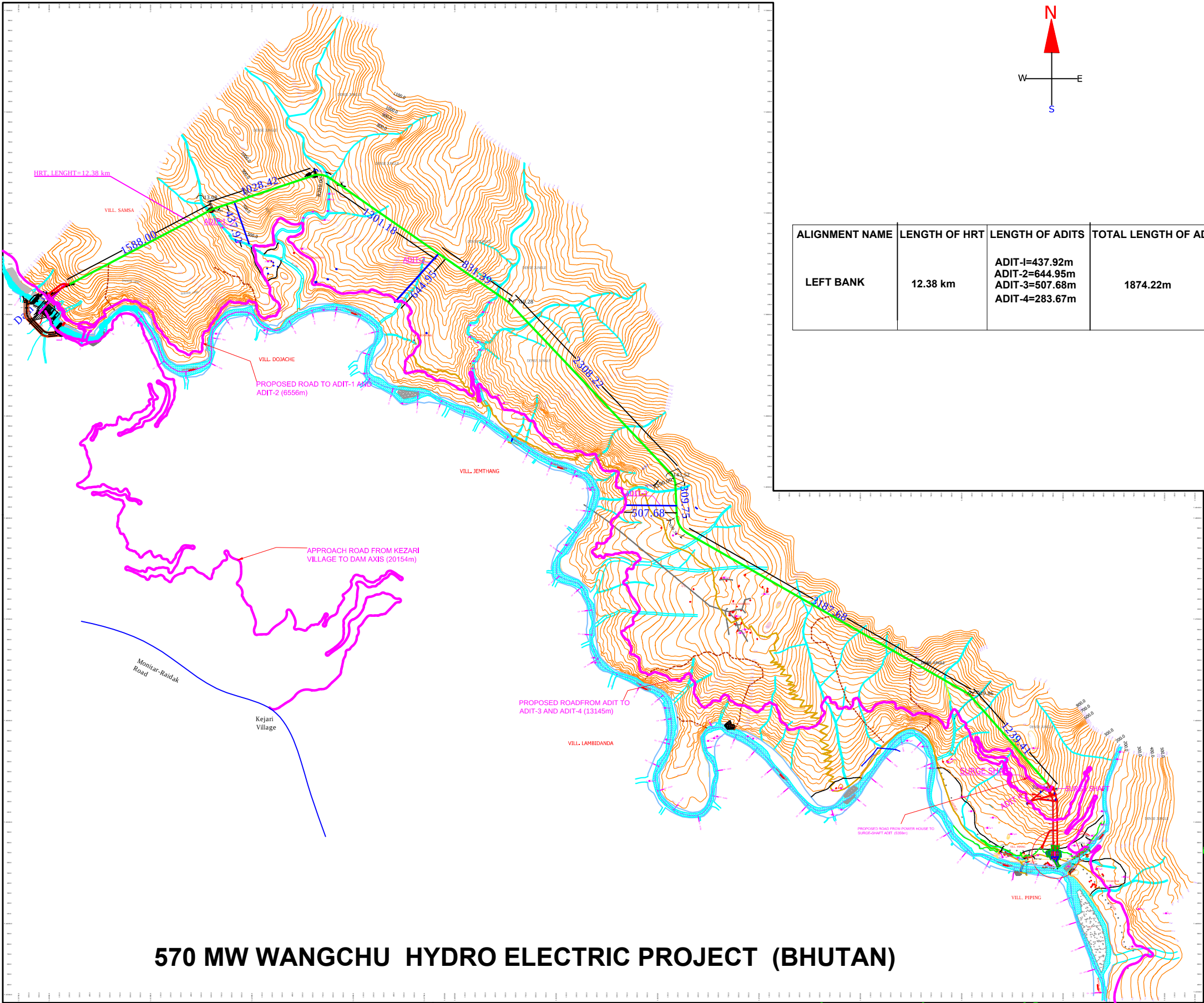
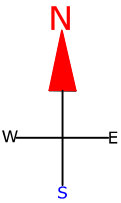




570 MW WANGCHU HYDRO ELECTRIC PROJECT (BHUTAN)



ALIGNMENT NAME	LENGTH OF HRT	LENGTH OF ADITS	TOTAL LENGTH OF ADITS	RD'S OF ADITS
LEFT BANK	12.38 km	ADIT-1=437.92m ADIT-2=644.95m ADIT-3=507.68m ADIT-4=283.67m	1874.22m	ADIT-1=1811.57m ADIT-2=4109.65m ADIT-3=7603.91m ADIT-4=12322.43m

- NOTES:-
1. ALL DIMENSIONS ARE IN METRES, UNLESS OTHERWISE SPECIFIED.
 2. NO DIMENSION SHALL BE SCALED OUT, ONLY WRITTEN DIMENSIONS ARE TO BE TAKEN AS CORRECT.

