL MATERIAL BEHIND END WALL SHALL BE SELECTED GRANULAR SOIL HAVING PROPERTIES
   MAX DRY DENSITY – 1850–2280kg/m³
   OPTIMUM MOISTURE CONTENT = 7–15
   AS PER IRC78–2014 AND MORTH SPECIFICATION.
7. THE FRL SHOWN IN THE DRAWING SHALL BE VERIFIED WITH CORRESPONDING PLAN AND PROFILE DRAWING BEFORE EXECUTION, IF THERE IS ANY VARIATION SHALL BE BROUGHT TO THE NOTICE OF ENGINEER.
8. THE DIMENSION AND LEVEL ARE SUBJECTED TO CHANGE AS PER SITE CONDITION AND DETAILED DESIGN.
9. BACKFILL TO BE DONE AND COMPACTED FROM BOTH SIDE SIMULTANEOUSLY.
10. 600MM THICK. FILTER MATERIAL BEHIND RETAINING WALL SHALL BE LAID AS PER APPENDIX 6 OF IRC 78–2014.
11. 50MM THICK CEMENT CONCRETE WEARING COAT SHALL BE PROVIDED.
12. 100MM DIA P.V.C. PIPE AT SPACING 1000MMc/c IN HORIZONTAL/VERTICAL DIRECTION SHALL BE PROVIDED UP TO 150MM ABOVE GROUND LEVEL FOR WEEP HOLES IN RETAINING WALL.
13. SBC SHALL BE 13t/m². AND SAME SHALL BE ENSURED AT SITE BY ANY SUITABLE METHOD.
14. AS PER MORTH SECTION–2500,WHERE THE REQUIRED SIZE OF BOULDERS ARE NOT AVAILABLE ECONOMICALLY.CEMENT CONCRETE BLOCKS OF EQUIVALENT WEIGHT SHALL BE USED.THE GRADE OF CONCRETE SHALL BE M15 NOMINAL MIX.CEMENT CONCRETE BLOCK SHALL BE PREFERRED WHERE PRACTICABLE.
15. CHOOSE ANY SUITABLE METHOD TO ACHIEVE THE REQUIRED SBC AS PER SITE.
16. THE EXPOSURE CONDITION IS MODERATE.

LEGEND:-
FRL FINISHED ROAD LEVEL
IL INVERT LEVEL
LVL. LEVEL
EGL. EXISTING GROUND LEVEL

FRL CAMBER & LOCATION IS TO BE MATCHED WITH HIGHWAY ALIGNMENT DRAWING.

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)

DESIGN AID, NEW DELHI

REFERENCE DRAWINGS:–
REINFORCEMENT DETAIL OF BOX CULVERT
AVC/NH–38/BOX/REINF./43+643/02

CLIENT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

EPC CONTRACTOR
KAMAC ENGINEERS (P) LTD
F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010
Kamac Engineers (P) Ltd
Authorised Signatory

AUTHORITY'S ENGINEER
ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED.
C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171

PROOF CONSULTANT:
CREATIVE ENGINEERING SERVICES
OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010

SAFETY CONSULTANT:
DESIGN AID
PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,

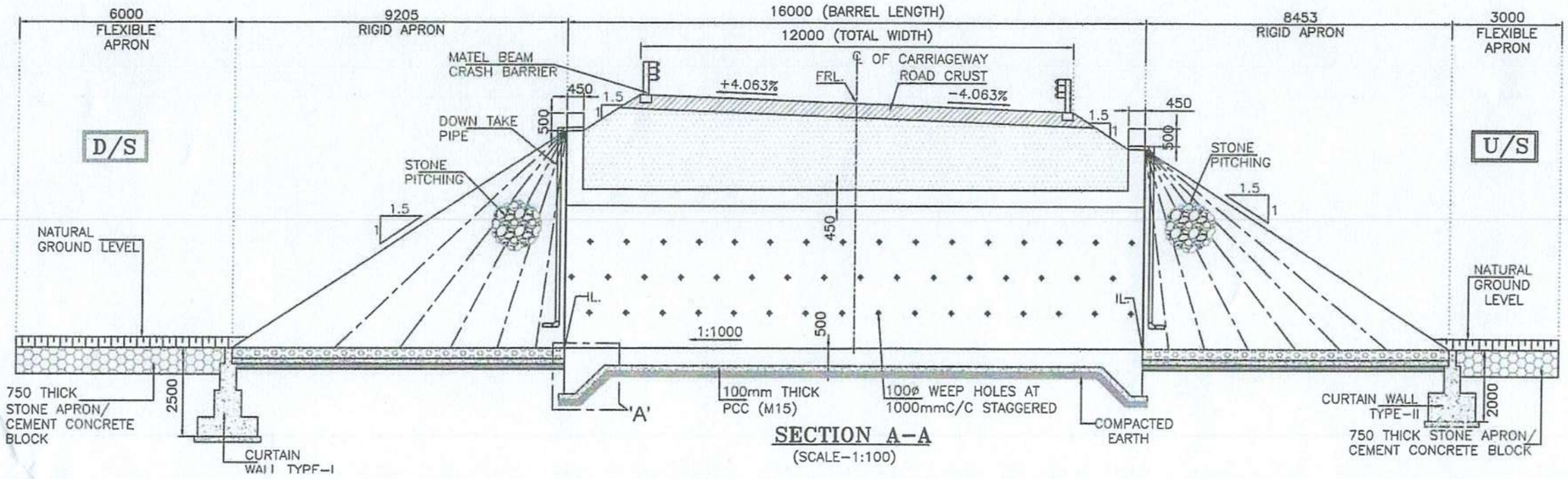
DESIGN CONSULTANT:
A.V. CONSTRUCTION
1st Floor, WZ-1240, Palam Extension, Bosee Ashram Wali Gali,New Delhi 110045
Winst Infra Solution Pvt. Ltd.
OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012
W I S P L

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

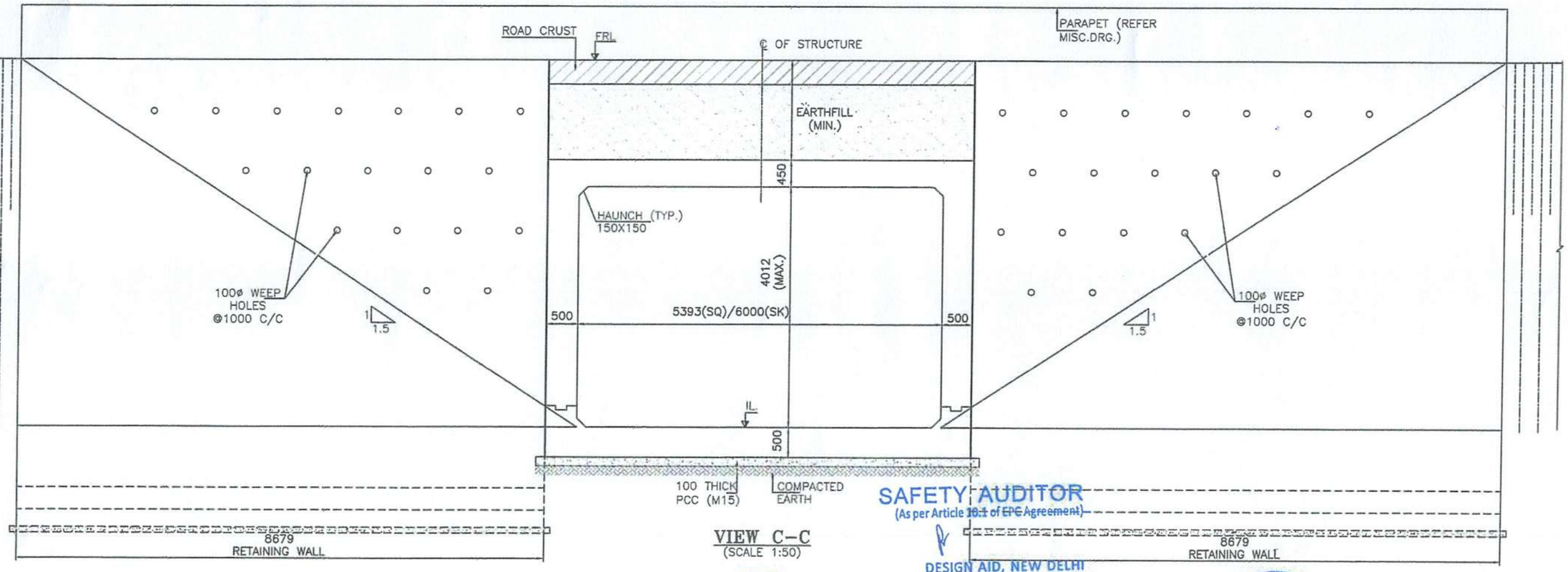
DRAWING TITLE:-
GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 43+643

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/GAD/43+643/01	1 OF 3	R0



SECTION A-A
(SCALE-1:100)



VIEW C-C
(SCALE 1:50)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

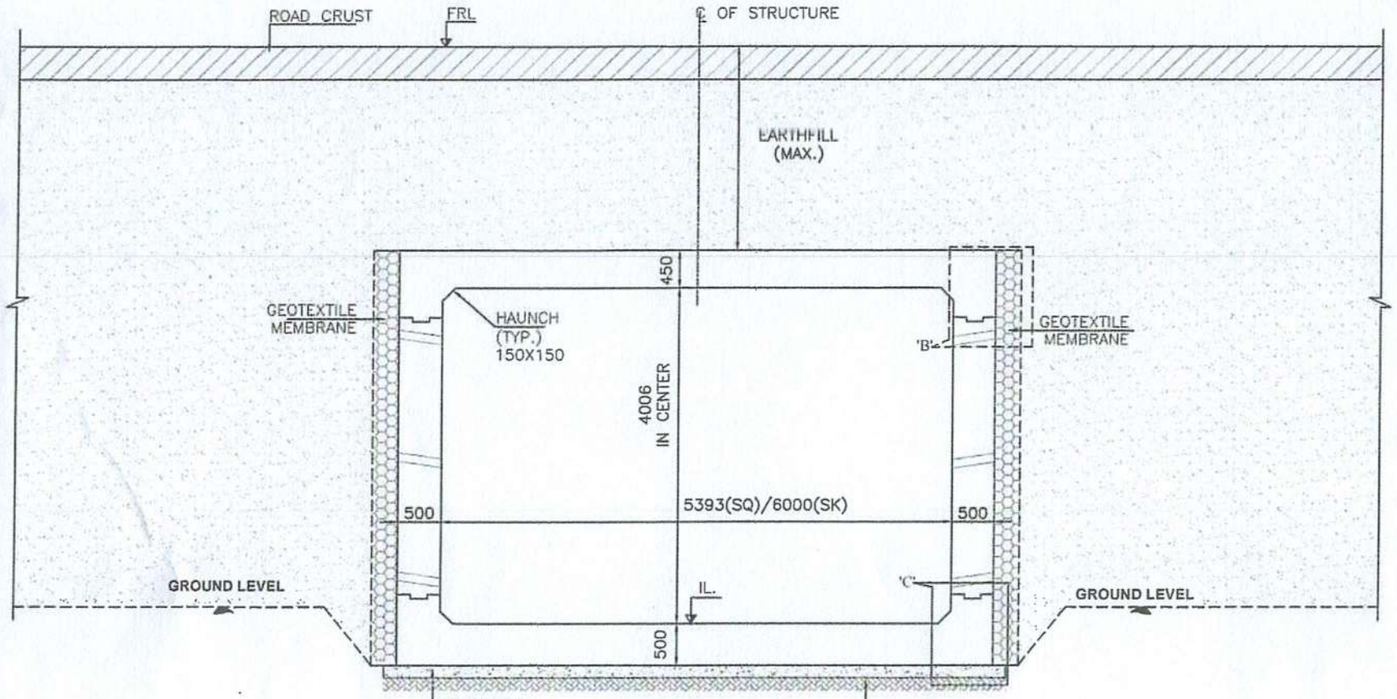
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD. P-0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 (Kamac Engineers (P) Ltd. Authorised Signatory)	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1249, Palam Extension, Bosco Ashram Wala Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 43+643

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

*Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/GAD/43+643/01	2 OF 3	R0



SECTION B–B
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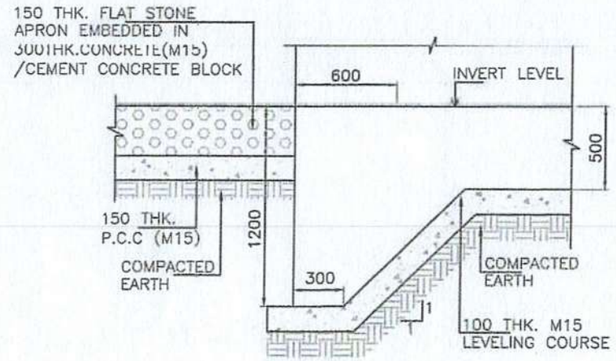
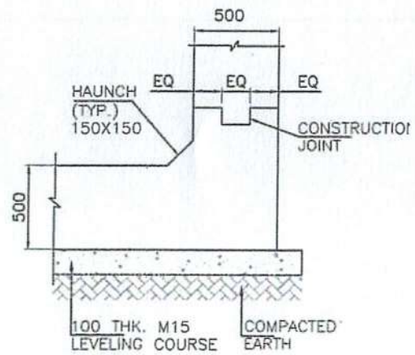
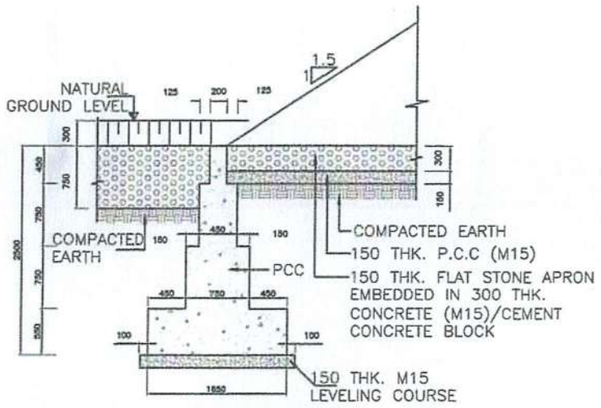


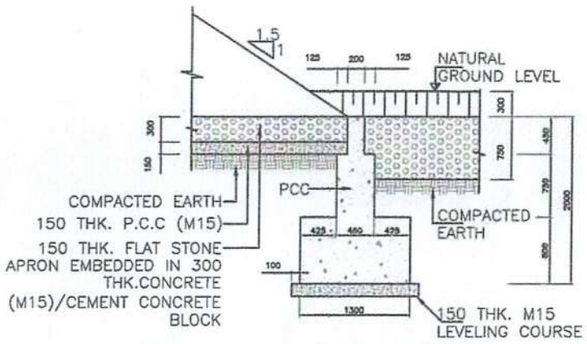
DETAIL–'A'
(SCALE 1:25)



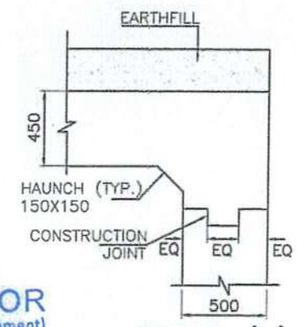
DETAIL–'C'
(SCALE 1:25)



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



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



DETAIL–'B'
(SCALE 1:25)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

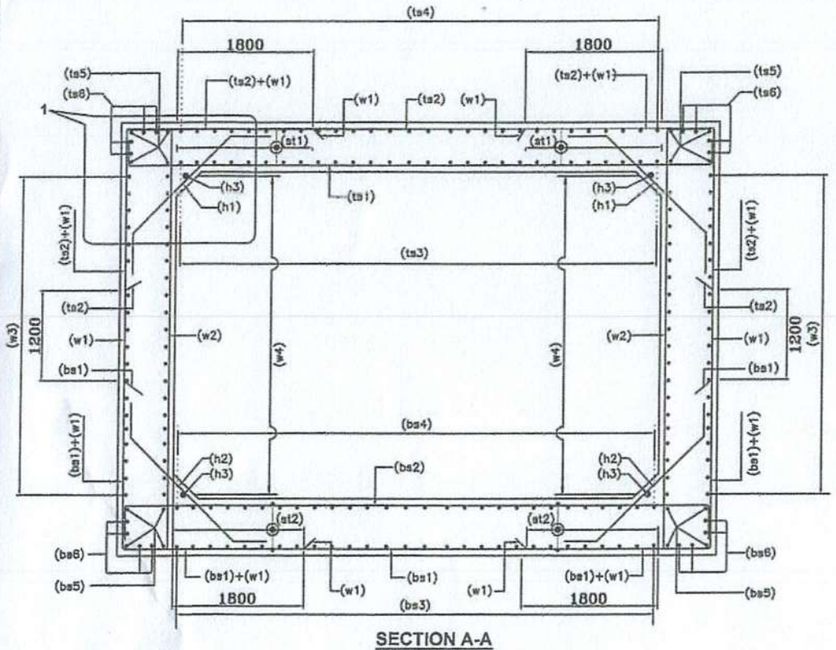
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 Kamac Engineer's (P) Ltd Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240, Palam Extension, Bosco Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE.(PACKAGE-5)

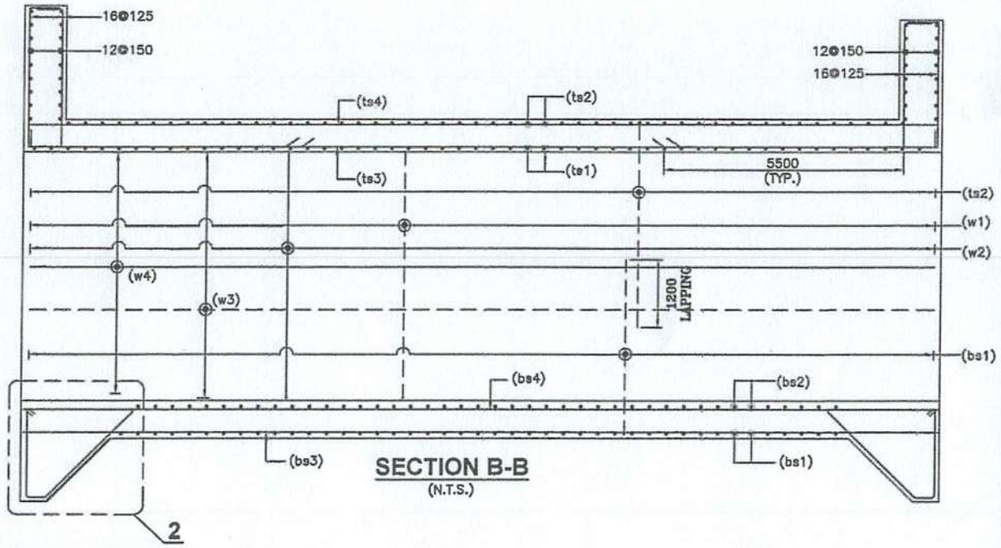
DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 43+643

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/GAD/43+643/01	3 OF 3	R0



SECTION A-A
(NTS)

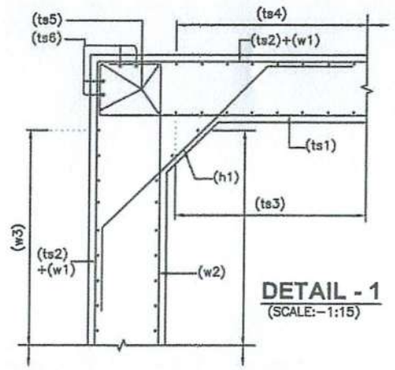


SECTION B-B
(N.T.S.)

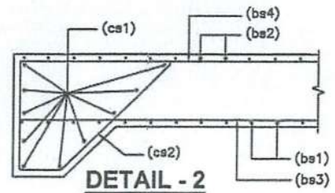
BOX REINF. SCHEDULE

SL.NO.	BAR MARK	BAR SHAPE	DIAMETER	SPACING
1	ts1		20+12	150
2	ts2		16	150
3	ts3		12	150
4	ts4		12	150
5	ts5		12	2x4 Nos.
6	ts6		12	2x4 Nos.
7	w1		16	150
8	w2		16	150
9	w3		12	150
10	w4		10	150
11	bs1		16	150
12	bs2		20+12	150
13	bs3		12	150
14	bs4		12	150
15	bs5		12	2x4 Nos.
16	bs6		12	2x4 Nos.
17	h1		10	150
18	h2		10	150
19	h3		10	1x4 Nos.
20	cs1		12	10 Nos.
21	cs2		10	150
22	st1		12	200 c/c (L–L) 150 c/c (T–T) DIRECTION
23	st2		2 LEGGED 10 ø 150 C/C (T–T) & (L–L) DIRECTION	

LEGEND:–	
TOP FACE BAR	———
BOTTOM FACE BAR	- - - - -

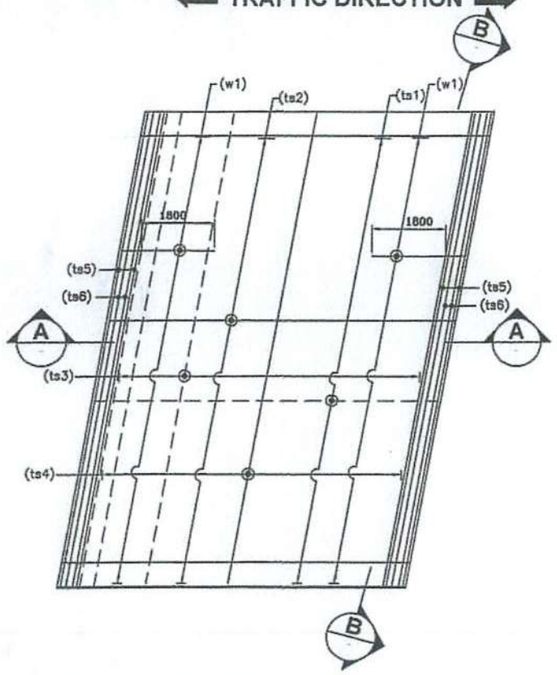


DETAIL - 1
(SCALE:–1:15)



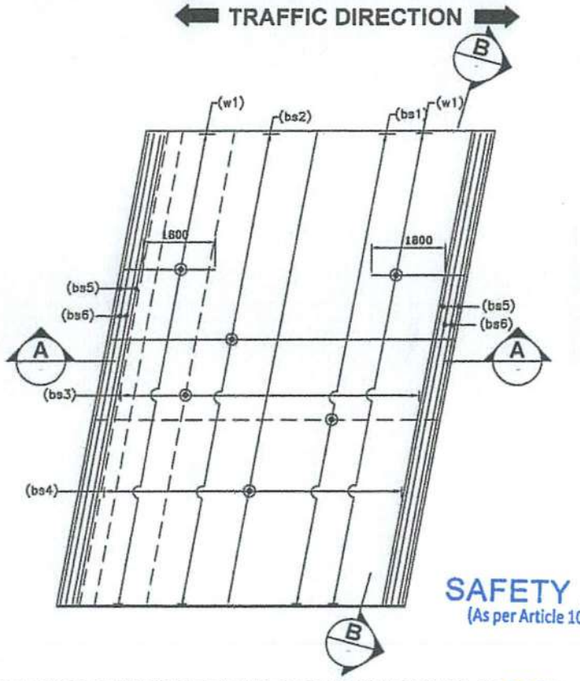
DETAIL - 2
(N.T.S.)

TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF TOP SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

TRAFFIC DIRECTION

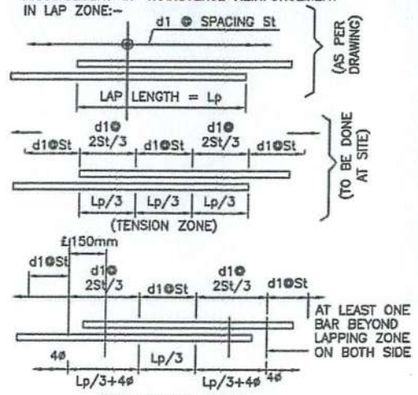


REINFORCEMENT DETAILS OF BOTTOM SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

NOTES:–

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE MENTIONED.
2. DRAWING SHOULD NOT BE SCALED ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. ALL REINFORCING BARS SHALL BE THERMO MECHANICALLY TREATED (TMT) BARS (GRADE DESIGNATION Fe–500) CONFIRMING TO IS:1786 STANDARDS.
4. MINIMUM CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE AS FOLLOWS:–
   a) TOP SLAB – 45mm
   b) BOTTOM SLAB – 75mm
   c) SIDE WALL (EARTH SIDE) – 75mm
   d) SIDE WALL (INNER SIDE) – 45mm
5. OVERLAPPING FOR SPLICING OF REINFORCEMENT SHALL BE AS PER CLAUSE NO.15.2.5.
   LAP LENGTH SHALL NOT BE LESS THAN 56ø.
   ARRANGEMENT OF TRANSVERSE REINFORCEMENT IN LAP ZONE:–



6. ANCHOURAGE LENGTH OF BOX SHALL BE TAKEN AS 40ø AS PER IRC:112.
7. FOR UNFAVORABLE BOND CONDITIONS THE FACTOR 40 SHOULD BE MULTIPLIED BY FACTOR OF 1.43 .
8. CENTER LINE OF OVERLAPPING BAR bs1 & ts2 IN WALL & MID HEIGHT OF WALLS ARE AT SAME POINT.
9. BAR BENDING SCHEDULE SHOULD BE STRICTLY FOLLOW DURING THE TIME OF EXECUTION IF IN CASE ANY CHANGES AT SITE KINDLY DISCUSS IT WITH ENGINEER IN CHARGE.

