

TENDER DOCUMENT

FOR

**Distribution Network for Aurangabad Division of Right Main
Canal (RMC), Bihar Portion under North Koel Reservoir
Project, Jharkhand and Bihar
Estimated Cost (Rs. 50.81 Crores)**

TENDER NO: WAP/NK/RMC/DIST/AURANGABAD/2025

TENDER DRAWINGS

Issued to M/s



NORTH KOEL RESERVOIR PROJECT

FEBRUARY 2025

Completion of Balance
Works of North Koel
Reservoir Project

DRAWING REPORT – DEO MINOR
(OFFTAKING FROM RIGHT MAIN CANAL AT
71.93 KM)



WAPCOS LIMITED

(GOVT. OF INDIA UNDERTAKING)
76- C SECTOR-18 INDUSTRIAL AREA,
GURUGRAM-122015 (HARYANA)

वाष्कोस



WAPCOS

INDEX		
S.NO	DESCRIPTION	PAGE NO.
1	L-SECTION OF DEO MINOR	1
2	TYPICAL X-SECTION OF DEO MINOR	4
3	CROSS-SECTION OF DEO MINOR	20
4	DRAWINGS OF STRUCTURES	28

L-SECTION

L- SECTION OF DEO MINOR
(OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
FROM CH 0+000 TO 1+500

DATA OF
PARENT
CANAL

FSL @ FULL
DISCH. = 137.214
FSL @ 2/3
DISCH. =136.584

CREST RL OF
HR = 135.765 M

B.L. = 133.364 M

CH: 0+300 KM
OUTLET - 1 (L)
OUTLET B.L.= 135.653 M

CH: 0+340 KM
OUTLET - 2 (R)
OUTLET B.L.= 135.640 M

CH:0+350
FALL (0.610 M)

CH:0+500
FALL (1.067 M) /
BRIDGE
B.O.S. - 136.034 M
D. - 1.300 M
W.W. - 2.387 M

CH:0+775
BRIDGE
B.O.S. - 135.056 M
D. - 1.300 M
W.W. - 2.387 M

CH: 0+800 KM
OUTLET - 3 (R)
OUTLET B.L.= 133.809 M

CH:1+000
FALL (1.220 M)

CH:1+106
CD WORKS
B.O.S. - 133.495 M
D. - 1.300 M
W.W. - 2.387 M

CH: 1+225 KM
OUTLET - 4 (L)
OUTLET B.L.= 132.448 M

CH:1+235
FALL (0.914 M) /
BRIDGE
B.O.S. - 133.017 M
D. - 1.300 M
W.W. - 2.387 M

CH:1+490
CD WORKS
B.O.S. - 131.408 M
D. - 1.150 M
W.W. - 2.387 M

CH:1+450
FALL (0.914 M) /
BRIDGE
B.O.S. - 132.098 M
D. - 1.150 M
W.W. - 2.387 M

(CH: 1.235 - 1.830 KM)		(IR DATA)	
Proposed (New IR)		AS PER IR	Unit
Discharge	0.17/5.96	0.423/14.94	cum/cusec
Bed Slope	1 in 3000	1 in 3000	33.3 cm/km
Bed Width	0.850	1.829	m
F.S.D.	0.520	0.558	m
Velocity	0.32	0.360	m/sec
CVR	0.88	0.955	
Bank Width L/R	1.500/5.000	1.83/4.573	m
Free Board	0.500	0.450	m

(CH: 0.000 - 0.350 KM)		(IR DATA)	
Proposed (New IR)		AS PER IR	Unit
Discharge	0.35/12.23	0.423/14.94	cum/cusec
Bed Slope	1 in 3000	1 in 3000	33.3 cm/km
Bed Width	1.380	1.829	m
F.S.D.	0.570	0.558	m
Velocity	0.37	0.360	m/sec
CVR	0.96	0.955	
Bank Width L/R	1.500/5.000	1.83/4.573	m
Free Board	0.500	0.450	m

(CH: 0.350 - 1.235 KM)		(IR DATA)	
Proposed (New IR)		AS PER IR	Unit
Discharge	0.25/8.87	0.423/14.94	cum/cusec
Bed Slope	1 in 3000	1 in 3000	33.3 cm/km
Bed Width	1.000	1.829	m
F.S.D.	0.570	0.558	m
Velocity	0.34	0.360	m/sec
CVR	0.89	0.955	
Bank Width L/R	1.500/5.000	1.83/4.573	m
Free Board	0.500	0.450	m

Chainage IN KM	EXISTING DATA			DESIGN DATA		
	NSL	TOP OF BANK LEVEL	Bed Level	Proposed Bed Level	F.S.L.	TOP OF BANK LEVEL
+ 0+000		137.609	136.490	135.453	136.023	136.523
+ 0+050	137.691	137.401	136.319	135.436	136.006	136.506
+ 0+100	137.355	137.192	136.206	135.420	135.990	136.490
+ 0+150	137.019	136.984	136.093	135.403	135.973	136.473
+ 0+200	136.684	136.776	135.980	135.386	135.956	136.456
+ 0+250	136.348	136.567	135.867	135.370	135.940	136.440
+ 0+300	136.013	136.359	135.753	135.353	135.923	136.423
+ 0+350	135.677	135.409	135.640	135.336	135.906	136.406
+ 0+400	135.340	135.268	134.789	134.710	135.280	135.780
+ 0+450	135.004	135.126	134.761	134.693	135.263	135.763
+ 0+500	134.669	134.678	134.734	134.676	135.246	135.746
+ 0+550	134.476	134.517	134.139	133.593	134.163	134.663
+ 0+600	134.345	134.356	134.069	133.576	134.146	134.646
+ 0+650	134.215	134.195	133.991	133.559	134.129	134.629
+ 0+700	134.084	134.033	133.922	133.543	134.113	134.613
+ 0+750	133.954	133.927	133.820	133.526	134.096	134.596
+ 0+800	133.824	133.825	133.692	133.509	134.079	134.579
+ 0+850	133.693	133.722	133.526	133.493	134.063	134.563
+ 0+900	133.563	133.619	133.360	133.476	134.046	134.546
+ 0+950	133.432	134.100	133.194	133.459	134.029	134.529
+ 1+000	133.290	133.400	133.079	133.443	134.013	134.513
+ 1+050	133.063	133.389	132.482	132.206	132.776	133.276
+ 1+100	132.835	133.377	132.225	132.189	132.759	133.259
+ 1+150	132.607	133.366	131.970	132.173	132.743	133.243
+ 1+200	132.379	131.994	131.717	132.156	132.726	133.226
+ 1+235	---	---	---	132.144	132.714	133.214
+ 1+250	132.150	131.937	131.535	131.236	131.750	132.250
+ 1+300	131.921	131.876	131.388	131.209	131.729	132.229
+ 1+350	131.692	131.813	131.241	131.192	131.712	132.212
+ 1+400	131.463	131.752	131.096	131.175	131.695	132.195
+ 1+450	131.234	131.328	130.948	131.159	131.679	132.179
+ 1+500	131.004	130.715	130.086	130.228	130.748	131.248

LEGEND

	NSL		EXISTING BED LEVEL
	EXISTING TOP OF BANK		PROPOSED BED LEVEL
	EXISTING FALL		PROPOSED FSL
	MODIFIED FALL		PROPOSED TOP OF BANK LEVEL
	NEW FALL		

IMPLEMENTING AGENCY :-

WAPCOS LTD.



PROJECT TITLE :-

NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND

DRAWING TITLE :-

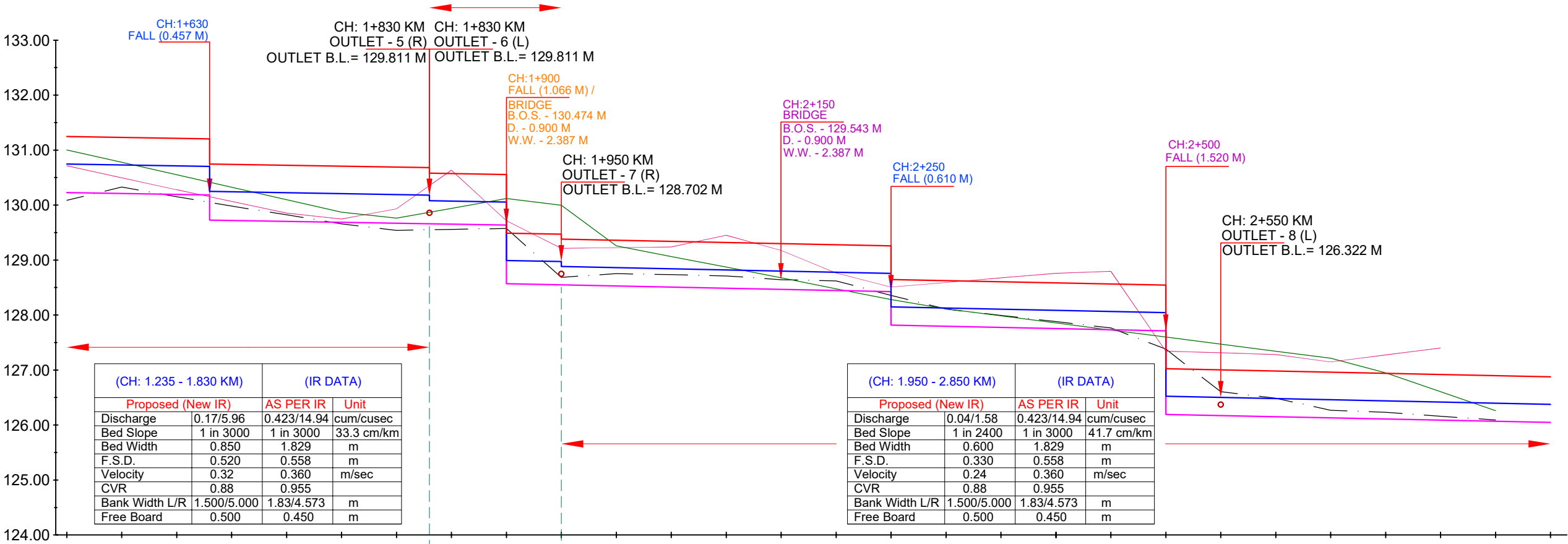
L- SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT)
NORTH KOEL RIGHT MAIN CANAL)

DRAWING NO. :-

WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ LSEC-

L- SECTION OF DEO MINOR
(OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
FROM CH 1+500 TO 2+850

	(CH: 1.830 - 1.950 KM)	(IR DATA)
	Proposed (New IR)	AS PER IR
Discharge	0.08/2.77	0.423/14.94
Bed Slope	1 in 2800	1 in 3000
Bed Width	0.600	1.829
F.S.D.	0.420	0.558
Velocity	0.28	0.360
CVR	0.88	0.955
Bank Width L/R	1.500/5.000	1.83/4.573
Free Board	0.500	0.450



Chainage IN KM	EXISTING DATA			DESIGN DATA		
	NSL	TOP OF BANK LEVEL	Bed Level	Proposed Bed Level	F.S.L.	TOP OF BANK LEVEL
- 1+500	131.004	130.715	130.086	130.228	130.748	131.248
- 1+550	130.780	130.496	130.327	130.211	130.731	131.231
- 1+600	130.552	130.279	130.152	130.195	130.715	131.215
- 1+650	130.325	130.068	129.981	130.185 130.728 129.721	130.705 130.248 130.241	131.205 130.748 130.741
- 1+700	130.097	129.854	129.823	129.704	130.224	130.724
- 1+750	129.870	129.746	129.658	129.688	130.208	130.708
- 1+800	129.764	129.932	129.539	129.671	130.191	130.691
- 1+830	---	---	---	129.664	130.181	130.681
- 1+850	129.941	130.635	129.559	129.654	130.081 130.074	130.581 130.574
- 1+900	130.118	129.716	129.574	129.636 128.570	130.056 128.990	130.556 129.490
- 1+950	129.998	129.243	128.685	128.552	128.972 128.882	129.472 129.382
- 2+000	129.259	129.226	128.754	128.531	128.861	129.361
- 2+050	129.064	129.239	128.734	128.510	128.840	129.340
- 2+100	128.871	129.450	128.712	128.490	128.820	129.320
- 2+150	128.677	129.176	128.643	128.469	128.799	129.299
- 2+200	128.475	128.765	128.622	128.448	128.778	129.278
- 2+250	128.283	128.509	128.356	128.427 127.817	128.757 128.147	129.257 128.647
- 2+300	128.113	128.592	128.108	127.796	128.126	128.626
- 2+350	127.985	128.676	127.994	127.775	128.105	128.605
- 2+400	127.856	128.760	127.880	127.755	128.085	128.585
- 2+450	127.728	128.795	127.766	127.734	128.064	128.564
- 2+500	127.599	127.343	127.380	127.713 126.193	128.043 126.523	128.543 127.023
- 2+550	127.471	127.313	126.605	126.172	126.502	127.002
- 2+600	127.342	127.283	126.487	126.151	126.481	126.981
- 2+650	127.214	127.147	126.368	126.130	126.460	126.960
- 2+700	126.950	127.274	126.231	126.110	126.440	126.940
- 2+750	126.606	127.400	126.160	126.089	126.419	126.919
- 2+800	126.261		126.090	126.068	126.398	126.898
- 2+850				126.047	126.377	126.877

LEGEND

	NSL		EXISTING BED LEVEL
	EXISTING TOP OF BANK		PROPOSED BED LEVEL
	EXISTING FALL		PROPOSED F.S.L.
	MODIFIED FALL		PROPOSED TOP OF BANK LEVEL
	NEW FALL		

IMPLEMENTING AGENCY :-

WAPCOS LTD.



PROJECT TITLE :-

NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND

DRAWING TITLE :-

L- SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT)
NORTH KOEL RIGHT MAIN CANAL)

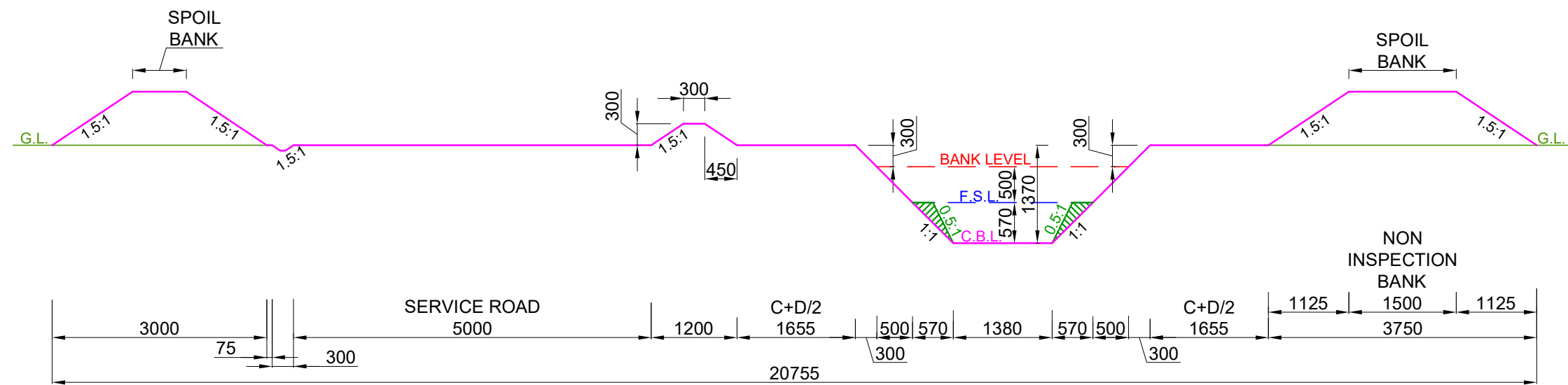
DRAWING NO. :-

WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ LSEC-

02 of 02

TYPICAL X-SECTION

TYPICAL X - SECTION OF DEO MINOR
(OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
DESIGN SECTION FOR FULL CUTTING



DESIGN SECTION FROM CH: 0.000 KM TO CH: 0.360 KM

- NOTE:-**
- 1. THE BANK WIDTH HAS BEEN ADOPTED AS PER IS 7112 : 2002 (TABLE-1).
 - 2. THE OFFTAKING CHAINAGE AND LENGTH OF THE CANAL HAS BEEN TAKEN AS PER ACTUAL SURVEY.
 - 3. THIS IS A TYPICAL DRAWING , INSPECTION & NON-INSPECTION BANK SHALL BE TAKEN AS PER SITE CONDITIONS.

LEGEND CUT AREA FILL AREA		Prepared by :- WAPCOS LTD. 	Project Title :-	NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND				
			Drawing Title :-	X - SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT) NORTH KOEL RIGHT MAIN CANAL)				
			Drawing No. :-	WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC /TYP-(FC)				

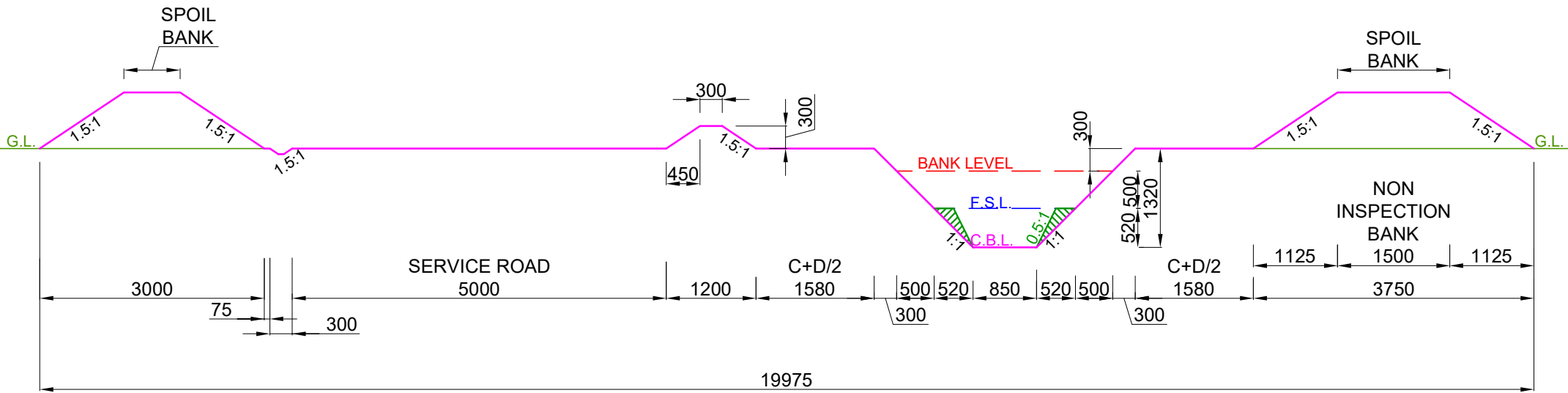
[illegible]

NOTE:-

1. THE BANK WIDTH HAS BEEN ADOPTED AS PER IS 7112 : 2002 (TABLE-1).
2. THE OFFTAKING CHAINAGE AND LENGTH OF THE CANAL HAS BEEN TAKEN AS PER ACTUAL SURVEY.
3. THIS IS A TYPICAL DRAWING , INSPECTION & NON-INSPECTION BANK SHALL BE TAKEN AS PER SITE CONDITIONS.

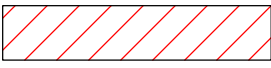
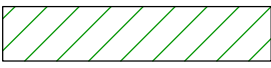
2 of 5

TYPICAL X - SECTION OF DEO MINOR
(OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
DESIGN SECTION FOR FULL CUTTING

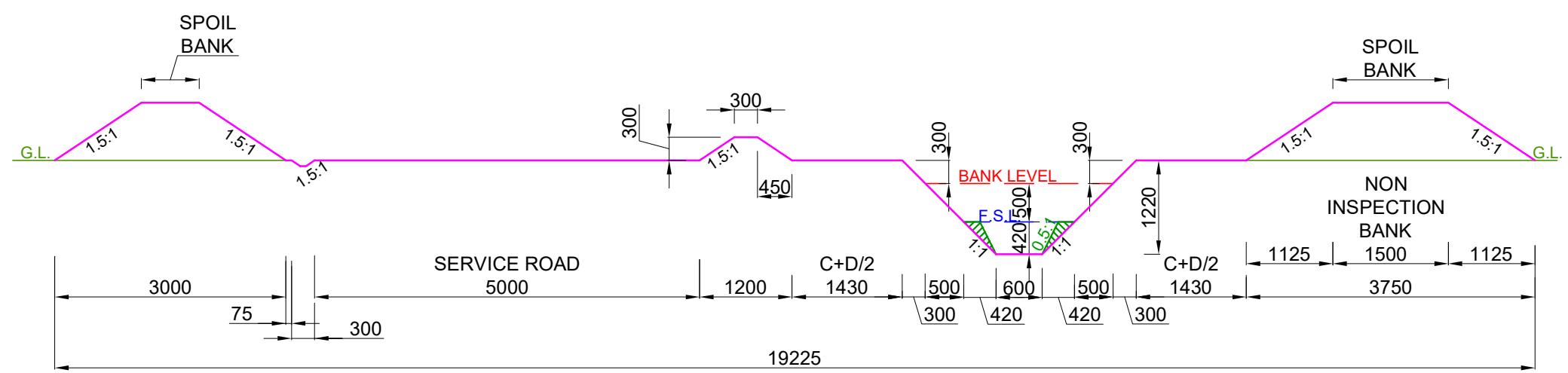


DESIGN SECTION FROM CH: 1.250 KM TO CH: 1.830 KM

- NOTE:-**
- 1. THE BANK WIDTH HAS BEEN ADOPTED AS PER IS 7112 : 2002 (TABLE-1).
 - 2. THE OFFTAKING CHAINAGE AND LENGTH OF THE CANAL HAS BEEN TAKEN AS PER ACTUAL SURVEY.
 - 3. THIS IS A TYPICAL DRAWING , INSPECTION & NON-INSPECTION BANK SHALL BE TAKEN AS PER SITE CONDITIONS.