FOR DETAILED PROJECT REPORT ONLY

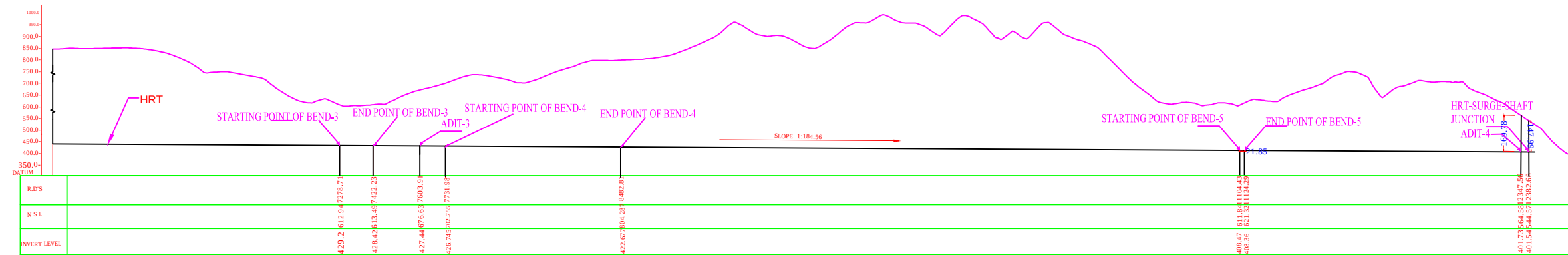
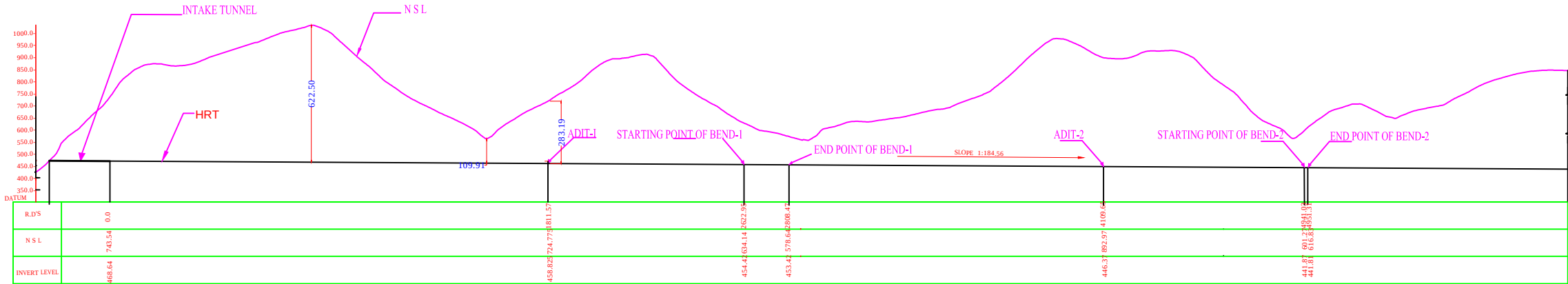
LEGEND	
1	RIVER
2	CONTOUR LINE
3	NALLAH
4	ROAD
5	BRIDGE
6	FOOT PATH
7	ROPEWAY
8	CONTROL POINT
CONTOUR INTERVAL 25.0m	

REVISION AS PER LATEST DATA AVAILABLE



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संगम जल वित्त परियोजना भूटान
WANGCHU H.E. PROJECT (BHUTAN)
HEAD RACE TUNNEL
LAYOUT PLAN

अभिप्रेत DRWN. ER. Bhanu Sharma	अभिप्रेत CHKD.ER. Mohit Shukla	अनुमोदित APPD. ER. L.M. VERMA
अभिप्रेत DRWN. ER. Projanta	अभिप्रेत SUBM-ER. MS THAKUR	
CIVIL DESIGN (FOREIGN PROJECTS)		
DRG.NO:HT-WP-DPR01/R2	Sep,2014	CD-1



- NOTES:-**
- THIS DRAWINGS SHOWS L-SECTION OF HEAD RACE TUNNEL.
 - ALL DIMENSIONS ARE IN MILLIMETRES & ELEVATIONS IN METRES UNLESS OTHERWISE SPECIFIED.
 - NO DIMENSION SHALL BE SCALED OUT, ONLY WRITTEN DIMENSIONS ARE TO BE TAKEN AS CORRECT.