REFERENCE DRAWING:–

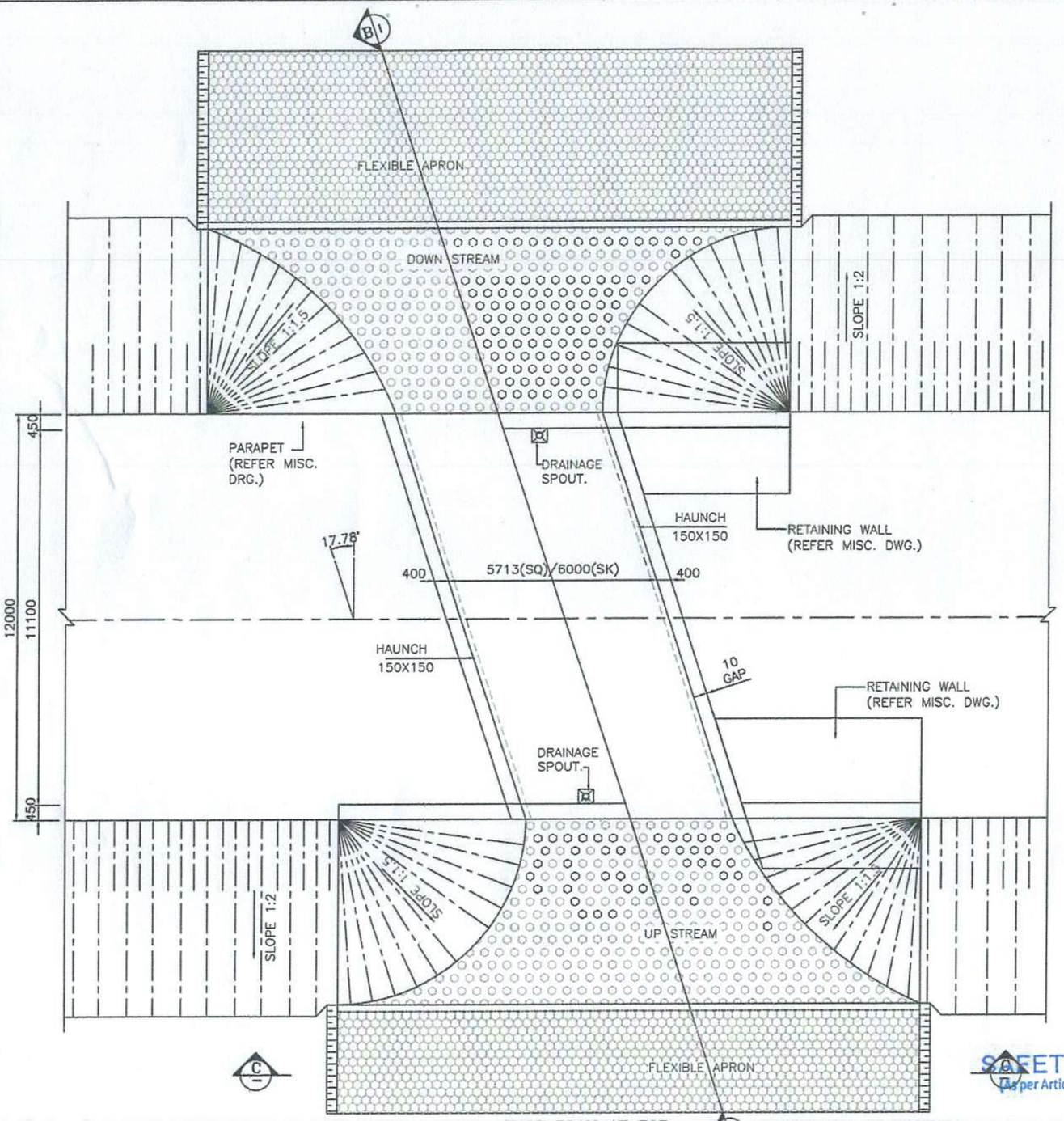
1. GENERAL ARRANGEMENT DRAWING. AVC/NH–38/BOX/GAD/43+643/01

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:	PROJECT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-124B, Palam Extension, Besco Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012	WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:– REINFORCEMENT DETAIL OF BOX CULVERT AT CH. 43+643

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/REIN./43+643/01	01 OF 01	R0

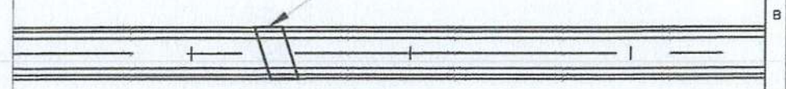


HALF PLAN AT TOP — HALF PLAN AT BOTTOM

PLAN
(SCALE–1:100)

DESCRIPTION	PROPOSED
DESIGN CHN.	44+070
CA.CHN.	44+065
STR.TYPE	BOX
SPAN/ DIA	1X6X3m
PROPOSAL	NEW 2 LANE

44050 — 44150



KEY PLAN

LEVELS

DESIGN CH.	FRL	GROUND LEVEL	INVERT LEVEL		VERTICAL CLEARANCE (MAX.)	EARTH FILL (MAX.)	EARTH FILL (MIN.)
			LHS	RHS			
44+070	146.576	143.249	142.949	142.961	3.156m	0	0

LEGEND:-
FRL FINISHED ROAD LEVEL
IL INVERT LEVEL
LVL. LEVEL
EGL. EXISTING GROUND LEVEL

FRL CAMBER & LOCATION IS TO BE MATCHED WITH HIGHWAY ALIGNMENT DRAWING.

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETER, LEVELS ARE IN METER AND CHAINAGE ARE IN KILOMETERS UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. THIS DRAWING SHALL BE READ IN CONJUCTION WITH THE RELEVANT PLAN AND PROFILE DRAWING OF ROAD.
3. GRADE OF CONCRETE:–
   a. M30–FOR RCC BOX CELL STRUCTURE.
   b. M15–FOR PCC AND LEVELING COURSE.
   c. M30–PARAPET
4. GRADE OF STEEL – Fe500.
5. THE FOLLOWING LOADS HAVE BEEN CONSIDERED IN THE DESIGN:–
   a. ONE LANE ,TWO LANE AND THREE LANE OF CLASS A
   b. ONE LANE OF CLASS A IN ADDITION OF ONE LANE OF CLASS 70R WHEEL OR ONE LANE OF 70R TRACKED WHICHEVER IS GOVERNS.
6. BACKFILL MATERIAL BEHIND END WALL SHALL BE SELECTED GRANULAR SOIL HAVING PROPERTIES
   MAX DRY DENSITY = 1850–2280kg/m³
   OPTIMUM MOISTURE CONTENT = 7–15
   AS PER IRC78–2014 AND MORTH SPECIFICATION.
7. THE FRL SHOWN IN THE DRAWING SHALL BE VERIFIED WITH CORRESPONDING PLAN AND PROFILE DRAWING BEFORE EXECUTION, IF THERE IS ANY VARIATION SHALL BE BROUGHT TO THE NOTICE OF ENGINEER.
8. THE DIMENSION AND LEVEL ARE SUBJECTED TO CHANGE AS PER SITE CONDITION AND DETAILED DESIGN.
9. BACKFILL TO BE DONE AND COMPACTED FROM BOTH SIDE SIMULTANEOUSLY.
10. 600MM THICK. FILTER MATERIAL BEHIND RETAINING WALL SHALL BE LAID AS PER APPENDIX 6 OF IRC 78–2014.
11. 50MM THICK CEMENT CONCRETE WEARING COAT SHALL BE PROVIDED.
12. 100MM DIA P.V.C. PIPE AT SPACING 1000MMc/c IN HORIZONTAL/VERTICAL DIRECTION SHALL BE PROVIDED UP TO 150MM ABOVE GROUND LEVEL FOR WEEP HOLES IN RETAINING WALL.
13. SBC SHALL BE 8t/m². AND SAME SHALL BE ENSURED AT SITE BY ANY SUITABLE METHOD.
14. AS PER MORTH SECTION–2500,WHERE THE REQUIRED SIZE OF BOULDERS ARE NOT AVAILABLE ECONOMICALLY.CEMENT CONCRETE BLOCKS OF EQUIVALENT WEIGHT SHALL BE USED.THE GRADE OF CONCRETE SHALL BE M15 NOMINAL MIX.CEMENT CONCRETE BLOCK SHALL BE PREFERRED WHERE PRACTICABLE.
15. CHOOSE ANY SUITABLE METHOD TO ACHIEVE THE REQUIRED SBC AS PER SITE.
16. THE EXPOSURE CONDITION IS MODERATE.

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

REFERENCE DRAWINGS:–
1. REINFORCEMENT DETAIL OF BOX CULVERT AVC/NH–38/BOX/REINF./44+070/02

CONSTRUCTION — NEW DELHI

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor WZ-1200, Palam Extension, Bosco Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-8, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012 WISPL

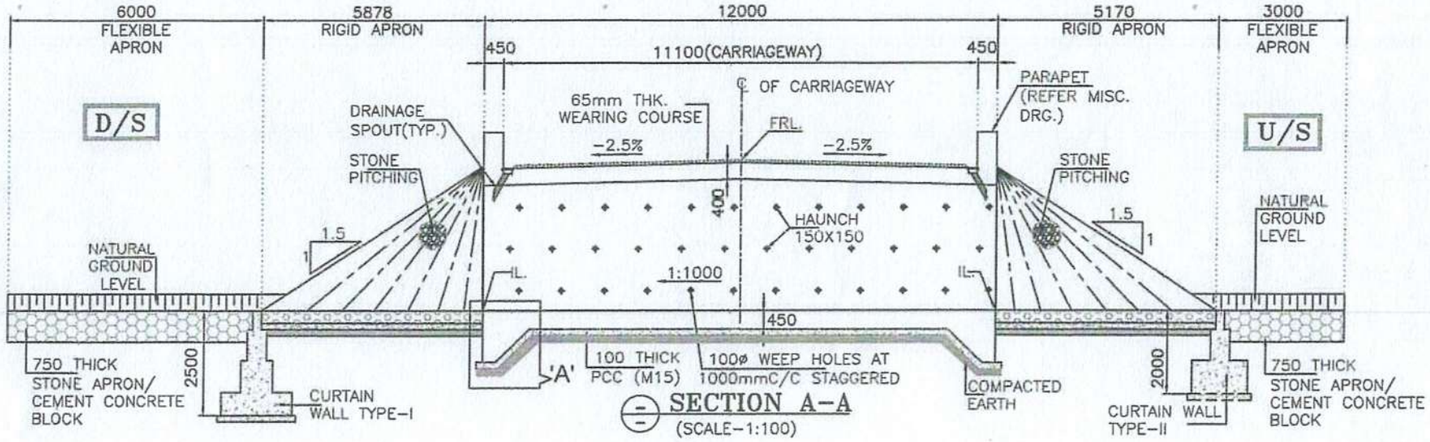
Kamac Engineers (P) Ltd — Authorised Signatory

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

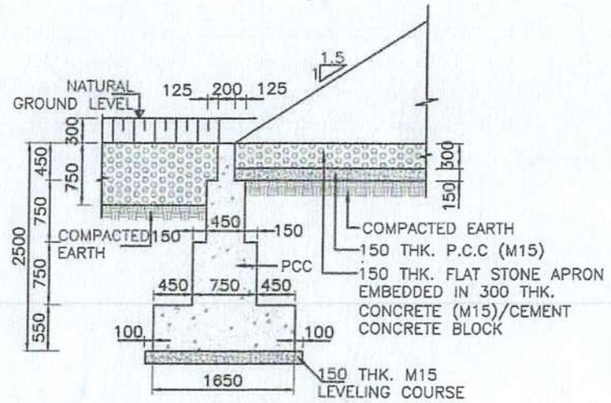
DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 44+070

Date	Drw.	Dsg.	Chk.	App.	Scale	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

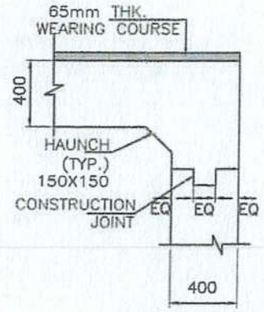
Project No. — Drawing No: AVC/NH-38/BOX/GAD/44+070/01 — Sheet No. 1 OF 2 — Rev. R0



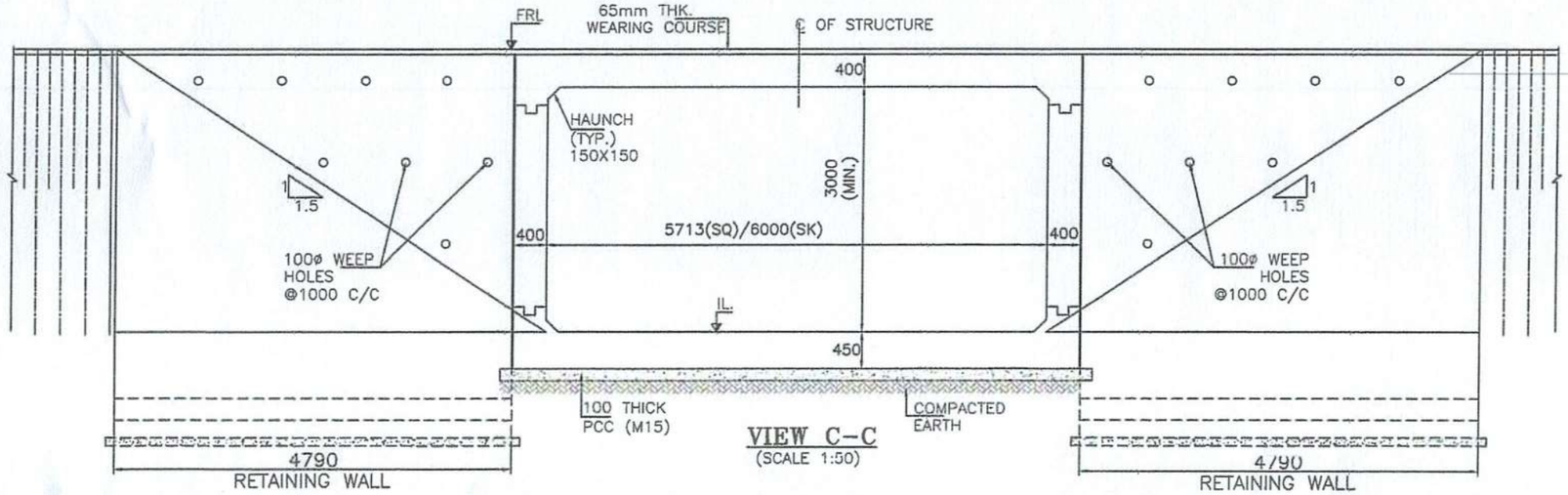
SECTION A–A
(SCALE–1:100)



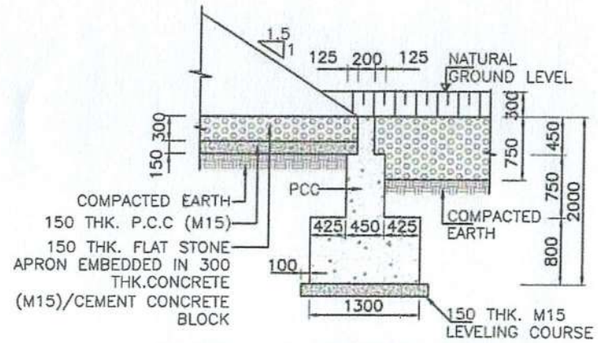
DETAIL OF CURTAIN WALL–I
(DOWN STREAM SIDE)
(SCALE 1:50)



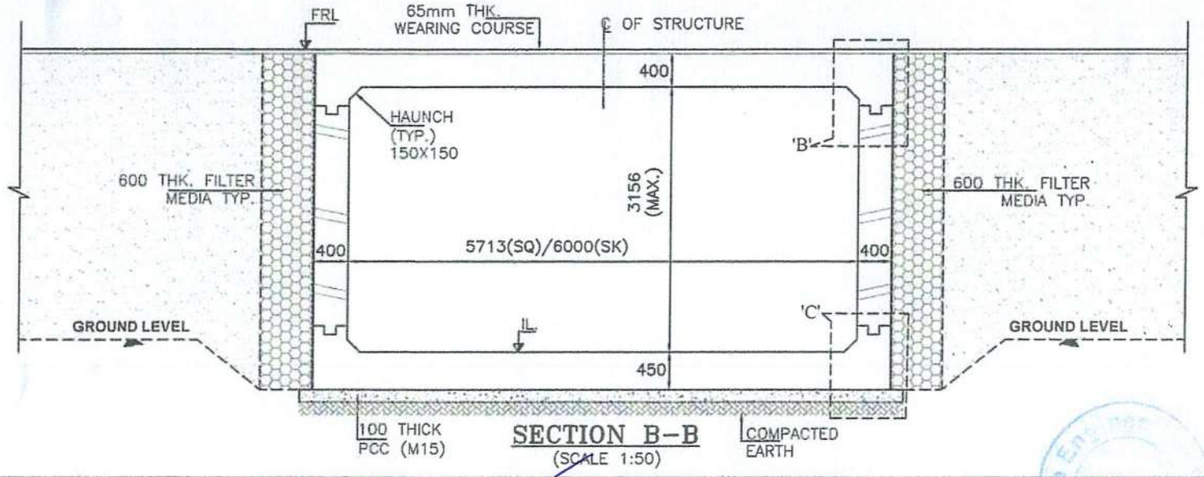
DETAIL–'B'
(SCALE 1:25)



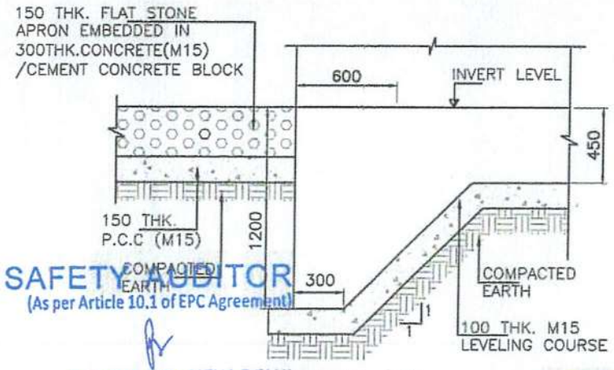
VIEW C–C
(SCALE 1:50)



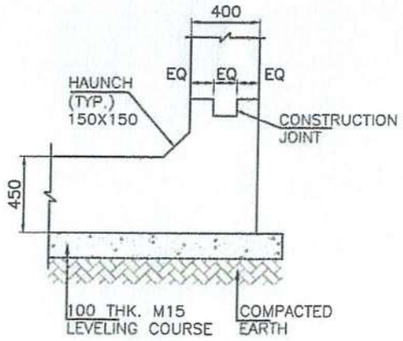
DETAIL OF CURTAIN WALL–II
(UP STREAM SIDE)
(SCALE 1:50)



SECTION B–B
(SCALE 1:50)



DETAIL–'A'
(SCALE 1:25)



DETAIL–'C'
(SCALE 1:25)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

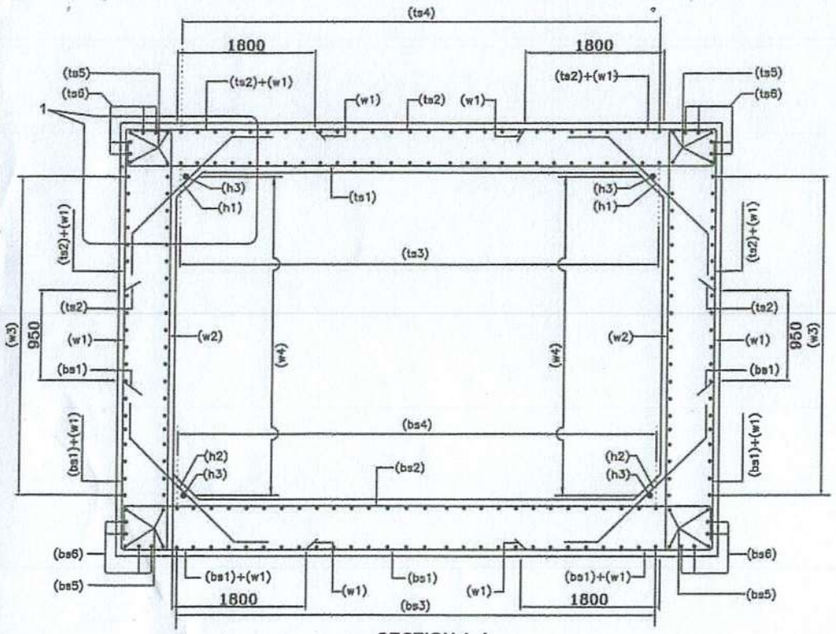
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:	PROJECT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD. F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM, VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1140, Palam Extension, Bosco Ashram Wali Gali, New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23, SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012

Kamac Engineers (P) Ltd. Authorised Signatory

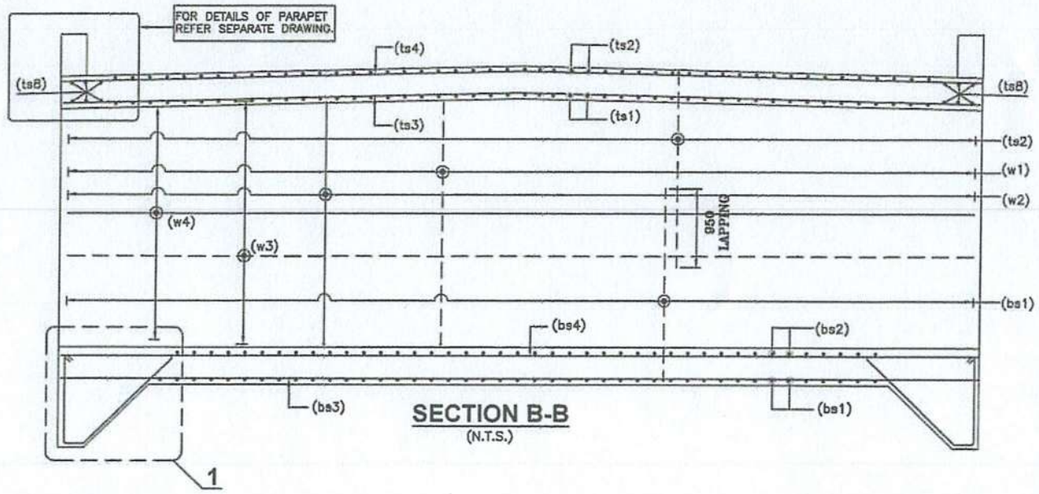
PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE.(PACKAGE-5)

DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 44+070

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	
Project No.	Drawing No.				Sheet No.	Rev.
	AVC/NH-38/BOX/GAD/44+070/01				2 OF 2	R0



SECTION A-A
(NTS)



SECTION B-B
(N.T.S.)

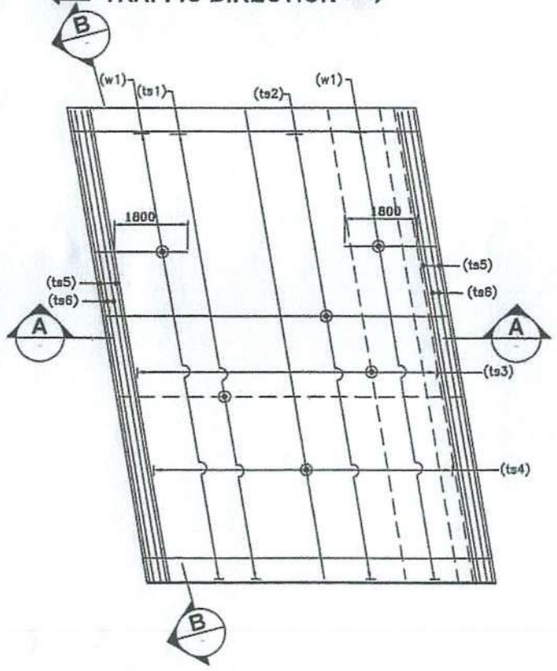
BOX REINF. SCHEDULE

SL.NO.	BAR MARK	BAR SHAPE	DIAMETER	SPACING
1	ts1		16+10	200
2	ts2		16	200
3	ts3		10	200
4	ts4		12	200
5	ts5		12	2x4 Nos.
6	ts6		12	2x4 Nos.
7	w1		16	200
8	w2		16	200
9	w3		12	200
10	w4		10	200
11	bs1		16	200
12	bs2		20+10	200
13	bs3		12	200
14	bs4		12	200
15	bs5		12	2x4 Nos.
16	bs6		12	2x4 Nos.
17	h1		10	200
18	h2		10	200
19	h3		10	1x4 Nos.
20	cs1		12	10 Nos.
21	cs2		10	200

LEGEND:-

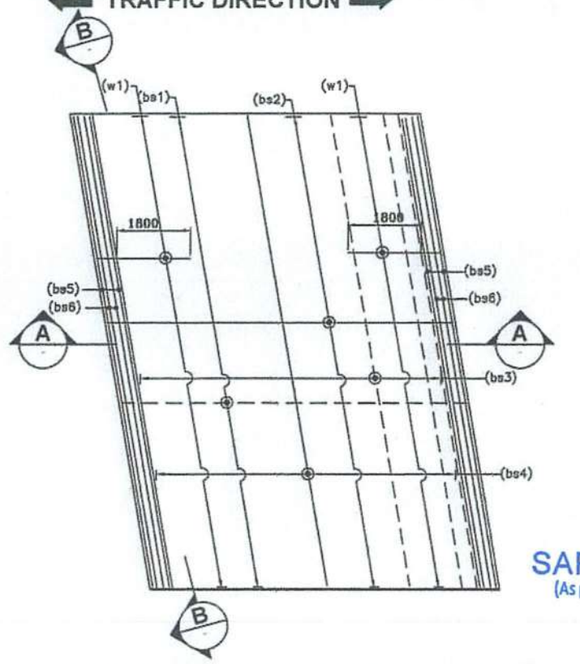
TOP FACE BAR	———
BOTTOM FACE BAR	- - - - -

TRAFFIC DIRECTION

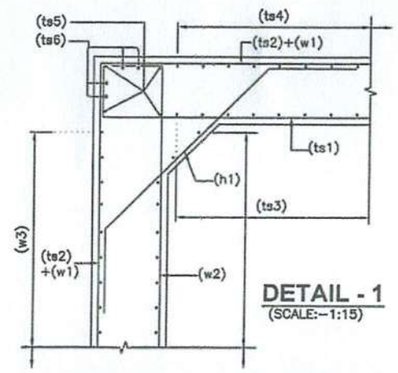


REINFORCEMENT DETAILS OF TOP SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

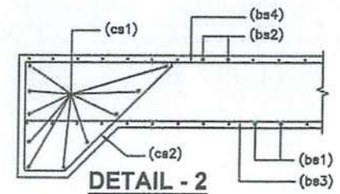
TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF BOTTOM SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)



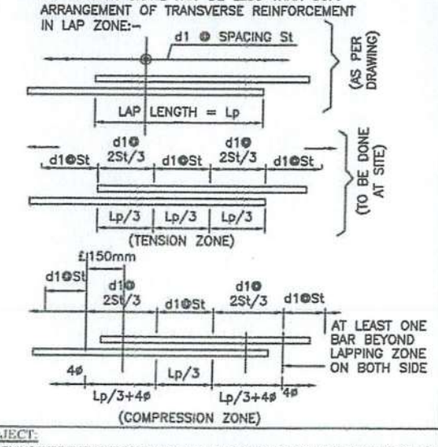
DETAIL - 1
(SCALE:-1:15)



DETAIL - 2
(N.T.S.)