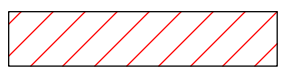
LEGEND		Prepared by :- WAPCOS LTD. 	Project Title :-	NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND				
	CUT AREA		Drawing Title :-	X - SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT) NORTH KOEL RIGHT MAIN CANAL)				
	FILL AREA		Drawing No. :-	WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC /TYP-(FC)				

TYPICAL X - SECTION OF DEO MINOR
(OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
DESIGN SECTION FOR FULL CUTTING

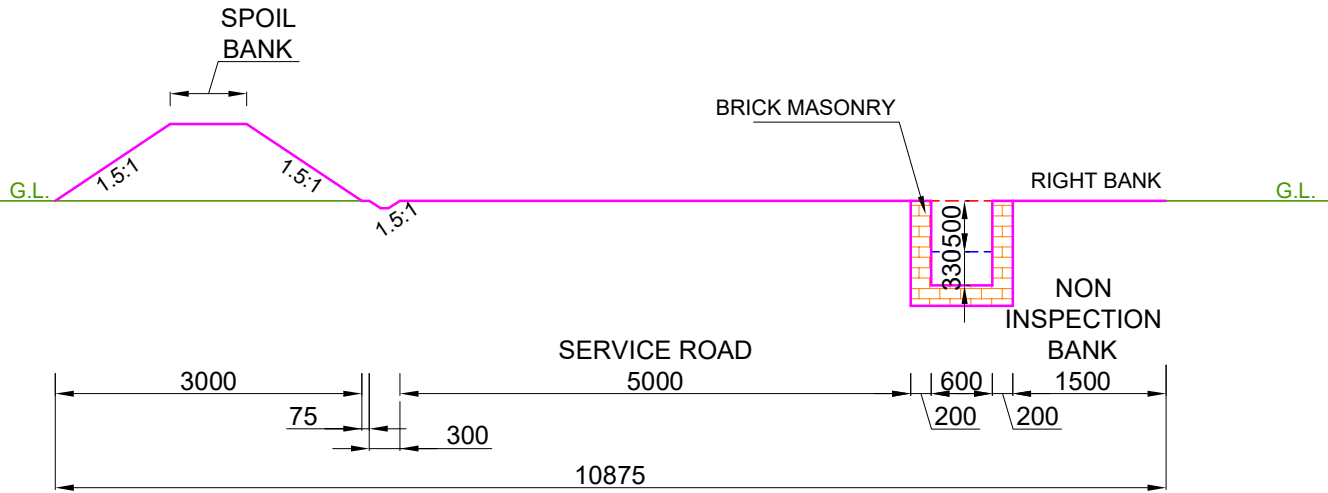


DESIGN SECTION FROM CH: 1.830 KM TO CH: 1.950 KM

- NOTE:-**
- 1. THE BANK WIDTH HAS BEEN ADOPTED AS PER IS 7112 : 2002 (TABLE-1).
 - 2. THE OFFTAKING CHAINAGE AND LENGTH OF THE CANAL HAS BEEN TAKEN AS PER ACTUAL SURVEY.
 - 3. THIS IS A TYPICAL DRAWING , INSPECTION & NON-INSPECTION BANK SHALL BE TAKEN AS PER SITE CONDITIONS.

LEGEND		Prepared by :- WAPCOS LTD. 	Project Title :-	NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND			
			Drawing Title :-	X - SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT) NORTH KOEL RIGHT MAIN CANAL)			
			Drawing No. :-	WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC /TYP-(FC)			
	CUT AREA						
	FILL AREA						

TYPICAL X - SECTION OF DEO MINOR
(OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
DESIGN SECTION FOR FULL CUTTING

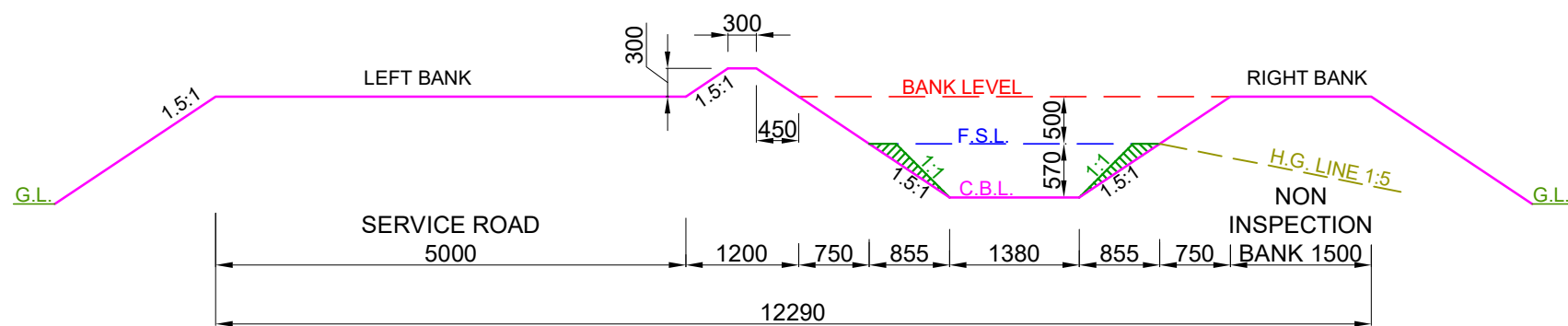


DESIGN SECTION FROM CH: 1.950 KM TO CH: 2.850 KM

- NOTE:-**
- 1. THE BANK WIDTH HAS BEEN ADOPTED AS PER IS 7112 : 2002 (TABLE-1).
 - 2. THE OFFTAKING CHAINAGE AND LENGTH OF THE CANAL HAS BEEN TAKEN AS PER ACTUAL SURVEY.
 - 3. THIS IS A TYPICAL DRAWING , INSPECTION & NON-INSPECTION BANK SHALL BE TAKEN AS PER SITE CONDITIONS.

LEGEND CUT AREA FILL AREA		Prepared by :- WAPCOS LTD.	Project Title :-	NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND				
			Drawing Title :-	X - SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT) NORTH KOEL RIGHT MAIN CANAL)				
			Drawing No. :-	WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC /TYP-(FC)				

TYPICAL X - SECTION OF DEO MINOR
(OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
DESIGN SECTION FOR FULL FILLING



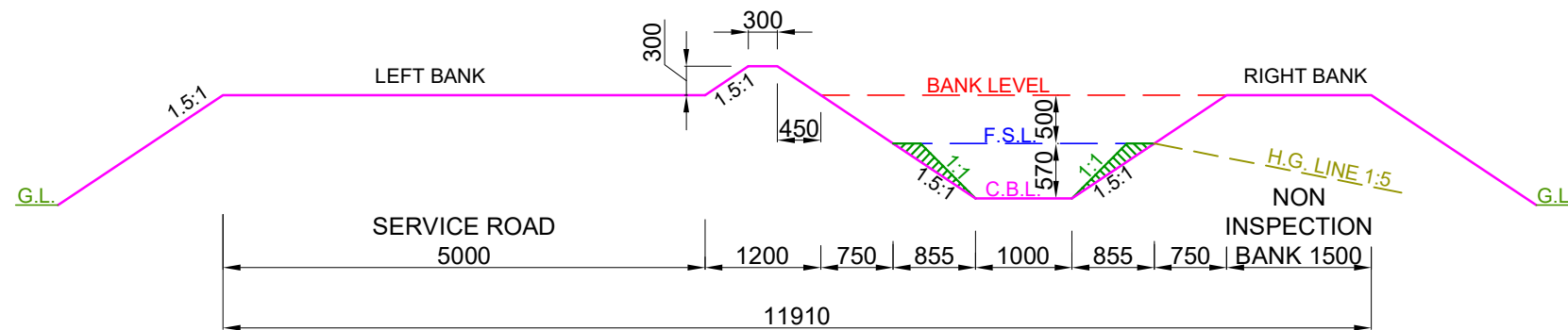
DESIGN SECTION FROM CH: 0.000 KM TO CH: 0.360 KM

- NOTE:-**
- 1. THE BANK WIDTH HAS BEEN ADOPTED AS PER IS 7112 : 2002 (TABLE-1).
 - 2. THE OFFTAKING CHAINAGE AND LENGTH OF THE CANAL HAS BEEN TAKEN AS PER ACTUAL SURVEY.
 - 3. THIS IS A TYPICAL DRAWING , INSPECTION & NON-INSPECTION BANK SHALL BE TAKEN AS PER SITE CONDITIONS.

LEGEND CUT AREA FILL AREA		Prepared by :- WAPCOS LTD.	Project Title :- NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND
			Drawing Title :- X - SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT) NORTH KOEL RIGHT MAIN CANAL)
			Drawing No. :- WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC /TYP-(FF)

1 of 5

TYPICAL X - SECTION OF DEO MINOR
(OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
DESIGN SECTION FOR FULL FILLING



DESIGN SECTION FROM CH: 0.360 KM TO CH: 1.250 KM

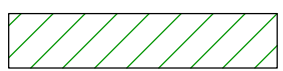
NOTE:-

1. THE BANK WIDTH HAS BEEN ADOPTED AS PER IS 7112 : 2002 (TABLE-1).
2. THE OFFTAKING CHAINAGE AND LENGTH OF THE CANAL HAS BEEN TAKEN AS PER ACTUAL SURVEY.
3. THIS IS A TYPICAL DRAWING , INSPECTION & NON-INSPECTION BANK SHALL BE TAKEN AS PER SITE CONDITIONS.

LEGEND



CUT AREA



FILL AREA

Prepared by :-

WAPCOS LTD.



Project Title :-

NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND

Drawing Title :-

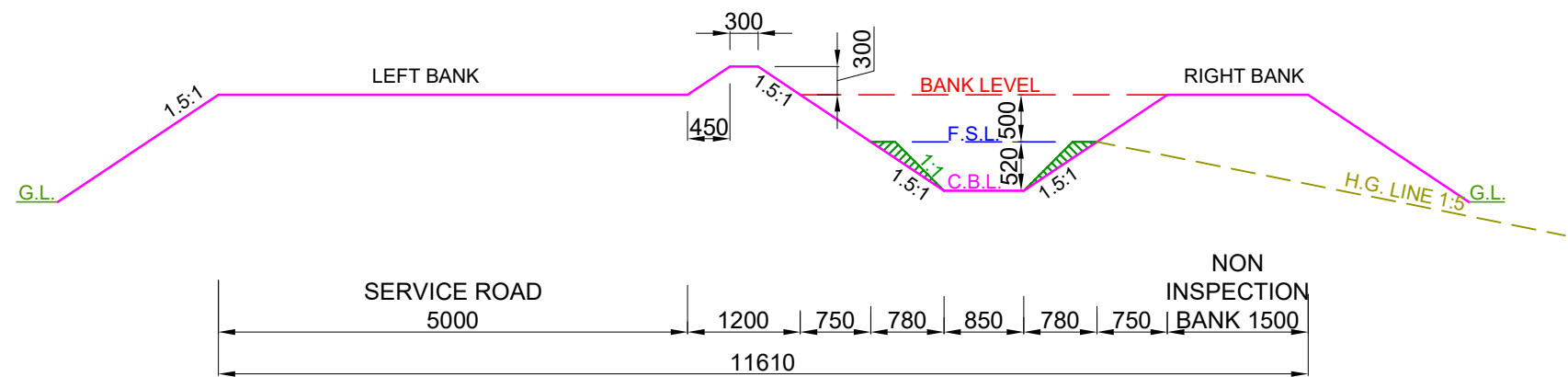
X - SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT)
NORTH KOEL RIGHT MAIN CANAL)

Drawing No. :-

WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC /TYP-(FF)

2 of 5

TYPICAL X - SECTION OF DEO MINOR
(OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
DESIGN SECTION FOR FULL FILLING

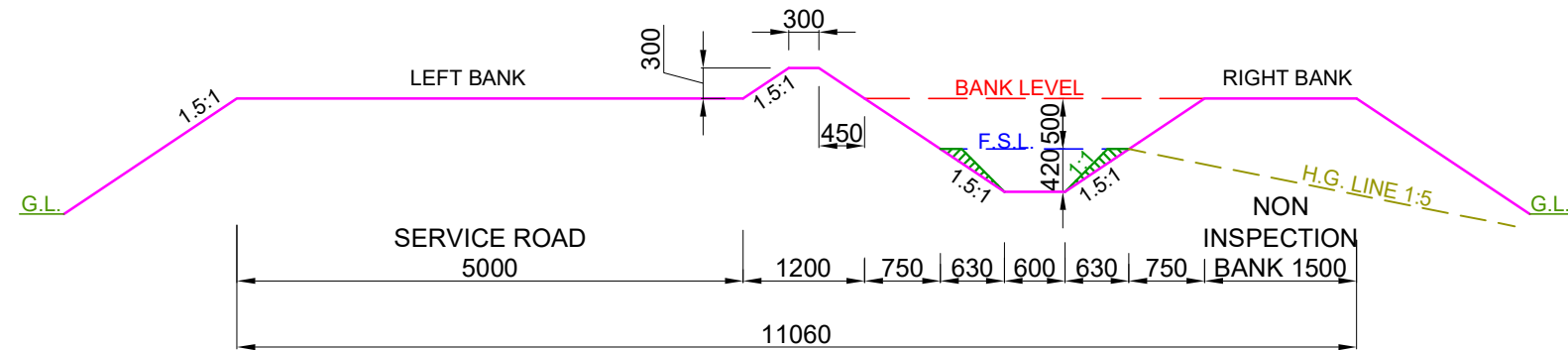


DESIGN SECTION FROM CH: 1.250 KM TO CH: 1.830 KM

- NOTE:-**
- 1. THE BANK WIDTH HAS BEEN ADOPTED AS PER IS 7112 : 2002 (TABLE-1).
 - 2. THE OFFTAKING CHAINAGE AND LENGTH OF THE CANAL HAS BEEN TAKEN AS PER ACTUAL SURVEY.
 - 3. THIS IS A TYPICAL DRAWING , INSPECTION & NON-INSPECTION BANK SHALL BE TAKEN AS PER SITE CONDITIONS.

LEGEND CUT AREA FILL AREA		Prepared by :- WAPCOS LTD.	Project Title :- NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND
			Drawing Title :- X - SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT) NORTH KOEL RIGHT MAIN CANAL)
			Drawing No. :- WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC /TYP-(FF)

TYPICAL X - SECTION OF DEO MINOR
(OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
DESIGN SECTION FOR FULL FILLING



DESIGN SECTION FROM CH: 1.830 KM TO CH: 1.950 KM

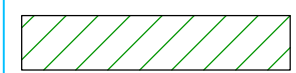
NOTE:-

1. THE BANK WIDTH HAS BEEN ADOPTED AS PER IS 7112 : 2002 (TABLE-1).
2. THE OFFTAKING CHAINAGE AND LENGTH OF THE CANAL HAS BEEN TAKEN AS PER ACTUAL SURVEY.
3. THIS IS A TYPICAL DRAWING , INSPECTION & NON-INSPECTION BANK SHALL BE TAKEN AS PER SITE CONDITIONS.

LEGEND



CUT AREA



FILL AREA

Prepared by :-

WAPCOS LTD.



Project Title :-

NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND

Drawing Title :-

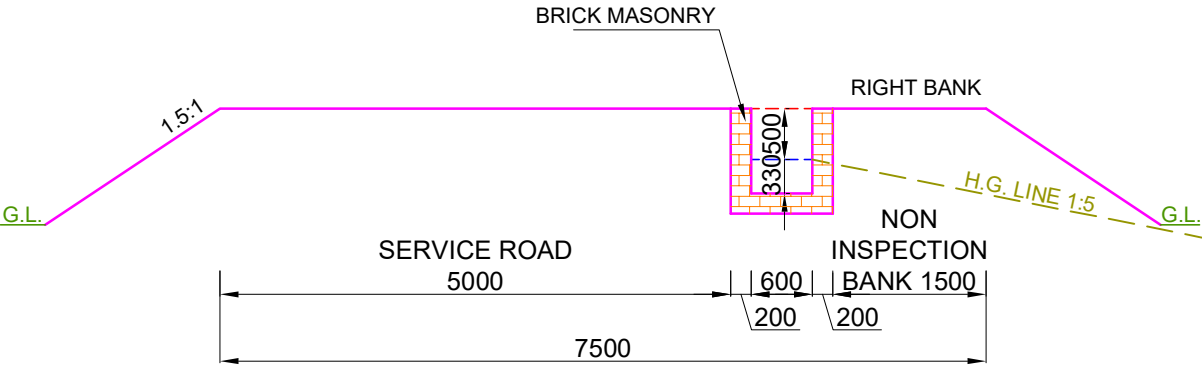
X - SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT)
NORTH KOEL RIGHT MAIN CANAL)

Drawing No. :-

WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC /TYP-(FF)

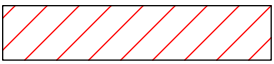
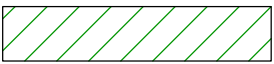
4 of 5

TYPICAL X - SECTION OF DEO MINOR
(OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
DESIGN SECTION FOR FULL FILLING

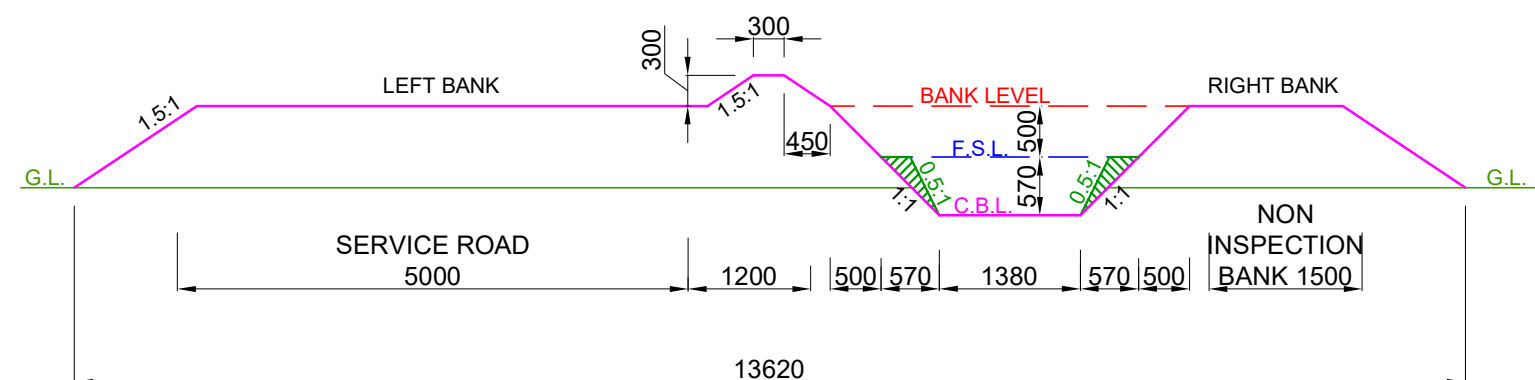


DESIGN SECTION FROM CH: 1.950 KM TO CH: 2.850 KM

- NOTE:-**
- 1. THE BANK WIDTH HAS BEEN ADOPTED AS PER IS 7112 : 2002 (TABLE-1).
 - 2. THE OFFTAKING CHAINAGE AND LENGTH OF THE CANAL HAS BEEN TAKEN AS PER ACTUAL SURVEY.
 - 3. THIS IS A TYPICAL DRAWING , INSPECTION & NON-INSPECTION BANK SHALL BE TAKEN AS PER SITE CONDITIONS.

LEGEND		Prepared by :- WAPCOS LTD. 	Project Title :-	NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND				
			Drawing Title :-	X - SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT) NORTH KOEL RIGHT MAIN CANAL)				
			Drawing No. :-	WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC /TYP-(FF)				
	CUT AREA							
	FILL AREA							

TYPICAL X - SECTION OF DEO MINOR
(OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
DESIGN SECTION FOR PARTLY CUTTING/ PARTLY FILLING

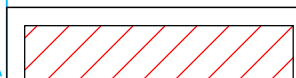


DESIGN SECTION FROM CH: 0.000 KM TO CH: 0.360 KM

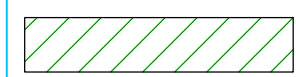
NOTE:-

1. THE BANK WIDTH HAS BEEN ADOPTED AS PER IS 7112 : 2002 (TABLE-1).
2. THE OFFTAKING CHAINAGE AND LENGTH OF THE CANAL HAS BEEN TAKEN AS PER ACTUAL SURVEY.
3. THIS IS A TYPICAL DRAWING , INSPECTION & NON-INSPECTION BANK SHALL BE TAKEN AS PER SITE CONDITIONS.

LEGEND



CUT AREA



FILL AREA

Prepared by :-

WAPCOS LTD.



Project Title :-

NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND

Drawing Title :-

X - SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT)
NORTH KOEL RIGHT MAIN CANAL)

Drawing No. :-

WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC /TYP-(PCF)

1 of 5

The diagram illustrates a cross-section of a road and ditch system. The total width is 13240m. The components and their dimensions are as follows:

- SERVICE ROAD:** 5000m wide.
- Ditch Area:** 1200m wide at the top, 1000m wide at the bottom. The sides are 1.5:1 sloped. The ditch has a 300m wide top, 450m high sides, and a 570m wide bottom.
- Non-Inspection Bank:** 1500m wide.
- Ground Level (G.L.):** Indicated by a horizontal line.
- Bank Level:** Indicated by a red line.
- Finished Surface Level (F.S.L.):** Indicated by a blue line.
- Center Line (C.B.L.):** Indicated by a pink line.