FOR DETAILED PROJECT REPORT ONLY

CONNECTED DRAWINGS

DRAWING NO.	TITLE
1.PL- WP-DPR-03	PROJECT LAYOUT



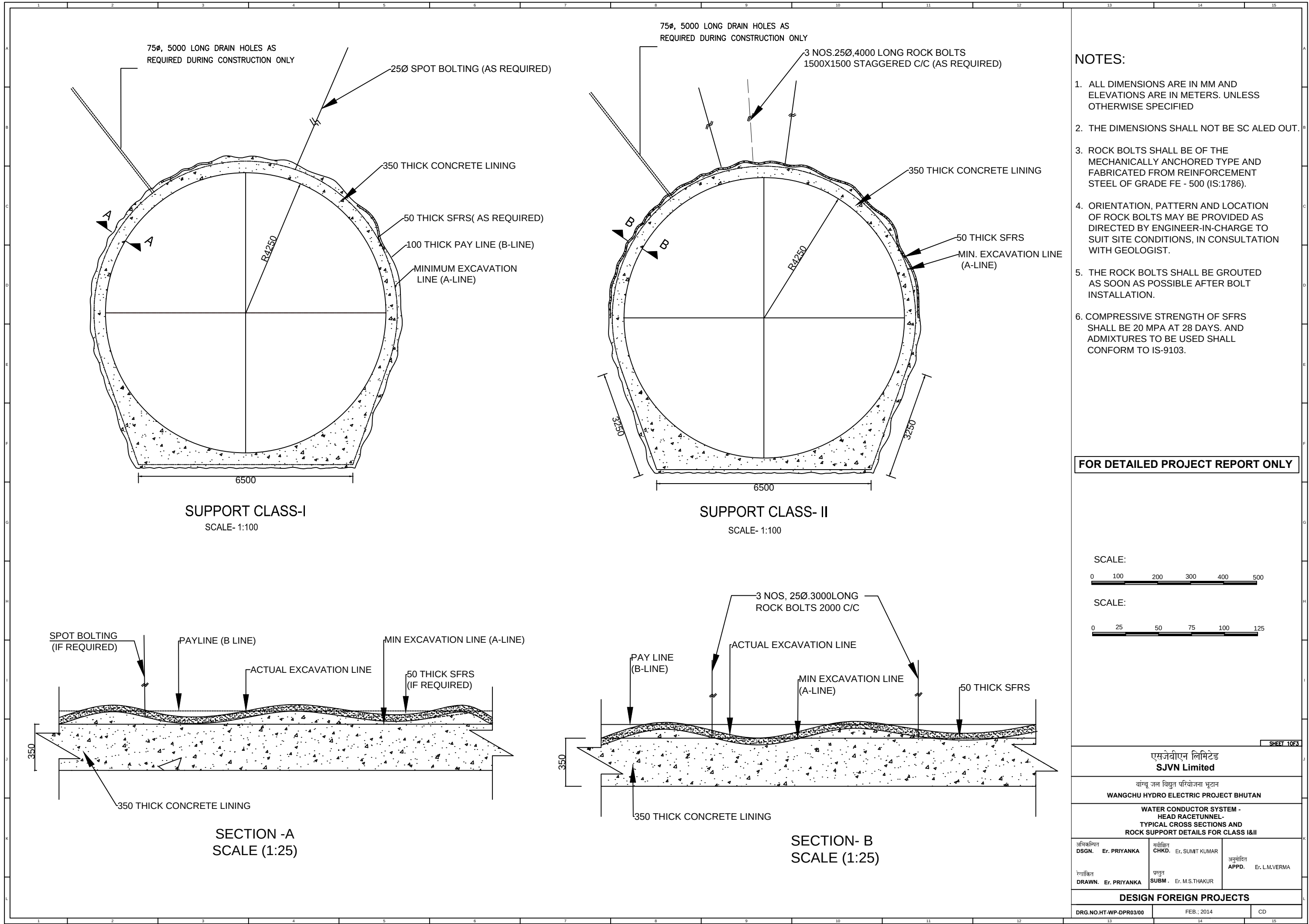
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SJVN Limited
वांगचू, जल वसुधैत परियोजना भूटान
WANGCHU H.E. PROJECT (BHUTAN)