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE MENTIONED.
2. DRAWING SHOULD NOT BE SCALED ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. ALL REINFORCING BARS SHALL BE THERMO MECHANICALLY TREATED (TMT) BARS (GRADE DESIGNATION Fe-500) CONFIRMING TO IS:1786 STANDARDS.
4. MINIMUM CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE AS FOLLOWS:-
   a) TOP SLAB - 45mm
   b) BOTTOM SLAB - 75mm
   c) SIDE WALL (EARTH SIDE) - 75mm
   d) SIDE WALL (INNER SIDE) - 45mm
5. OVERLAPPING FOR SPLICING OF REINFORCEMENT SHALL BE AS PER CLAUSE NO.15.2.5.
   LAP LENGTH SHALL NOT BE LESS THAN 56ø.
   ARRANGEMENT OF TRANSVERSE REINFORCEMENT IN LAP ZONE:-



6. ANCHOURAGE LENGTH OF BOX SHALL BE TAKEN AS 40ø AS PER IRC:112.
7. FOR UNFAVORABLE BOND CONDITIONS THE FACTOR 40 SHOULD BE MULTIPLIED BY FACTOR OF 1.43 .
8. CENTER LINE OF OVERLAPPING BAR bs1 & ts2 IN WALL & MID HEIGHT OF WALLS ARE AT SAME POINT.
9. BAR BENDING SCHEDULE SHOULD BE STRICTLY FOLLOW DURING THE TIME OF EXECUTION IF IN CASE ANY CHANGES AT SITE KINDLY DISCUSS IT WITH ENGINEER IN CHARGE.

REFERENCE DRAWING:-

1. GENERAL ARRANGEMENT DRAWING.
   AVC/NH-38/BOX/GAD/44+070/01

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

CONSTRUCTION FOR NEW DELHI

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1248, Palam Extension, Bosco Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012

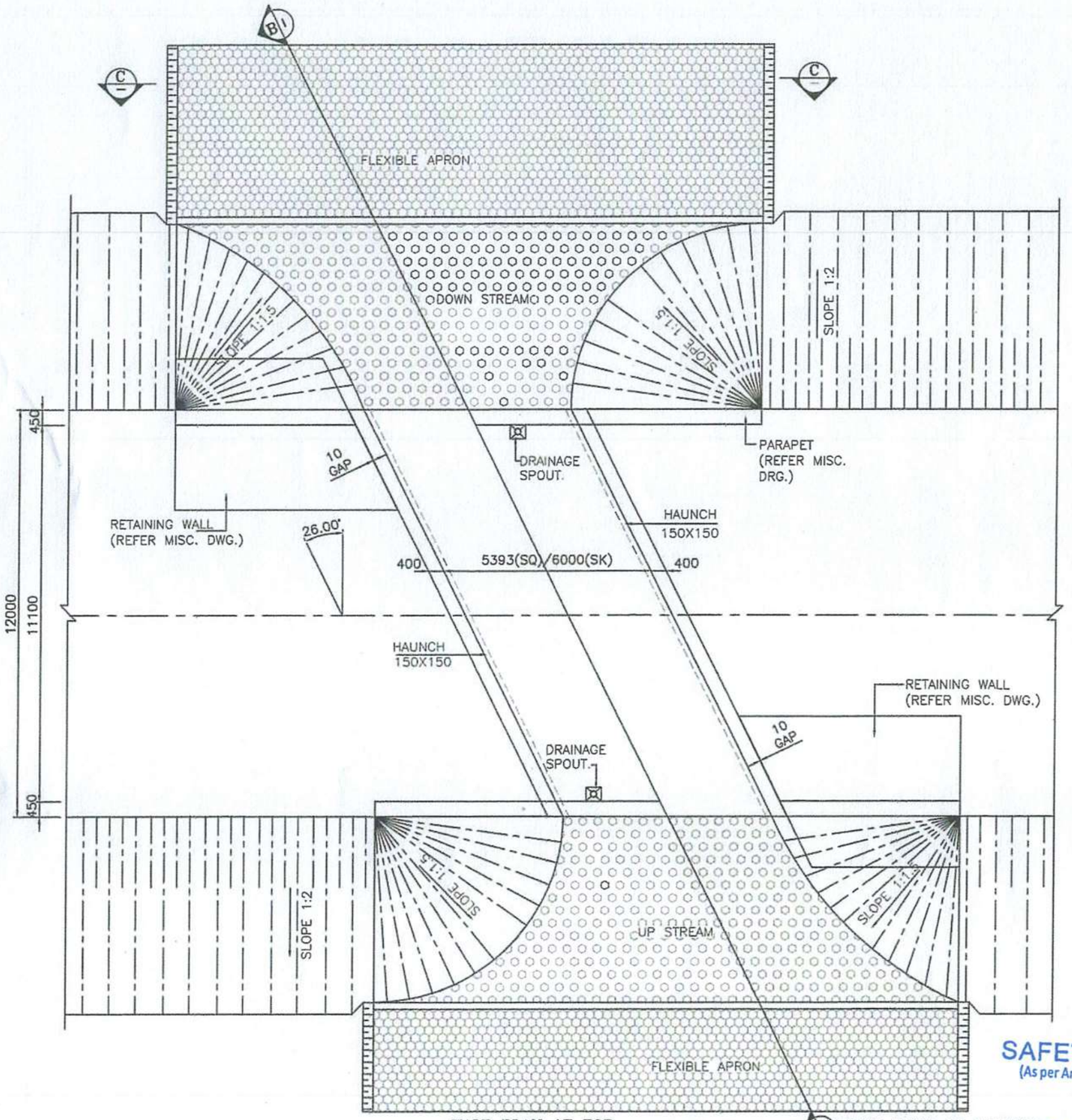
Kamac Engineer's (P) Ltd
Authorised Signatory

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- REINFORCEMENT DETAIL OF BOX CULVERT AT CH. 44+070

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

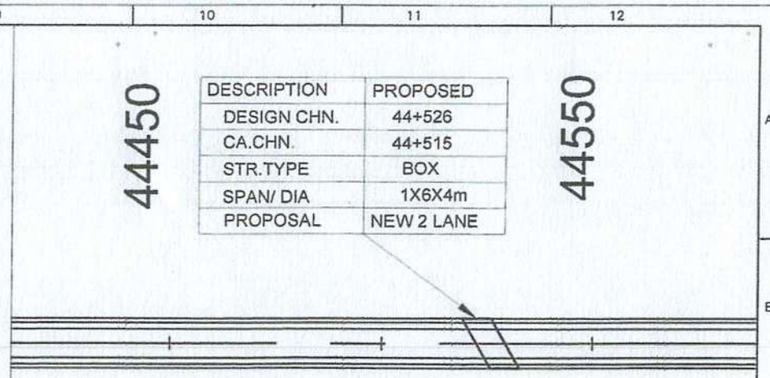
Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/REIN./44+070/01	01 OF 01	R0



HALF PLAN AT TOP

PLAN (SCALE–1:100)

HALF PLAN AT BOTTOM



DESCRIPTION	PROPOSED
DESIGN CHN.	44+526
CA.CHN.	44+515
STR.TYPE	BOX
SPAN/ DIA	1X6X4m
PROPOSAL	NEW 2 LANE

KEY PLAN

LEVELS

DESIGN CH.	FRL	GROUND LEVEL	INVERT LEVEL		VERTICAL CLEARANCE (MAX.)	EARTH FILL (MAX.)	EARTH FILL (MIN.)
			LHS	RHS			
44+526	147.431	142.472	142.172	172.184	4.012m	0.847m	0.708m

NOTES:-

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2. THIS DRAWING SHALL BE READ IN CONJUCTION WITH THE RELEVANT PLAN AND PROFILE DRAWING OF ROAD.
3. GRADE OF CONCRETE:–
   a. M30–FOR RCC BOX CELL STRUCTURE.
   b. M15–FOR PCC AND LEVELING COURSE.
   c. M30–PARAPET
4. GRADE OF STEEL – Fe500.
5. THE FOLLOWING LOADS HAVE BEEN CONSIDERED IN THE DESIGN:–
   a. ONE LANE ,TWO LANE AND THREE LANE OF CLASS A
   b. ONE LANE OF CLASS A IN ADDITION OF ONE LANE OF CLASS 70R WHEEL OR ONE LANE OF 70R TRACKED WHICHEVER IS GOVERNS.
6. BACKFILL MATERIAL BEHIND END WALL SHALL BE SELECTED GRANULAR SOIL HAVING PROPERTIES
   MAX DRY DENSITY = 1850–2280kg/m³
   OPTIMUM MOISTURE CONTENT = 7–15
   AS PER IRC78–2014 AND MORTH SPECIFICATION.
7. THE FRL SHOWN IN THE DRAWING SHALL BE VERIFIED WITH CORRESPONDING PLAN AND PROFILE DRAWING BEFORE EXECUTION, IF THERE IS ANY VARIATION SHALL BE BROUGHT TO THE NOTICE OF ENGINEER.
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10. 600MM THICK. FILTER MATERIAL BEHIND RETAINING WALL SHALL BE LAID AS PER APPENDIX 6 OF IRC 78–2014.
11. 50MM THICK CEMENT CONCRETE WEARING COAT SHALL BE PROVIDED.
12. 100MM DIA P.V.C. PIPE AT SPACING 1000MMc/c IN HORIZONTAL/VERTICAL DIRECTION SHALL BE PROVIDED UP TO 150MM ABOVE GROUND LEVEL FOR WEEP HOLES IN RETAINING WALL.
13. SBC SHALL BE 10t/m². AND SAME SHALL BE ENSURED AT SITE BY ANY SUITABLE METHOD.
14. AS PER MORTH SECTION–2500,WHERE THE REQUIRED SIZE OF BOULDERS ARE NOT AVAILABLE ECONOMICALLY.CEMENT CONCRETE BLOCKS OF EQUIVALENT WEIGHT SHALL BE USED.THE GRADE OF CONCRETE SHALL BE M15 NOMINAL MIX.CEMENT CONCRETE BLOCK SHALL BE PREFERRED WHERE PRACTICABLE.
15. CHOOSE ANY SUITABLE METHOD TO ACHIEVE THE REQUIRED SBC AS PER SITE.
16. THE EXPOSURE CONDITION IS MODERATE.

LEGEND:-
FRL FINISHED ROAD LEVEL
IL INVERT LEVEL
LVL. LEVEL
EGL. EXISTING GROUND LEVEL

FRL CAMBER & LOCATION IS TO BE MATCHED WITH HIGHWAY ALIGNMENT DRAWING.

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)

DESIGN AID, NEW DELHI

REFERENCE DRAWINGS:-
REINFORCEMENT DETAIL OF BOX CULVERT
AVC/NH–38/BOX/REINF./44+526/02

A.V. CONSTRUCTION PVT. LTD. NEW DELHI

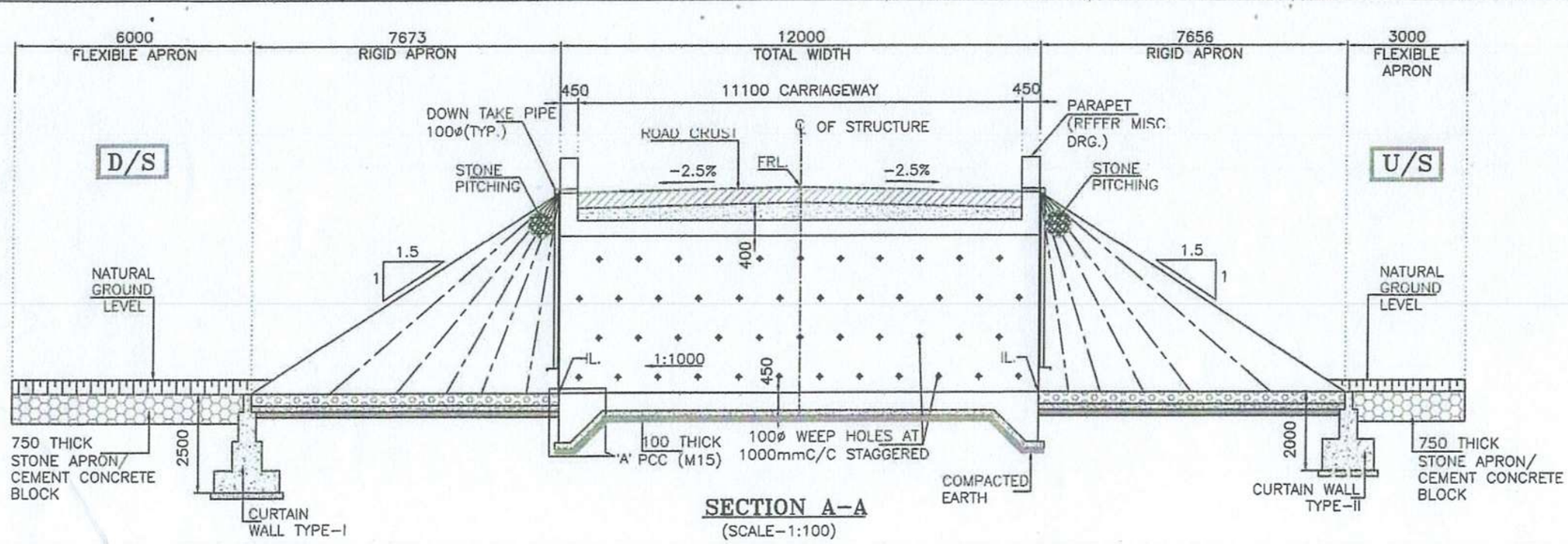
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD. 6201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 (Kamac Engineers (P) Ltd. Authorised Signatory)	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION Floor, WZ-1240, Palam Extension, Bosco Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 44+526

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/GAD/44+526/01	1 OF 3	R0



SECTION A-A
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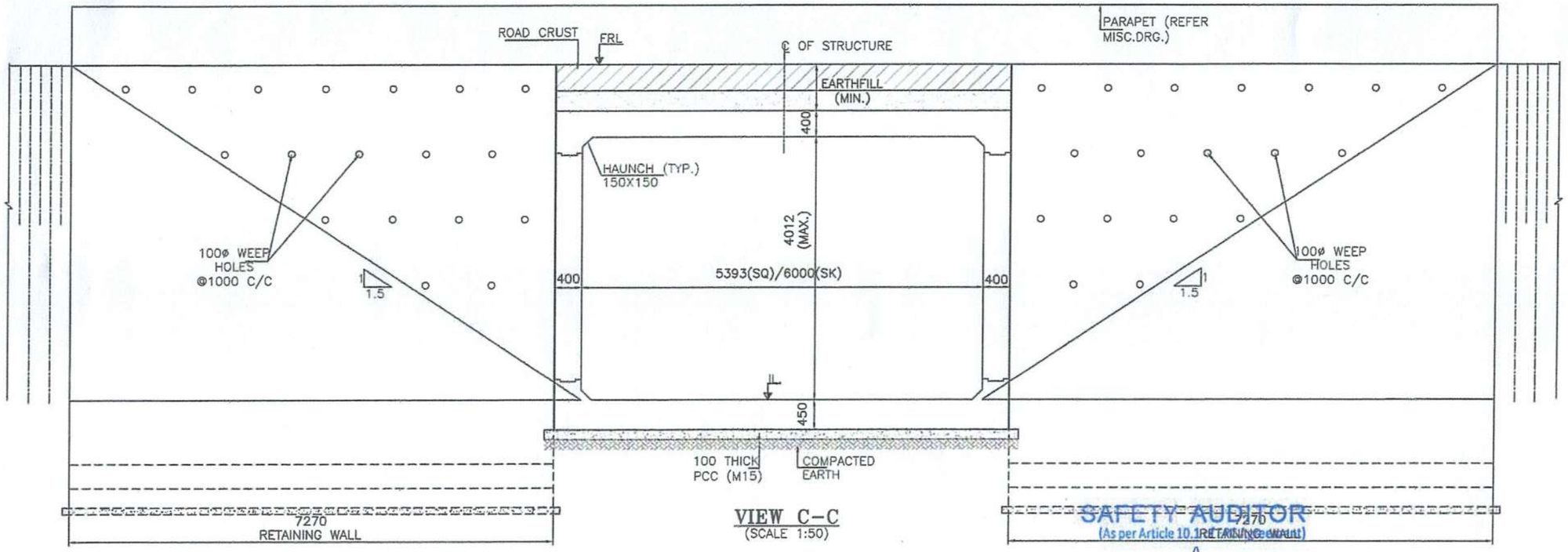


VIEW C-C
(SCALE 1:50)

SAFETY AUDITOR
(As per Article 10.1 RFP Document)

DESIGN AID, NEW DELHI

Kamac Engineer's (P) Ltd
Authorised Signatory

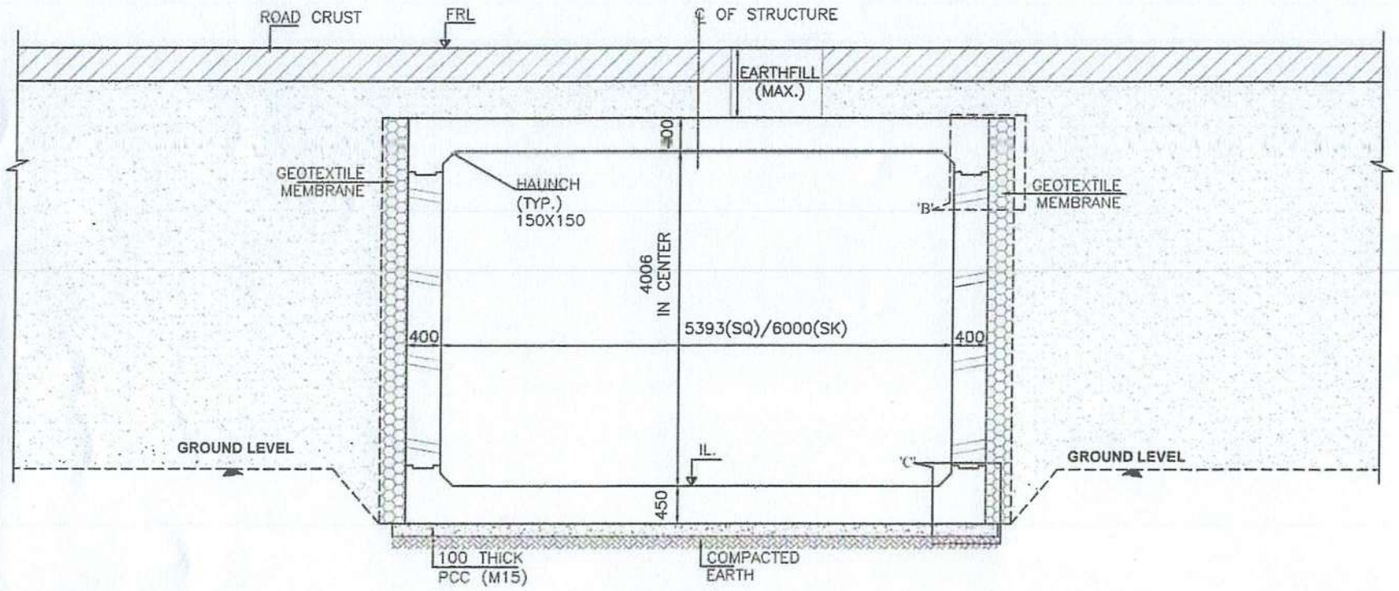
CLIENT:	EPC CONTRACTOR:	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070.	A.V. CONSTRUCTION 4th Floor, WZ-1220, Palam Extension, Bosco Ashram Wali Gali,New Delhi-110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012 W I S P L

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:-
GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 44+526

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/GAD/44+526/01	2 OF 3	R0



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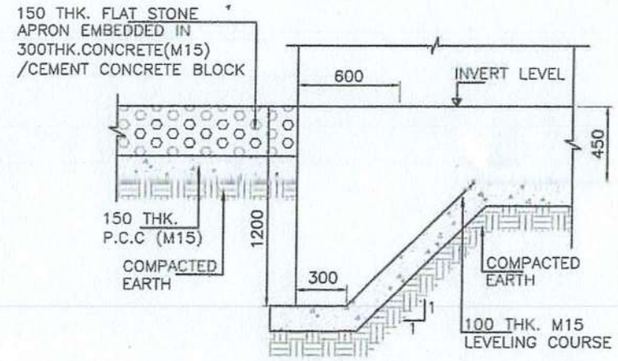

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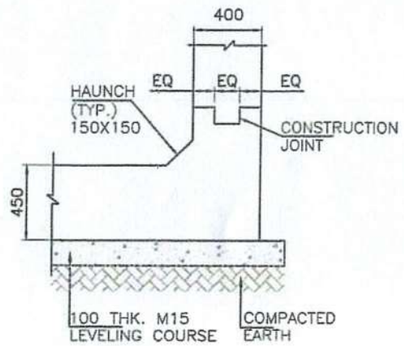

DETAIL–'C'
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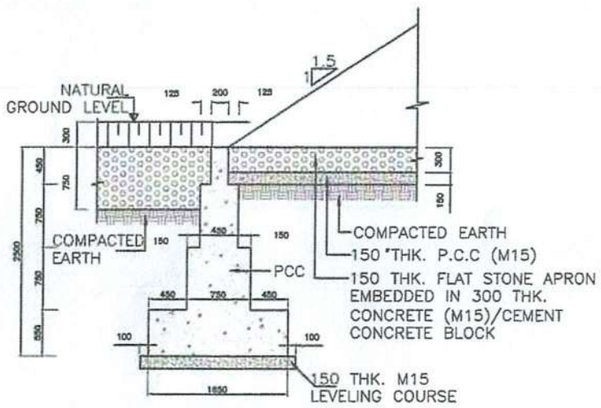
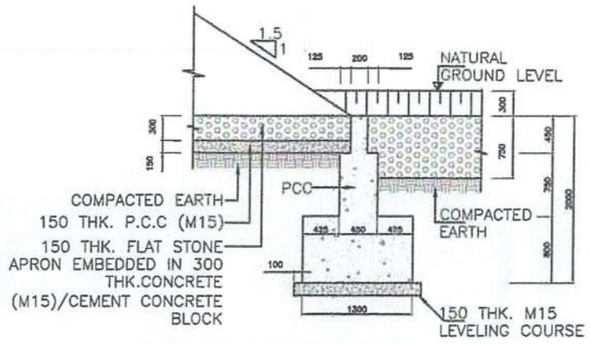
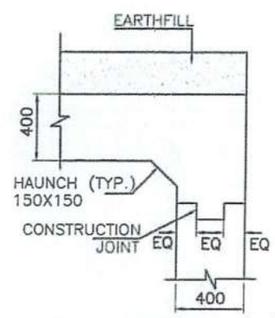


DETAIL OF CURTAIN WALL–I
(DOWN STREAM SIDE)
(SCALE 1:50)



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



DETAIL–'B'
(SCALE 1:25)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

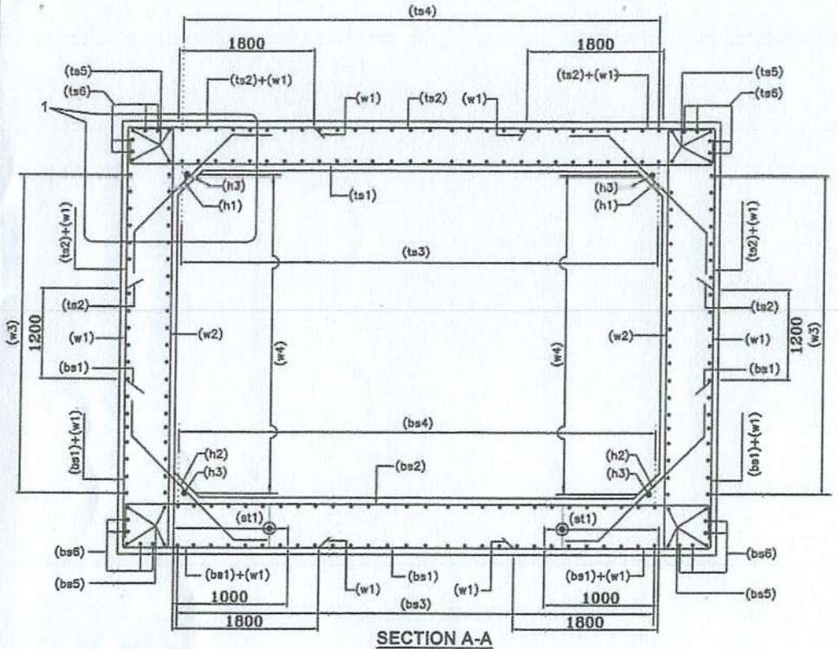
CONSTRUCTION NEW DELHI

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:	PROJECT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 Kamac Engineer's (P) Ltd Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor,WZ-1280, Palam Extension, Bosco Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012	WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

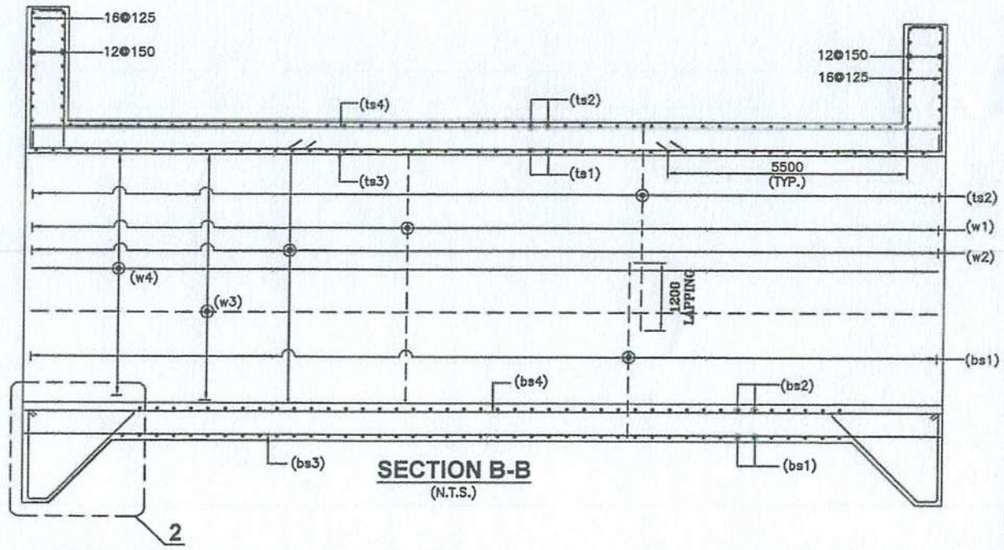
DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 44+526

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/GAD/44+526/01	3 OF 3	R0



SECTION A-A
(NTS)

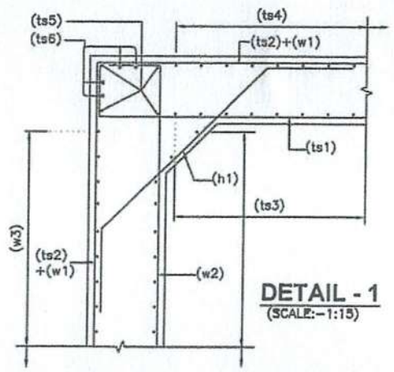


SECTION B-B
(N.T.S.)