NOTE:-

- ## LEGEND

WAPCOS LTD.



NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND

X - SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT)
NORTH KOEL RIGHT MAIN CANAL)

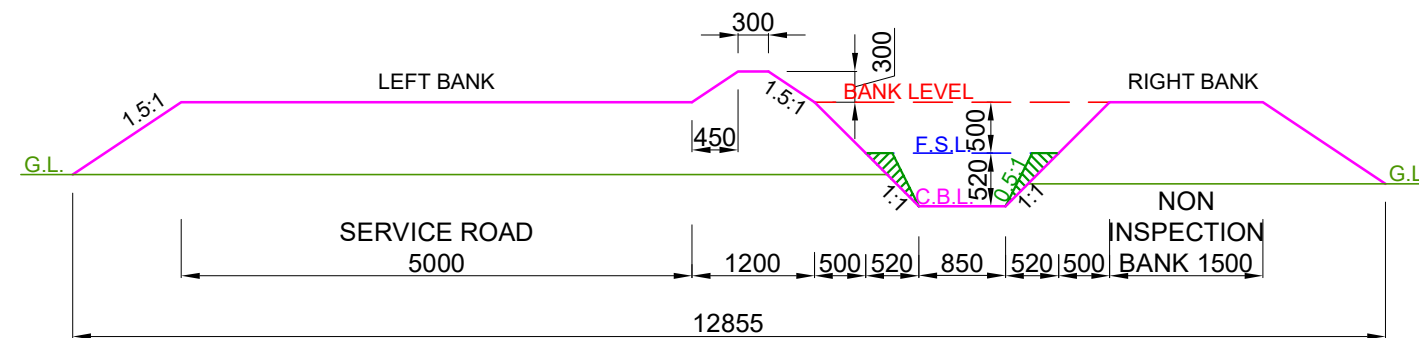
WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC /TYP-(PCF)

2 of 5

CUT AREA

FILL AREA

TYPICAL X - SECTION OF DEO MINOR
(OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
DESIGN SECTION FOR PARTLY CUTTING/ PARTLY FILLING



DESIGN SECTION FROM CH: 1.250 KM TO CH: 1.830 KM

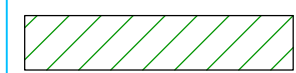
NOTE:-

1. THE BANK WIDTH HAS BEEN ADOPTED AS PER IS 7112 : 2002 (TABLE-1).
2. THE OFFTAKING CHAINAGE AND LENGTH OF THE CANAL HAS BEEN TAKEN AS PER ACTUAL SURVEY.
3. THIS IS A TYPICAL DRAWING , INSPECTION & NON-INSPECTION BANK SHALL BE TAKEN AS PER SITE CONDITIONS.

LEGEND



CUT AREA



FILL AREA

Prepared by :-

WAPCOS LTD.



Project Title :-

NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND

Drawing Title :-

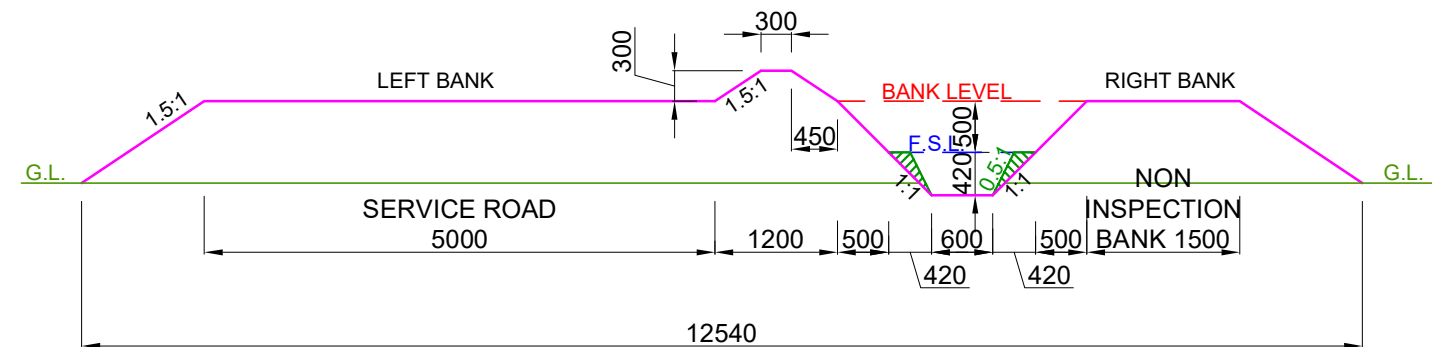
X - SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT)
NORTH KOEL RIGHT MAIN CANAL)

Drawing No. :-

WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC /TYP-(PCF)

3 of 5

TYPICAL X - SECTION OF DEO MINOR
(OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
DESIGN SECTION FOR PARTLY CUTTING/ PARTLY FILLING

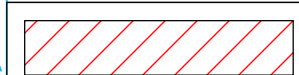


DESIGN SECTION FROM CH: 1.830 KM TO CH: 1.950 KM

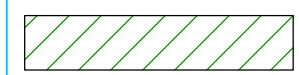
NOTE:-

1. THE BANK WIDTH HAS BEEN ADOPTED AS PER IS 7112 : 2002 (TABLE-1).
2. THE OFFTAKING CHAINAGE AND LENGTH OF THE CANAL HAS BEEN TAKEN AS PER ACTUAL SURVEY.
3. THIS IS A TYPICAL DRAWING , INSPECTION & NON-INSPECTION BANK SHALL BE TAKEN AS PER SITE CONDITIONS.

LEGEND



CUT AREA



FILL AREA

Prepared by :-

WAPCOS LTD.



Project Title :-

NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND

Drawing Title :-

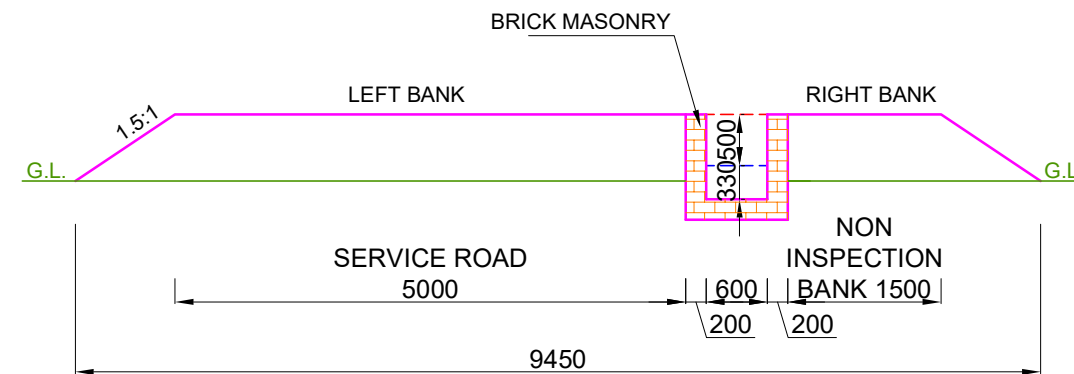
X - SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT)
NORTH KOEL RIGHT MAIN CANAL)

Drawing No. :-

WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC /TYP-(PCF)

4 of 5

TYPICAL X - SECTION OF DEO MINOR
(OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
DESIGN SECTION FOR PARTLY CUTTING/ PARTLY FILLING



DESIGN SECTION FROM CH: 1.950 KM TO CH: 2.850 KM

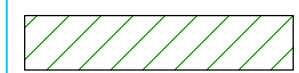
NOTE:-

1. THE BANK WIDTH HAS BEEN ADOPTED AS PER IS 7112 : 2002 (TABLE-1).
2. THE OFFTAKING CHAINAGE AND LENGTH OF THE CANAL HAS BEEN TAKEN AS PER ACTUAL SURVEY.
3. THIS IS A TYPICAL DRAWING , INSPECTION & NON-INSPECTION BANK SHALL BE TAKEN AS PER SITE CONDITIONS.

LEGEND



CUT AREA



FILL AREA

Prepared by :-

WAPCOS LTD.



Project Title :-

NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND

Drawing Title :-

X - SECTION OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT)
NORTH KOEL RIGHT MAIN CANAL)

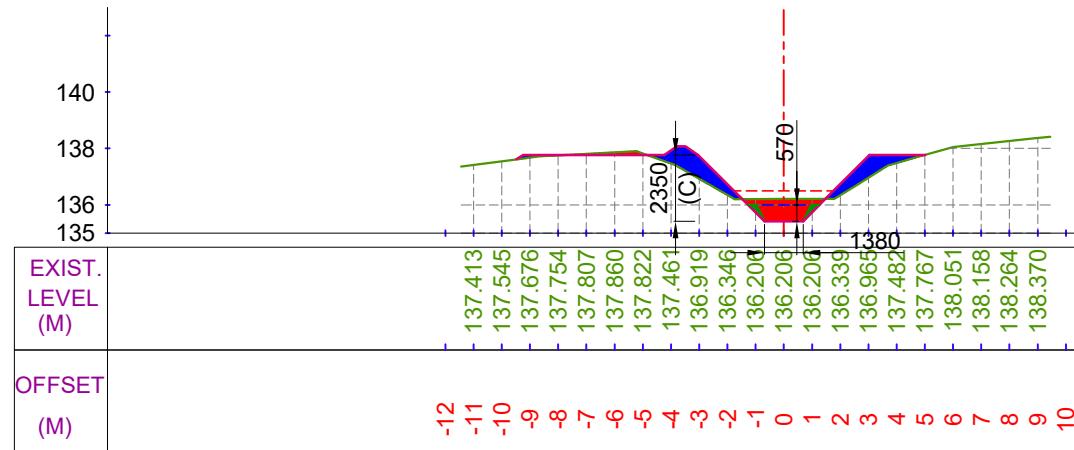
Drawing No. :-

WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC /TYP-(PCF)

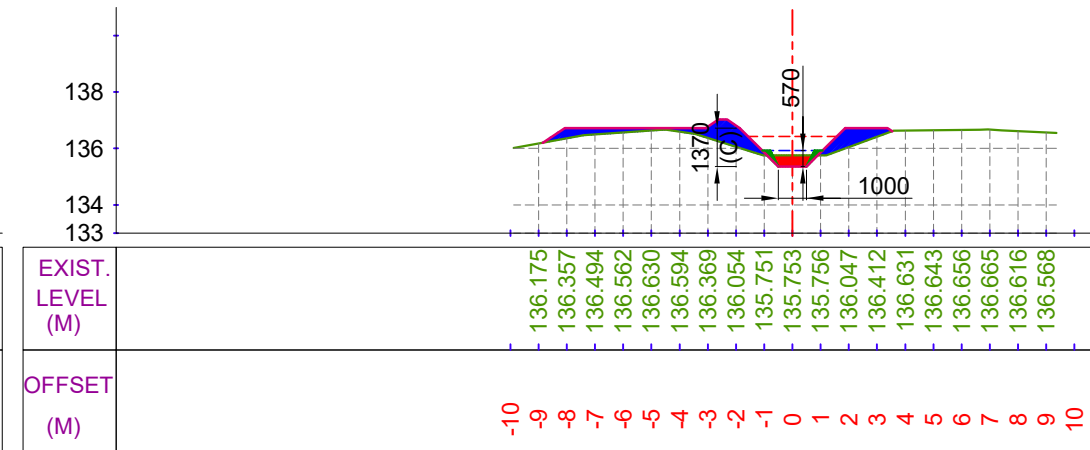
5 of 5

CROSS-SECTION

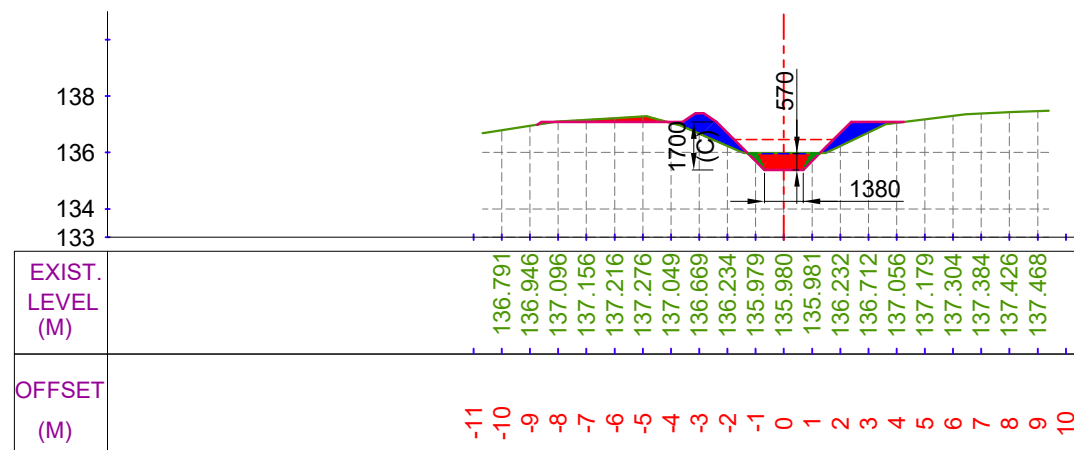
X SECTION OF DEO MINOR



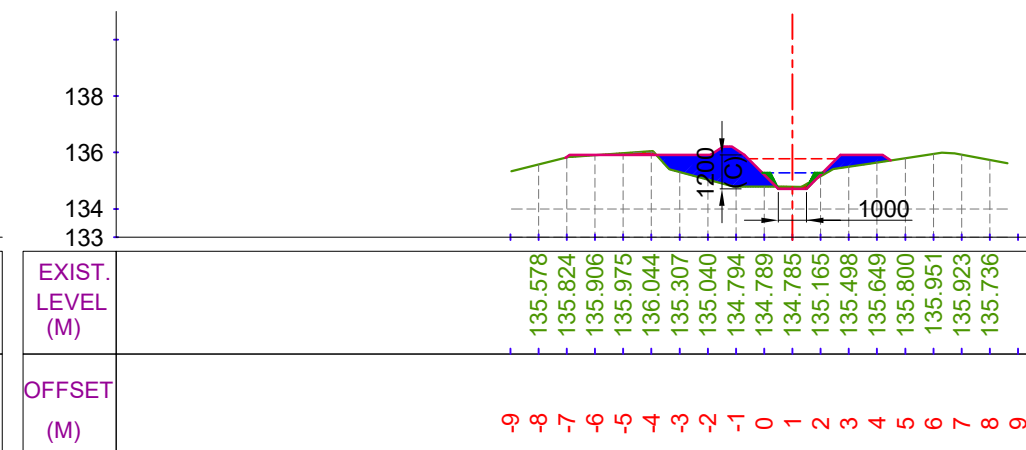
CUTTING AREA (SQ.M) = 1.725
FILLING AREA (SQ.M) = 3.086
CH. (KM):- 0+100
DESIGNED BED LEVEL = 135.420 M



CUTTING AREA (SQ.M) = 0.481
FILLING AREA (SQ.M) = 3.349
CH. (KM):- 0+300
DESIGNED BED LEVEL = 135.353 M



CUTTING AREA (SQ.M) = 1.407
FILLING AREA (SQ.M) = 2.093
CH. (KM):- 0+200
DESIGNED BED LEVEL = 135.386 M



CUTTING AREA (SQ.M) = 0.243
FILLING AREA (SQ.M) = 2.984
CH. (KM):- 0+400
DESIGNED BED LEVEL = 134.710 M

LEGEND

	CUT AREA		EXISTING BED LINE
			F.S.L.
	FILL AREA		DESIGNED BED LINE
			H.G. LINE

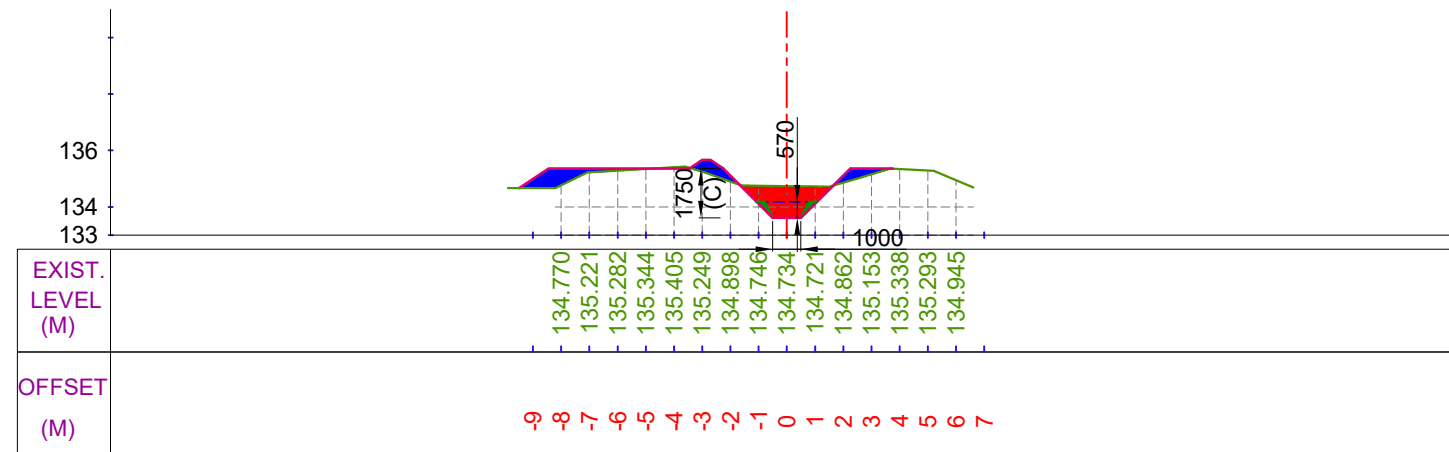
Prepared by :-

WAPCOS LTD.

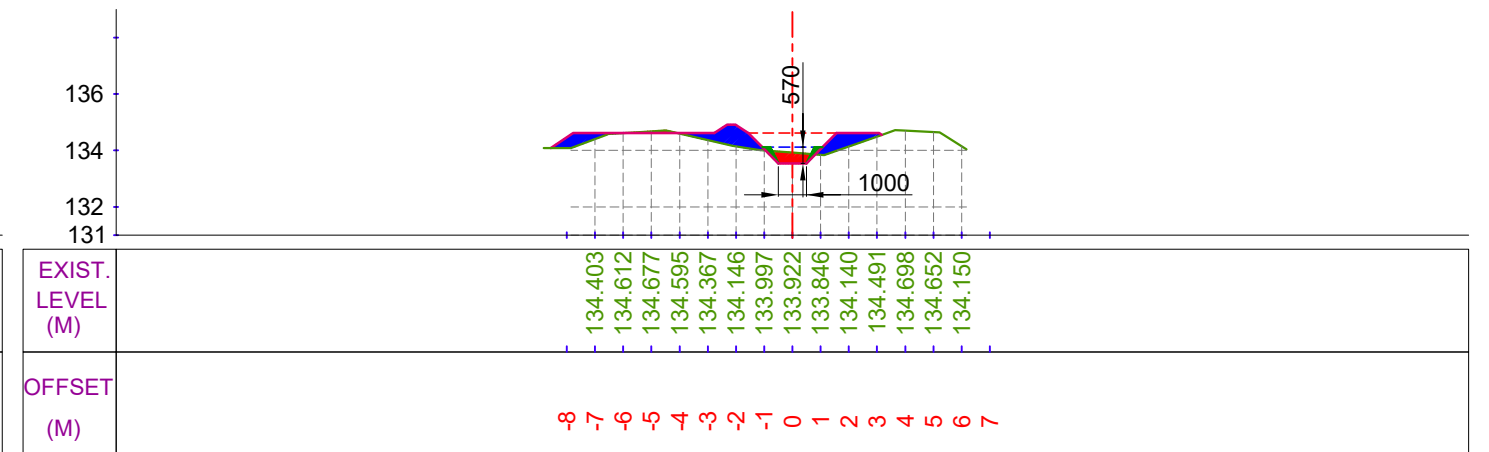


Project Title :-	NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND
Drawing Title :-	X SECTION OF DEO MINOR (OFFTAKE FROM RD - 71+949 KM. (L), NORTH KOEL RIGHT MAIN CANAL)
Drawing No. :-	WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC- 1 of 7