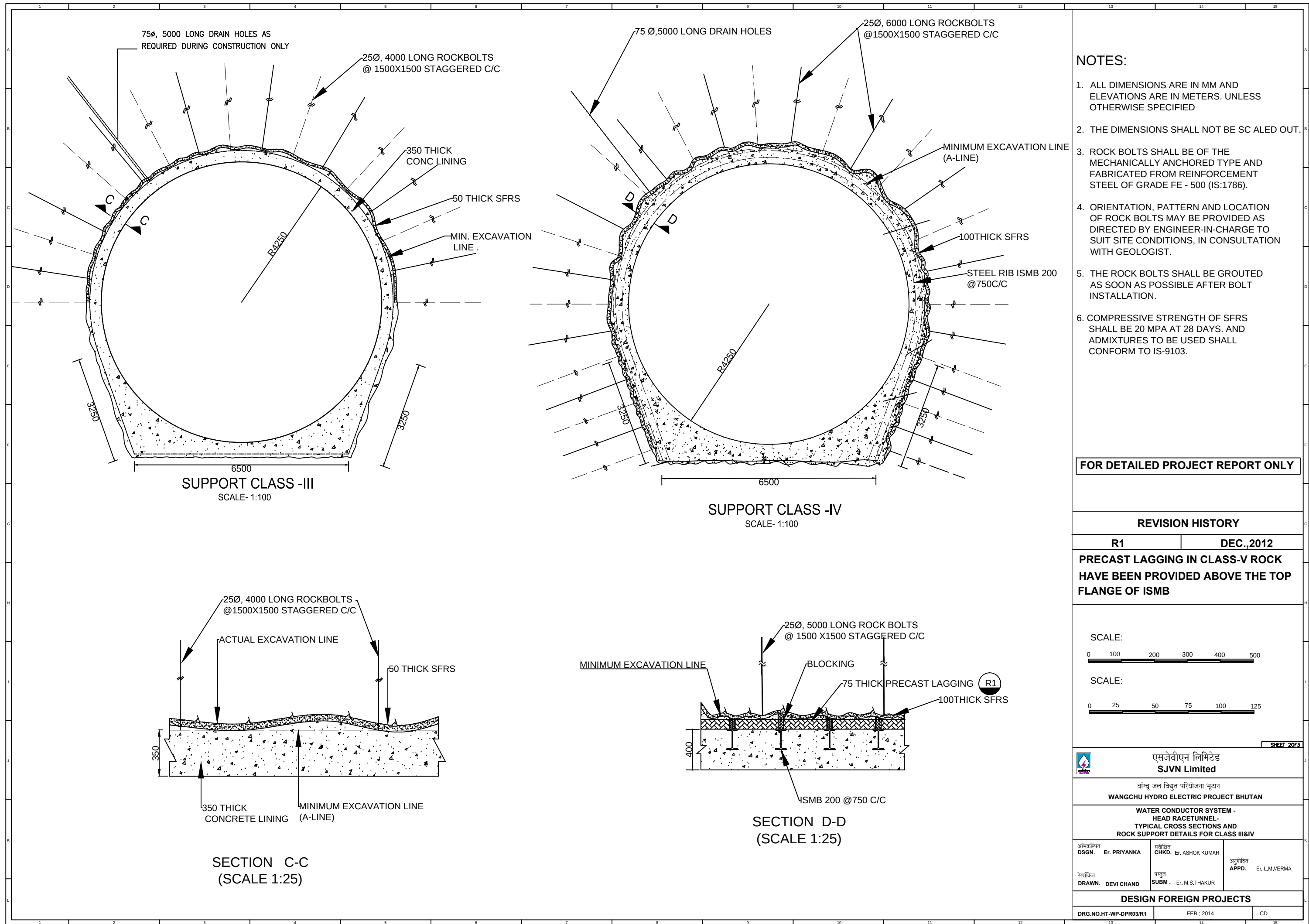
HEAD RACE TUNNEL
L SECTION

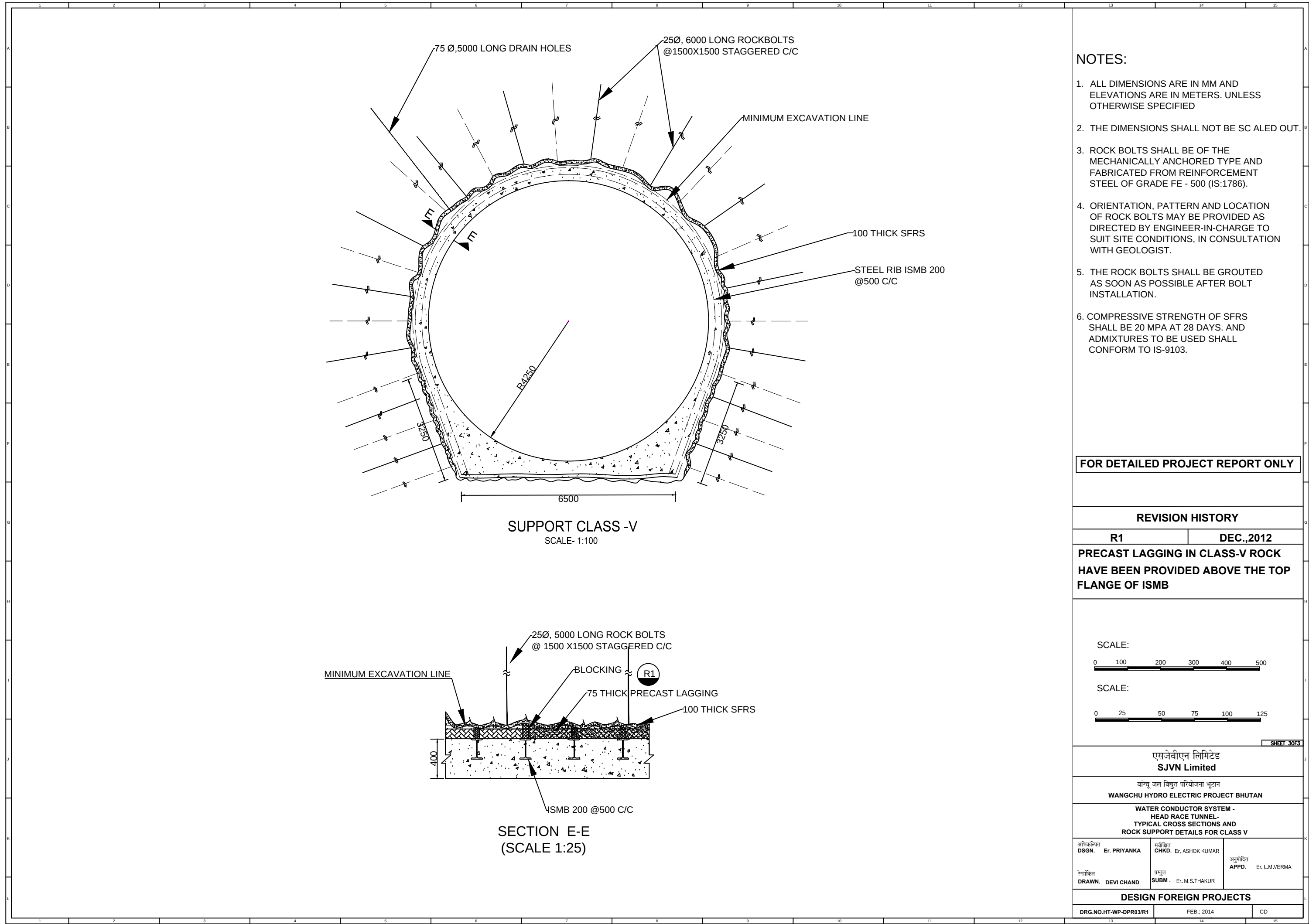
अभियन्ता DSGN.-ER.Bhanu Sharma	समीक्षक CHKD.-ER.Priyanka	अनुमोदित APPD.-ER. L.M. VERMA
ड्राफ्ट DRWN.-ER.Mohit Shukla	सबमिटर SUBM.-ER. MS THAKUR	

CIVIL DESIGN (FOREIGN PROJECTS)

DRG.NO.HT-WP-DPR02/R1	Feb, 2014	CD-1
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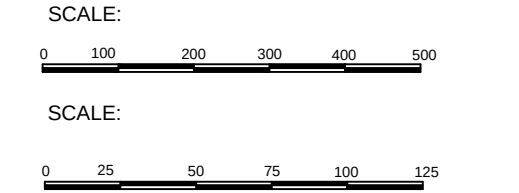