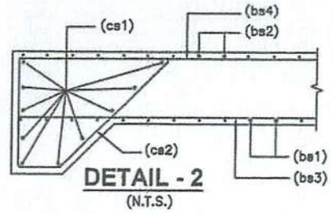
BOX REINF. SCHEDULE

SL.NO.	BAR MARK	BAR SHAPE	DIAMETER	SPACING
1	ts1		20+8	180
2	ts2		16	180
3	ts3		12	200
4	ts4		12	200
5	to5		12	2x4 Nos.
6	ts6		12	2x4 Nos.
7	w1		16	180
8	w2		16	180
9	w3		12	200
10	w4		10	200
11	bs1		16	180
12	bs2		20+10	180
13	bs3		12	200
14	bs4		12	200
15	bs5		12	2x4 Nos.
16	bs6		12	2x4 Nos.
17	h1		10	180
18	h2		10	180
19	h3		10	1x4 Nos.
20	cs1		12	10 Nos.
21	cs2		10	200
22	st1		8	200 c/c (L-L) 180 c/c (T-T) DIRECTION

LEGEND:-	
TOP FACE BAR	———
BOTTOM FACE BAR	- - - - -

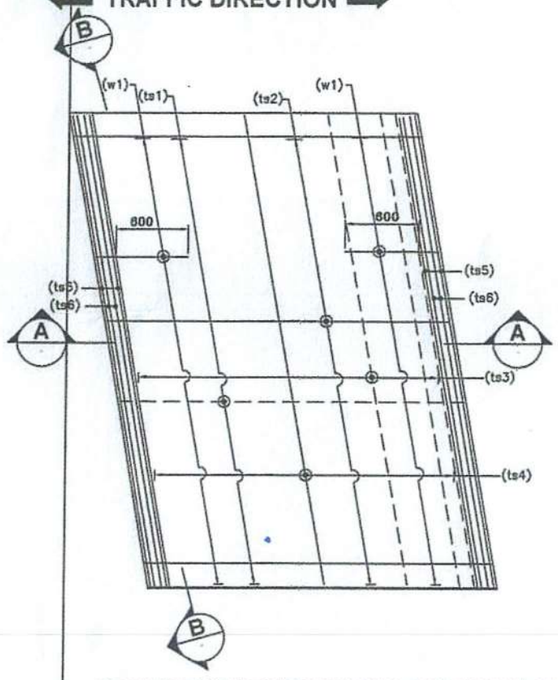


DETAIL - 1
(SCALE:-1:15)



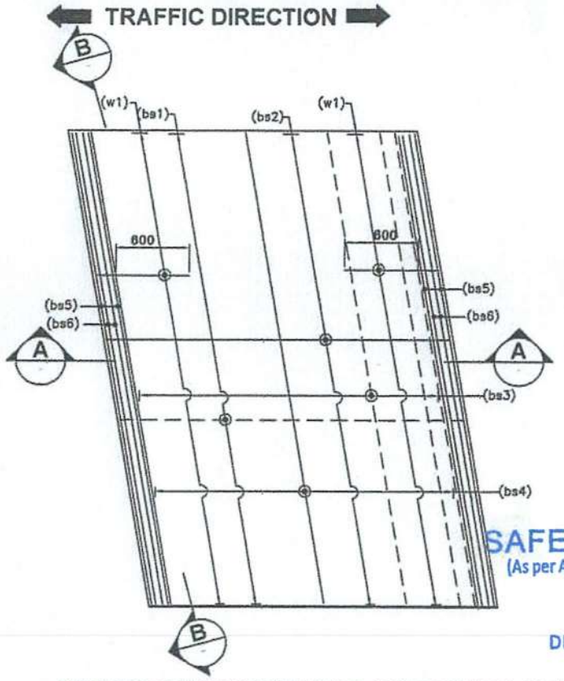
DETAIL - 2
(N.T.S.)

TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF TOP SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

TRAFFIC DIRECTION

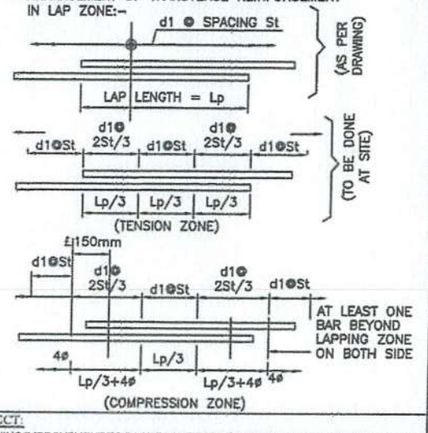


REINFORCEMENT DETAILS OF BOTTOM SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE MENTIONED.
2. DRAWING SHOULD NOT BE SCALED ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. ALL REINFORCING BARS SHALL BE THERMO MECHANICALLY TREATED (TMT) BARS (GRADE DESIGNATION Fe-500) CONFIRMING TO IS:1786 STANDARDS.
4. MINIMUM CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE AS FOLLOWS:-
   a) TOP SLAB - 45mm
   b) BOTTOM SLAB - 75mm
   c) SIDE WALL (EARTH SIDE) - 75mm
   d) SIDE WALL (INNER SIDE) - 45mm
5. OVERLAPPING FOR SPLICING OF REINFORCEMENT SHALL BE AS PER CLAUSE NO.15.2.5.
   LAP LENGTH SHALL NOT BE LESS THAN 56ø.
   ARRANGEMENT OF TRANSVERSE REINFORCEMENT IN LAP ZONE:-



6. ANCHOURAGE LENGTH OF BOX SHALL BE TAKEN AS 40ø AS PER IRC:112.
7. FOR UNFAVORABLE BOND CONDITIONS THE FACTOR 40 SHOULD BE MULTIPLIED BY FACTOR OF 1.43 .
8. CENTER LINE OF OVERLAPPING BAR bs1 & ts2 IN WALL & MID HEIGHT OF WALLS ARE AT SAME POINT.
9. BAR BENDING SCHEDULE SHOULD BE STRICTLY FOLLOW DURING THE TIME OF EXECUTION IF IN CASE ANY CHANGES AT SITE KINDLY DISCUSS IT WITH ENGINEER IN CHARGE.

REFERENCE DRAWING:-

1. GENERAL ARRANGEMENT DRAWING. AVC/NH-38/BOX/GAD/44+526/01

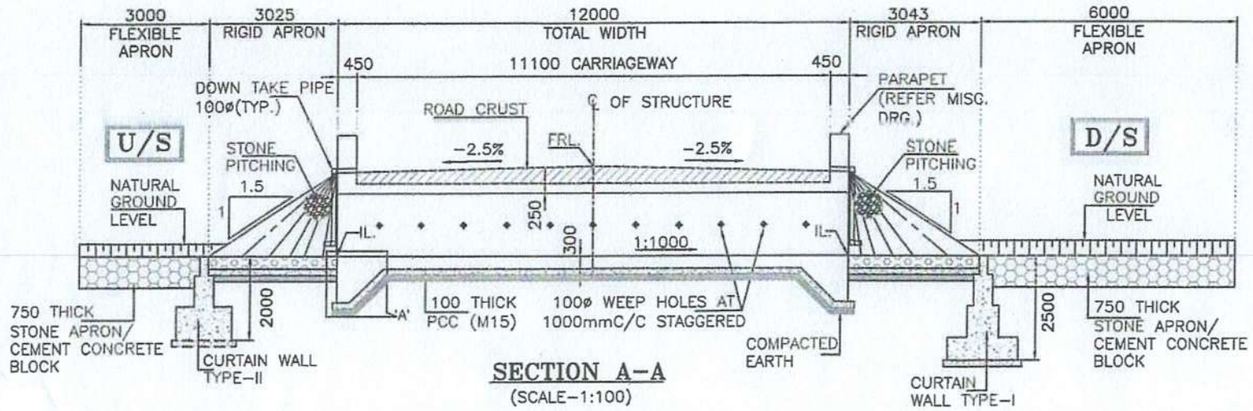
CONSTRUCTION

CLIENT:	EPC CONTRACTOR:	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	Kamac Engineers (P) Ltd. Authorised Signatory. KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1 Floor, WZ-124 Palam Extension, Bosco Ashram Wall Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE.(PACKAGE-5)

DRAWING TITLE: REINFORCEMENT DETAIL OF BOX CULVERT AT CH. 44+526

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	
Project No.	Drawing No. AVC/NH-38/BOX/REIN./44+526/01				Sheet No. 01 OF 01	Rev. R0



SECTION A-A
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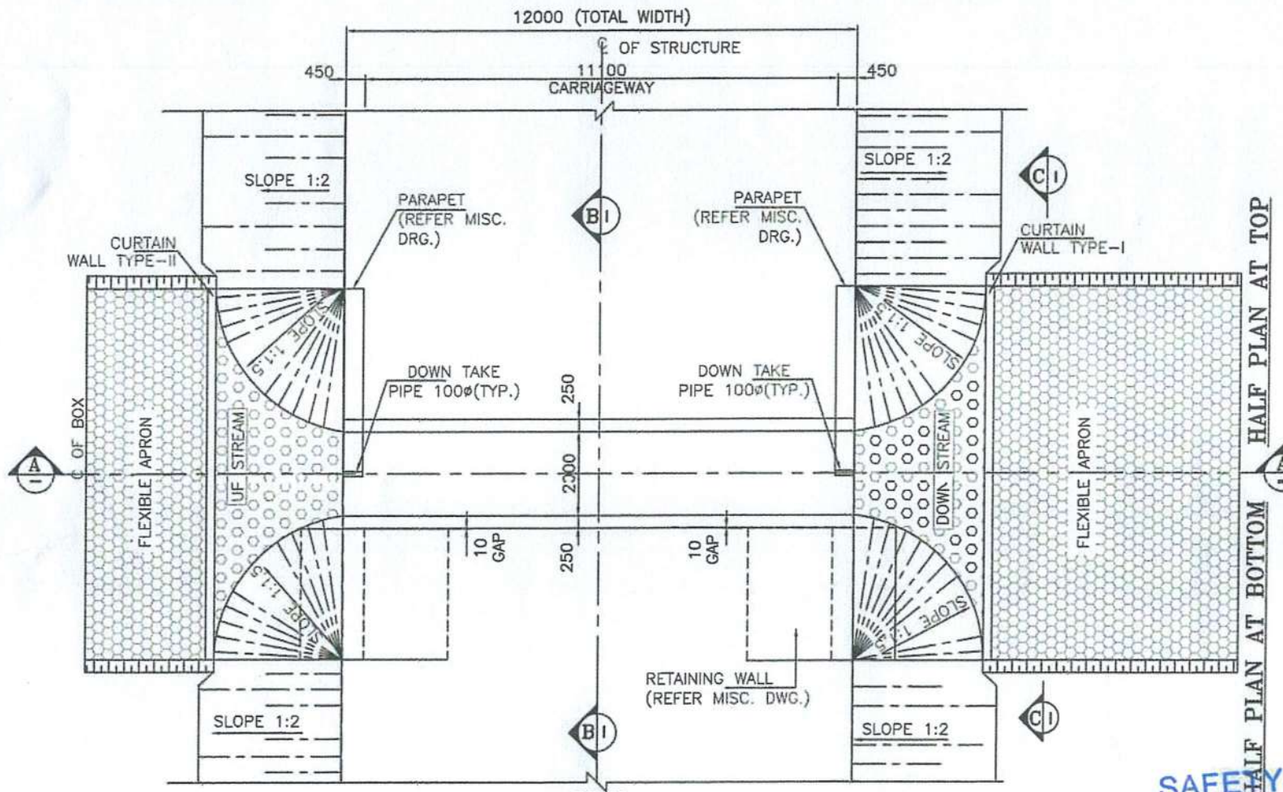

PLAN
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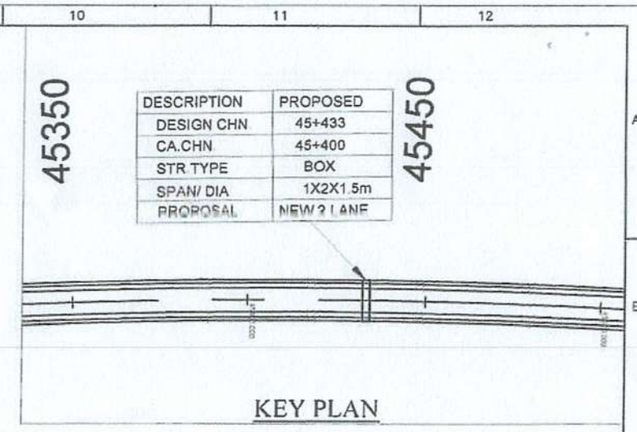


KEY PLAN

LEVELS

DESIGN CH.	FRL	GROUND LEVEL	INVERT LEVEL		VERTICAL CLEARANCE (MAX.)	EARTHFILL (MAX.)	EARTHFILL (MIN.)
			LHS	RHS			
45+433	149.591	147.719	147.431	147.419	1.512 m	0.410 m	0.271 m

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETER, LEVELS ARE IN METER AND CHAINAGE ARE IN KILOMETERS UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. THIS DRAWING SHALL BE READ IN CONJUCTION WITH THE RELEVANT PLAN AND PROFILE DRAWING OF ROAD.
3. GRADE OF CONCRETE:-
   a. M30-FOR RCC BOX CELL STRUCTURE.
   b. M15-FOR PCC AND LEVELING COURSE.
   c. M30-PARAPET
4. GRADE OF STEEL - Fe 500.
5. THE CARRIAGEWAY OF PROPOSED CULVERT IS DESIGN AS PER 6-2017.
6. BACKFILL MATERIAL BEHIND END WALL SHALL BE SELECTED GRANULAR SOIL HAVING PROPERTIES
   MAX DRY DENSITY = 1850-2280kg/m³
   OPTIMUM MOISTURE CONTENT = 7-15
   AS PER IRC78-2014 AND MORTH SPECIFICATION.
7. THE FRL SHOWN IN THE DRAWING SHALL BE VERIFIED WITH CORRESPONDING PLAN AND PROFILE DRAWING BEFORE EXECUTION, IF THERE IS ANY VARIATION SHALL BE BROUGHT TO THE NOTICE OF ENGINEER.
8. THE DIMENSION AND LEVEL ARE SUBJECTED TO CHANGE AS PER SITE CONDITION AND DETAILED DESIGN.
9. BACKFILL TO BE DONE AND COMPACTED FROM BOTH SIDE SIMULTANEOUSLY.
10. 100MM DIA P.V.C. PIPE AT SPACING 1000MMc/c IN HORIZONTAL/VERTICAL DIRECTION SHALL BE PROVIDED UP TO 150MM ABOVE GROUND LEVEL FOR WEEP HOLES IN RETAINING WALL.
11. SBC SHALL BE 9t/m². AND SAME SHALL BE ENSURED AT SITE BY ANY SUITABLE METHOD.
12. AS PER MORTH SECTION-2500,WHERE THE REQUIRED SIZE OF BOULDERS ARE NOT AVAILABLE ECONOMICALLY.CEMENT CONCRETE BLOCKS OF EQUIVALENT WEIGHT SHALL BE USED.THE GRADE OF CONCRETE SHALL BE M15 NOMINAL MIX.CEMENT CONCRETE BLOCK SHALL BE PREFERRED WHERE PRACTICABLE.
13. CHOOSE ANY SUITABLE METHOD TO ACHIEVE THE REQUIRED SBC AS PER SITE.

LEGEND:-
FRL FINISHED ROAD LEVEL
IL INVERT LEVEL
LVL. LEVEL
EGL. EXISTING GROUND LEVEL

FRL CAMBER & LOCATION IS TO BE MATCHED WITH HIGHWAY ALIGNMENT DRAWING.

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

REFERENCE DRAWINGS:-
1. REINFORCEMENT DETAIL OF BOX CULVERT AVC/NH-38/BC/REINF./45+433/01

CLIENT:	EPC CONTRACTOR:	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL,-SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-300, Palam Extension, Bosco Ashram Well Gall,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012

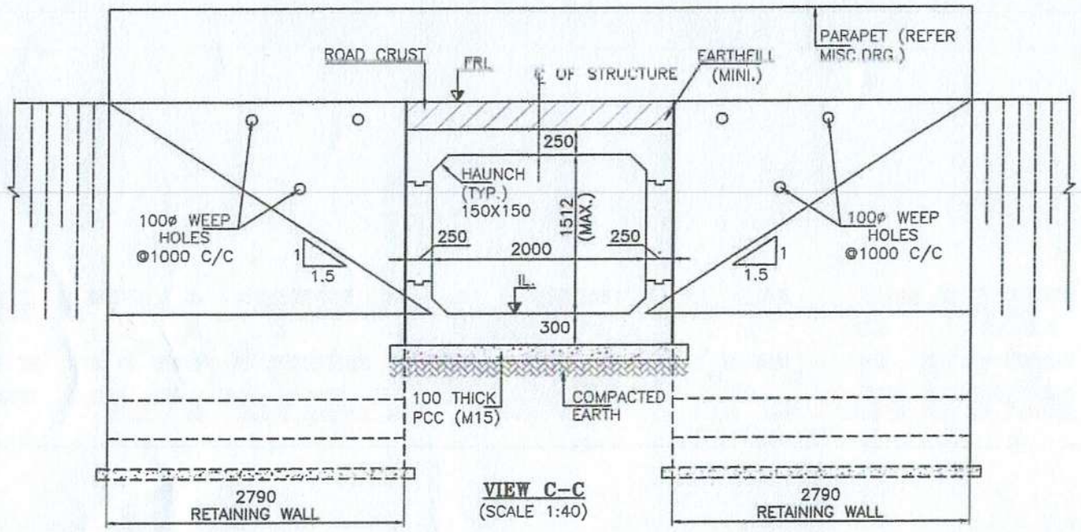
Kamac Engineers (P) Ltd
Authorised Signatory

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

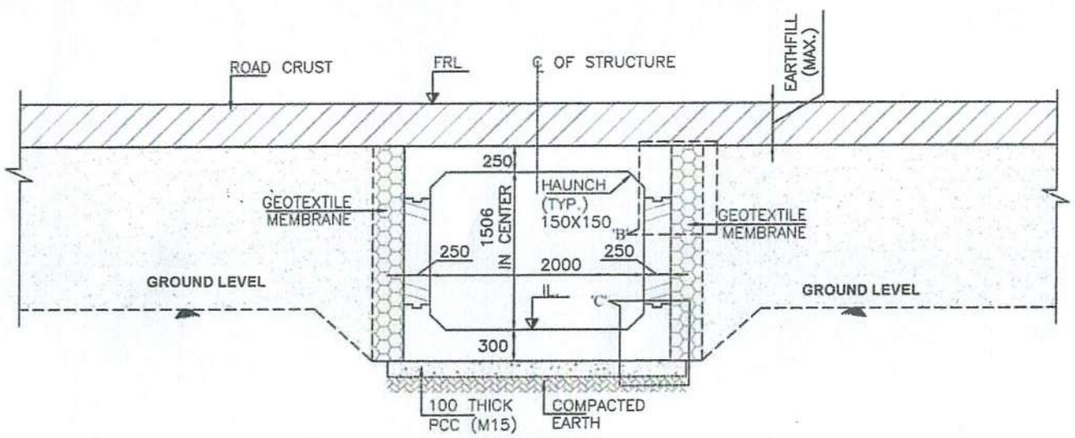
DRAWING TITLE:
GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 45+433

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

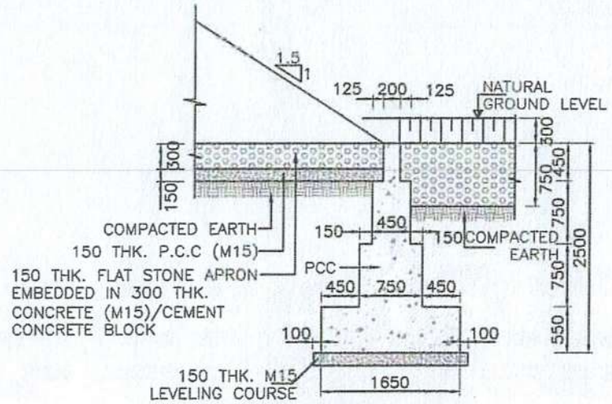
Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/45+433/01	01 OF 02	R0



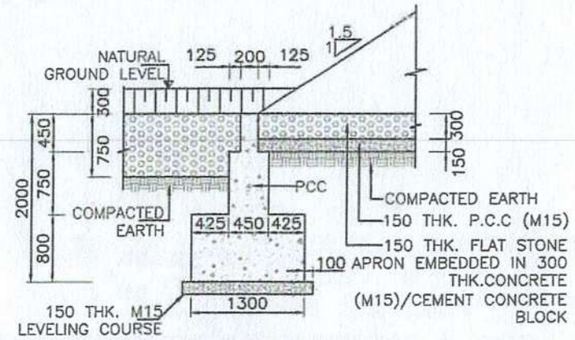
VIEW C–C
(SCALE 1:40)



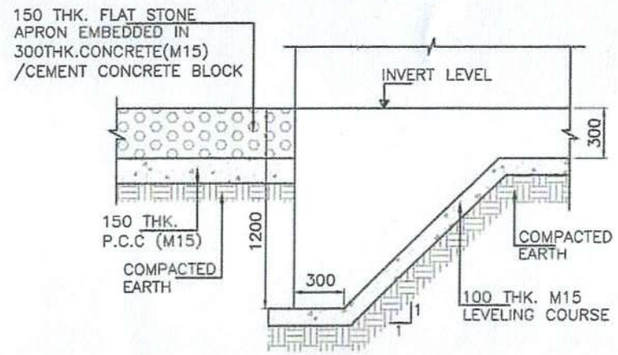
SECTION B–B
(SCALE 1:40)



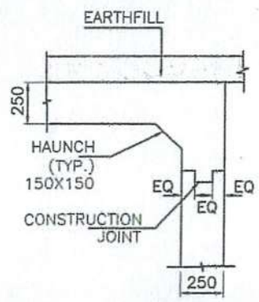
DETAIL OF CURTAIN WALL–I
(DOWN STREAM SIDE)
(SCALE 1:50)



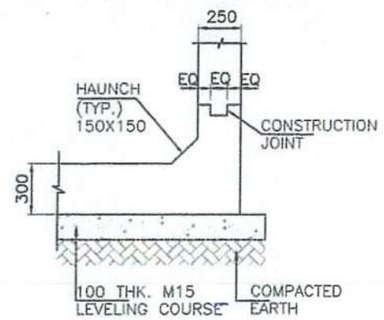
DETAIL OF CURTAIN WALL–II
(UP STREAM SIDE)
(SCALE 1:50)



DETAIL–'A'
(SCALE 1:25)



DETAIL–'B'
(SCALE 1:25)



DETAIL–'C'
(SCALE 1:25)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

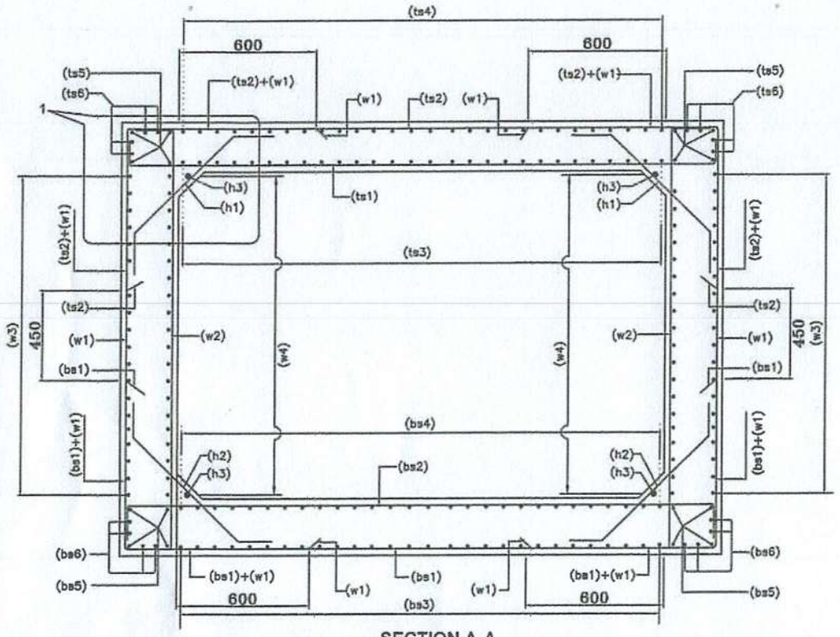
CLIENT:	EPC CONTRACTOR:	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 Kamac Engineers (P) Ltd Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240, Palam Extension, Bodo Ashram Wali Gali New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-8, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE.(PACKAGE-5)

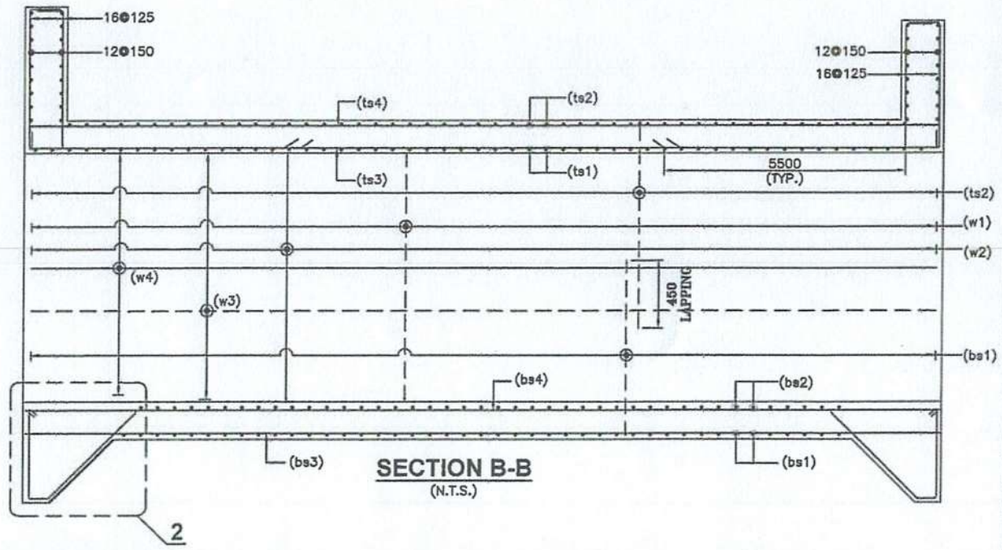
DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 45+433

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/45+433/01	02 OF 02	R0



SECTION A-A
(NTS)

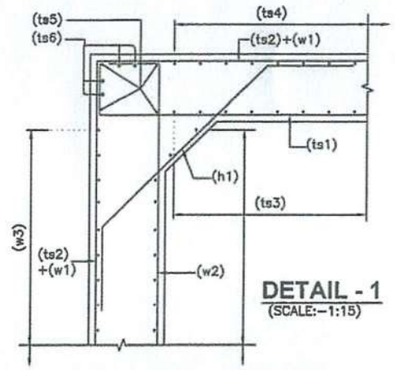


SECTION B-B
(N.T.S.)