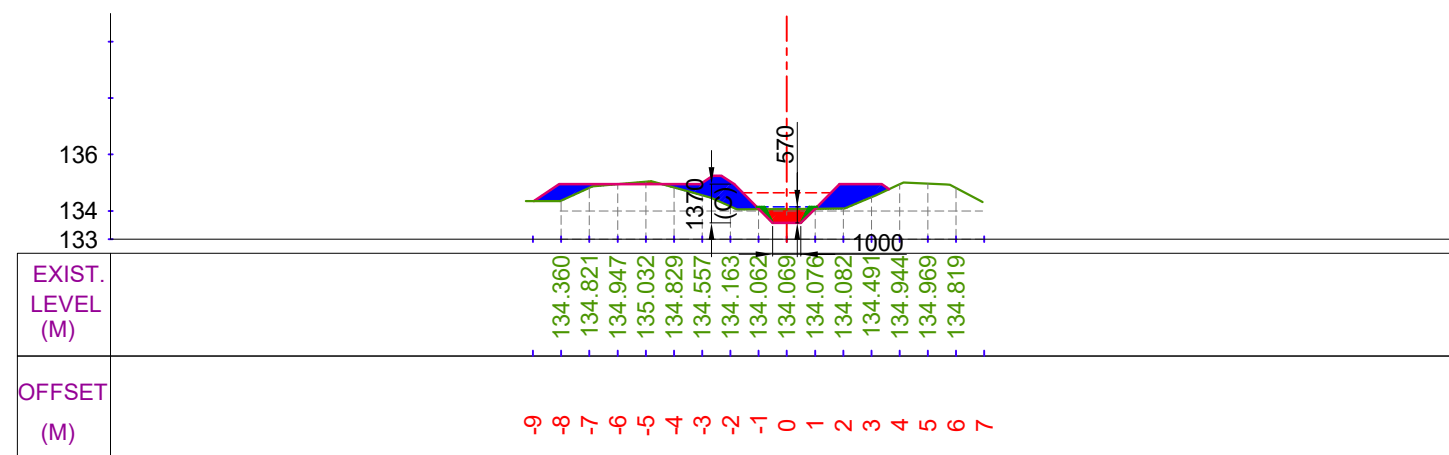
X SECTION OF DEO MINOR



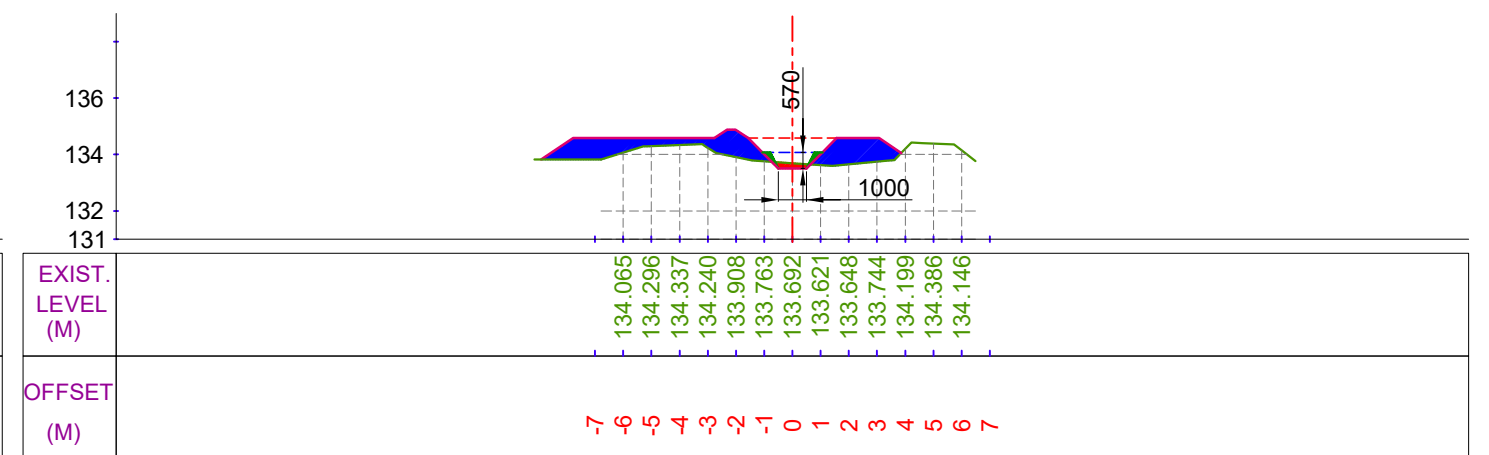
CUTTING AREA (SQ.M) = 2.279
FILLING AREA (SQ.M) = 2.127
CH. (KM):- 0+500
DESIGNED BED LEVEL = 133.609



CUTTING AREA (SQ.M) = 0.544
FILLING AREA (SQ.M) = 2.461
CH. (KM):- 0+700
DESIGNED BED LEVEL = 133.543 M



CUTTING AREA (SQ.M) = 0.696
FILLING AREA (SQ.M) = 3.612
CH. (KM):- 0+600
DESIGNED BED LEVEL = 133.576 M



CUTTING AREA (SQ.M) = 0.201
FILLING AREA (SQ.M) = 6.147
CH. (KM):- 0+800
DESIGNED BED LEVEL = 133.509 M

LEGEND

	CUT AREA		EXISTING BED LINE
			F.S.L.
	FILL AREA		DESIGNED BED LINE
			H.G. LINE

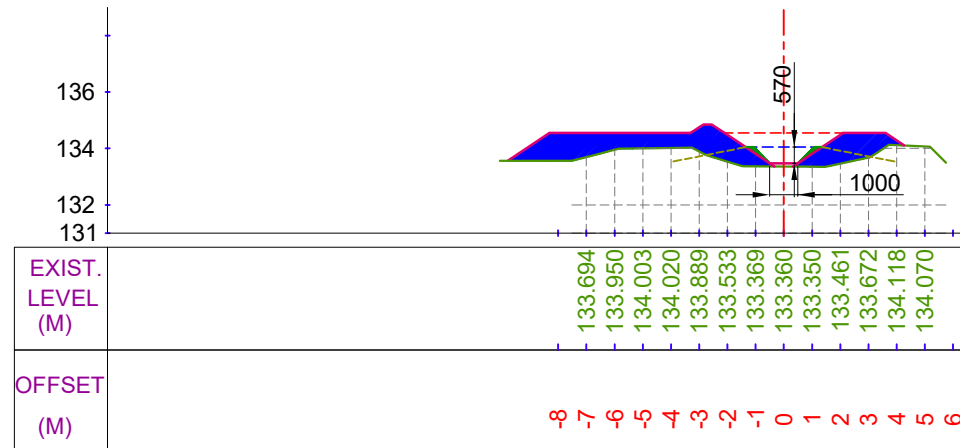
Prepared by :-

WAPCOS LTD.

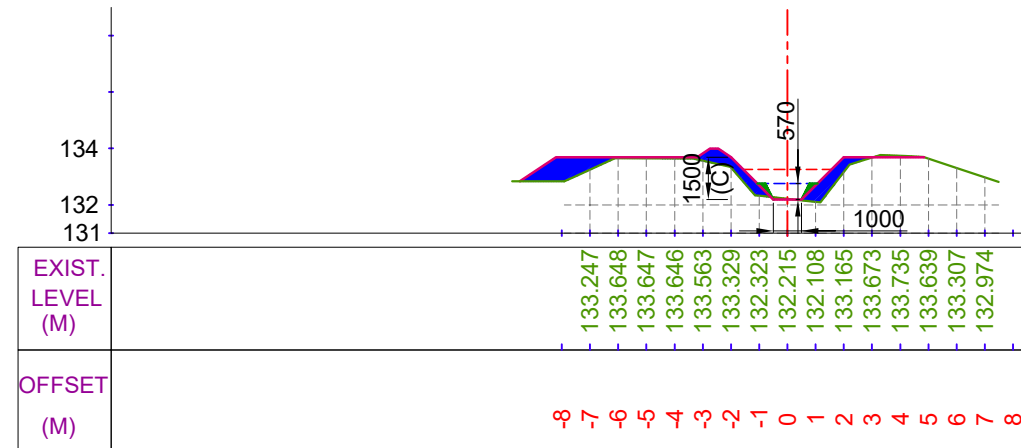


Project Title :-	NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND
Drawing Title :-	X SECTION OF DEO MINOR (OFFTAKE FROM RD - 71+949 KM. (L), NORTH KOEL RIGHT MAIN CANAL)
Drawing No. :-	WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC- 2 of 7

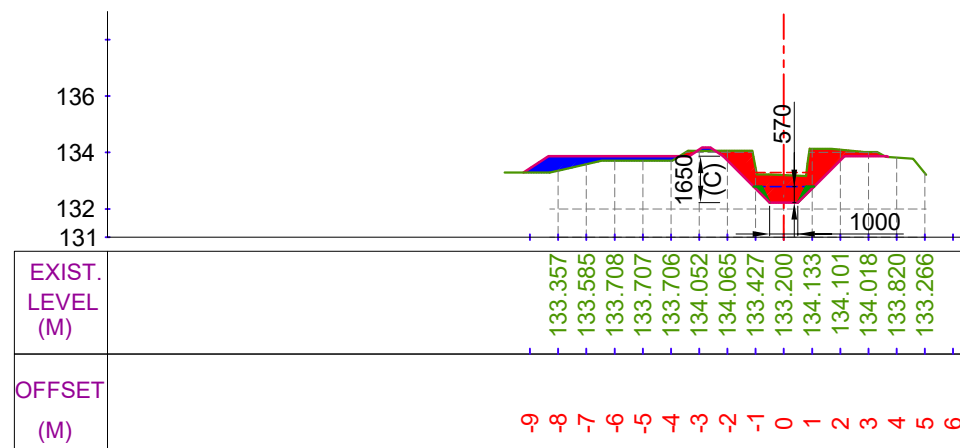
X SECTION OF DEO MINOR



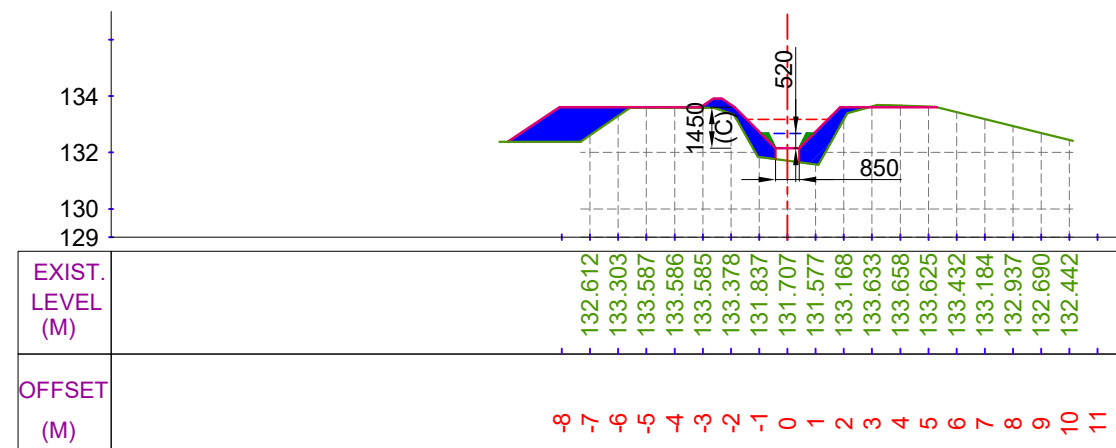
CUTTING AREA (SQ.M) = 0.000
FILLING AREA (SQ.M) = 8.736
CH. (KM):- 0+900
DESIGNED BED LEVEL = 133.476 M



CUTTING AREA (SQ.M) = 0.107
FILLING AREA (SQ.M) = 3.709
CH. (KM):- 1+100
DESIGNED BED LEVEL = 132.189 M



CUTTING AREA (SQ.M) = 3.779
FILLING AREA (SQ.M) = 1.467
CH. (KM):- 1+000
DESIGNED BED LEVEL = 132.223 M



CUTTING AREA (SQ.M) = 0.104
FILLING AREA (SQ.M) = 5.979
CH. (KM):- 1+200
DESIGNED BED LEVEL = 132.156 M

LEGEND

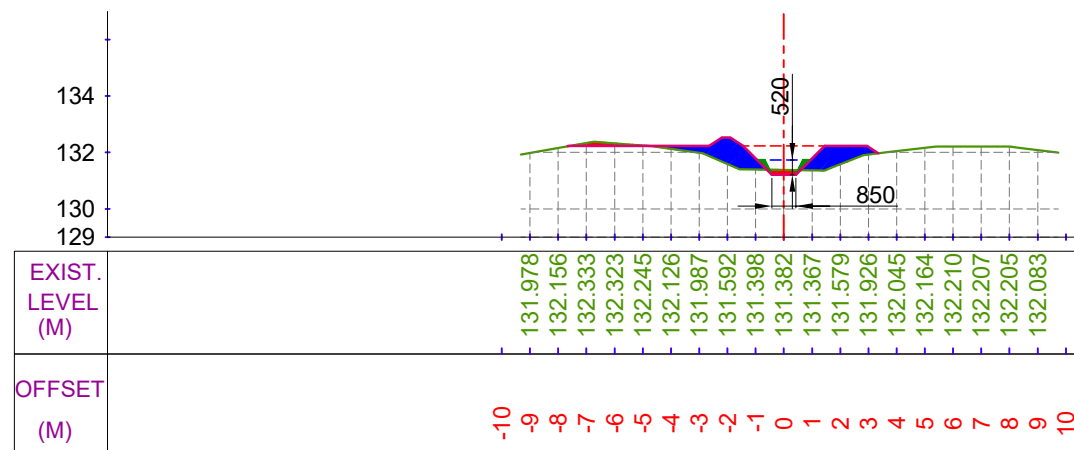
	CUT AREA		EXISTING BED LINE
			F.S.L.
	FILL AREA		DESIGNED BED LINE
			H.G. LINE

Prepared by :-

WAPCOS LTD.

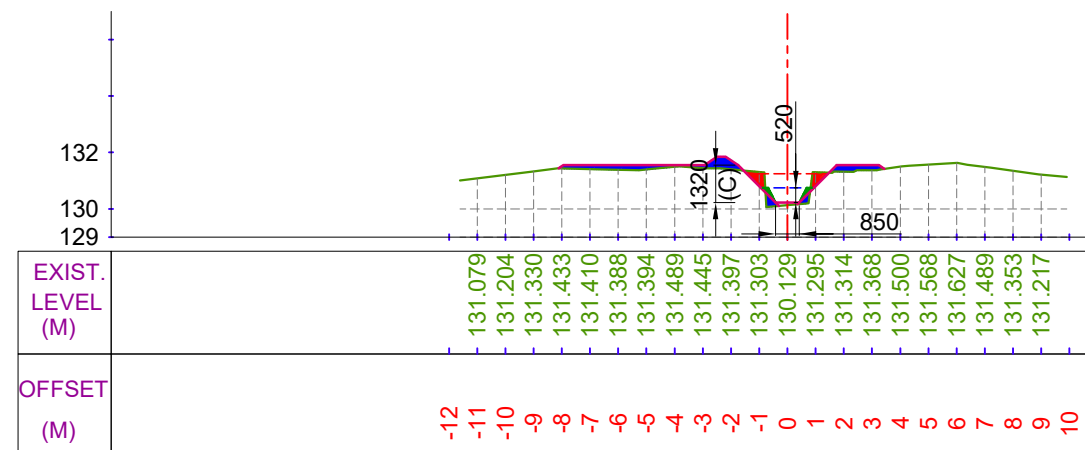


Project Title :-	NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND
Drawing Title :-	X SECTION OF DEO MINOR (OFFTAKE FROM RD - 71+949 KM. (L), NORTH KOEL RIGHT MAIN CANAL)
Drawing No. :-	WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC- 3 of 7



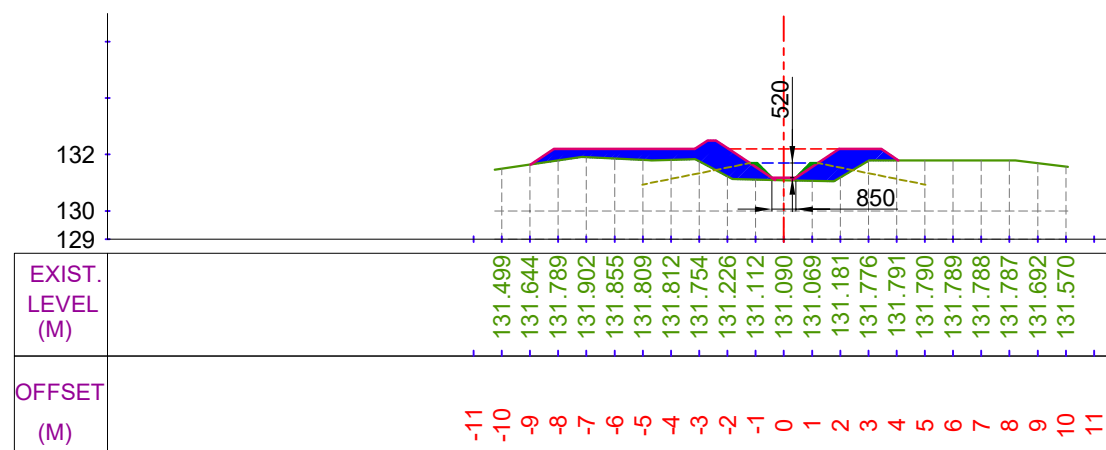
CUTTING AREA (SQ.M) = 0.374
FILLING AREA (SQ.M) = 2.914

CH. (KM):- 1+300
DESIGNED BED LEVEL = 131.209 M



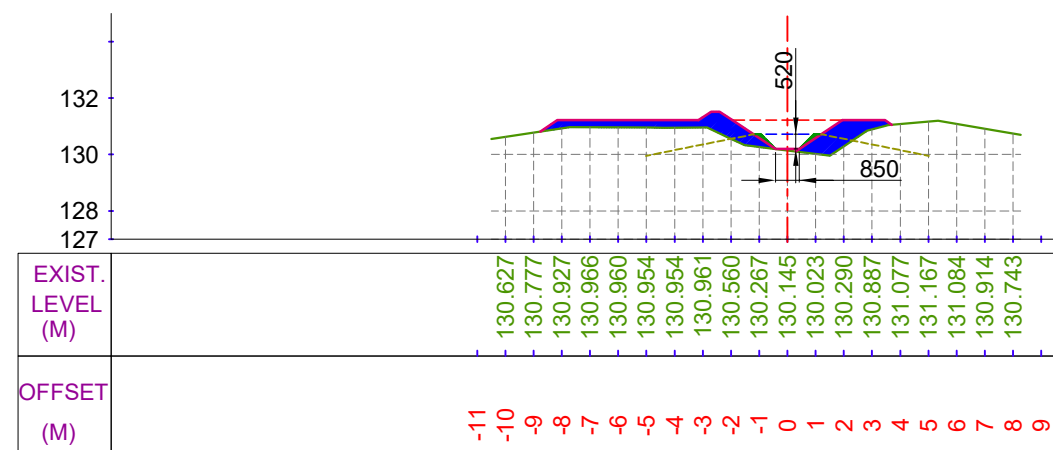
CUTTING AREA (SQ.M) = 0.441
FILLING AREA (SQ.M) = 1.569

CH. (KM):- 1+500
DESIGNED BED LEVEL = 130.228 M



CUTTING AREA (SQ.M) = 0.000
FILLING AREA (SQ.M) = 5.882

CH. (KM):- 1+400
DESIGNED BED LEVEL = 131.175 M



CUTTING AREA (SQ.M) = 0.000
FILLING AREA (SQ.M) = 4.494

CH. (KM):- 1+600
DESIGNED BED LEVEL = 130.195 M

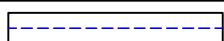
LEGEND



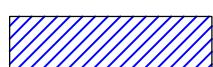
CUT AREA



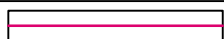
EXISTING BED LINE



F.S.L.



FILL AREA



DESIGNED BED LINE



H.G. LINE

Prepared by :-

WAPCOS LTD.