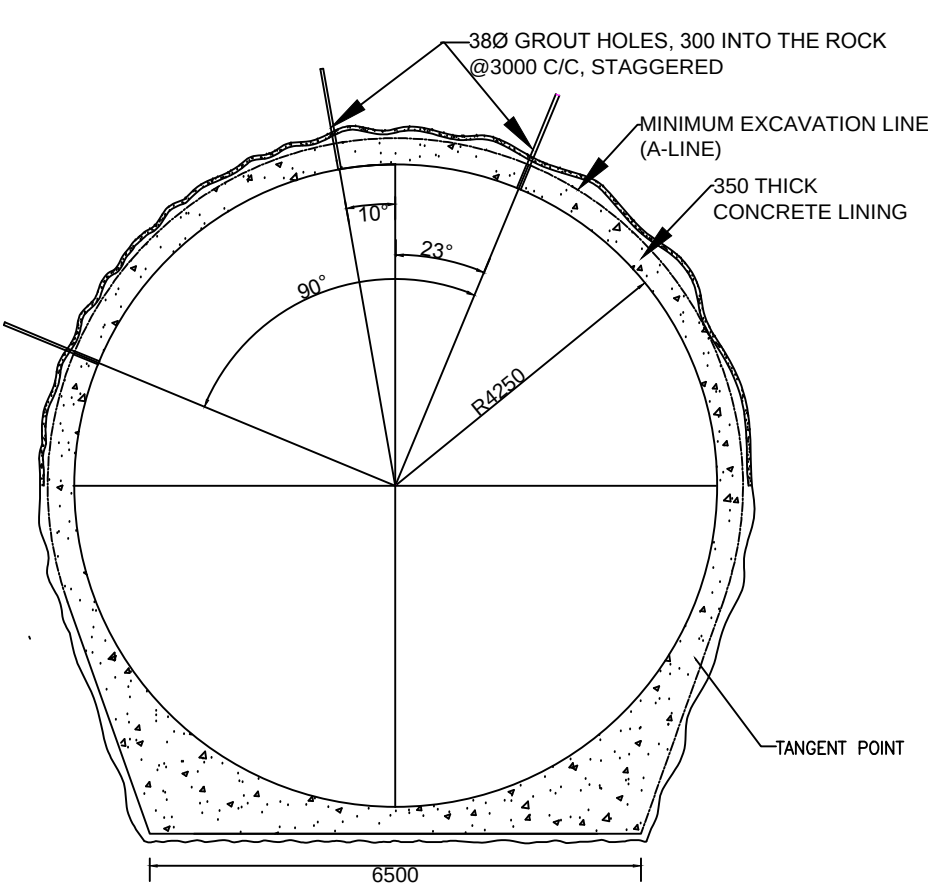
- NOTES:
1. ALL DIMENSIONS ARE IN MM AND ELEVATIONS ARE IN METERS. UNLESS OTHERWISE SPECIFIED
 2. THE DIMENSIONS SHALL NOT BE SC ALED OUT.
 3. ROCK BOLTS SHALL BE OF THE MECHANICALLY ANCHORED TYPE AND FABRICATED FROM REINFORCEMENT STEEL OF GRADE FE - 500 (IS:1786).
 4. ORIENTATION, PATTERN AND LOCATION OF ROCK BOLTS MAY BE PROVIDED AS DIRECTED BY ENGINEER-IN-CHARGE TO SUIT SITE CONDITIONS, IN CONSULTATION WITH GEOLOGIST.
 5. THE ROCK BOLTS SHALL BE GROUTED AS SOON AS POSSIBLE AFTER BOLT INSTALLATION.
 6. COMPRESSIVE STRENGTH OF SFRS SHALL BE 20 MPA AT 28 DAYS. AND ADMIXTURES TO BE USED SHALL CONFORM TO IS-9103.

FOR DETAILED PROJECT REPORT ONLY

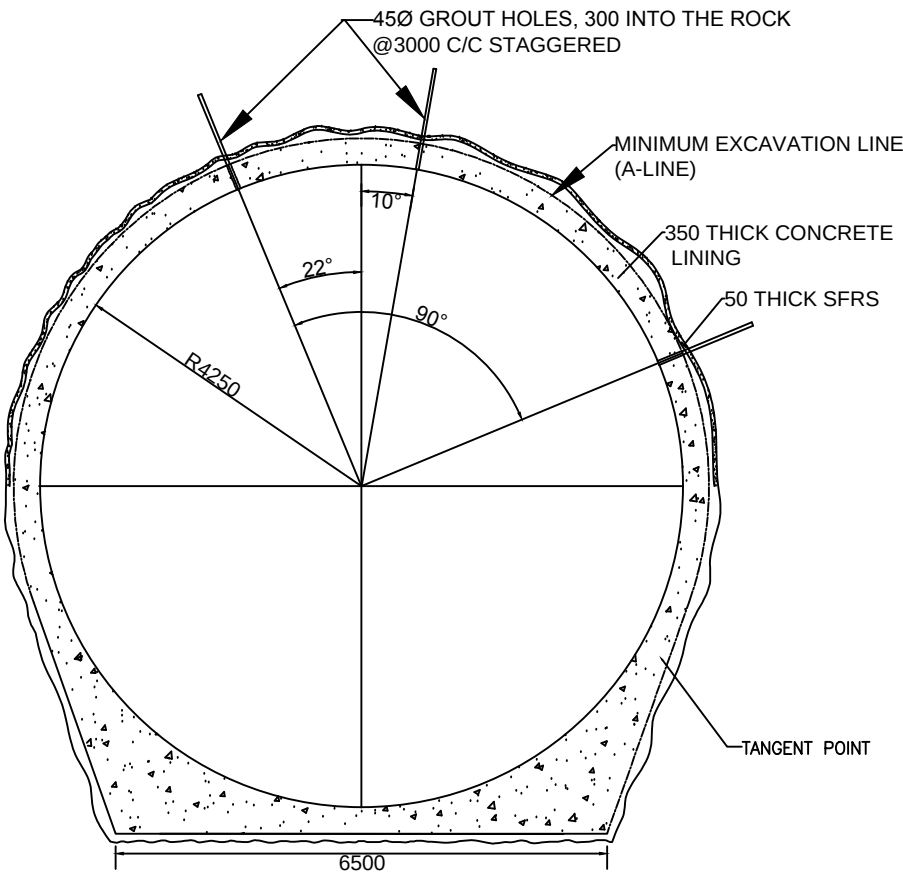
REVISION HISTORY	
R1	DEC.,2012
PRECAST LAGGING IN CLASS-V ROCK HAVE BEEN PROVIDED ABOVE THE TOP FLANGE OF ISMB	