BOX REINF. SCHEDULE

SL.NO.	BAR MARK	BAR SHAPE	DIAMETER	SPACING
1	ts1		12	200
2	ts2		10	200
3	ts3		8	200
4	ts4		10	200
5	ts5		12	2x4 Nos.
6	ts6		12	2x4 Nos.
7	w1		10	200
8	w2		10	200
9	w3		10	200
10	w4		8	200
11	bs1		10	200
12	bs2		10+8	200
13	bs3		10	200
14	bs4		8	200
15	bs5		12	2x4 Nos.
16	bs6		12	2x4 Nos.
17	h1		10	200
18	h2		10	200
19	h3		10	1x4 Nos.
20	cs1		12	10 Nos.
21	cs2		10	200

LEGEND:-	
TOP FACE BAR	———
BOTTOM FACE BAR	- - - - -



DETAIL - 1
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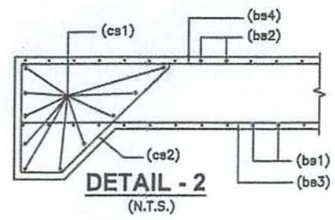
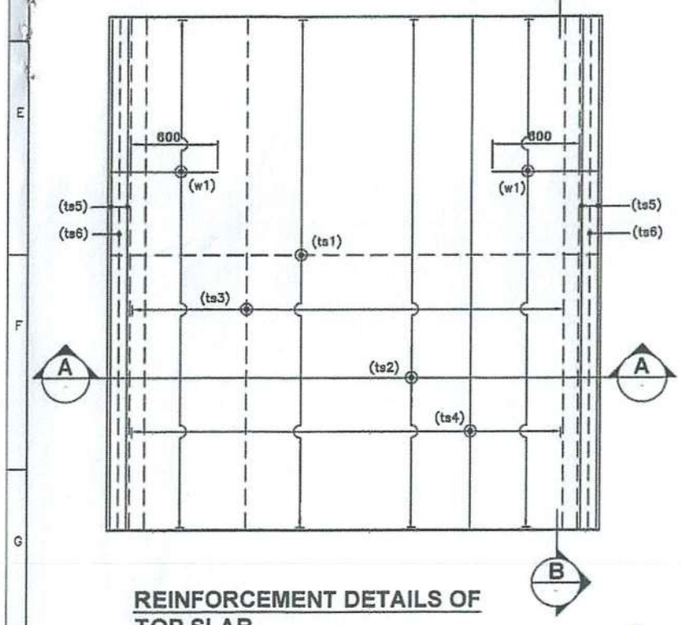


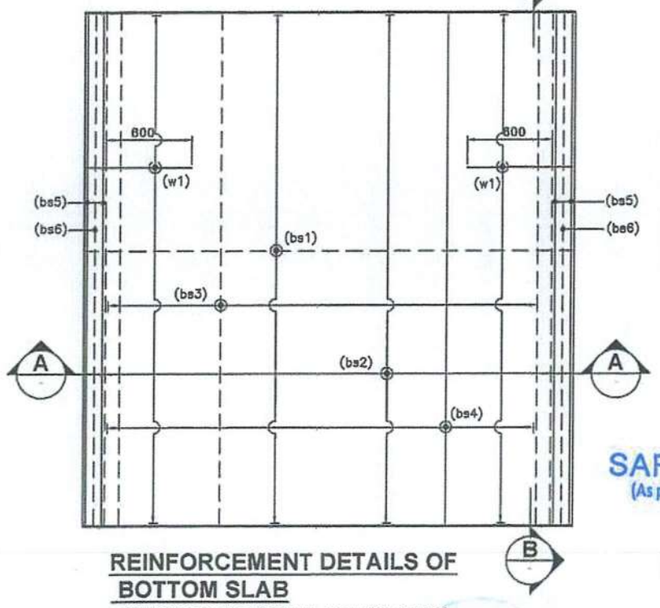
DETAIL - 2
(N.T.S.)

TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF TOP SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

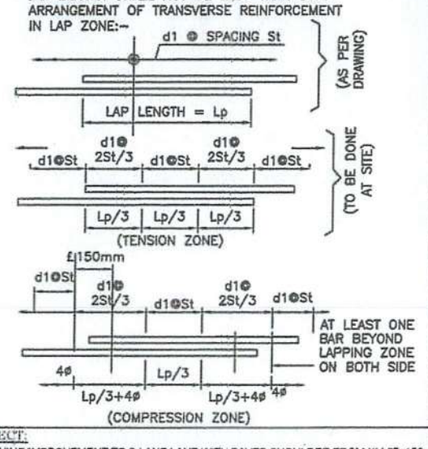
TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF BOTTOM SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE MENTIONED.
2. DRAWING SHOULD NOT BE SCALED ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. ALL REINFORCING BARS SHALL BE THERMO MECHANICALLY TREATED (TMT) BARS (GRADE DESIGNATION Fe-500) CONFIRMING TO IS:1786 STANDARDS.
4. MINIMUM CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE AS FOLLOWS:-
   a) TOP SLAB - 45mm
   b) BOTTOM SLAB - 75mm
   c) SIDE WALL (EARTH SIDE) - 75mm
   d) SIDE WALL (INNER SIDE) - 45mm
5. OVERLAPPING FOR SPLICING OF REINFORCEMENT SHALL BE AS PER CLAUSE NO.15.2.5.
   LAP LENGTH SHALL NOT BE LESS THAN 56ø.
   ARRANGEMENT OF TRANSVERSE REINFORCEMENT IN LAP ZONE:-



6. ANCHOURAGE LENGTH OF BOX SHALL BE TAKEN AS 40ø AS PER IRC:112.
7. FOR UNFAVORABLE BOND CONDITIONS THE FACTOR 40 SHOULD BE MULTIPLIED BY FACTOR OF 1.43 .
8. CENTER LINE OF OVERLAPPING BAR bs1 & ts2 IN WALL & MID HEIGHT OF WALLS ARE AT SAME POINT.
9. BAR BENDING SCHEDULE SHOULD BE STRICTLY FOLLOW DURING THE TIME OF EXECUTION IF IN CASE ANY CHANGES AT SITE KINDLY DISCUSS IT WITH ENGINEER IN CHARGE.

SAFETY AUDIT
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

REFERENCE DRAWING:-

1. GENERAL ARRANGEMENT DRAWING.
   AVC/NH-38/BOX/GAD/45+433/01

Kamac Engineers (P) Ltd
Authorised Signatory

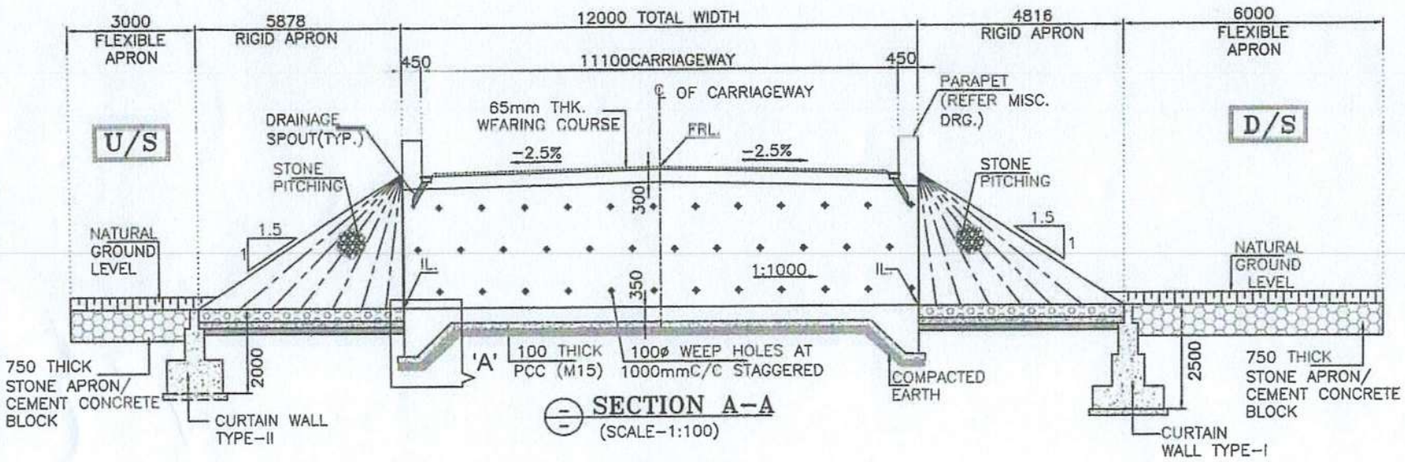
CLIENT:	EPC CONTRACTOR:	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+882 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

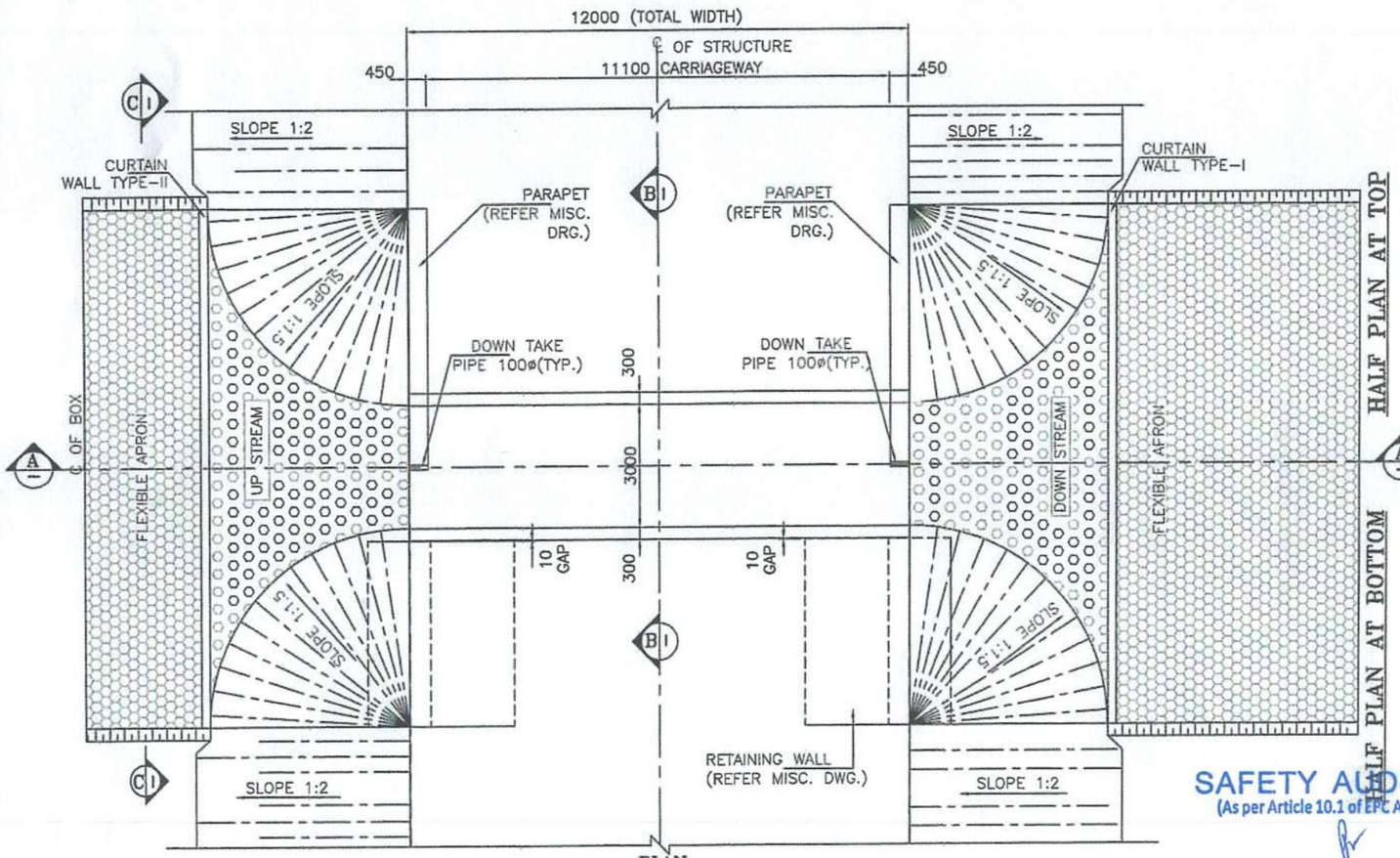
DRAWING TITLE:- REINFORCEMENT DETAIL OF BOX CULVERT AT CH. 45+433

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

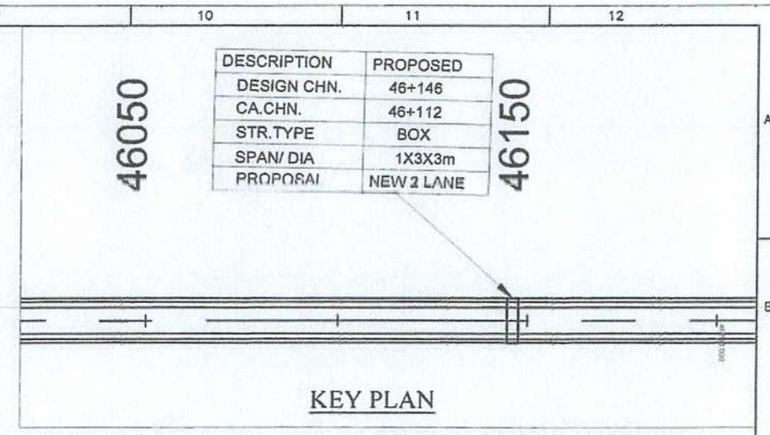
Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/REIN./45+433/01	01 OF 01	R0



SECTION A–A
(SCALE–1:100)



PLAN
(SCALE–1:100)



DESCRIPTION	PROPOSED
DESIGN CHN.	46+146
CA.CHN.	46+112
STR.TYPE	BOX
SPAN/ DIA	1X3X3m
PROPOSAL	NEW 2 LANE

KEY PLAN

LEVELS

DESIGN CH.	FRL	GROUND LEVEL	INVERT LEVEL		VERTICAL CLEARANCE (MAX.)	EARTH FILL (MAX.)	EARTH FILL (MIN.)
			LHS	RHS			
46+146	148.959	145.880	145.592	145.580	3.008m	0	0

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETER, LEVELS ARE IN METER AND CHAINAGE ARE IN KILOMETERS UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. THIS DRAWING SHALL BE READ IN CONJUCTION WITH THE RELEVANT PLAN AND PROFILE DRAWING OF ROAD.
3. GRADE OF CONCRETE:–
   a. M30–FOR RCC BOX CELL STRUCTURE.
   b. M15–FOR PCC AND LEVELING COURSE.
   c. M30–PARAPET
4. GRADE OF STEEL – Fe500.
5. THE FOLLOWING LOADS HAVE BEEN CONSIDERED IN THE DESIGN:–
   a. ONE LANE ,TWO LANE AND THREE LANE OF CLASS A
   b. ONE LANE OF CLASS A IN ADDITION OF ONE LANE OF CLASS 70R WHEEL OR ONE LANE OF 70R TRACKED WHICHEVER IS GOVERNS.
6. BACKFILL MATERIAL BEHIND END WALL SHALL BE SELECTED GRANULAR SOIL HAVING PROPERTIES
   MAX DRY DENSITY = 1850–2280kg/m³
   OPTIMUM MOISTURE CONTENT = 7–15
   AS PER IRC78–2014 AND MORTH SPECIFICATION.
7. THE FRL SHOWN IN THE DRAWING SHALL BE VERIFIED WITH CORRESPONDING PLAN AND PROFILE DRAWING BEFORE EXECUTION, IF THERE IS ANY VARIATION SHALL BE BROUGHT TO THE NOTICE OF ENGINEER.
8. THE DIMENSION AND LEVEL ARE SUBJECTED TO CHANGE AS PER SITE CONDITION AND DETAILED DESIGN.
9. BACKFILL TO BE DONE AND COMPACTED FROM BOTH SIDE SIMULTANEOUSLY.
10. 600MM THICK. FILTER MATERIAL BEHIND RETAINING WALL SHALL BE LAID AS PER APPENDIX 6 OF IRC 78–2014.
11. 50MM THICK CEMENT CONCRETE WEARING COAT SHALL BE PROVIDED.
12. 100MM DIA P.V.C. PIPE AT SPACING 1000MMc/c IN HORIZONTAL/VERTICAL DIRECTION SHALL BE PROVIDED UP TO 150MM ABOVE GROUND LEVEL FOR WEEP HOLES IN RETAINING WALL.
13. SBC SHALL BE 8t/m². AND SAME SHALL BE ENSURED AT SITE BY ANY SUITABLE METHOD.
14. AS PER MORTH SECTION–2500,WHERE THE REQUIRED SIZE OF BOULDERS ARE NOT AVAILABLE ECONOMICALLY.CEMENT CONCRETE BLOCKS OF EQUIVALENT WEIGHT SHALL BE USED.THE GRADE OF CONCRETE SHALL BE M15 NOMINAL MIX.CEMENT CONCRETE BLOCK SHALL BE PREFERRED WHERE PRACTICABLE.
15. CHOOSE ANY SUITABLE METHOD TO ACHIEVE THE REQUIRED SBC AS PER SITE.
16. THE EXPOSURE CONDITION IS MODERATE.

LEGEND:-
FRL FINISHED ROAD LEVEL
IL INVERT LEVEL
LVL. LEVEL
EGL. EXISTING GROUND LEVEL

FRL CAMBER & LOCATION IS TO BE MATCHED WITH HIGHWAY ALIGNMENT DRAWING.

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

REFERENCE DRAWINGS:–
1. REINFORCEMENT DETAIL OF BOX CULVERT AVC/NH–38/BOX/REINF./46+146/02

CLIENT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.

EPC CONTRACTOR:
KAMAC ENGINEERS PVT.LTD
F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010
Kamac Engineers (P) Ltd
Authorised Signatory

AUTHORITY'S ENGINEER
ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED.
C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171

PROOF CONSULTANT:
CREATIVE ENGINEERING SERVICES
OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010

SAFETY CONSULTANT:
DESIGN AID
PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,

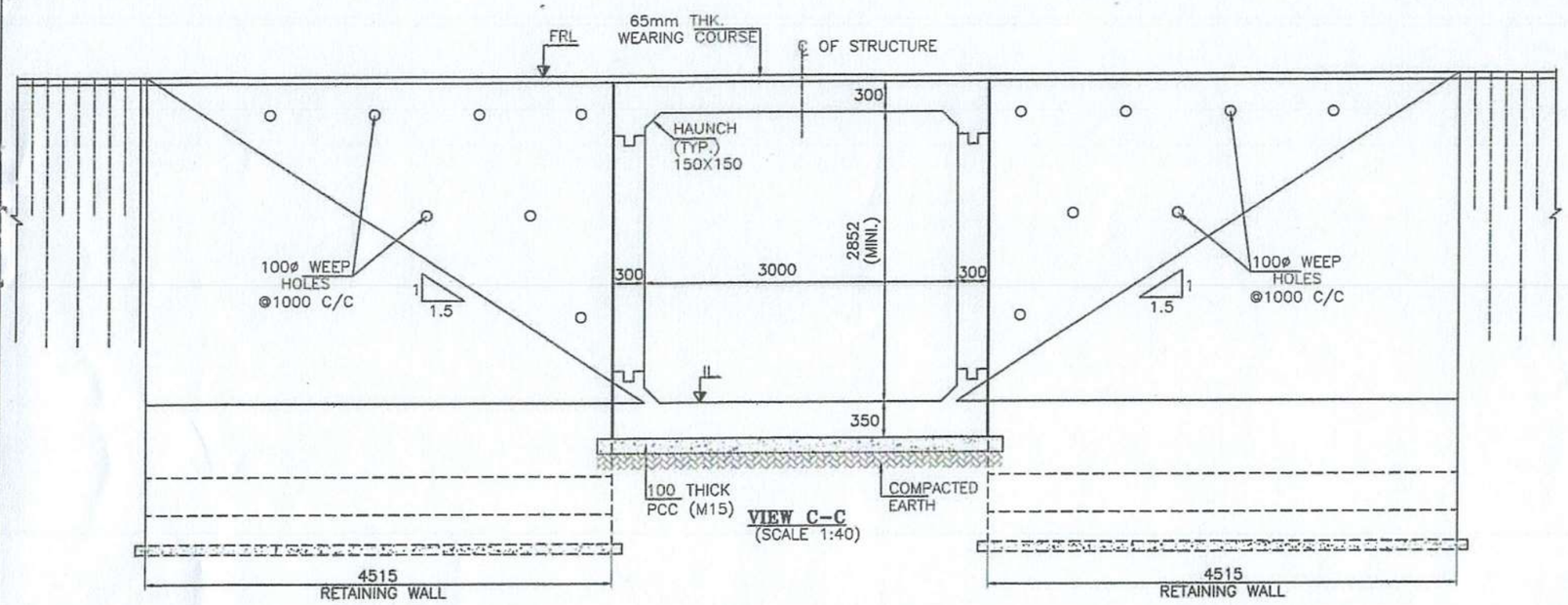
DESIGN CONSULTANT:
AV CONSTRUCTION
1st Floor, WZ-124, Palam Extension, Bosco Ashram Wali Gali,New Delhi 110045
Winst Infra Solution Pvt. Ltd.
OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012
W I S P L

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 46+146

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/46+146/01	01 OF 02	R0



VIEW C–C
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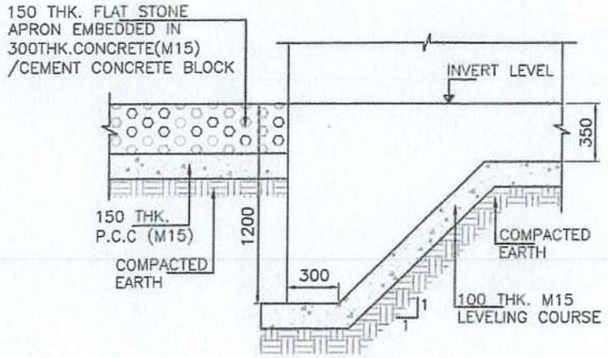
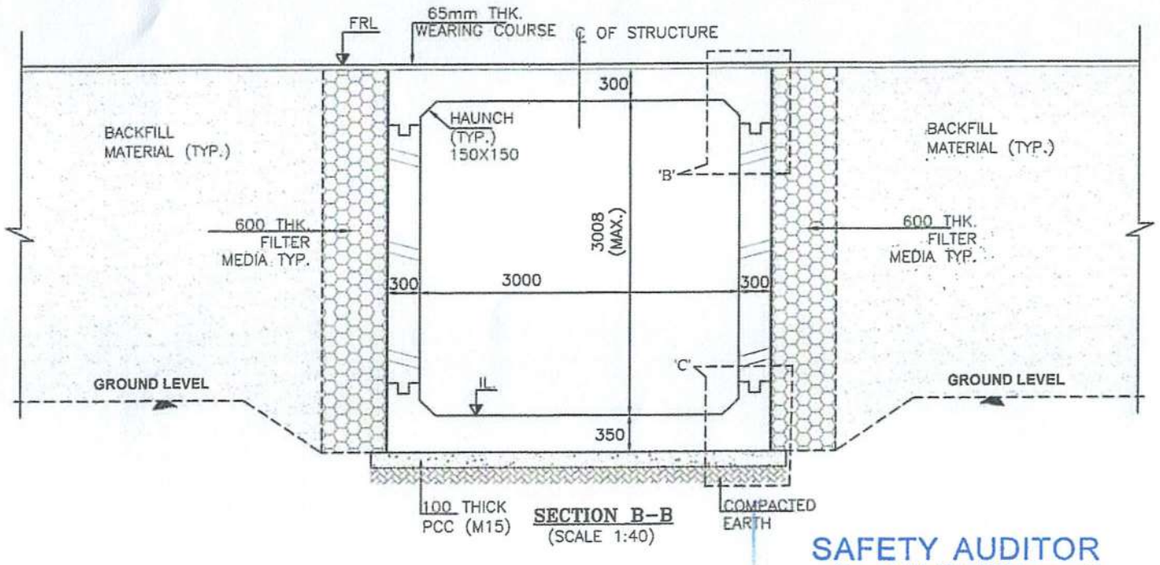
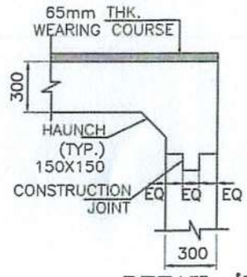


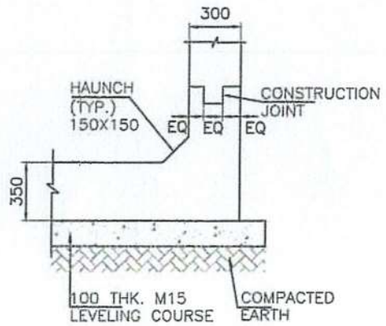
DETAIL–'A'
(SCALE 1:25)



SECTION B–B
(SCALE 1:40)