Project Title :-

NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND

Drawing Title :-

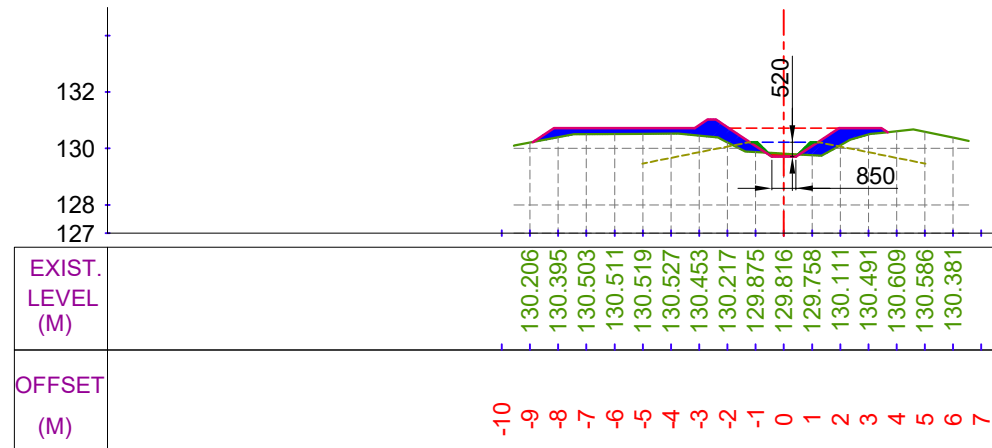
X SECTION OF DEO MINOR (OFFTAKE FROM RD - 71+949 KM. (L), NORTH KOEL RIGHT MAIN CANAL)

Drawing No. :-

WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC-

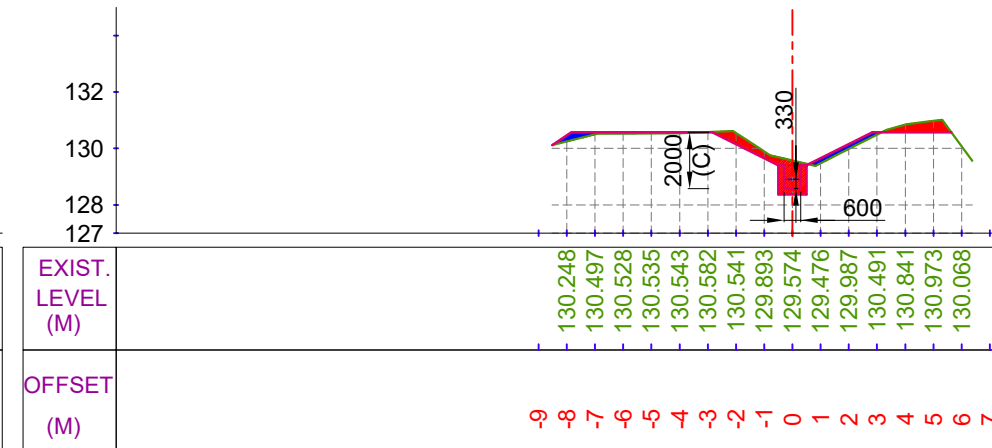
4 of 7

X SECTION OF DEO MINOR



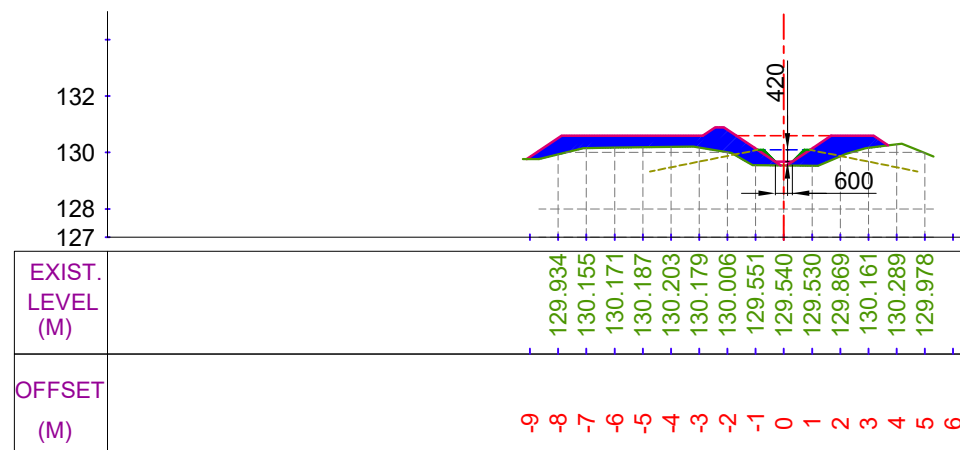
CUTTING AREA (SQ.M) = 0.109
FILLING AREA (SQ.M) = 3.452

CH. (KM):- 1+700
DESIGNED BED LEVEL = 129.704 M



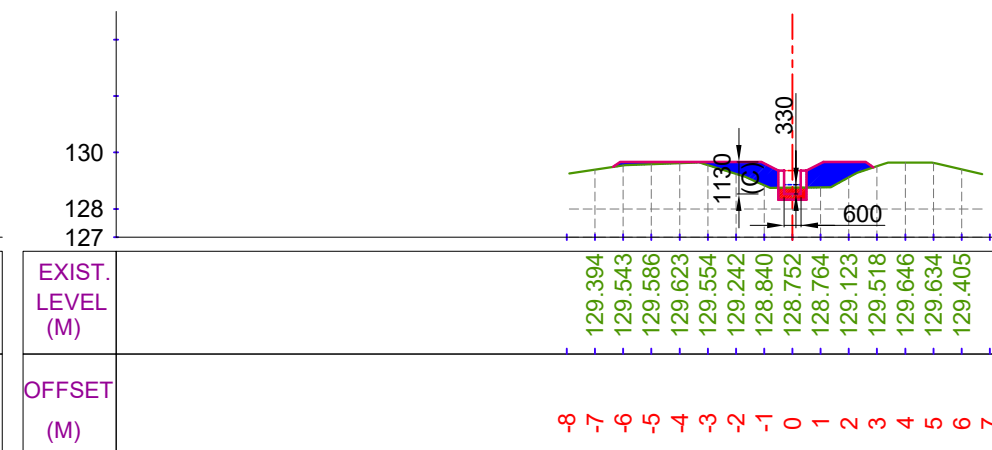
CUTTING AREA (SQ.M) = 2.518
FILLING AREA (SQ.M) = 0.751

CH. (KM):- 1+900
DESIGNED BED LEVEL = 128.570 M



CUTTING AREA (SQ.M) = 0.000
FILLING AREA (SQ.M) = 5.941

CH. (KM):- 1+800
DESIGNED BED LEVEL = 129.671 M



CUTTING AREA (SQ.M) = 0.421
FILLING AREA (SQ.M) = 2.852

CH. (KM):- 2+000
DESIGNED BED LEVEL = 128.531 M

LEGEND

	CUT AREA		EXISTING BED LINE
			F.S.L.
	FILL AREA		DESIGNED BED LINE
			H.G. LINE

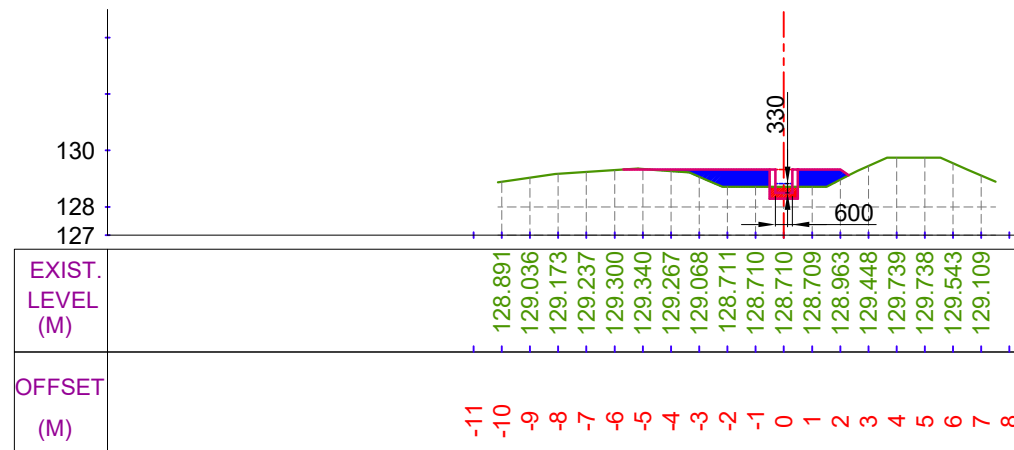
Prepared by :-

WAPCOS LTD.

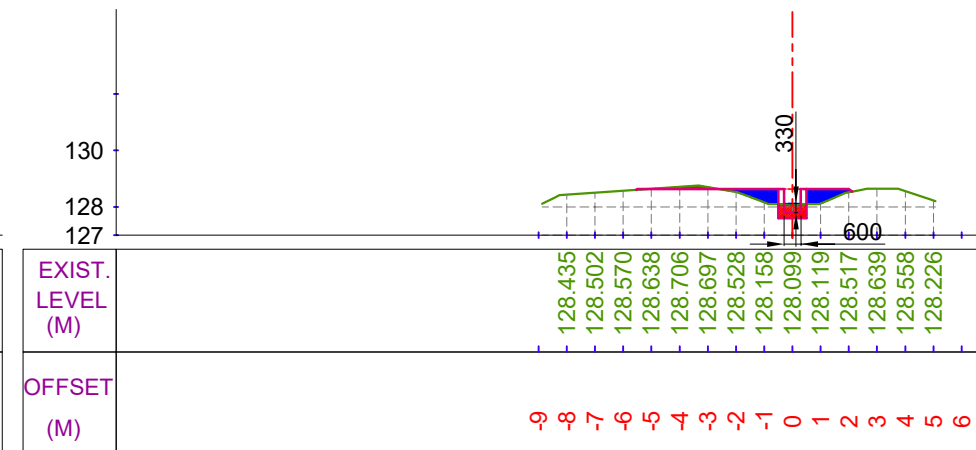


Project Title :-	NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND
Drawing Title :-	X SECTION OF DEO MINOR (OFFTAKE FROM RD - 71+949 KM. (L), NORTH KOEL RIGHT MAIN CANAL)
Drawing No. :-	WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC- 5 of 7

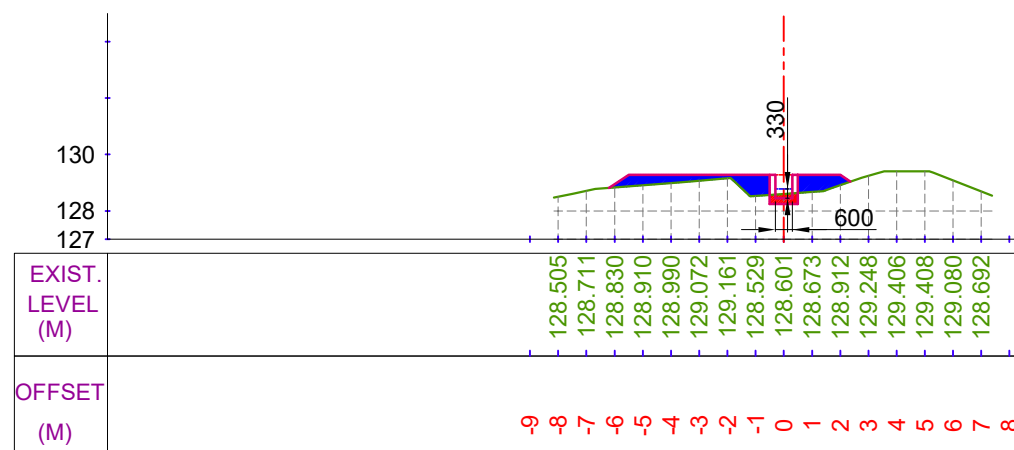
X SECTION OF DEO MINOR



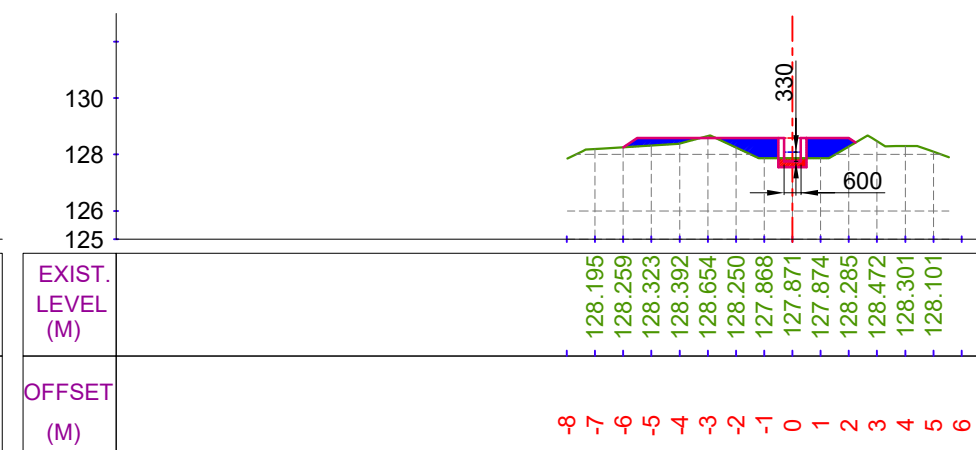
CUTTING AREA (SQ.M) = 0.436
FILLING AREA (SQ.M) = 2.416
CH. (KM):- 2+100
DESIGNED BED LEVEL = 128.490 M



CUTTING AREA (SQ.M) = 0.666
FILLING AREA (SQ.M) = 1.136
CH. (KM):- 2+300
DESIGNED BED LEVEL = 127.796 M



CUTTING AREA (SQ.M) = 0.353
FILLING AREA (SQ.M) = 2.796
CH. (KM):- 2+200
DESIGNED BED LEVEL = 128.448 M



CUTTING AREA (SQ.M) = 0.341
FILLING AREA (SQ.M) = 2.510
CH. (KM):- 2+400
DESIGNED BED LEVEL = 127.755 M

LEGEND

	CUT AREA		EXISTING BED LINE
			F.S.L.
	FILL AREA		DESIGNED BED LINE
			H.G. LINE

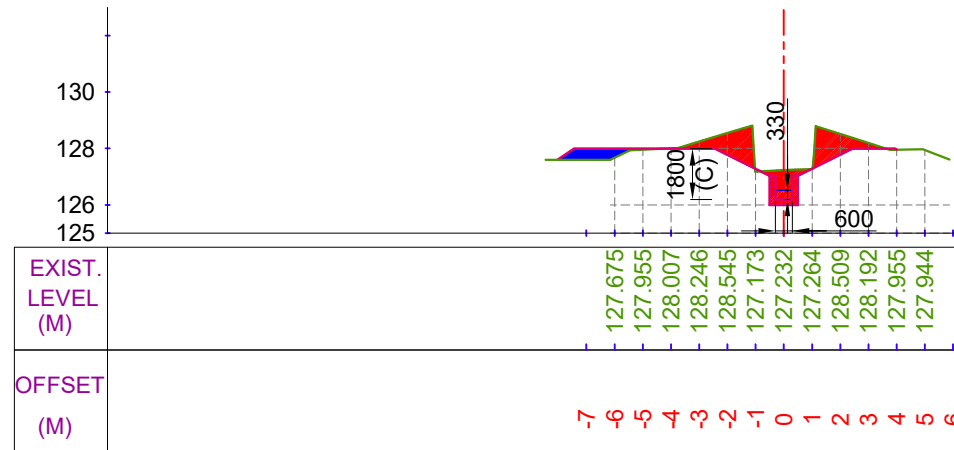
Prepared by :-

WAPCOS LTD.

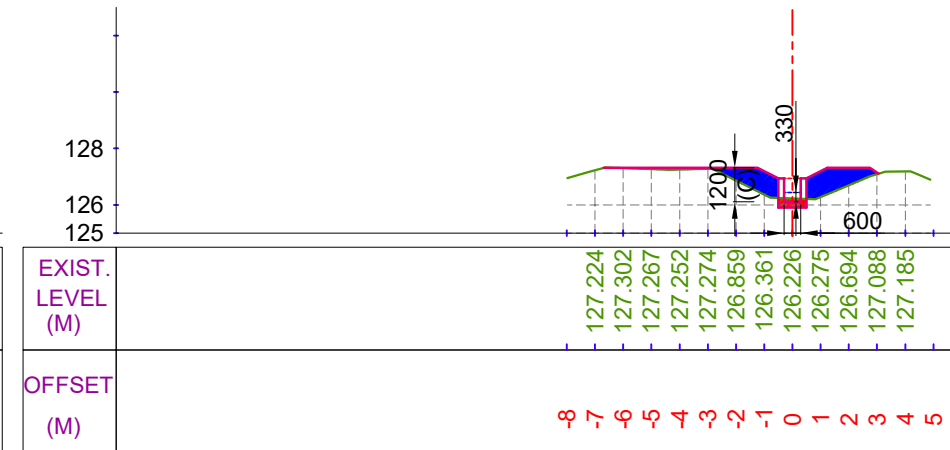


Project Title :-	NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND
Drawing Title :-	X SECTION OF DEO MINOR (OFFTAKE FROM RD - 71+949 KM. (L), NORTH KOEL RIGHT MAIN CANAL)
Drawing No. :-	WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC- 6 of 7

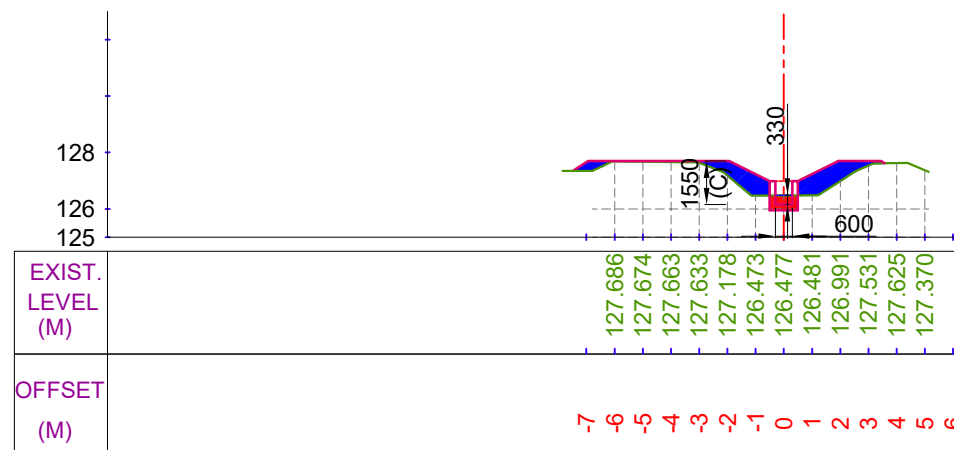
X SECTION OF DEO MINOR



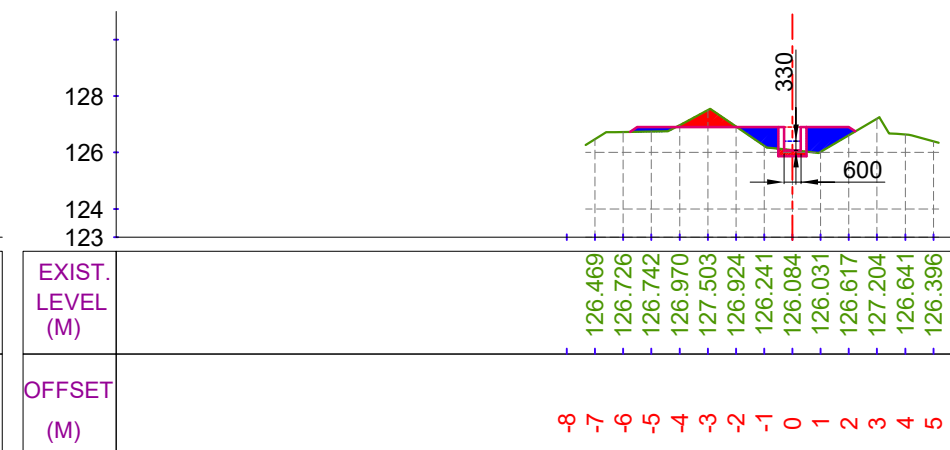
CUTTING AREA (SQ.M) = 4.438
 FILLING AREA (SQ.M) = 0.837
 CH. (KM):- 2+500
 DESIGNED BED LEVEL = 126.193 M



CUTTING AREA (SQ.M) = 0.319
 FILLING AREA (SQ.M) = 3.045
 CH. (KM):- 2+700
 DESIGNED BED LEVEL = 126.110 M



CUTTING AREA (SQ.M) = 0.526
 FILLING AREA (SQ.M) = 3.252
 CH. (KM):- 2+600
 DESIGNED BED LEVEL = 126.151 M



CUTTING AREA (SQ.M) = 0.922
 FILLING AREA (SQ.M) = 1.941
 CH. (KM):- 2+800
 DESIGNED BED LEVEL = 126.068 M

LEGEND

	CUT AREA		EXISTING BED LINE
			F.S.L.
	FILL AREA		DESIGNED BED LINE
			H.G. LINE

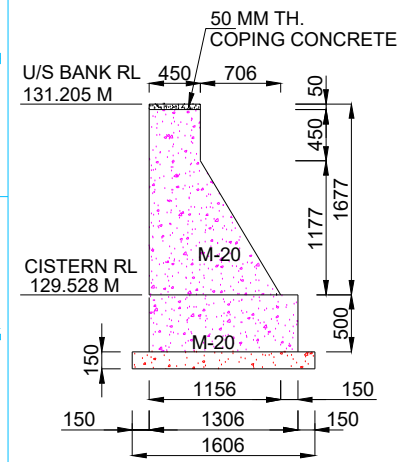
Prepared by :-

WAPCOS LTD.