SHEET 30F3		
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वांग्चु जल विद्युत परियोजना भूटान WANGCHU HYDRO ELECTRIC PROJECT BHUTAN		
WATER CONDUCTOR SYSTEM - HEAD RACE TUNNEL- TYPICAL CROSS SECTIONS AND ROCK SUPPORT DETAILS FOR CLASS V		
अभिष्कारित DSGN. Er. PRIYANKA	समीक्षित CHKD. Er. ASHOK KUMAR	अनुमोदित APPD. Er. L.M.VERMA
रचयिता DRAWN. DEVI CHAND	प्रस्तुत SUBM. Er. M.S.THAKUR	
DESIGN FOREIGN PROJECTS		
DRG.NO.HT-WP-DPR03/R1	FEB., 2014	CD

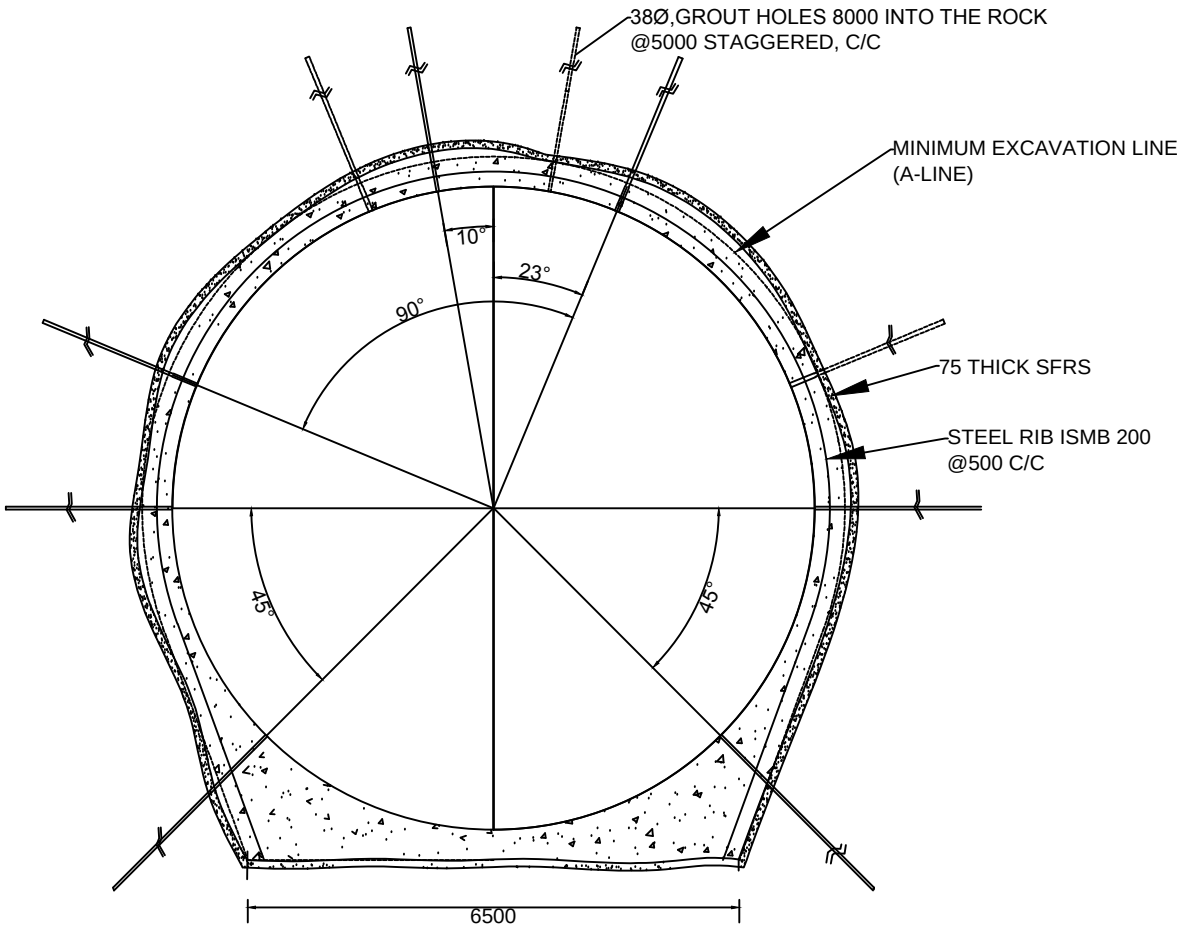


GROUT PLANE NO-I



GROUT PLANE NO-II

CONTACT GROUTING (TYPICAL)
(PATTERN FOR CONSECUTIVE GROUT PLANES)
SCALE (1:100)



CONSOLIDATION GROUTING (TYPICAL)

NOTES:

- ALL DIMENSIONS ARE IN MM AND ELEVATIONS ARE IN METERS. UNLESS OTHERWISE SPECIFIED
- THE DIMENSIONS SHALL NOT BE SCALE D OUT.
- ROCK BOLTS SHALL BE OF THE MECHANICALLY ANCHORED TYPE AND FABRICATED FROM REINFORCEMENT STEEL OF GRADE FE - 500 (IS:1786).