DETAIL–'B'
(SCALE 1:25)



DETAIL–'C'
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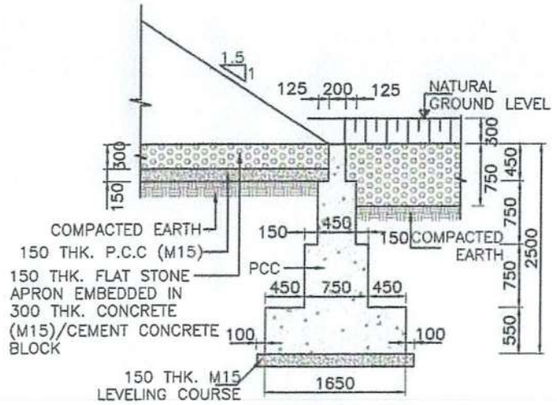
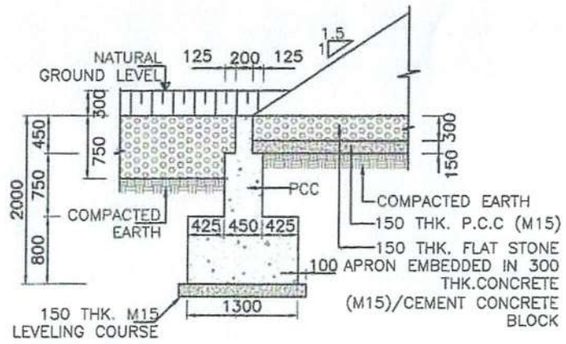


DETAIL OF CURTAIN WALL–I
(DOWN STREAM SIDE)
(SCALE 1:50)



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

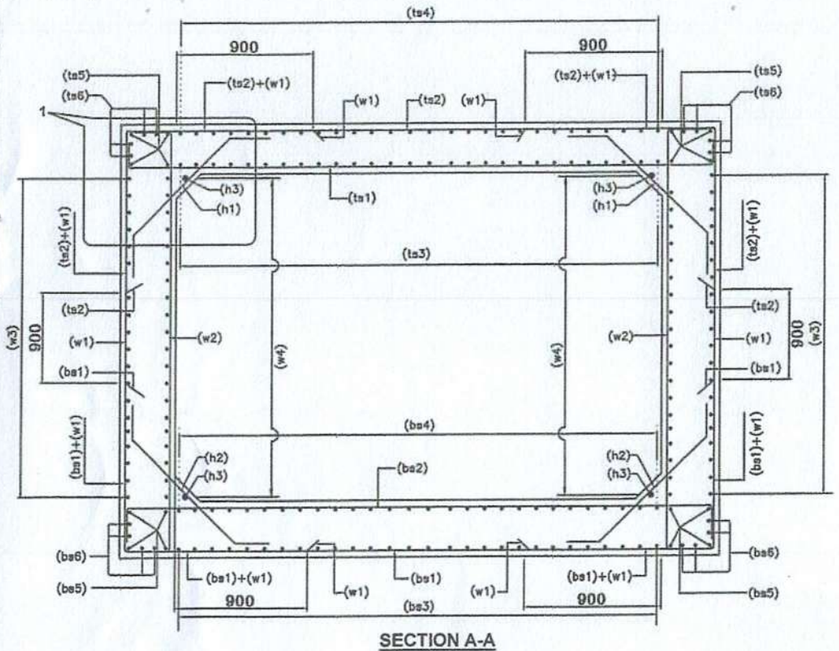
SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:	PROJECT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	Kamac Engineers (P) Ltd. KAMAC ENGINEERS PVT. LTD. F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1248 Palam Extension, Bosco Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

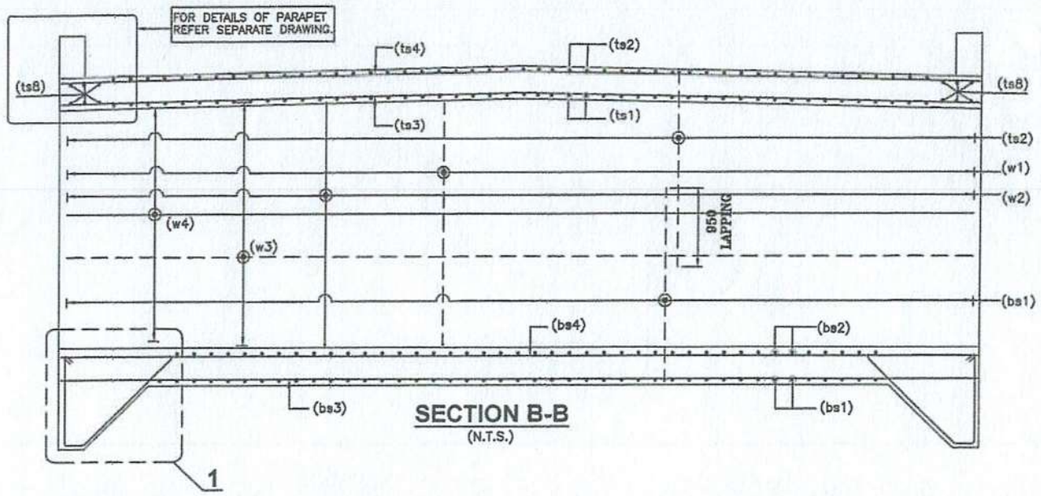
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 46+146

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	
Project No.	Drawing No. AVC/NH-38/BC/GAD/46+146/01				Sheet No. 02 OF 02	Rev. R0



SECTION A-A
(NTS)



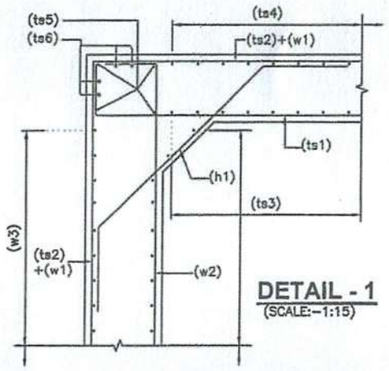
SECTION B-B
(N.T.S.)

BOX REINF. SCHEDULE

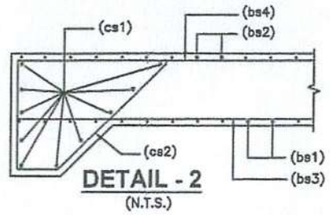
SL.NO.	BAR MARK	BAR SHAPE	DIAMETER	SPACING
1	ts1		12+10	180
2	ts2		12	180
3	ts3		10	200
4	ts4		10	200
5	ts5		12	2x4 Nos.
6	ts6		12	2x4 Nos.
7	w1		12	180
8	w2		12	180
9	w3		10	200
10	w4		8	200
11	bs1		12	180
12	bs2		12+12	180
13	bs3		10	200
14	bs4		10	200
15	bs5		12	2x4 Nos.
16	bs6		12	2x4 Nos.
17	h1		10	180
18	h2		10	180
19	h3		10	1x4 Nos.
20	cs1		12	10 Nos.
21	cs2		10	200

LEGEND:-

TOP FACE BAR	———
BOTTOM FACE BAR	- - - -

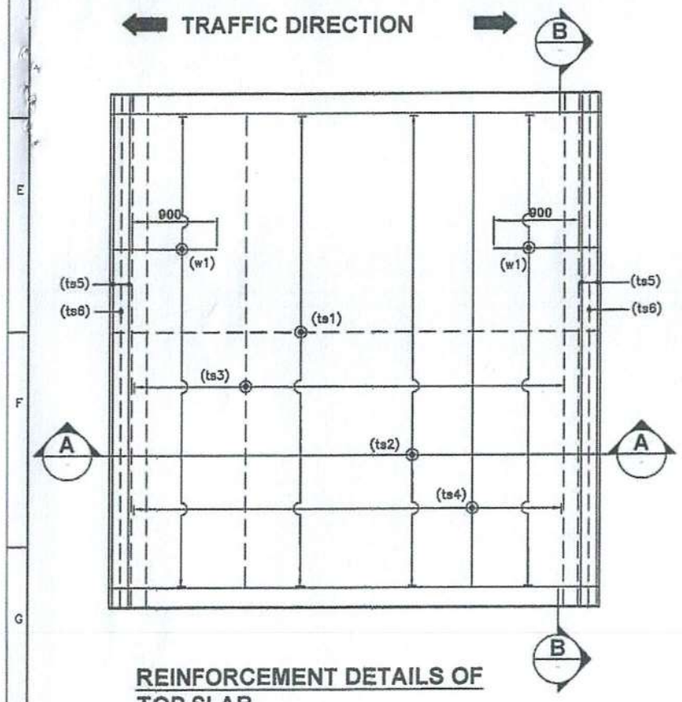


DETAIL - 1
(SCALE:-1:15)



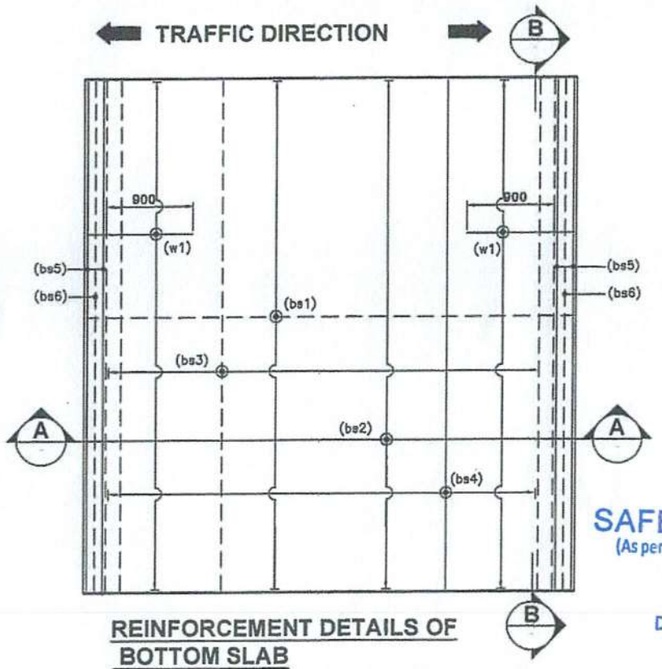
DETAIL - 2
(N.T.S.)

TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF TOP SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

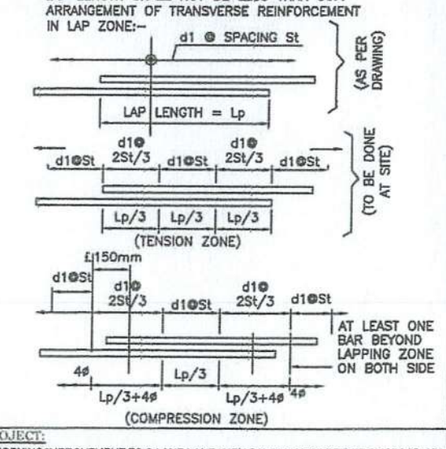
TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF BOTTOM SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE MENTIONED.
2. DRAWING SHOULD NOT BE SCALED ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. ALL REINFORCING BARS SHALL BE THERMO MECHANICALLY TREATED (TMT) BARS (GRADE DESIGNATION Fe-500) CONFIRMING TO IS:1786 STANDARDS.
4. MINIMUM CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE AS FOLLOWS:-
   a) TOP SLAB - 45mm
   b) BOTTOM SLAB - 75mm
   c) SIDE WALL (EARTH SIDE) - 75mm
   d) SIDE WALL (INNER SIDE) - 45mm
5. OVERLAPPING FOR SPLICING OF REINFORCEMENT SHALL BE AS PER CLAUSE NO.15.2.5.
   LAP LENGTH SHALL NOT BE LESS THAN 56ø.
   ARRANGEMENT OF TRANSVERSE REINFORCEMENT IN LAP ZONE:-



6. ANCHOURAGE LENGTH OF BOX SHALL BE TAKEN AS 40ø AS PER IRC:112.
   FOR UNFAVORABLE BOND CONDITIONS THE FACTOR 40 SHOULD BE MULTIPLIED BY FACTOR OF 1.43 .
8. CENTER LINE OF OVERLAPPING BAR bs1 & ts2 IN WALL & MID HEIGHT OF WALLS ARE AT SAME POINT.
9. BAR BENDING SCHEDULE SHOULD BE STRICTLY FOLLOW DURING THE TIME OF EXECUTION IF IN CASE ANY CHANGES AT SITE KINDLY DISCUSS IT WITH ENGINEER IN CHARGE.

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

REFERENCE DRAWING:-

1. GENERAL ARRANGEMENT DRAWING.
   AVC/NH-38/BOX/GAD/46+146/01

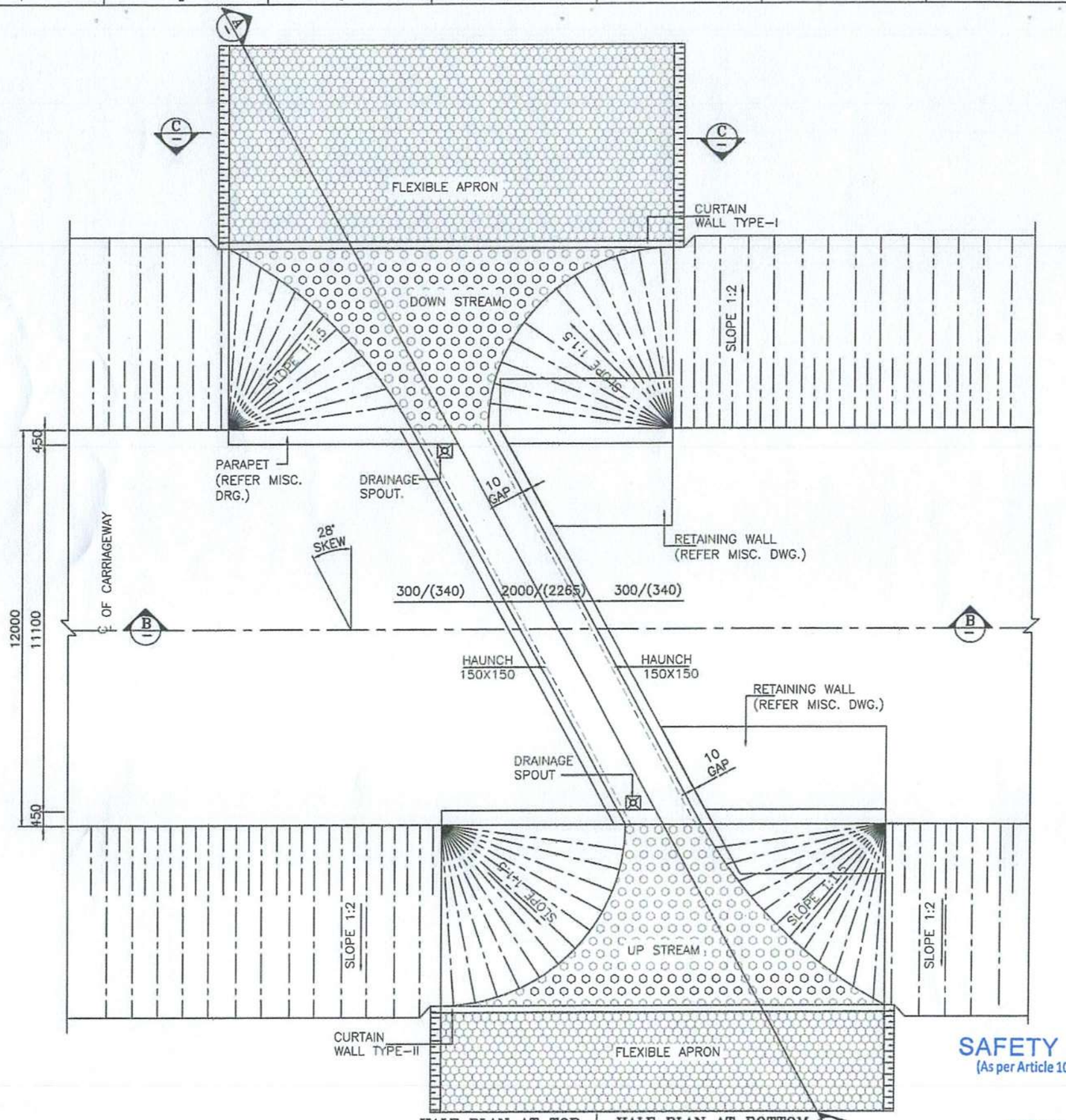
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:	PROJECT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 Kamac Engineer's (P) Ltd Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240, Palam Extension, Bosco Ashram Wali Gali, New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE.(PACKAGE-5)

DRAWING TITLE:- REINFORCEMENT DETAIL OF BOX CULVERT AT CH. 46+146

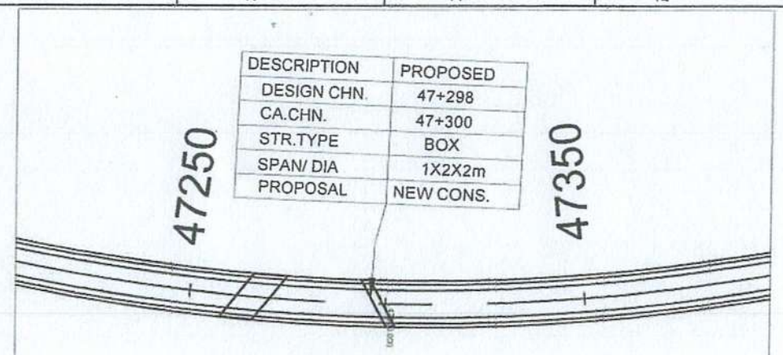
Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No:	Rev.
	AVC/NH-38/BOX/REIN./46+146/01	01 OF 01	R0



HALF PLAN AT TOP ϕ HALF PLAN AT BOTTOM

PLAN
(SCALE–1:100)



DESCRIPTION	PROPOSED
DESIGN CHN.	47+298
CA.CHN.	47+300
STR.TYPE	BOX
SPAN/ DIA	1X2X2m
PROPOSAL	NEW CONS.

KEY PLAN

LEVELS

DESIGN CH.	FRL	GROUND LEVEL	INVERT LEVEL		VERTICAL CLEARANCE (MAX.)	EARTH FILL (MAX.)	EARTH FILL (MIN.)
			LHS	RHS			
47+298	155.130	151.475	150.294	150.306	2.312m	2.540m	1.908m

LEGEND:-
FRL FINISHED ROAD LEVEL
IL INVERT LEVEL
LVL. LEVEL
EGL. EXISTING GROUND LEVEL

FRL CAMBER & LOCATION IS TO BE MATCHED WITH HIGHWAY ALIGNMENT DRAWING.

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETER, LEVELS ARE IN METER AND CHAINAGE ARE IN KILOMETERS UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. THIS DRAWING SHALL BE READ IN CONJUCTION WITH THE RELEVANT PLAN AND PROFILE DRAWING OF ROAD.
3. GRADE OF CONCRETE:–
   a. M30–FOR RCC BOX CELL STRUCTURE.
   b. M15–FOR PCC AND LEVELING COURSE.
   c. M30–PARAPET
4. GRADE OF STEEL – Fe500.
5. THE FOLLOWING LOADS HAVE BEEN CONSIDERED IN THE DESIGN:–
   a. ONE LANE ,TWO LANE AND THREE LANE OF CLASS A
   b. ONE LANE OF CLASS A IN ADDITION OF ONE LANE OF CLASS 70R WHEEL OR ONE LANE OF 70R TRACKED WHICHEVER IS GOVERNS.
6. BACKFILL MATERIAL BEHIND END WALL SHALL BE SELECTED GRANULAR SOIL HAVING PROPERTIES
   MAX DRY DENSITY = 1850–2280kg/m³
   OPTIMUM MOISTURE CONTENT = 7–15
   AS PER IRC78–2014 AND MORTH SPECIFICATION.
7. THE FRL SHOWN IN THE DRAWING SHALL BE VERIFIED WITH CORRESPONDING PLAN AND PROFILE DRAWING BEFORE EXECUTION, IF THERE IS ANY VARIATION SHALL BE BROUGHT TO THE NOTICE OF ENGINEER.
8. THE DIMENSION AND LEVEL ARE SUBJECTED TO CHANGE AS PER SITE CONDITION AND DETAILED DESIGN.
9. BACKFILL TO BE DONE AND COMPACTED FROM BOTH SIDE SIMULTANEOUSLY.
10. 600MM THICK. FILTER MATERIAL BEHIND RETAINING WALL SHALL BE LAID AS PER APPENDIX 6 OF IRC 78–2014.
11. 50MM THICK CEMENT CONCRETE WEARING COAT SHALL BE PROVIDED.
12. 100MM DIA P.V.C. PIPE AT SPACING 1000MMc/c IN HORIZONTAL/VERTICAL DIRECTION SHALL BE PROVIDED UP TO 150MM ABOVE GROUND LEVEL FOR WEEP HOLES IN RETAINING WALL.
13. SBC SHALL BE 13t/m². AND SAME SHALL BE ENSURED AT SITE BY ANY SUITABLE METHOD.
14. AS PER MORTH SECTION–2500,WHERE THE REQUIRED SIZE OF BOULDERS ARE NOT AVAILABLE ECONOMICALLY.CEMENT CONCRETE BLOCKS OF EQUIVALENT WEIGHT SHALL BE USED.THE GRADE OF CONCRETE SHALL BE M15 NOMINAL MIX.CEMENT CONCRETE BLOCK SHALL BE PREFERRED WHERE PRACTICABLE.
15. CHOOSE ANY SUITABLE METHOD TO ACHIEVE THE REQUIRED SBC AS PER SITE.
THE EXPOSURE CONDITION IS MODERATE.

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

REFERENCE DRAWINGS:–
1. REINFORCEMENT DETAIL OF BOX CULVERT WISPL/NH–38/BOX/REINF./47+298/02

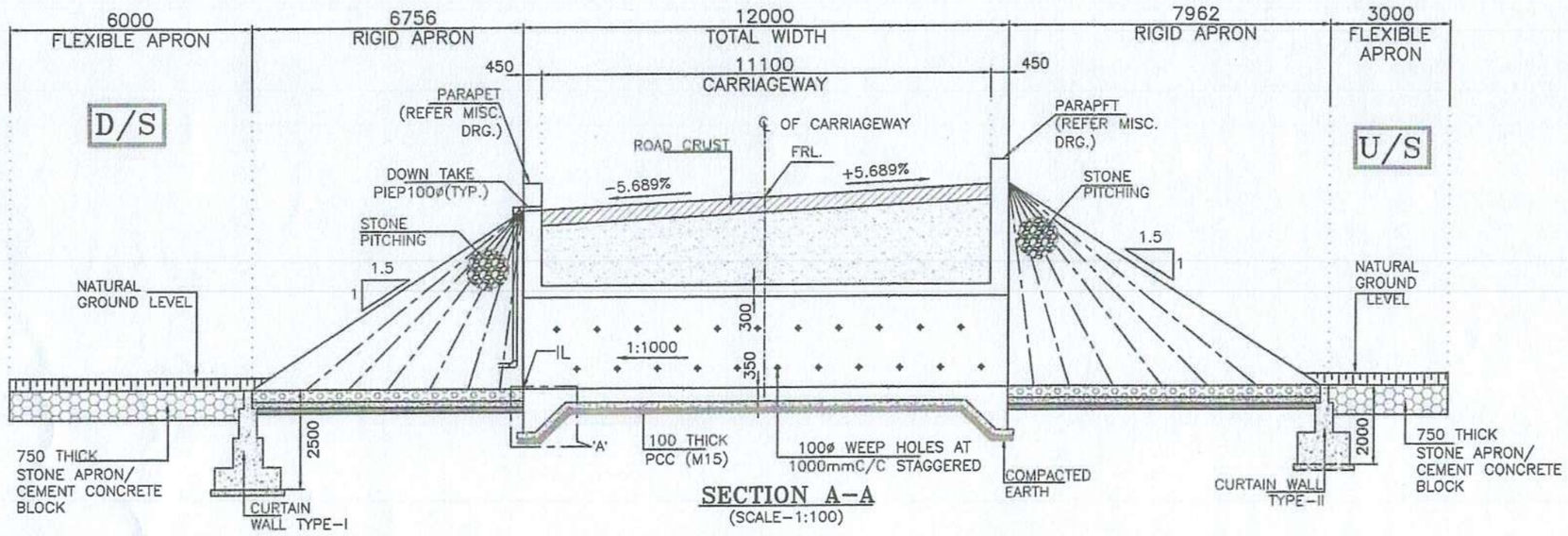
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F8201,CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240 Palam Extension, Sagarpur Ashram Wali Gali,New Delhi-110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-S)

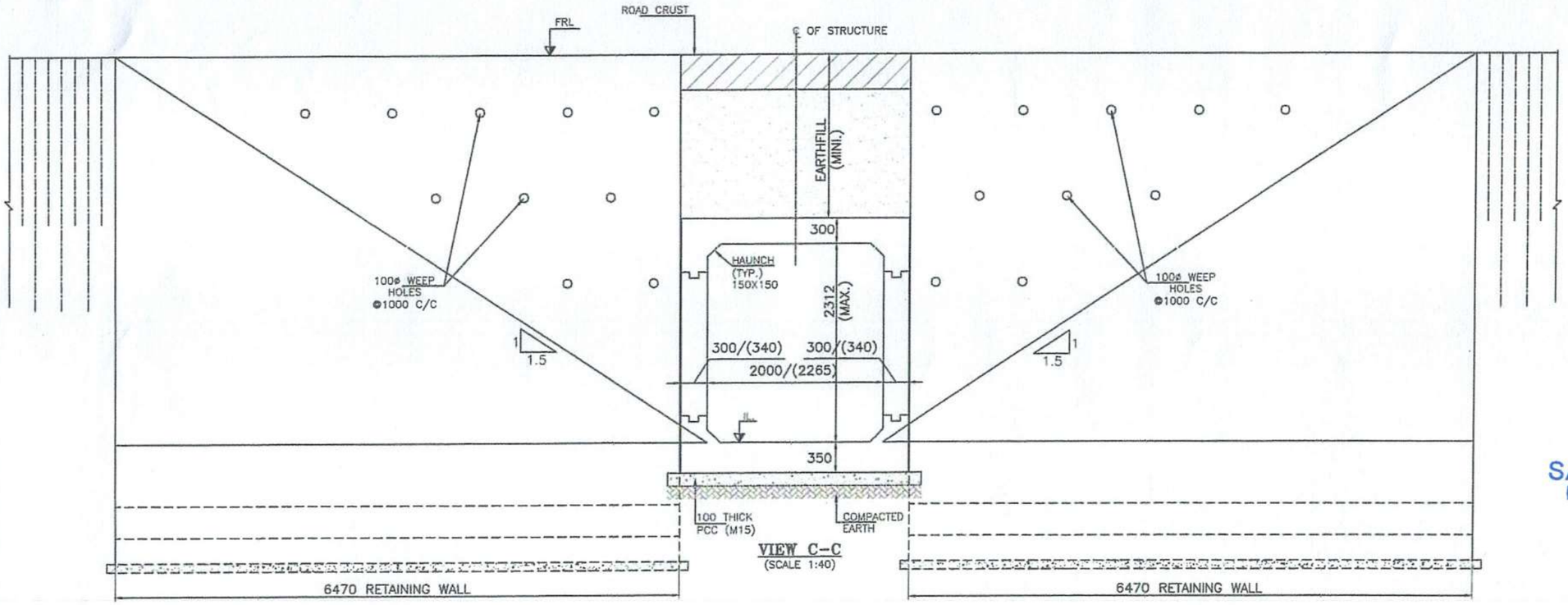
DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 47+298