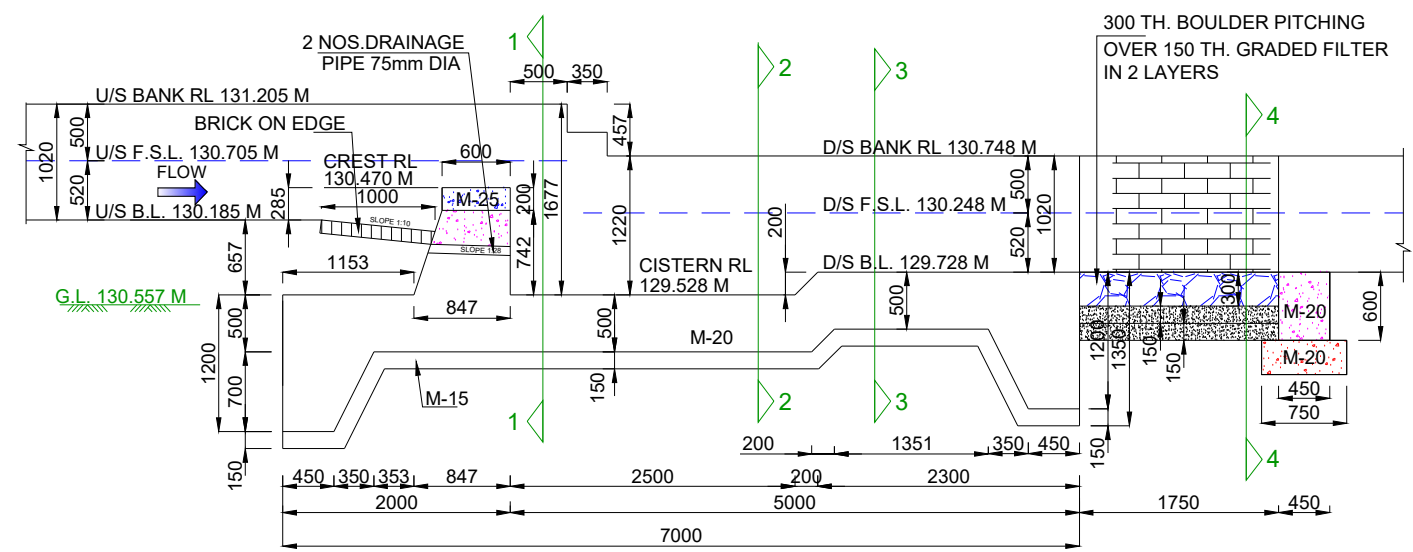


Project Title :-	NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND
Drawing Title :-	X SECTION OF DEO MINOR (OFFTAKE FROM RD - 71+949 KM. (L), NORTH KOEL RIGHT MAIN CANAL)
Drawing No. :-	WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ XSEC- 7 of 7

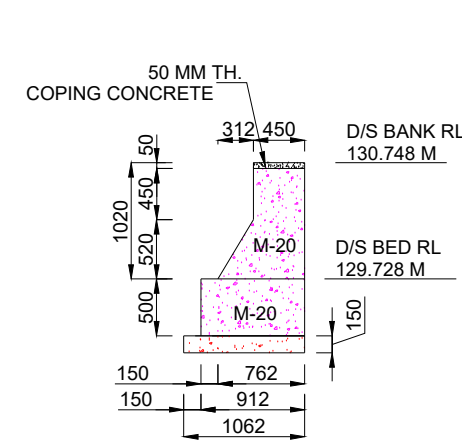
DRAWING OF STRUCTURES



SECTION AT 5-5
(SCALE A)



SECTION A-A
(SCALE A)

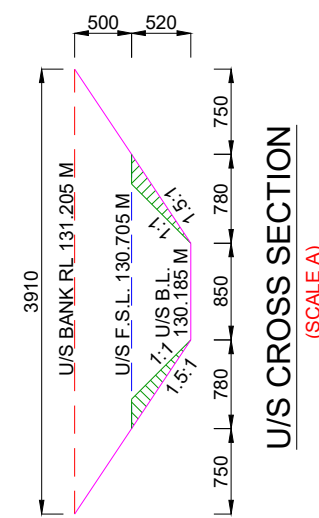


SECTION AT 6-6
(SCALE A)

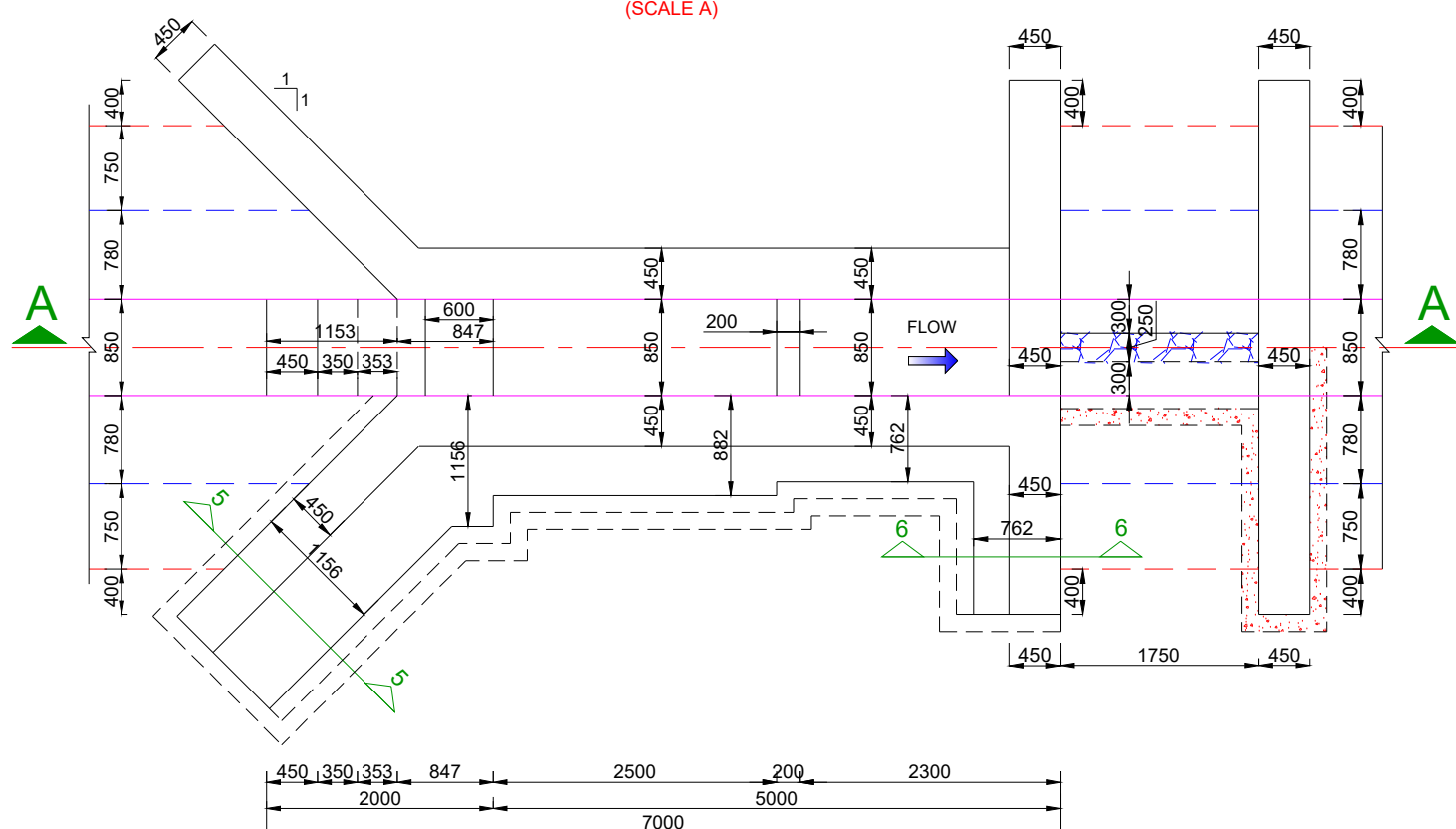
- NOTES:-**
- ALL DIMENSIONS ARE IN mm AND LEVELS IN METRES EXCEPT OTHERWISE MENTIONED.
 - THE DRAWING SHALL NOT BE SCALED OFF, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
 - ALL CONCRETE WORK SHALL CONFORM TO IS: 456 -2000. GRADE OF CONCRETE IN DIFFERENT COMPONENTS SHALL BE AS FOLLOWS,
FLOOR M 20
FOUNDATION OF ABUTMENTS & WING WALL M 20
PCC UNDER FLOOR M 15
ABUTMENTS / WING WALLS M 20
 - ANY OVER DIGGING SHALL BE FILLED BY CONCRETE 1:3:6 GRADE.
 - SKIN REINFORCEMENT SHALL BE PROVIDED IN FLOOR AND ABUTMENT OF 12 MM DIA BARS @ 250 MM.

HYDRAULIC:- DATA

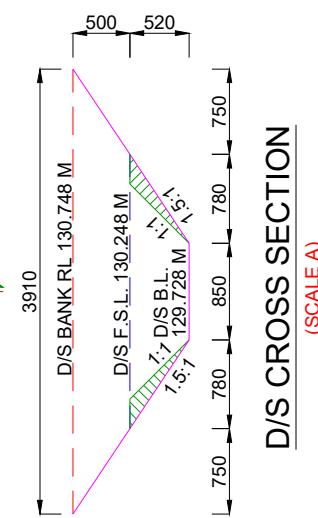
	U/S	D/S	UNIT
FULL SUPPLY DISCHARGE	0.170	0.170	CUMEC
VERTICAL DROP	0.457	0.457	METRE
FULL SUPPLY DEPTH	0.520	0.520	METRE
BED WIDTH	0.850	0.850	METRE
BED SLOPE	1 : 3000	1 : 3000	



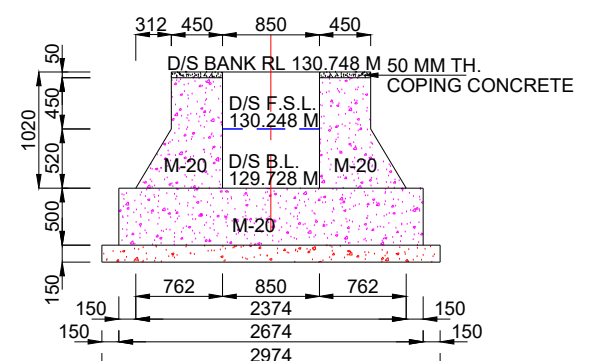
U/S CROSS SECTION
(SCALE A)



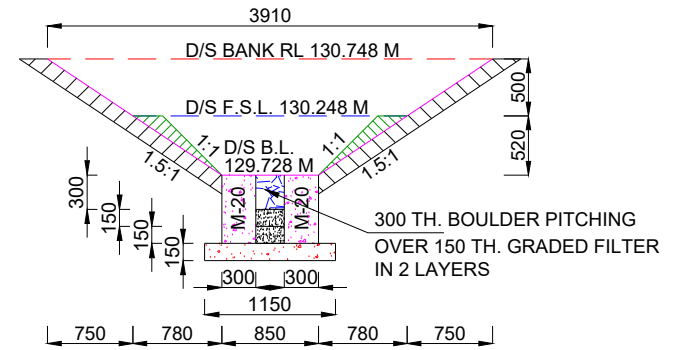
HALF TOP / HALF FOUNDATION PLAN
(SCALE A)



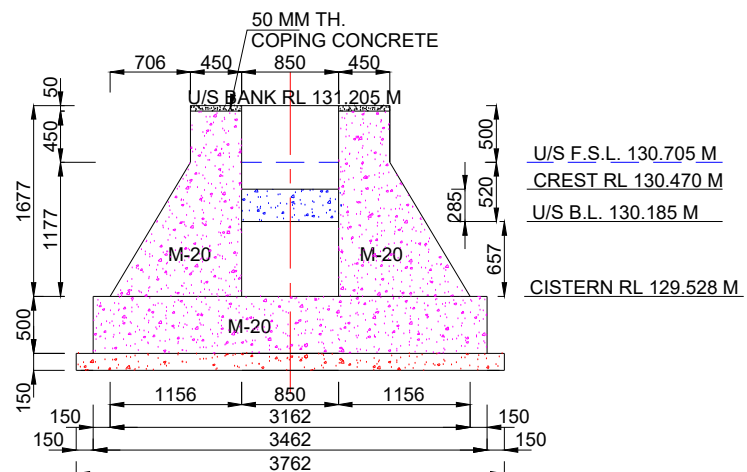
D/S CROSS SECTION
(SCALE A)



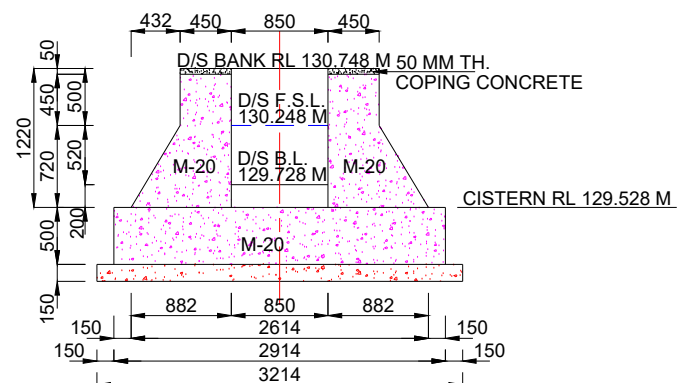
SECTION AT 3-3
(SCALE A)



SECTION AT 4-4
(SCALE A)

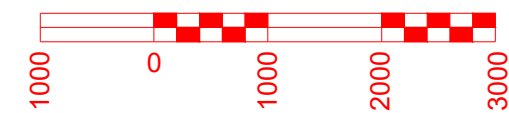


SECTION AT 1-1
(SCALE A)



SECTION AT 2-2
(SCALE A)

SCALE A:-

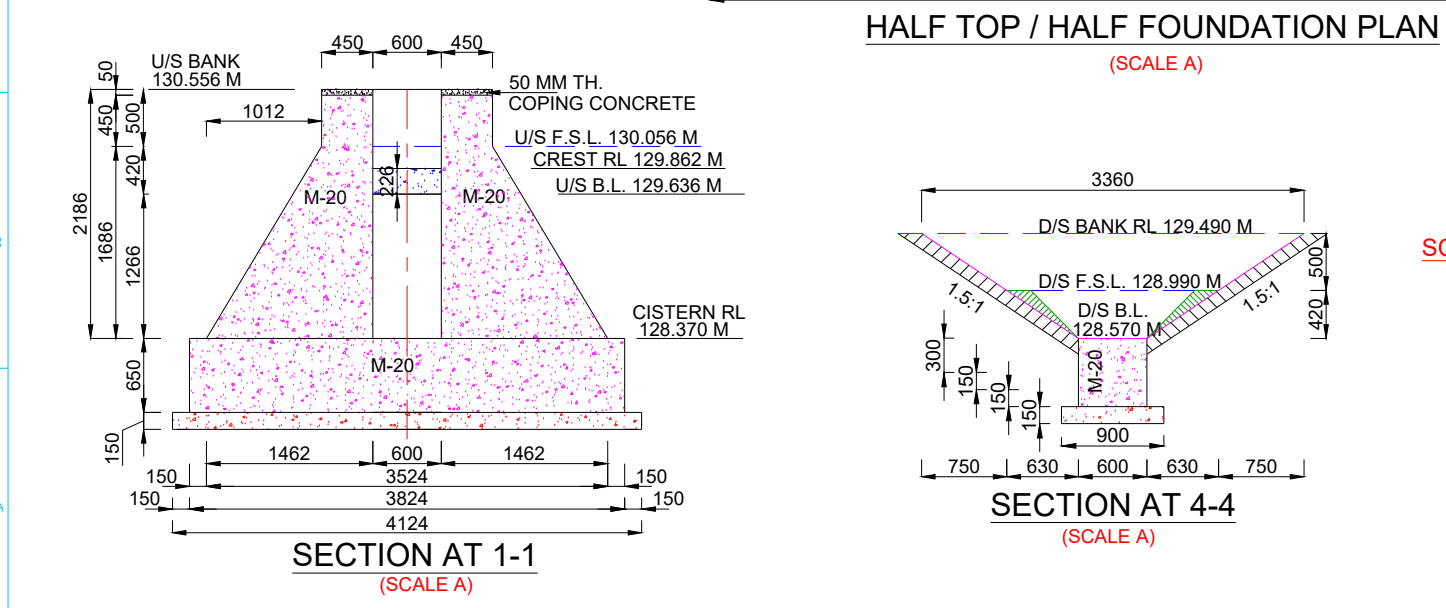
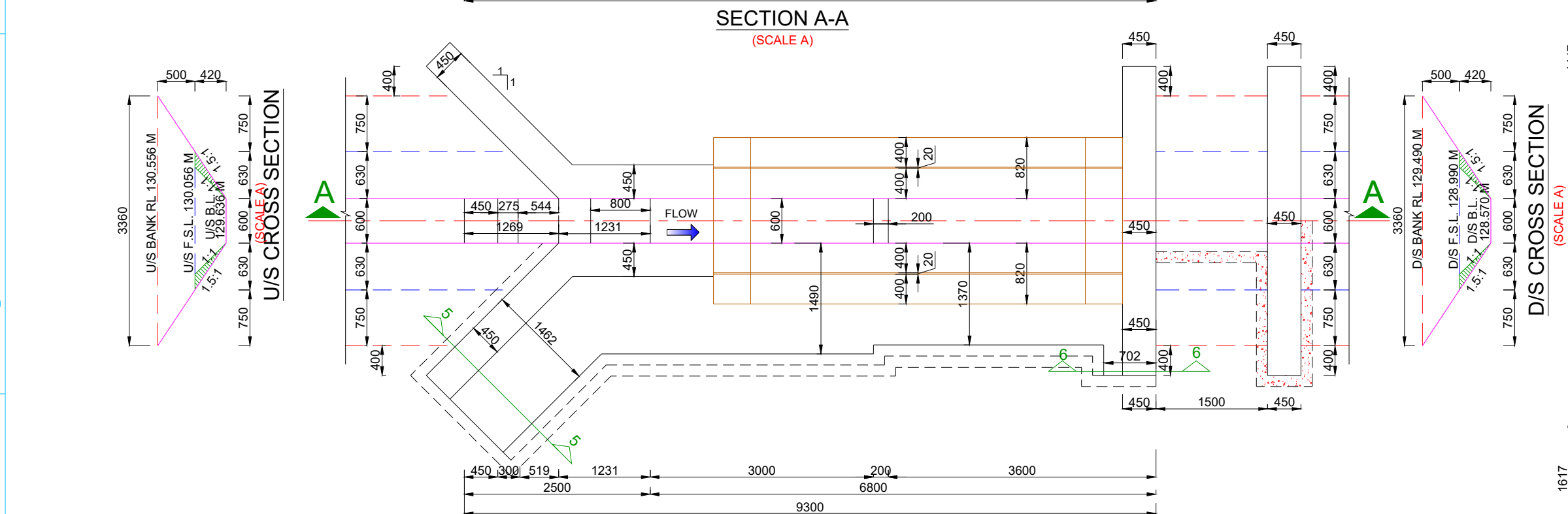
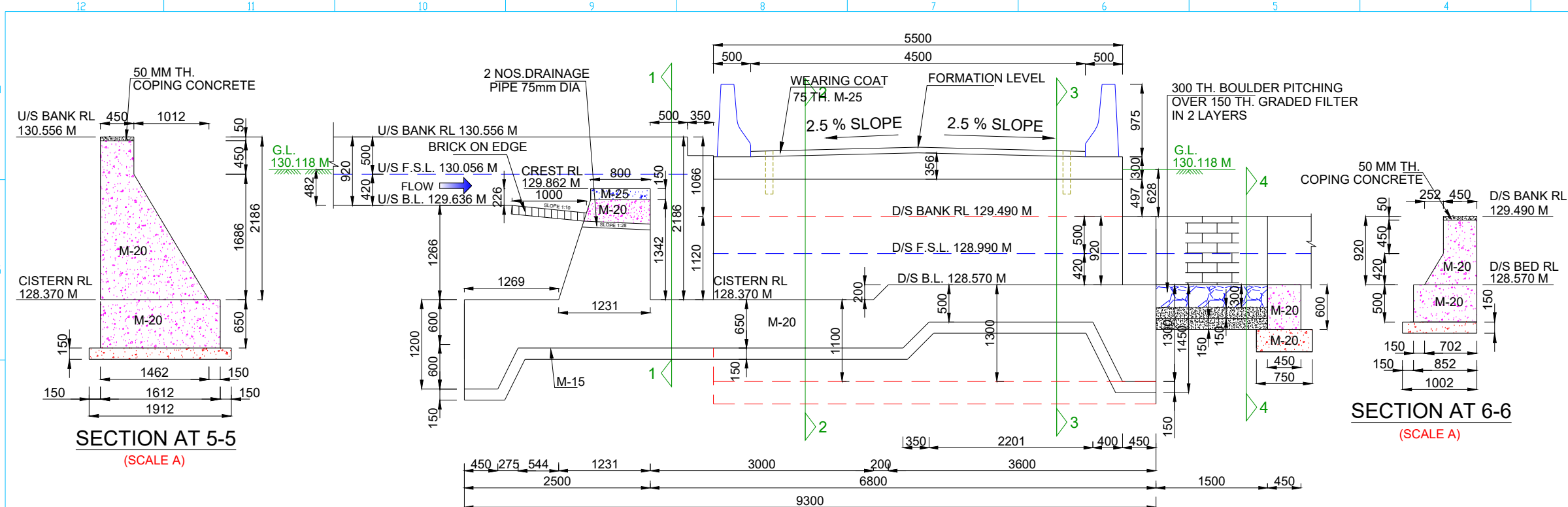


Prepared by :-

WAPCOS LTD.