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/47+298/01	01 OF 03	R0



SECTION A-A
(SCALE-1:100)



VIEW C-C
(SCALE 1:40)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW D

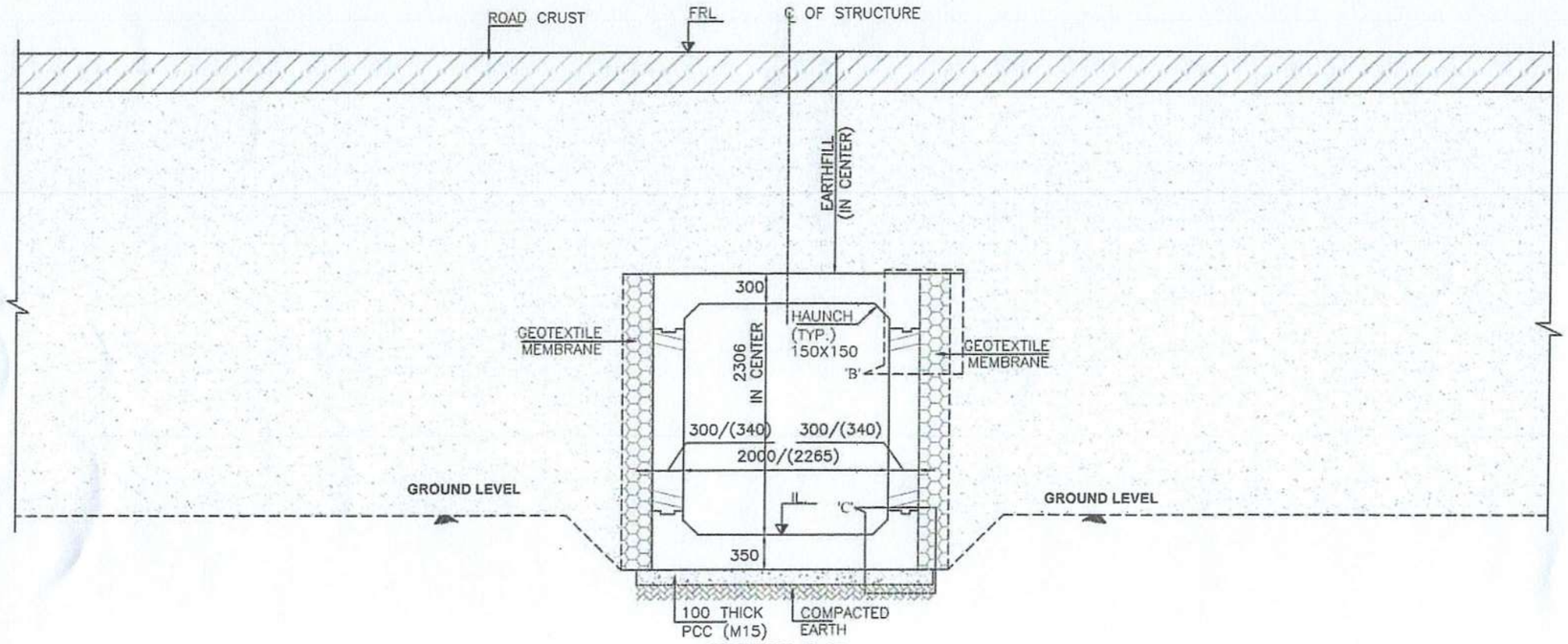
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT. LTD F-20, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 Kamac Engineers (P) Ltd Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM, VASANT KUNJ, NEW DELHI-110070.	A.V. CONSTRUCTION 1st Floor, WZ-1540, Palam Extension, Bosco Ashram Wali Gali, New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23, SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE.(PACKAGE-5)

DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 47+298

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/47+298/01	02 OF 03	R0



SECTION B–B
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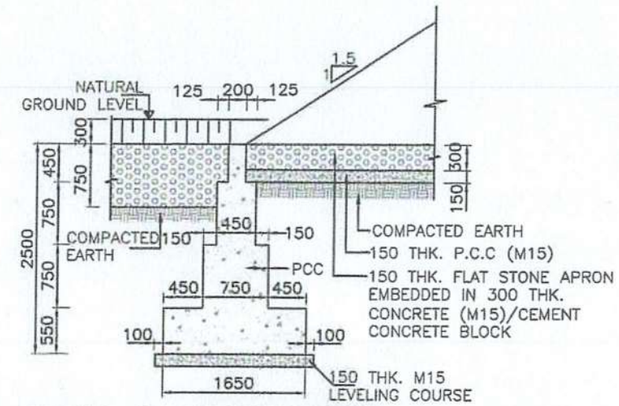
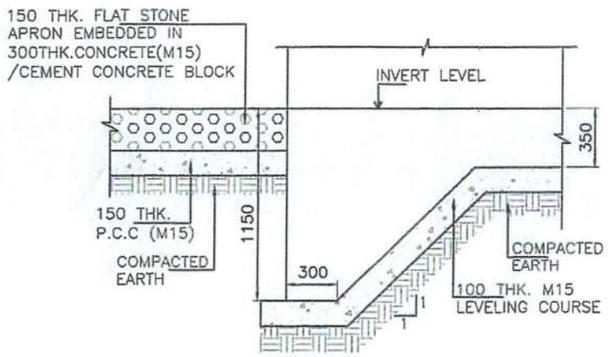
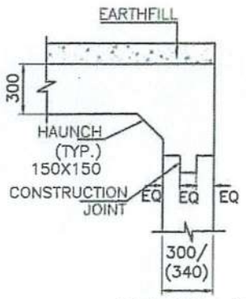


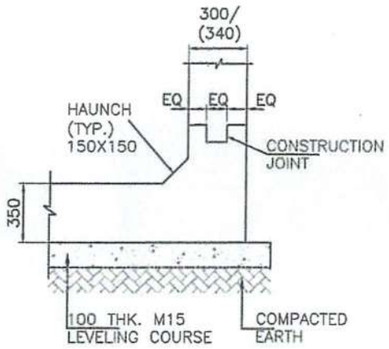
DETAIL OF CURTAIN WALL–I
(DOWN STREAM SIDE)
(SCALE 1:50)



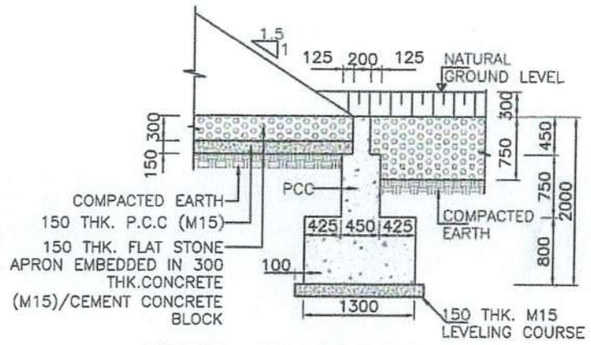
DETAIL–'A'
(SCALE 1:25)



DETAIL–'B'
(SCALE 1:25)



DETAIL–'C'
(SCALE 1:25)



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

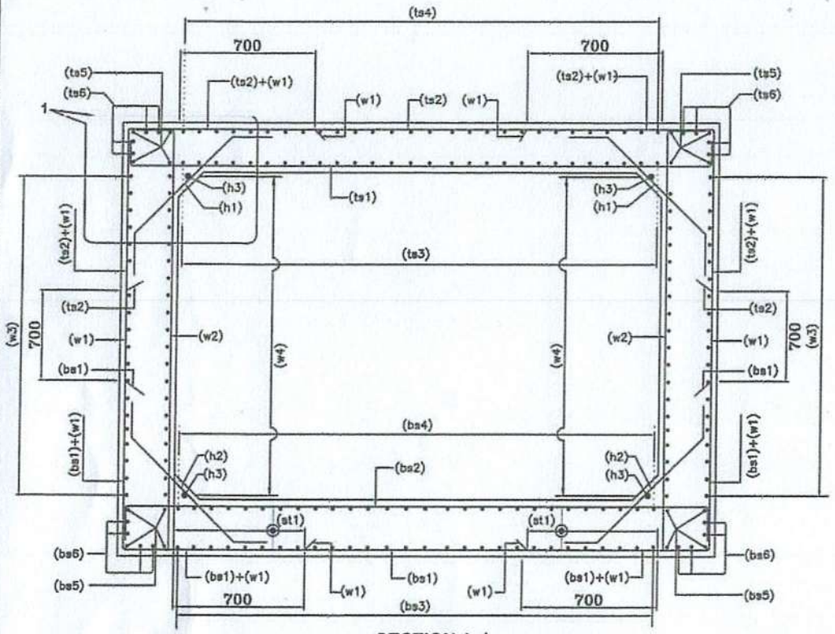
SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 Kamac Engineers (P) Ltd Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240, Palam Extension, Bosco Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012 W I S P L

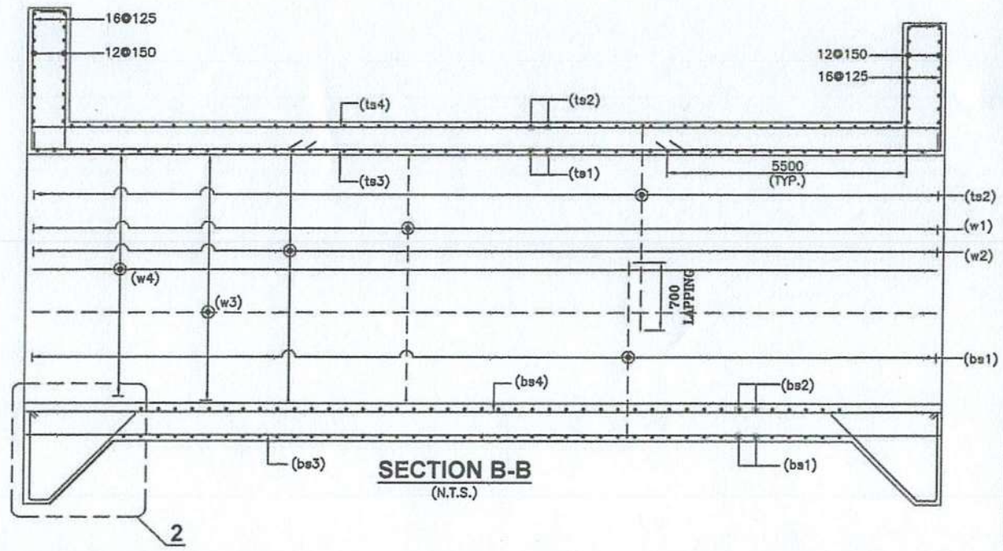
PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 47+298

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	
Project No.	Drawing No. AVC/NH-38/BC/GAD/47+298/01				Sheet No. 03 OF 03	Rev. R0



SECTION A-A
(NTS)

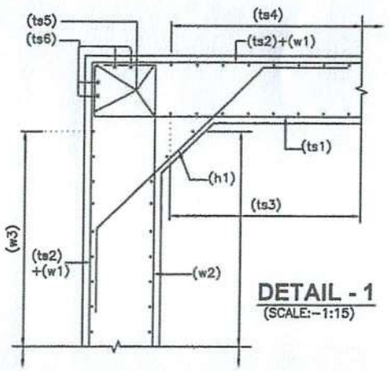


SECTION B-B
(N.T.S.)

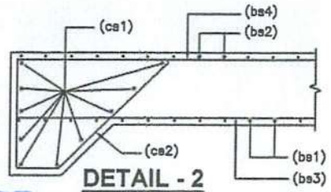
BOX REINF. SCHEDULE

SL.NO.	BAR MARK	BAR SHAPE	DIAMETER	SPACING
1	ts1		12	170
2	ts2		10	170
3	ts3		8	200
4	ts4		10	200
5	ts5		12	2x4 Nos.
6	ts6		12	2x4 Nos.
7	w1		10	170
8	w2		10	170
9	w3		10	200
10	w4		8	200
11	bs1		10	170
12	bs2		12+8	170
13	bs3		10	200
14	bs4		8	200
15	bs5		12	2x4 Nos.
16	bs6		12	2x4 Nos.
17	h1		10	170
18	h2		10	170
19	h3		10	1x4 Nos.
20	cs1		12	10 Nos.
21	cs2		10	200
22	st1		8	200 c/c (L–L) 170 c/c (T–T) DIRECTION

LEGEND:–	
TOP FACE BAR	———
BOTTOM FACE BAR	- - - - -

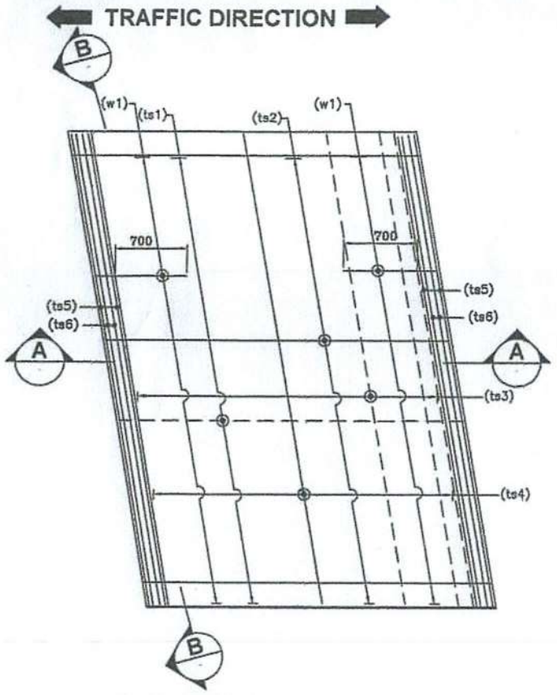


DETAIL - 1
(SCALE:–1:15)



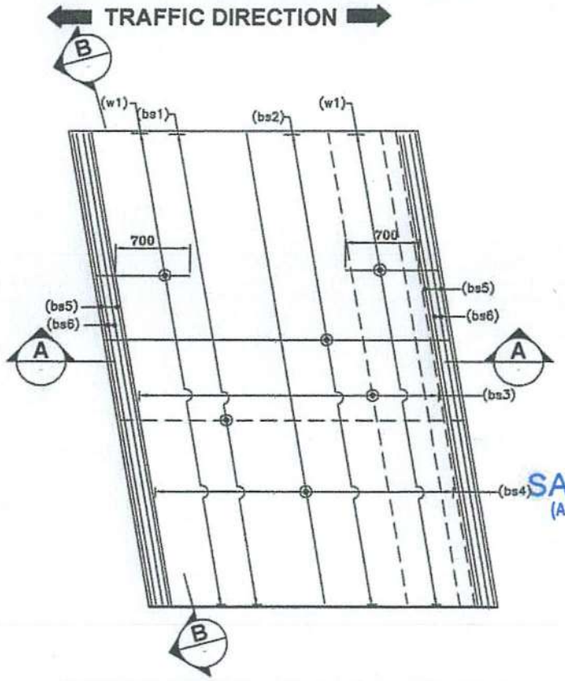
DETAIL - 2
(N.T.S.)

TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF TOP SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF BOTTOM SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

NOTES:–

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2. DRAWING SHOULD NOT BE SCALED ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
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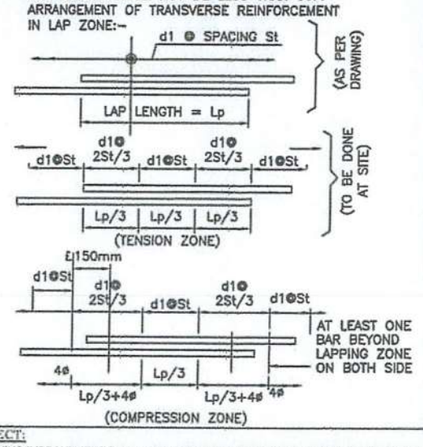
4. MINIMUM CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE AS FOLLOWS:–
   a) TOP SLAB – 45mm
   b) BOTTOM SLAB – 75mm
   c) SIDE WALL (EARTH SIDE) – 75mm
   d) SIDE WALL (INNER SIDE) – 45mm
5. OVERLAPPING FOR SPLICING OF REINFORCEMENT SHALL BE AS PER CLAUSE NO.15.2.5.
   LAP LENGTH SHALL NOT BE LESS THAN 56ø.
   ARRANGEMENT OF TRANSVERSE REINFORCEMENT IN LAP ZONE:–



6. ANCHOURAGE LENGTH OF BOX SHALL BE TAKEN AS 40ø AS PER IRC:112.
7. FOR UNFAVOROABLE BOND CONDITIONS THE FACTOR 40 SHOULD BE MULTIPLIED BY FACTOR OF 1.43 .
8. CENTER LINE OF OVERLAPPING BAR bs1 & ts2 IN WALL & MID HEIGHT OF WALLS ARE AT SAME POINT.
9. BAR BENDING SCHEDULE SHOULD BE STRICTLY FOLLOW DURING THE TIME OF EXECUTION IF IN CASE ANY CHANGES AT SITE KINDLY DISCUSS IT WITH ENGINEER IN CHARGE.

REFERENCE DRAWING:–

1. GENERAL ARRANGEMENT DRAWING.
   AVC/NH–38/BOX/GAD/47+298/01

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F0201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.K. CONSTRUCTION 1st Floor, WZ-1340, Palam Extension, Basco Ashram Wali Gali, New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

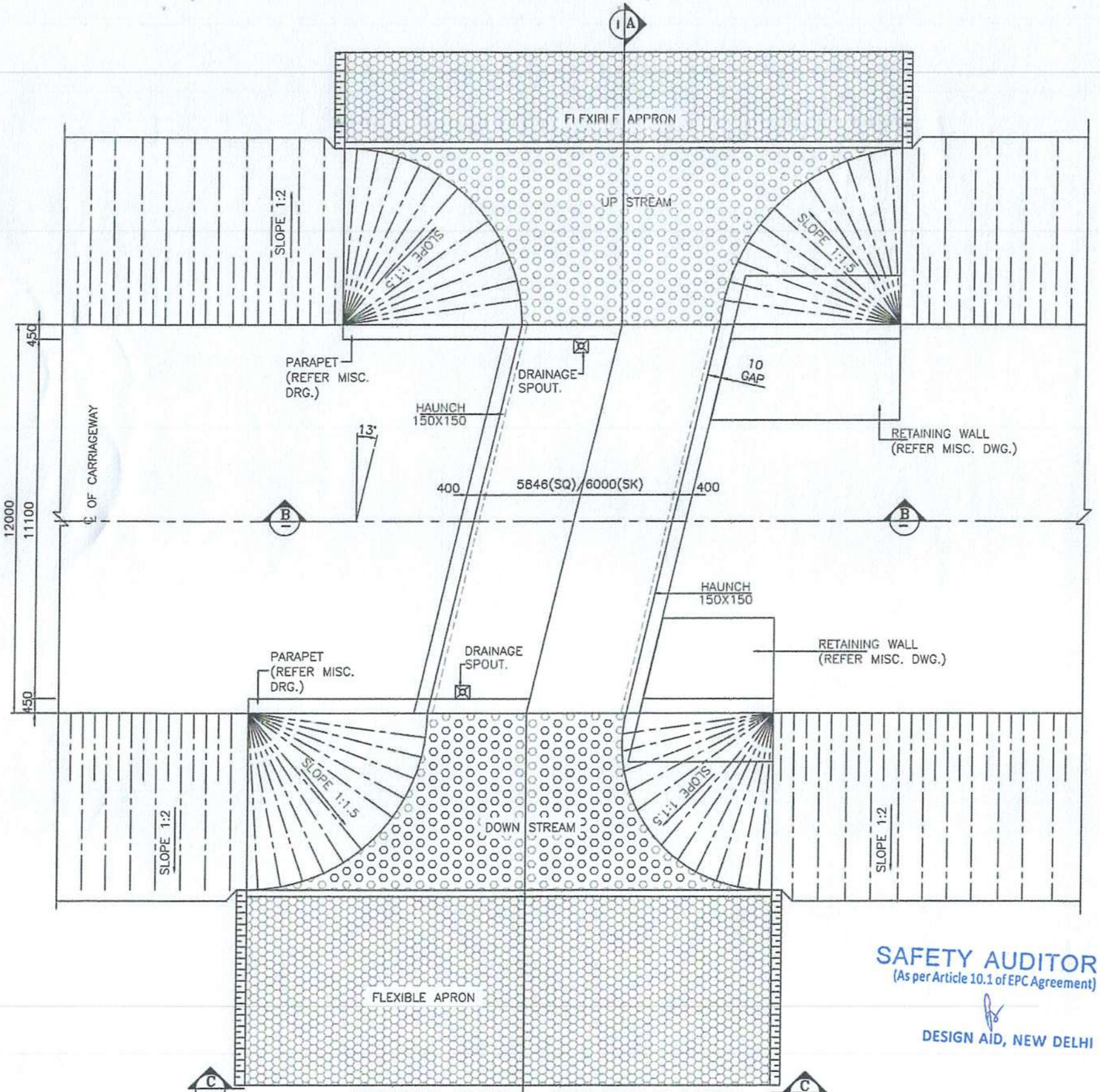
Kamac Engineers (P) Ltd
Authorised Signatory

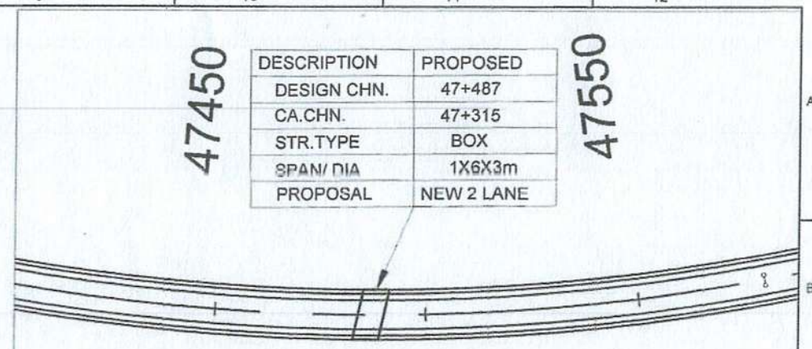
PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- REINFORCEMENT DETAIL OF BOX CULVERT AT CH. 47+298

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BOX/REIN./47+298/01	01 OF 01	R0





DESCRIPTION	PROPOSED
DESIGN CHN.	47+487
CA.CHN.	47+315
STR.TYPE	BOX
SPAN/ DIA	1X6X3m
PROPOSAL	NEW 2 LANE

KEY PLAN

LEVELS

DESIGN CH.	FRL	GROUND LEVEL	INVERT LEVEL		VERTICAL CLEARANCE (MAX.)	EARTH FILL (MAX.)	EARTH FILL (MIN.)
			LHS	RHS			
47+487	157.935	153.023	152.735	152.723	3.012m	2.124m	1.476m

LEGEND:-
FRL FINISHED ROAD LEVEL
IL INVERT LEVEL
LVL. LEVEL
EGL. EXISTING GROUND LEVEL

FRL CAMBER & LOCATION IS TO BE MATCHED WITH HIGHWAY ALIGNMENT DRAWING.

NOTES:-

1. ALL DIMENSIONS ARE IN MILLIMETER, LEVELS ARE IN METER AND CHAINAGE ARE IN KILOMETERS UNLESS OTHERWISE MENTIONED. ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
2. THIS DRAWING SHALL BE READ IN CONJUCTION WITH THE RELEVANT PLAN AND PROFILE DRAWING OF ROAD.
3. GRADE OF CONCRETE:–
   a. M30–FOR RCC BOX CELL STRUCTURE.
   b. M15–FOR PCC AND LEVELING COURSE.
   c. M30–PARAPET
4. GRADE OF STEEL – Fe500.
5. THE FOLLOWING LOADS HAVE BEEN CONSIDERED IN THE DESIGN:–
   a. ONE LANE ,TWO LANE AND THREE LANE OF CLASS A
   b. ONE LANE OF CLASS A IN ADDITION OF ONE LANE OF CLASS 70R WHEEL OR ONE LANE OF 70R TRACKED WHICHEVER IS GOVERNS.
6. BACKFILL MATERIAL BEHIND END WALL SHALL BE SELECTED GRANULAR SOIL HAVING PROPERTIES
   MAX DRY DENSITY = 1850–2280kg/m³
   OPTIMUM MOISTURE CONTENT = 7–15
   AS PER IRC78–2014 AND MORTH SPECIFICATION.
7. THE FRL SHOWN IN THE DRAWING SHALL BE VERIFIED WITH CORRESPONDING PLAN AND PROFILE DRAWING BEFORE EXECUTION, IF THERE IS ANY VARIATION SHALL BE BROUGHT TO THE NOTICE OF ENGINEER.
8. THE DIMENSION AND LEVEL ARE SUBJECTED TO CHANGE AS PER SITE CONDITION AND DETAILED DESIGN.
9. BACKFILL TO BE DONE AND COMPACTED FROM BOTH SIDE SIMULTANEOUSLY.
10. 600MM THICK. FILTER MATERIAL BEHIND RETAINING WALL SHALL BE LAID AS PER APPENDIX 6 OF IRC 78–2014.
11. 50MM THICK CEMENT CONCRETE WEARING COAT SHALL BE PROVIDED.
12. 100MM DIA P.V.C. PIPE AT SPACING 1000MMc/c IN HORIZONTAL/VERTICAL DIRECTION SHALL BE PROVIDED UP TO 150MM ABOVE GROUND LEVEL FOR WEEP HOLES IN RETAINING WALL.
13. SBC SHALL BE 12t/m². AND SAME SHALL BE ENSURED AT SITE BY ANY SUITABLE METHOD.
14. AS PER MORTH SECTION–2500,WHERE THE REQUIRED SIZE OF BOULDERS ARE NOT AVAILABLE ECONOMICALLY.CEMENT CONCRETE BLOCKS OF EQUIVALENT WEIGHT SHALL BE USED.THE GRADE OF CONCRETE SHALL BE M15 NOMINAL MIX.CEMENT CONCRETE BLOCK SHALL BE PREFERRED WHERE PRACTICABLE.
15. CHOOSE ANY SUITABLE METHOD TO ACHIEVE THE REQUIRED SBC AS PER SITE.
16. THE EXPOSURE CONDITION IS MODERATE.