Project Title :-	NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND
Drawing Title :-	SHARDA TYPE 0.457 M HT. FALL AT KM. 1.630 OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
Drawing No. :-	WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ FALL 1 of 1

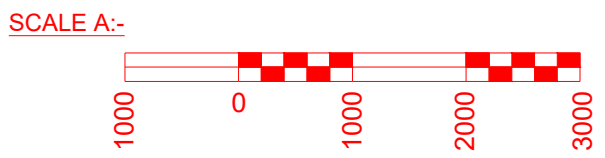
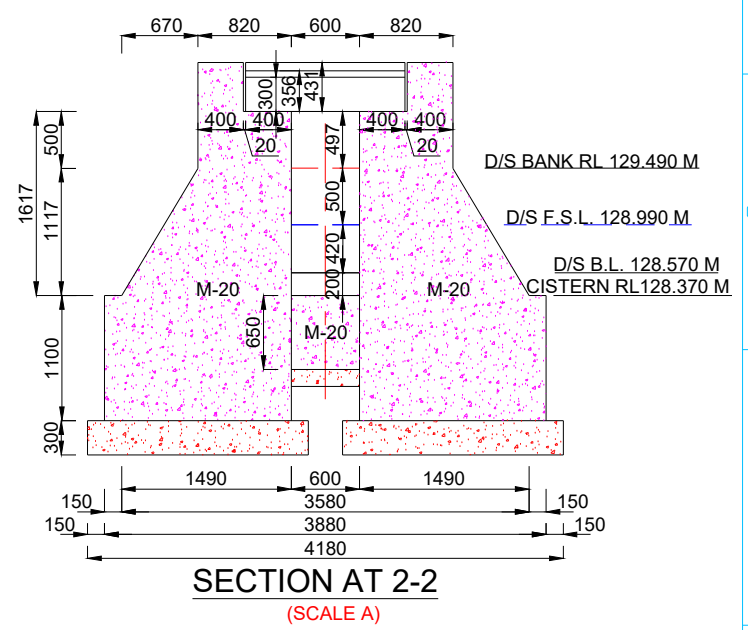
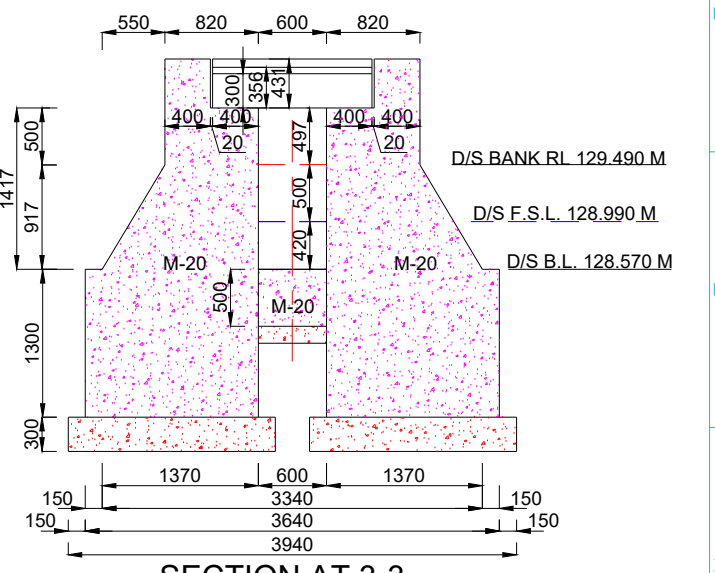


NOTES:-

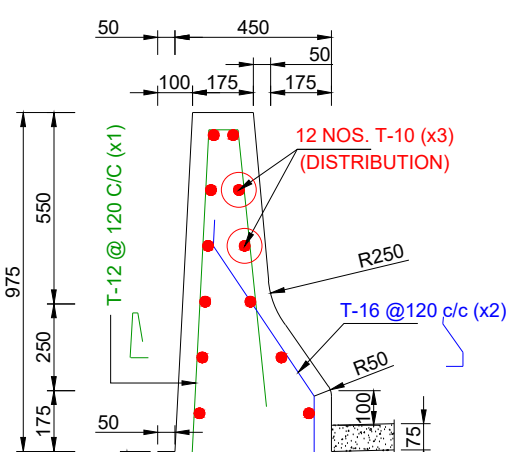
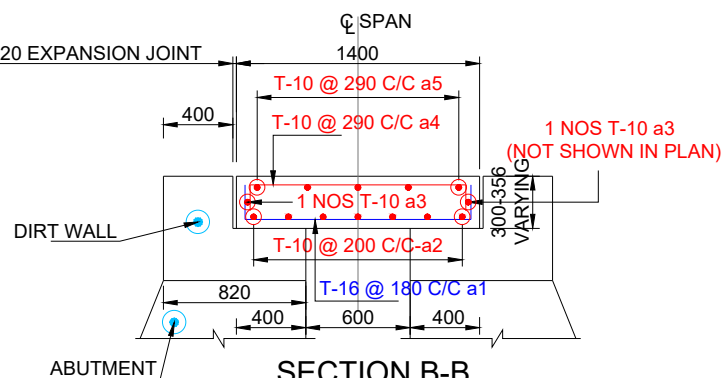
1. ALL DIMENSIONS ARE IN mm AND LEVELS IN METRES EXCEPT OTHERWISE MENTIONED.
2. THE DRAWING SHALL NOT BE SCALED OFF, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
3. ALL CONCRETE WORK SHALL CONFORM TO IS: 456 -2000. GRADE OF CONCRETE IN DIFFERENT COMPONENTS SHALL BE AS FOLLOWS,
FLOOR M 20
FOUNDATION OF ABUTMENTS & WING WALL M 20
PCC UNDER FLOOR M 15
ABUTMENTS / WING WALLS M 20
4. ANY OVER DIGGING SHALL BE FILLED BY CONCRETE 1:3:6 GRADE.
5. SKIN REINFORCEMENT SHALL BE PROVIDED IN FLOOR AND ABUTMENT OF 12 MM DIA BARS @ 250 MM.

HYDRAULIC:- DATA

	U/S	D/S	UNIT
FULL SUPPLY DISCHARGE	0.080	0.080	CUMEC
VERTICAL DROP	1.066	1.066	METRE
FULL SUPPLY DEPTH	0.420	0.420	METRE
BED WIDTH	0.600	0.600	METRE
BED SLOPE	1 : 2800	1 : 2800	

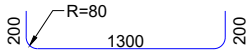
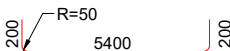
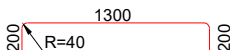
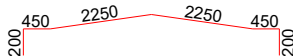
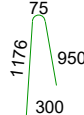
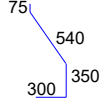


Prepared by :- WAPCOS LTD. 	Project Title :- NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND
Drawing Title :- SHARDA TYPE 1.066 M HT. FALL AT KM. 1.900 OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)	
Drawing No. :- WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ FALL	1 of 2



REINF. DETAILS OF
CRASH BARRIER IN
MAIN SLAB
(SCALE B)

BAR BENDING SCHEDULE

S. No.	Type of bars	Shape of bars (not to scale (Dimensions are in millimetres))	Dia of Bars (mm)	Spacing (mm)	Nos. of Bars
SLAB PER SPAN					
1	a1		16	180	31
2	a2		10	200	7
3	a3		10	-	2
4	a4		10	290	19
5	a5		10	290	5
CRASH BARRIER					
1	x1		12	120	11X2
2	x2		16	120	11X2
3	x3		12	-	10X2

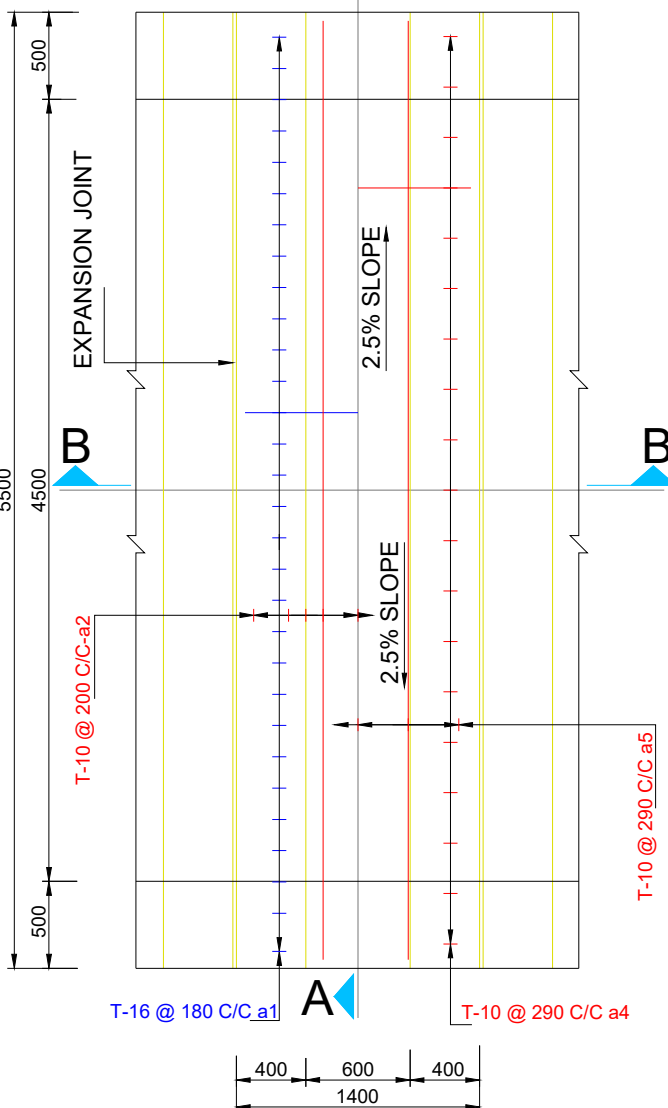
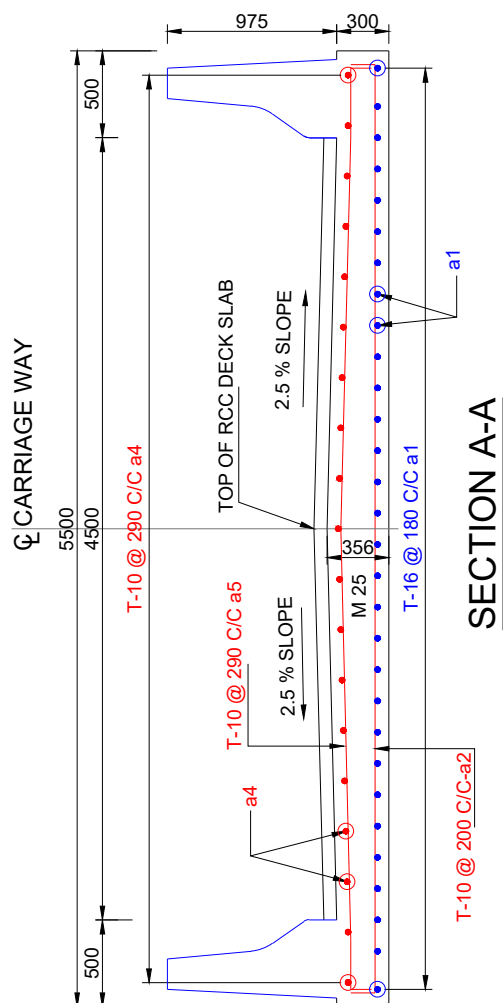
NOTES:-

- 1 ALL DIMENSIONS ARE IN mm AND LEVELS IN METRES EXCEPT OTHERWISE MENTIONED.
- 2 THE DRAWING SHALL NOT BE SCALED OFF ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
- 3 ALL CONCRETE WORK SHALL CONFORM TO IS:456 - 2000.
GRADE OF CONCRETE IN DIFFERENT COMPONENTS SHALL BE AS FOLLOWS,
BRIDGE SLAB & PARAPET M-25
4. ALL REINFORCEMENT BARS SHALL BE OF HIGH YIELD STRENGTH DEFORMED BARS (Fe 500) COMFORMING I.S. 1786.
5. MIN. CLEAR COVER TO ANY REINF. INCLUDING STIRRUPS SHALL BE 40 MM OR UNLESS OTHERWISE SPECIFIED.
6. THE COVER INDICATED IN THIS DRAWINGS IS CLEAR COVER TO MAIN REINFORCEMENT BARS NEAREST TO THE CONCRETE SURFACE INCLUDING STIRRUPS AND BINDERS UNLESS MENTIONED OTHERWISE.
7. BENDING OF REINF. BARS SHALL CONFORM TO I.S. 2502.
8. REINF. BARS SHALL BE CUT AND ADJUSTED TO ACCOMODATE DRAINAGE SPOUT.
9. 75 MM THK. WEARING COAT IN M-25 CC SHALL BE PROVIDED.
10. APPROACH SLAB & APPROACH SLAB SUPPORT SHALL BE DECIDED BY FIELD ENGINEERS ACCORDING TO THE SITE CONDITIONS.
11. TARFELT BEARING SHALL BE PROVIDED UNDER SLAB AT SUPPORT.
12. THE REINFORCEMENT OF CRASH BARRIER SHALL BE INCORPORATED BEFORE CASTING OF THE DECK SLAB.
13. 8 MM DIA BAR @ 200 C/C IN BOTH DIRECTION SHALL BE PROVIDED IN WEARING COAT AT MIDDLE DEPTH.
14. WHEN BARS OF TWO DIFFERENT DIAMETERS ARE TO BE SPICED, THE LAP LENGTH SHALL BE CALCULATED ON THE BASIS OF DIAMETER OF SMALLER BAR.
15. THE DEVELOPMENT LENGTH OF BARS ARE GIVEN BELOW:

DEVELOPMENT LENGTH FULLY STRESSED DEFORMED BARS							
(fy=500N/mm ²) (IS 456 CLAUSE 26.2.1)							
TENSION BARS GRADE OF CONCRETE				COMPRESSION BARS GRADE OF CONCRETE			
M15	M20	M25	M30	M15	M20	M25	M30
68.00	56.60	48.50	45.30	54.40	45.30	38.80	36.30
81.60	68.00	58.30	54.40	65.30	54.40	46.60	43.50
108.80	90.60	77.70	72.50	87.00	87.00	62.10	58.00
135.90	113.30	97.10	90.60	108.80	108.80	77.70	72.50
169.90	141.60	121.40	113.30	135.90	135.90	97.10	90.60
217.50	181.30	155.40	145.00	174.00	174.00	124.30	116.00

1. THE DEVELOPMENT LENGTHS GIVEN ABOVE ARE FOR A STRESS OF 0.87 fy IN THE BAR
2. THE DEVELOPMENT LENGTH INCLUDES ANCHORAGE VALUES OF HOOKS IN TENSION REINFORCEMENT.

16. LAPPING OF REINFORCEMENT SHALL BE AVOIDED AS FAR AS POSSIBLE IN CASE LAPPING OF BARS BECOMES UNAVOIDABLE, MINIMUM LAP LENGTH OF REINFORCEMENT BARS SHALL BE CALCULATED AS FOLLOW WITH MAXIMUM ALLOWABLE LAPPING (p) OF 50 % ONLY (IRC:112 - 2011) CLAUSE: 15.2.5.1)
LAP LENGTH = αl_{bnet}
WHERE, αl = 1.0 for $p \leq 25\%$
 αl = 1.15 for $25\% \leq p \leq 33\%$
 αl = 1.4 for $33\% \leq p \leq 50\%$
17. THE STRAIGHT LENGTH OF THE LAP SHOULD NOT BE LESS THAN 15 ϕ OR 200 MM (WHICH EVER IS MORE)
18. THE LAP LENGTH MUST BE AT LEAST EQUAL TO DEVELOPMENT LENGTH IN NO CASE, THE LAP LENGTH SHOULD BE LESS THAN 30 ϕ FOR FLEXURAL AND DIRECT TENSION AND 24 ϕ FOR COMPRESSION.
19. LAP SPLICES SHALL BE CONSIDERED AS STAGGERED IF THE C/C DISTANCE OF SPLICES IS NOT LESS THAN 1.3 TIMES THE LAP LENGTH CALCULATED.
20. WHEN BARS OF TWO DIFFERENT DIAMETERS ARE TO BE SPLICED, THE LAP LENGTH SHALL BE CALCULATED ON THE BASIS OF DIAMETER OF SMALLER BAR.



BOTTOM REINFORCEMENT TOP REINFORCEMENT
PLAN SHOWING REINFORCEMENT DETAILS OF DECK SLAB
(SCALE A)



Prepared by :-

WAPCOS LTD.



Project Title :-

NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND

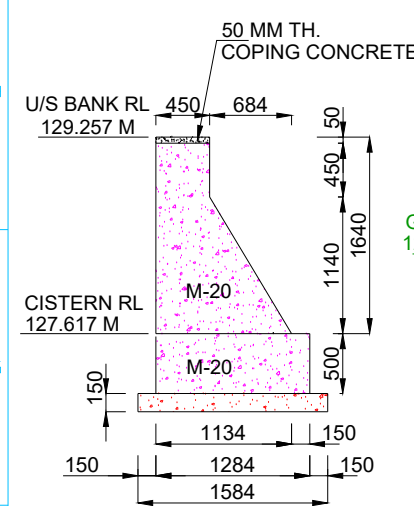
Drawing Title :-

REINFORCEMENT DETAILS OF SLAB FOR FALL CUM BRG. AT KM. 1.900 OF
DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RMC)

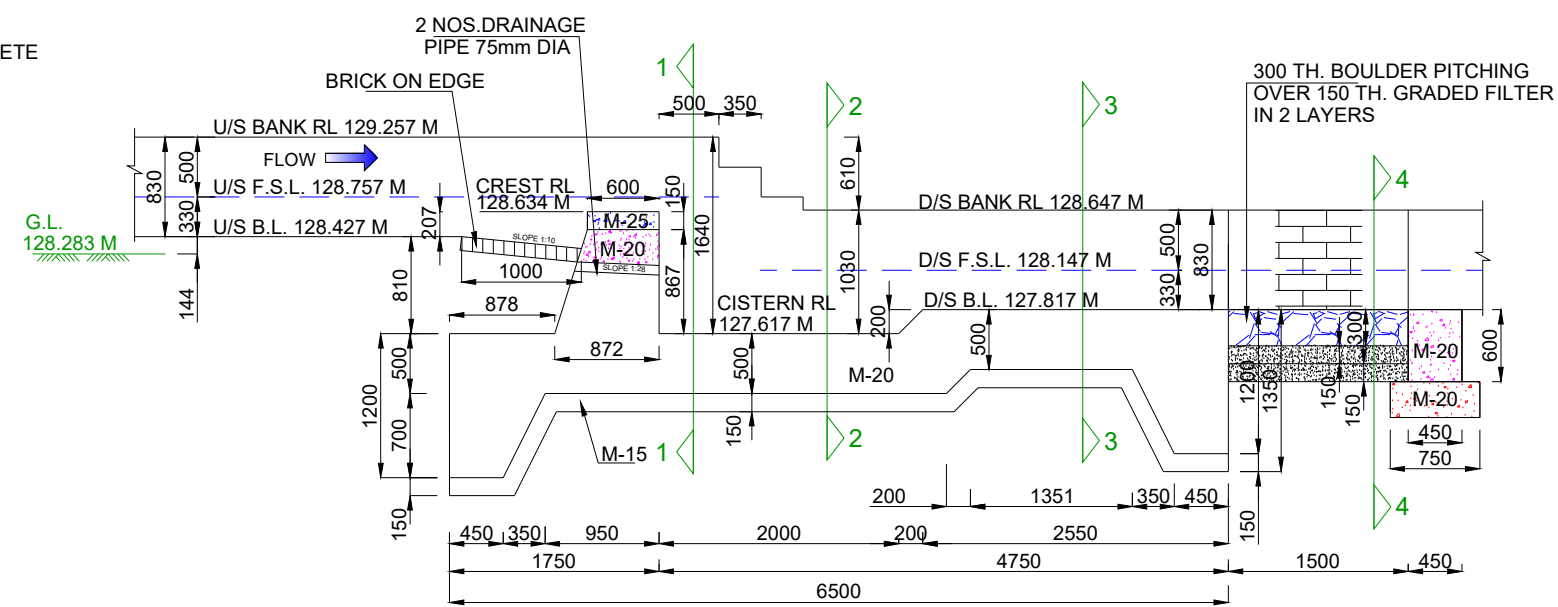
Drawing No. :-

WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ FALL

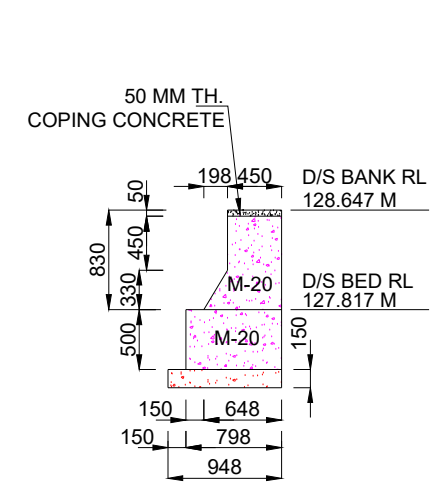
2 of 2



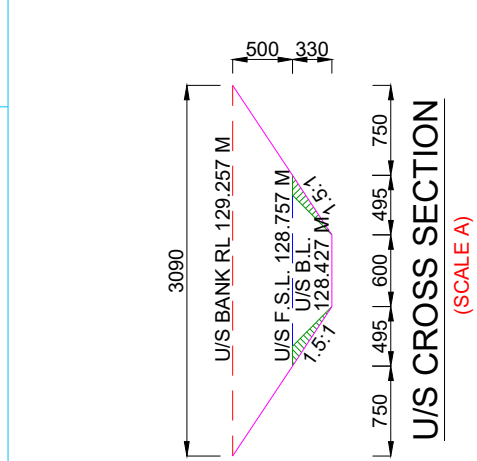
SECTION AT 5-5
(SCALE A)



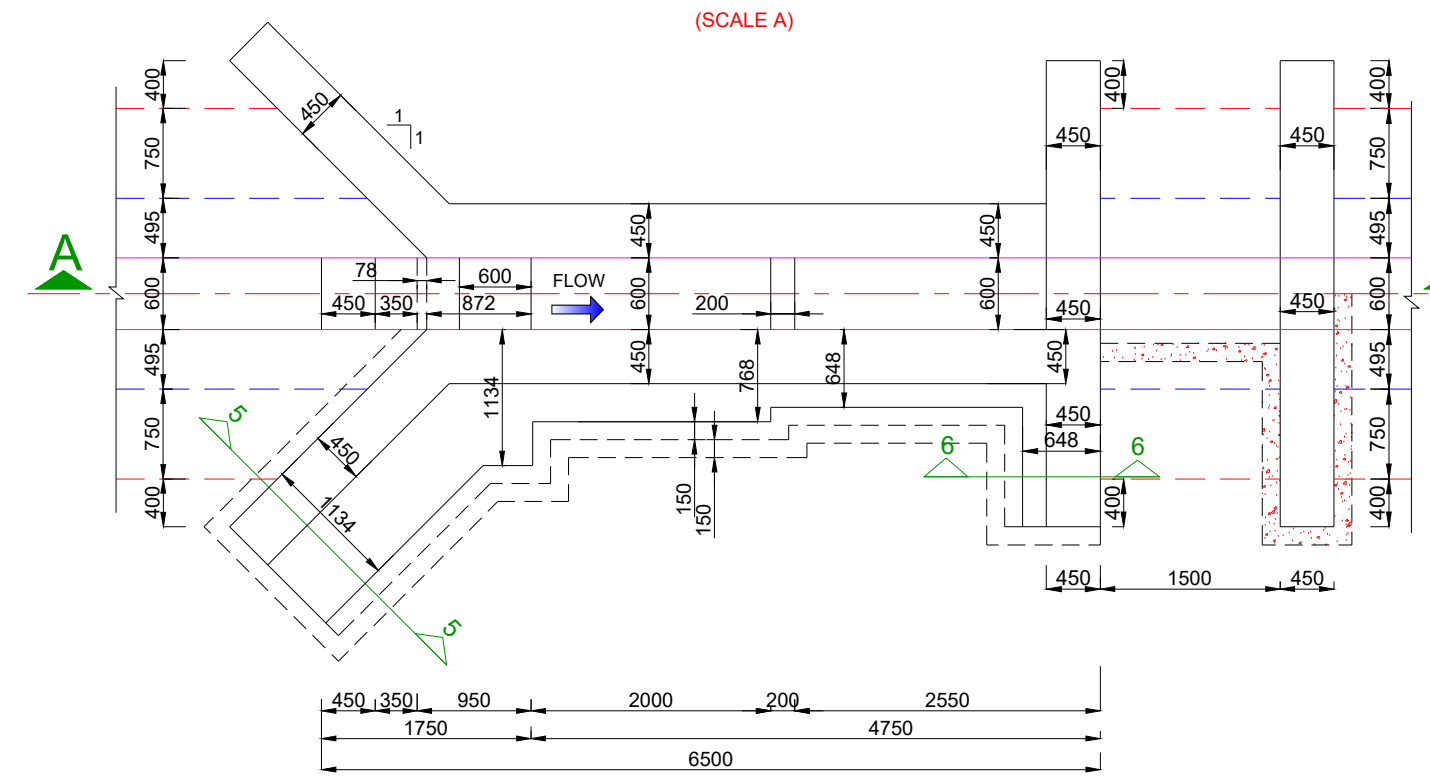
SECTION A-A
(SCALE A)



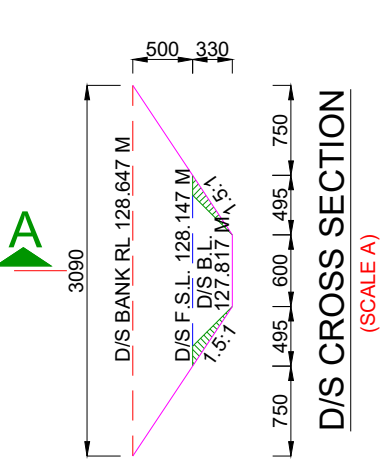
SECTION AT 6-6
(SCALE A)



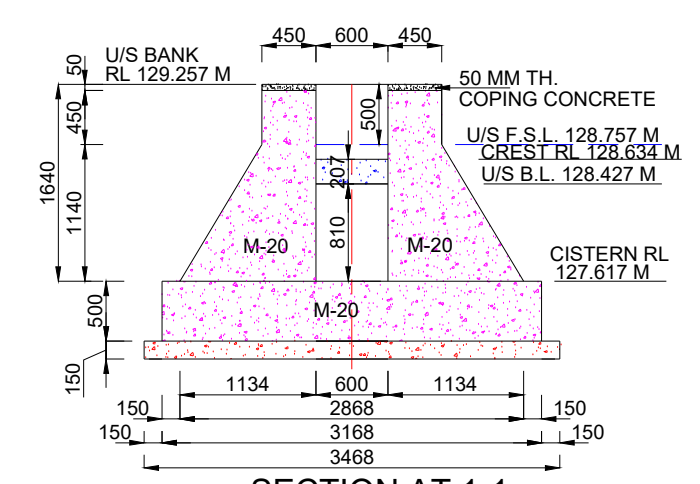
U/S CROSS SECTION
(SCALE A)



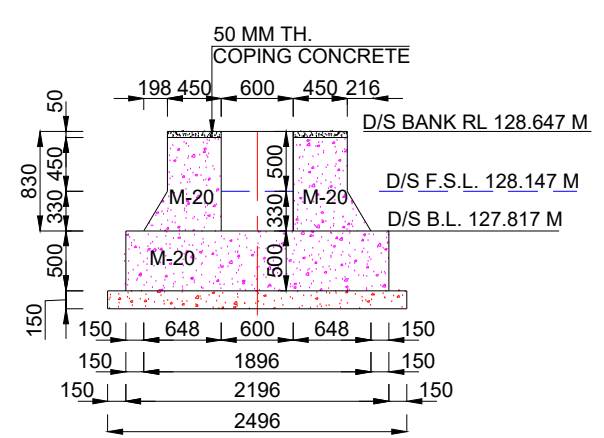
HALF TOP / HALF FOUNDATION PLAN
(SCALE A)



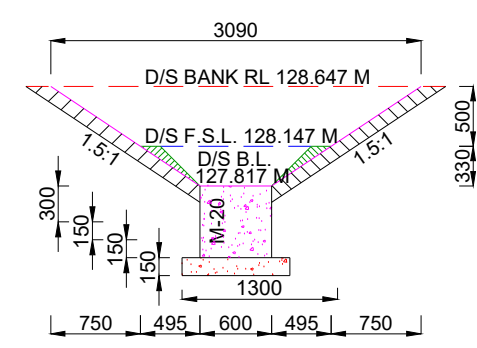
D/S CROSS SECTION
(SCALE A)



SECTION AT 1-1
(SCALE A)



SECTION AT 3-3
(SCALE A)



SECTION AT 2-2
(SCALE A)

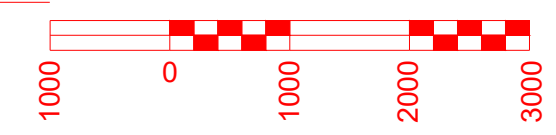
NOTES:-

1. ALL DIMENSIONS ARE IN mm AND LEVELS IN METRES EXCEPT OTHERWISE MENTIONED.
2. THE DRAWING SHALL NOT BE SCALED OFF, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
3. ALL CONCRETE WORK SHALL CONFORM TO IS: 456 -2000. GRADE OF CONCRETE IN DIFFERENT COMPONENTS SHALL BE AS FOLLOWS,
FLOOR M 20
FOUNDATION OF ABUTMENTS & WING WALL M 20
PCC UNDER FLOOR M 15
ABUTMENTS / WING WALLS M 20
4. ANY OVER DIGGING SHALL BE FILLED BY CONCRETE 1:3:6 GRADE.
5. SKIN REINFORCEMENT SHALL BE PROVIDED IN FLOOR AND ABUTMENT OF 12 MM DIA BARS @ 250 MM.

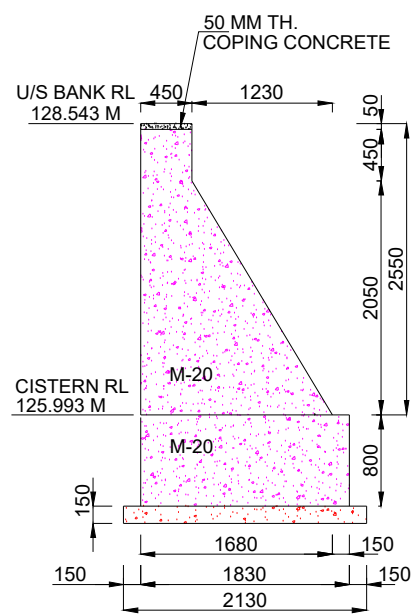
HYDRAULIC:- DATA

	U/S	D/S	UNIT
FULL SUPPLY DISCHARGE	0.040	0.040	CUMEC
VERTICAL DROP	0.610	0.610	METRE
FULL SUPPLY DEPTH	0.330	0.330	METRE
BED WIDTH	0.600	0.600	METRE
BED SLOPE	1 : 2400	1 : 2400	

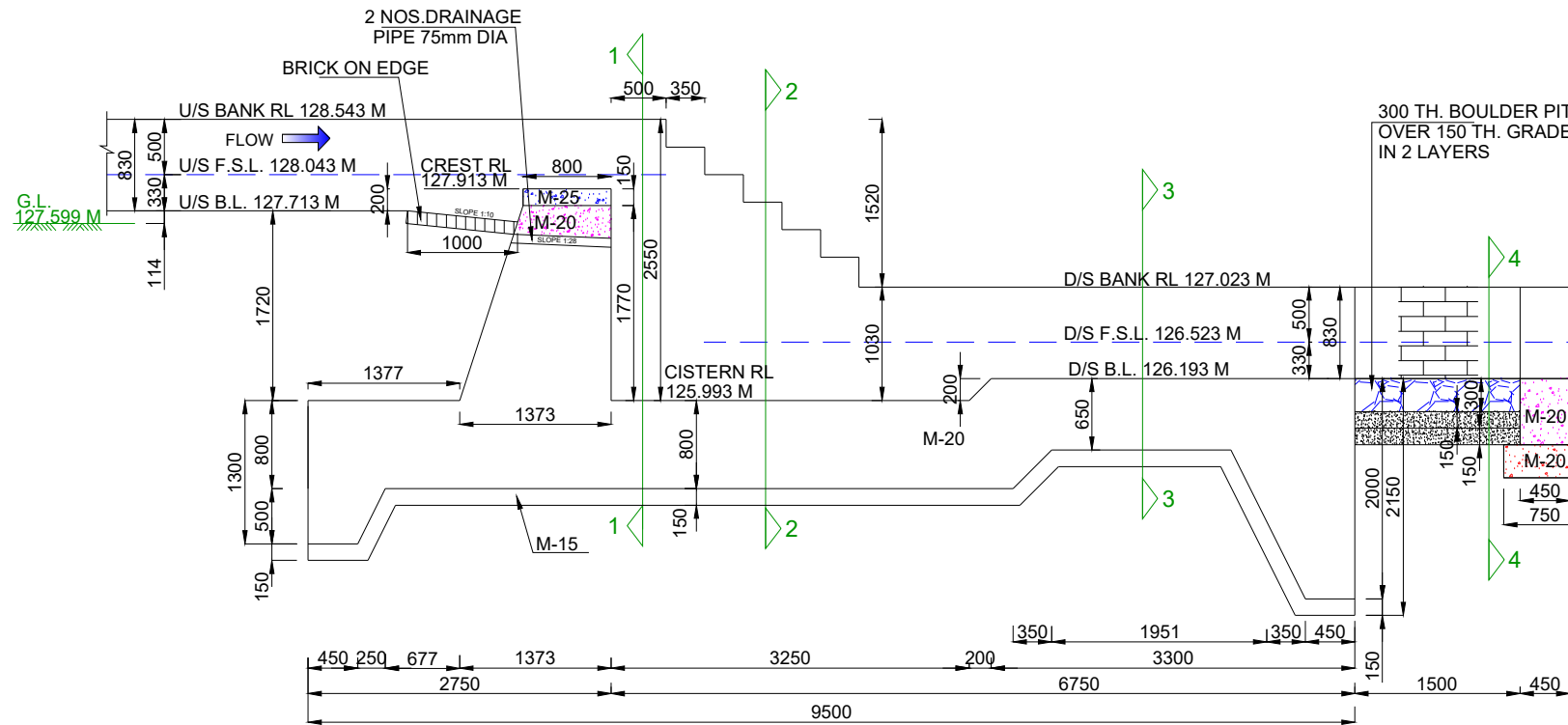
SCALE A:-



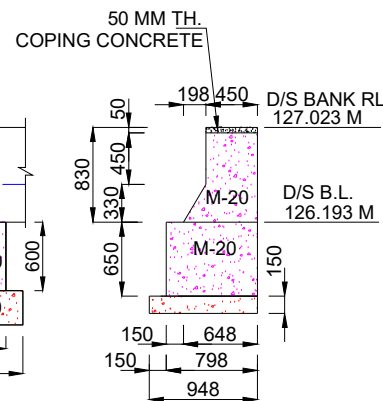
Prepared by :- WAPCOS LTD. 	Project Title :- Drawing Title :- Drawing No. :-	NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND SHARDA TYPE 0.610 M HT. FALL AT KM. 2.250 OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL) WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ FALL 1 of 1
-----------------------------------	--	---



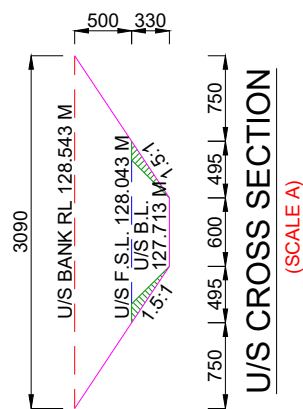
SECTION AT 5-5
(SCALE A)



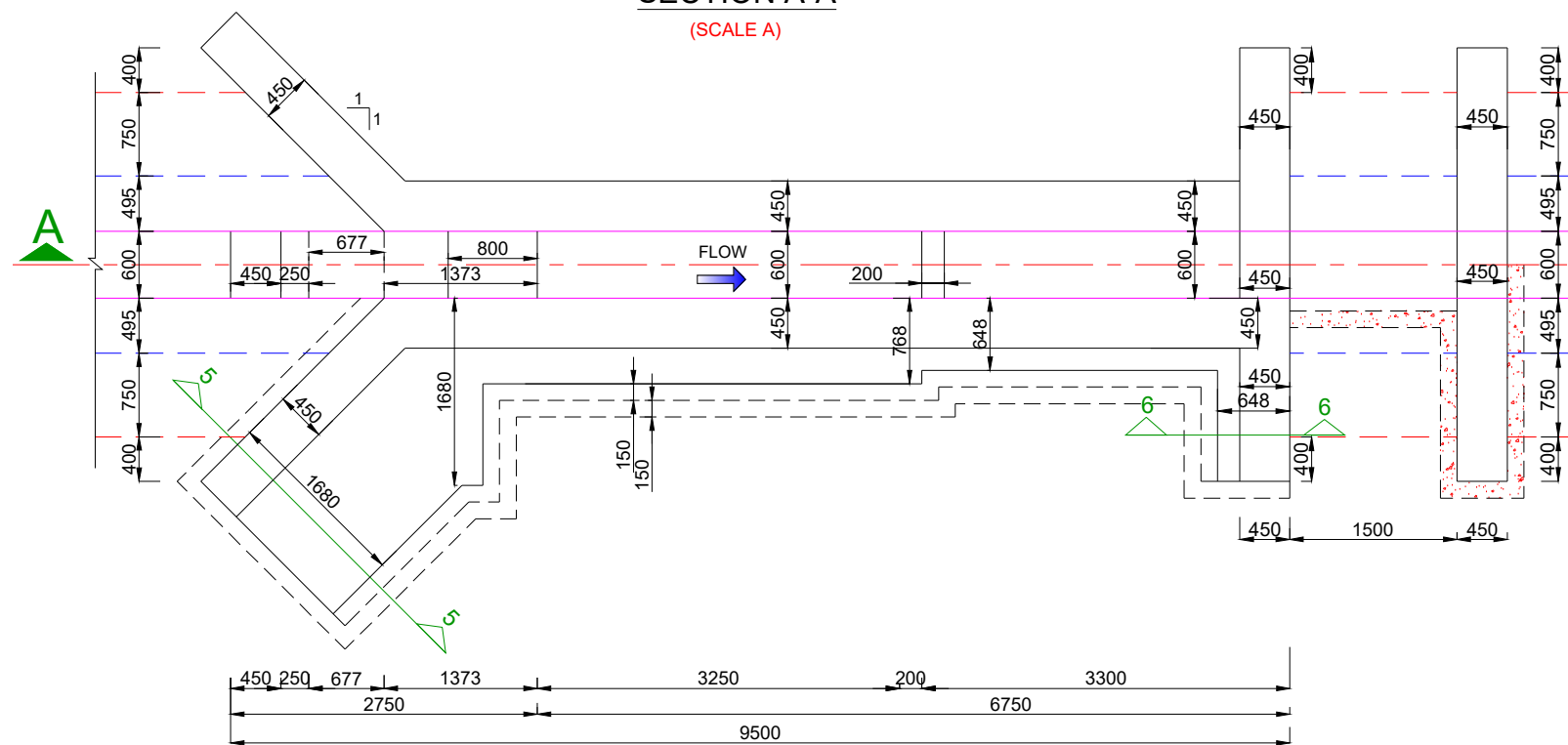
SECTION A-A
(SCALE A)



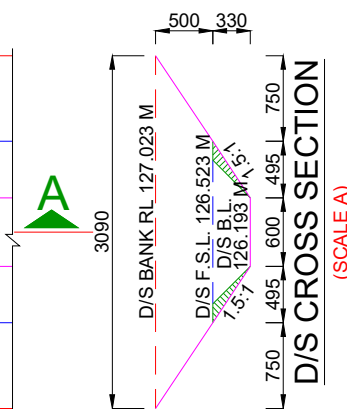
SECTION AT 6-6
(SCALE A)



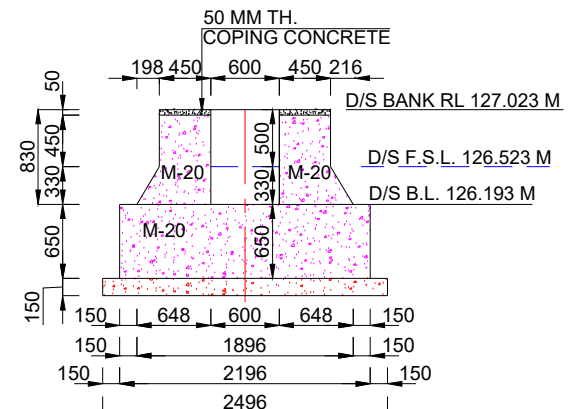
U/S CROSS SECTION
(SCALE A)



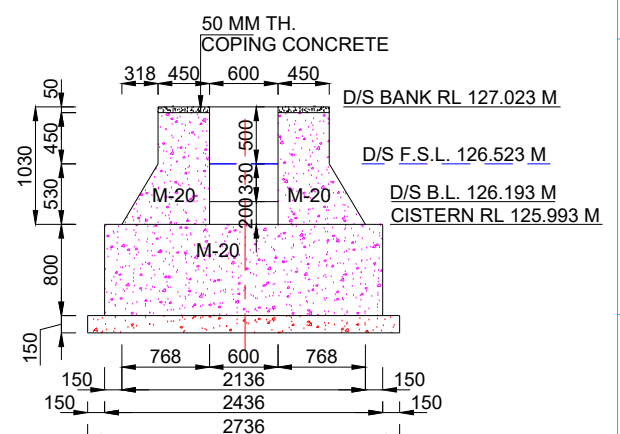
HALF TOP / HALF FOUNDATION PLAN
(SCALE A)



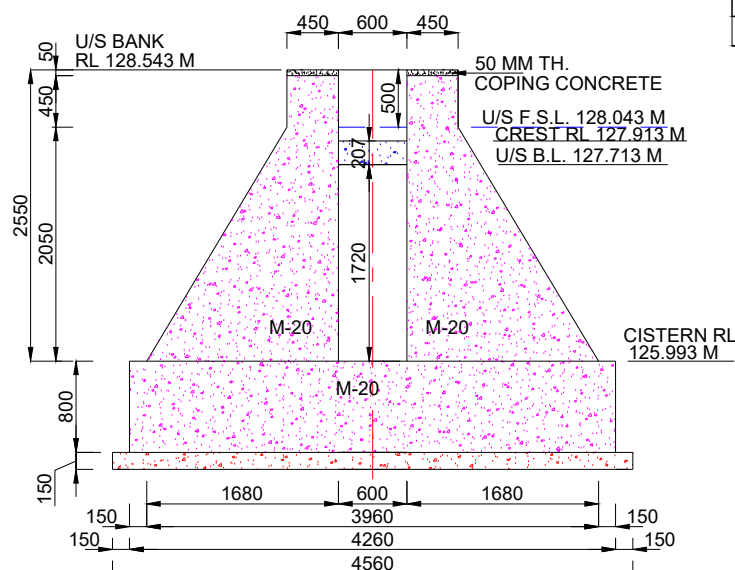
D/S CROSS SECTION
(SCALE A)



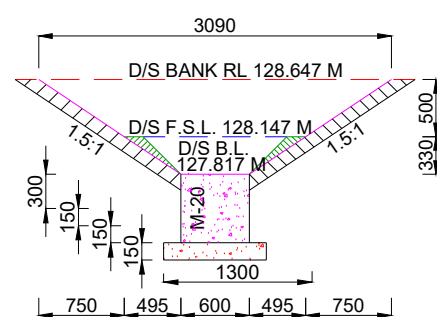
SECTION AT 3-3
(SCALE A)



SECTION AT 2-2
(SCALE A)



SECTION AT 1-1
(SCALE A)



SCALE A:-

Prepared by :-
WAPCOS LTD.



Project Title :-	NORTH KOEL RESERVOIR PROJECT, BIHAR AND JHARKHAND
Drawing Title :-	SHARDA TYPE 1.520 M HT. FALL AT KM. 2.500 OF DEO MR. (OFFTAKE FROM RD - 71+949 KM. (LT), NORTH KOEL RIGHT MAIN CANAL)
Drawing No. :-	WAP/ INFRA/ NORTHKOEL/ BC/ R-23/ FALL

NOTES:-

1. ALL DIMENSIONS ARE IN mm AND LEVELS IN METRES EXCEPT OTHERWISE MENTIONED.
2. THE DRAWING SHALL NOT BE SCALED OFF, ONLY WRITTEN DIMENSIONS SHALL BE FOLLOWED.
3. ALL CONCRETE WORK SHALL CONFORM TO IS: 456 -2000. GRADE OF CONCRETE IN DIFFERENT COMPONENTS SHALL BE AS FOLLOWS,

FLOOR	M 20
FOUNDATION OF ABUTMENTS & WING WALL	M 20
PCC UNDER FLOOR	M 15
ABUTMENTS / WING WALLS	M 20
4. ANY OVER DIGGING SHALL BE FILLED BY CONCRETE 1:3:6 GRADE.
5. SKIN REINFORCEMENT SHALL BE PROVIDED IN FLOOR AND ABUTMENT OF 12 MM DIA BARS @ 250 MM.

HYDRAULIC:- DATA

	U/S	D/S	UNIT
FULL SUPPLY DISCHARGE	0.040	0.040	CUMEC
VERTICAL DROP	1.520	1.520	METRE
FULL SUPPLY DEPTH	0.330	0.330	METRE
BED WIDTH	0.600	0.600	METRE
BED SLOPE	1 : 2400	1 : 2400	