REFERENCE DRAWINGS:–
1. REINFORCEMENT DETAIL OF BOX CULVERT AVC/NH–38/BOX/REINF./47+487/02

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

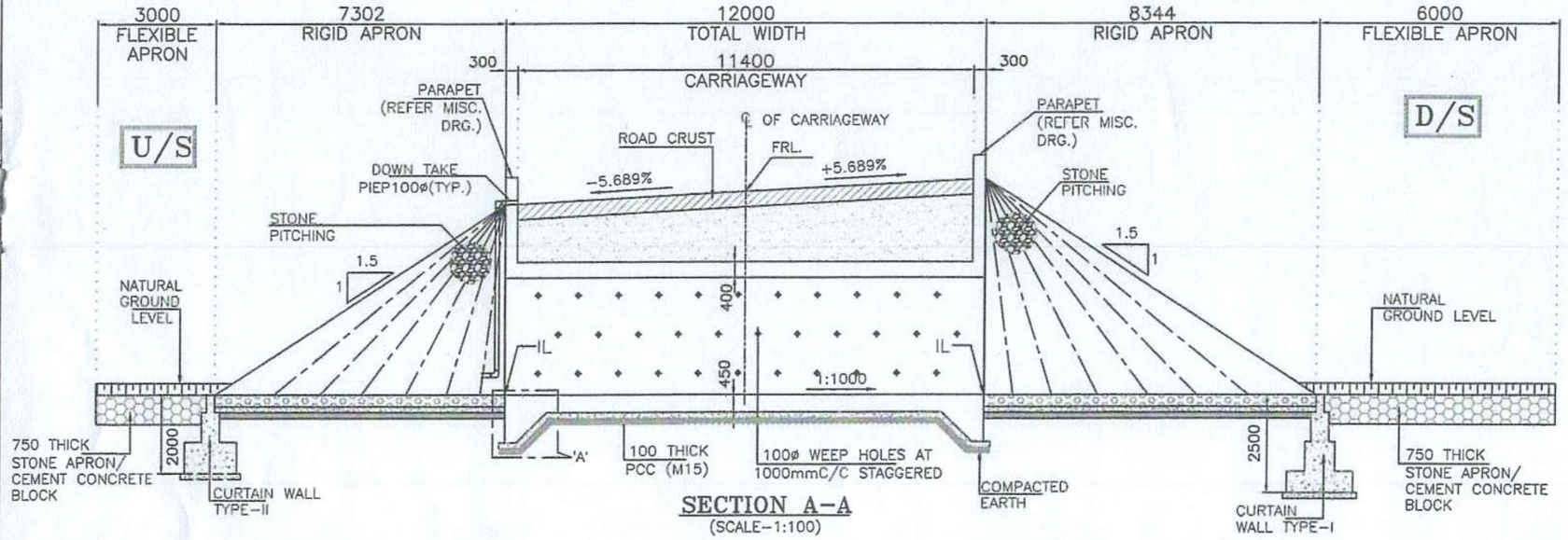
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD REGISTERED OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 Kamac Engineers (P) Ltd Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1 Floor, WZ-1240, Palam Extension, Bosco Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

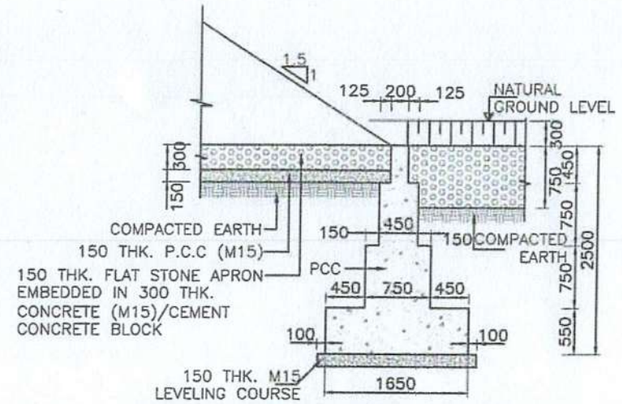
DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 47+487

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

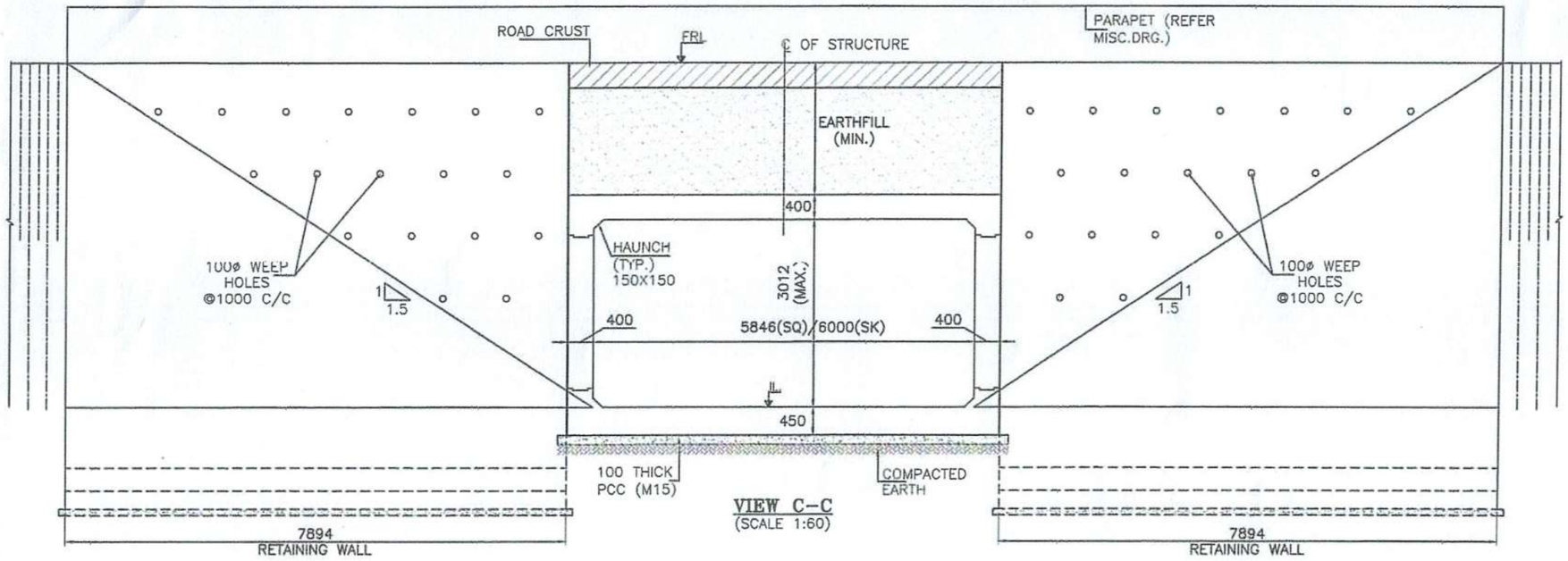
Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/47+487/01	01 OF 03	R0



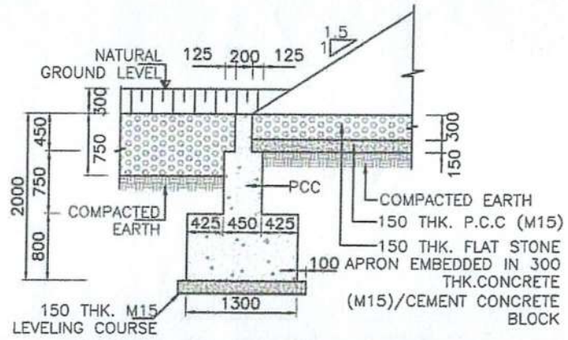
SECTION A-A
(SCALE-1:100)



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



VIEW C-C
(SCALE 1:60)



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

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)

DESIGN AID, NEW DELHI

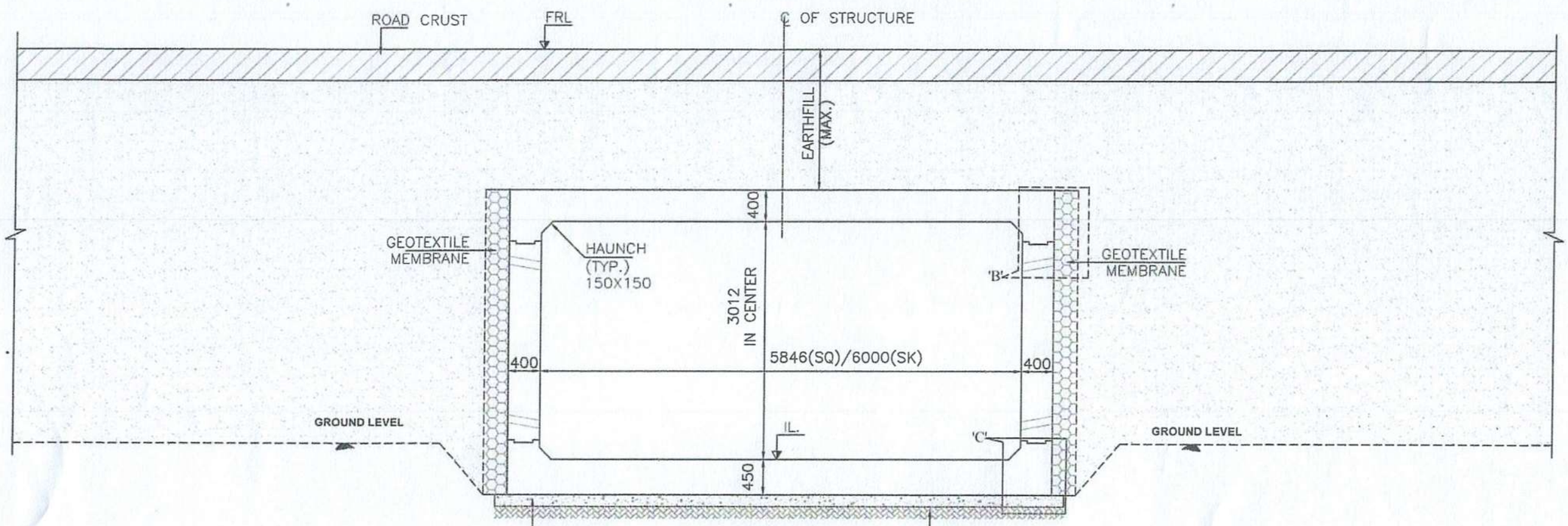
CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD Kamac Engineers (P) Ltd Authorised Signatory 1201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.V. CONSTRUCTION 1st Floor, WZ-1240, Palam Extension, Bosco Ashram Wali Gali,New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012 W I S P L

PROJECT: WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 47+487

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
JAN.2024	W.P	V.S	A.B		NTS	

Project No.	Drawing No.	Sheet No.	Rev.
	AVC/NH-38/BC/GAD/47+487/01	02 OF 03	R0



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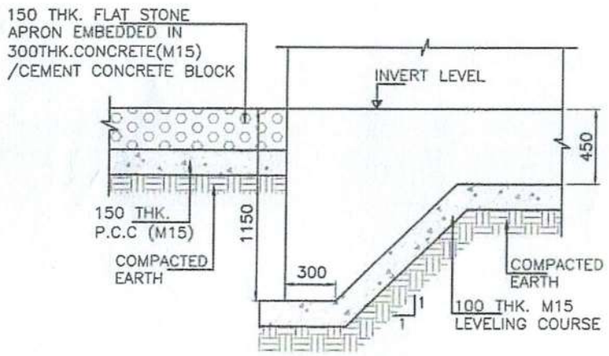
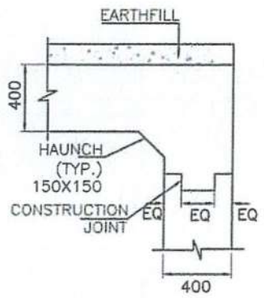
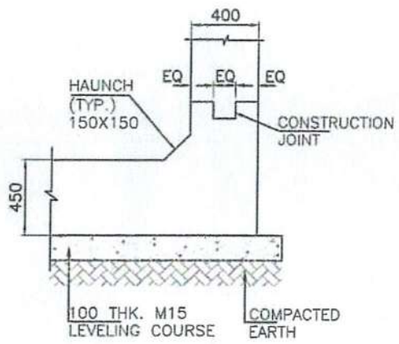


DETAIL–'A'
(SCALE 1:25)



DETAIL–'B'
(SCALE 1:25)



DETAIL–'C'
(SCALE 1:25)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD F-201, CITY CENTER OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 (Kamac Engineers (P) Ltd Authorised Signatory)	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070.	A.V. CONSTRUCTION 1st Floor, WZ-C10, Palam Extension, Bosco Ashram Wali Gali, New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA GHAZIABAD, U.P-201012

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DRAWING TITLE:- GENERAL ARRANGEMENT DRAWING FOR BOX CULVERT AT CHAINAGE 47+487

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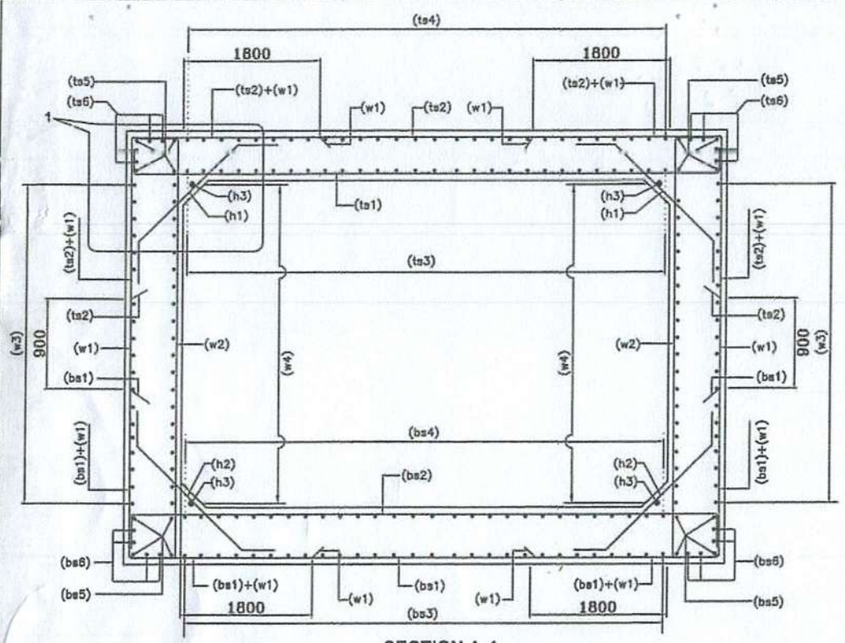
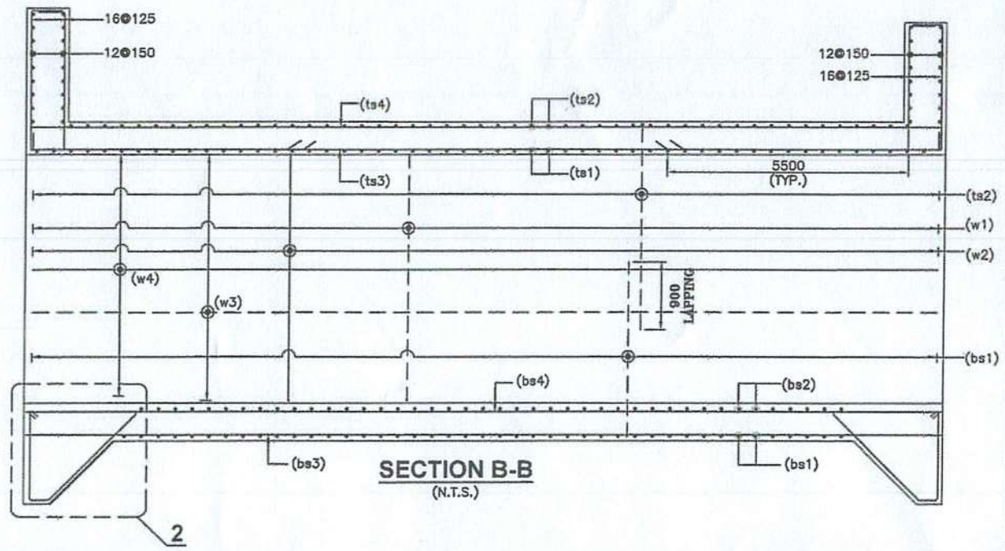


SECTION A-A
(NTS)



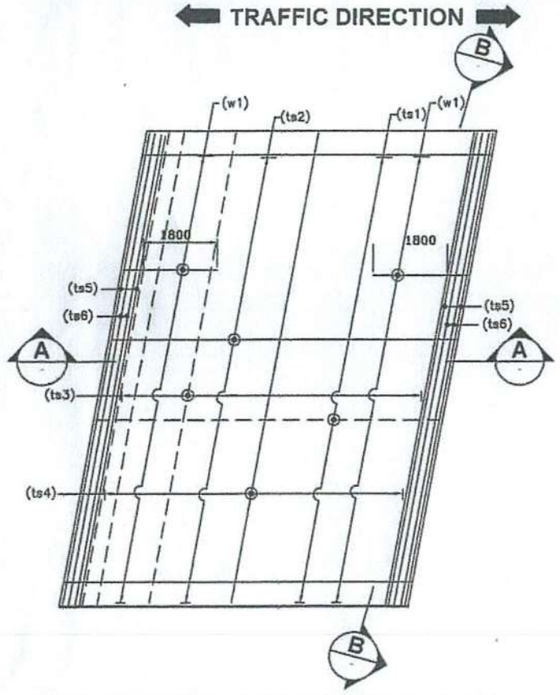
SECTION B-B
(N.T.S.)

LEGEND:-	
TOP FACE BAR	————
BOTTOM FACE BAR	- - - - - -

BOX REINF. SCHEDULE

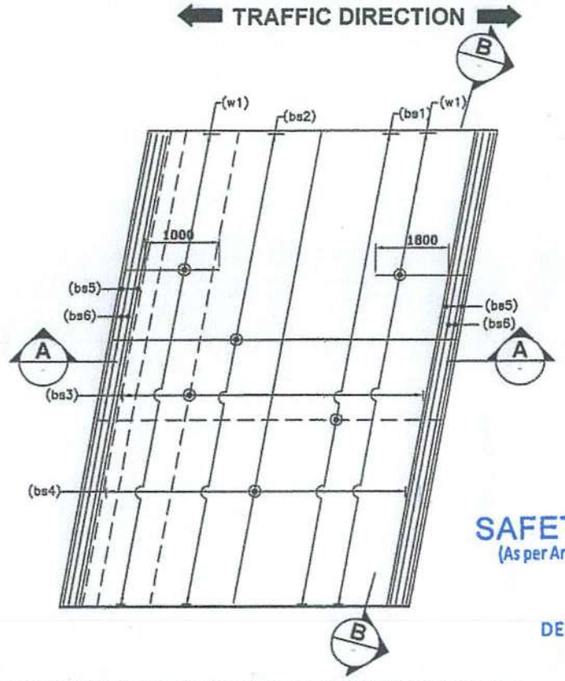
SL.NO.	BAR MARK	BAR SHAPE	DIAMETER	SPACING
1	ts1		16+10	130
2	ts2		16	130
3	ts3		12	180
4	ts4		12	180
5	ts5		12	2x4 Nos.
6	ts6		12	2x4 Nos.
7	w1		12	130
8	w2		16	130
9	w3		12	180
10	w4		10	180
11	bs1		16	130
12	bs2		16+10	130
13	bs3		12	180
14	bs4		12	180
15	bs5		12	2x4 Nos.
16	bs6		12	2x4 Nos.
17	h1		10	130
18	h2		10	130
19	h3		10	1x4 Nos.
20	cs1		12	10 Nos.
21	cs2		10	180
22	st1		10	180 c/c (L–L) 130 c/c (T–T) DIRECTION
23	st2		12	180 c/c (L–L) 130 c/c (T–T) DIRECTION

TRAFFIC DIRECTION

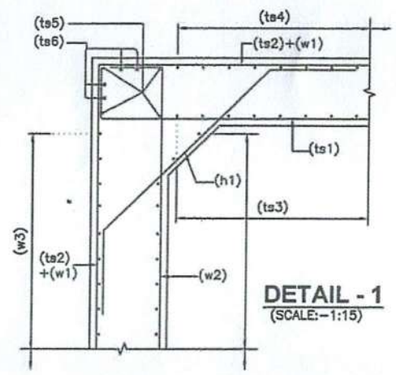


REINFORCEMENT DETAILS OF TOP SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)

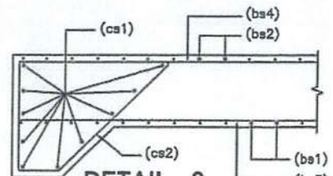
TRAFFIC DIRECTION



REINFORCEMENT DETAILS OF BOTTOM SLAB
(HAUNCH BAR NOT SHOWN IN PLAN FOR CLARITY)
(N.T.S.)



DETAIL - 1
(SCALE:–1:15)

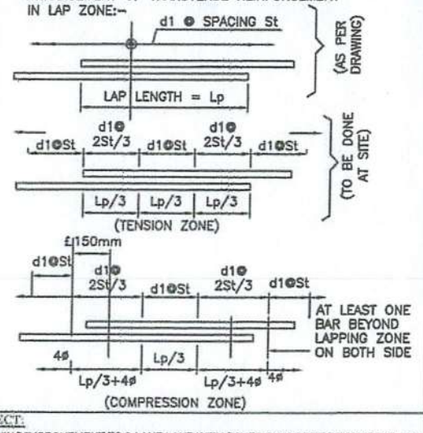


DETAIL - 2
(N.T.S.)

SAFETY AUDITOR
(As per Article 10.1 of EPC Agreement)
DESIGN AID, NEW DELHI

NOTES:–

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS UNLESS OTHERWISE MENTIONED.
2. DRAWING SHOULD NOT BE SCALED ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. ALL REINFORCING BARS SHALL BE THERMO MECHANICALLY TREATED (TMT) BARS (GRADE DESIGNATION Fe–500) CONFIRMING TO IS:1786 STANDARDS.
4. MINIMUM CLEAR COVER TO OUTERMOST REINFORCEMENT SHALL BE AS FOLLOWS:–
   a) TOP SLAB – 45mm
   b) BOTTOM SLAB – 75mm
   c) SIDE WALL (EARTH SIDE) – 75mm
   d) SIDE WALL (INNER SIDE) – 45mm
5. OVERLAPPING FOR SPLICING OF REINFORCEMENT SHALL BE AS PER CLAUSE NO.15.2.5.
   LAP LENGTH SHALL NOT BE LESS THAN 56ø.
   ARRANGEMENT OF TRANSVERSE REINFORCEMENT IN LAP ZONE:–



6. ANCHOURAGE LENGTH OF BOX SHALL BE TAKEN AS 40ø AS PER IRC:112.
7. FOR UNFAVORABLE BOND CONDITIONS THE FACTOR 40 SHOULD BE MULTIPLIED BY FACTOR OF 1.43 .
8. CENTER LINE OF OVERLAPPING BAR bs1 & ts2 IN WALL & MID HEIGHT OF WALLS ARE AT SAME POINT.
9. BAR BENDING SCHEDULE SHOULD BE STRICTLY FOLLOW DURING THE TIME OF EXECUTION IF IN CASE ANY CHANGES AT SITE KINDLY DISCUSS IT WITH ENGINEER IN CHARGE.

REFERENCE DRAWING:–

1. GENERAL ARRANGEMENT DRAWING. AVC/NH–38/BOX/GAD/47+487/01

CLIENT:	EPC CONTRACTOR	AUTHORITY'S ENGINEER	PROOF CONSULTANT:	SAFETY CONSULTANT:	DESIGN CONSULTANT:
NATIONAL HIGHWAYS & INFRASTRUCTURE DEVELOPMENT CORPORATION LTD.	KAMAC ENGINEERS PVT.LTD NO201, SIX SENSE OFFICE BLOCK, 2ND FLOOR, MATIGARA 734010 Kamac Engineers (P) Ltd Authorised Signatory	ALMONDZ GLOBAL INFRA CONSULTANT LIMITED IN JV WITH AYOLEEZA CONSULTANT PRIVATE LIMITED. C/O JAYANTA SAIKIA, SARBAJANIN NAMGHAR, BORBIL NO.2, DIGBOI, TINSUKIA, ASSAM-786171	CREATIVE ENGINEERING SERVICES OFFICE NO: 620, SIGNATURE GLOBAL MALL, SECTOR-3, VAISHALI, GHAZIABAD, U.P-201010	DESIGN AID PLOT NO.54, 3rd FLOOR(FRONT), MASOODPUR DAIRY FARM,VASANT KUNJ, NEW DELHI-110070,	A.P.CONSTRUCTION 4th Floor, WZ-240, Palam Extension, Bosco Ashram Wali Gali, New Delhi 110045 Winst Infra Solution Pvt. Ltd. OFFICE: F-6, ISHAAN CORPORATE TOWER, PLOT NO-C-23,SECTOR-13, VASUNDHRA,GHAZIABAD, U.P-201012

PROJECT:
WIDENING/IMPROVEMENT TO 2-LANE LANE WITH PAVED SHOULDER FROM KM 27+150 (GOLAI GOAN) TO KM 47+682 (LEDO) ON DIBRUGARH TO LEDO SECTION WITH PROPOSED MARGHERITA & LEDO BYPASS (BROWNFIELD AND GREEN FIELD) (2-LANE+PS) OF NH-38 IN TINSUKIA DISTRICT IN THE STATE OF ASSAM ON EPC MODE (PACKAGE-5)

DRAWING TITLE:- REINFORCEMENT DETAIL OF BOX CULVERT AT CH. 47+487

Date	Drw.	Dsg.	Chk.	App.	Scale.	Drawing Status.
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Project No.	Drawing No. AVC/NH-38/BOX/REIN./47+487/01				Sheet No. 01 OF 01	Rev. R0