- ORIENTATION, PATTERN AND LOCATION OF ROCK BOLTS MAY BE PROVIDED AS DIRECTED BY ENGINEER-IN-CHARGE TO SUIT SITE CONDITIONS, IN CONSULTATION WITH GEOLOGIST.
- THE ROCK BOLTS SHALL BE GROUTED AS SOON AS POSSIBLE AFTER BOLT INSTALLATION.
- COMPRESSIVE STRENGTH OF SFRS SHALL BE 20 MPA AT 28 DAYS. AND ADMIXTURES TO BE USED SHALL CONFORM TO IS-9103.

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SCALE:



SCALE:



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WANGCHU HYDRO ELECTRIC PROJECT BHUTAN

WATER CONDUCTOR SYSTEM -
HEAD RACE TUNNEL-
GROUTING DETAILS

अभिप्रेत
DSGN. Er. PRIYANKA

समीक्षित
CHKD. Er. SUMIT KUMAR

अनुमोदित
APPD. Er. L.M.VERMA

रेखांकित
DRAWN. Er. PRIYANKA

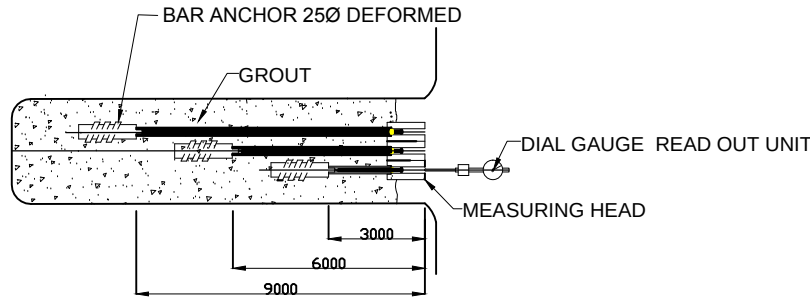
प्रस्तुत
SUBM. Er. M.S.THAKUR

DESIGN FOREIGN PROJECTS

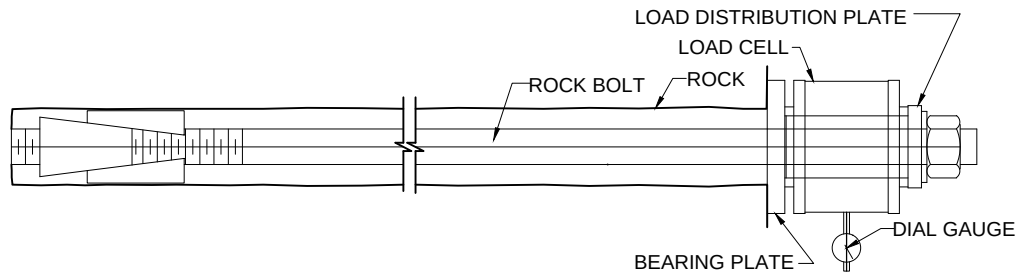
DRG.NO.HT-WP-DPR04/00

FEB. 2014

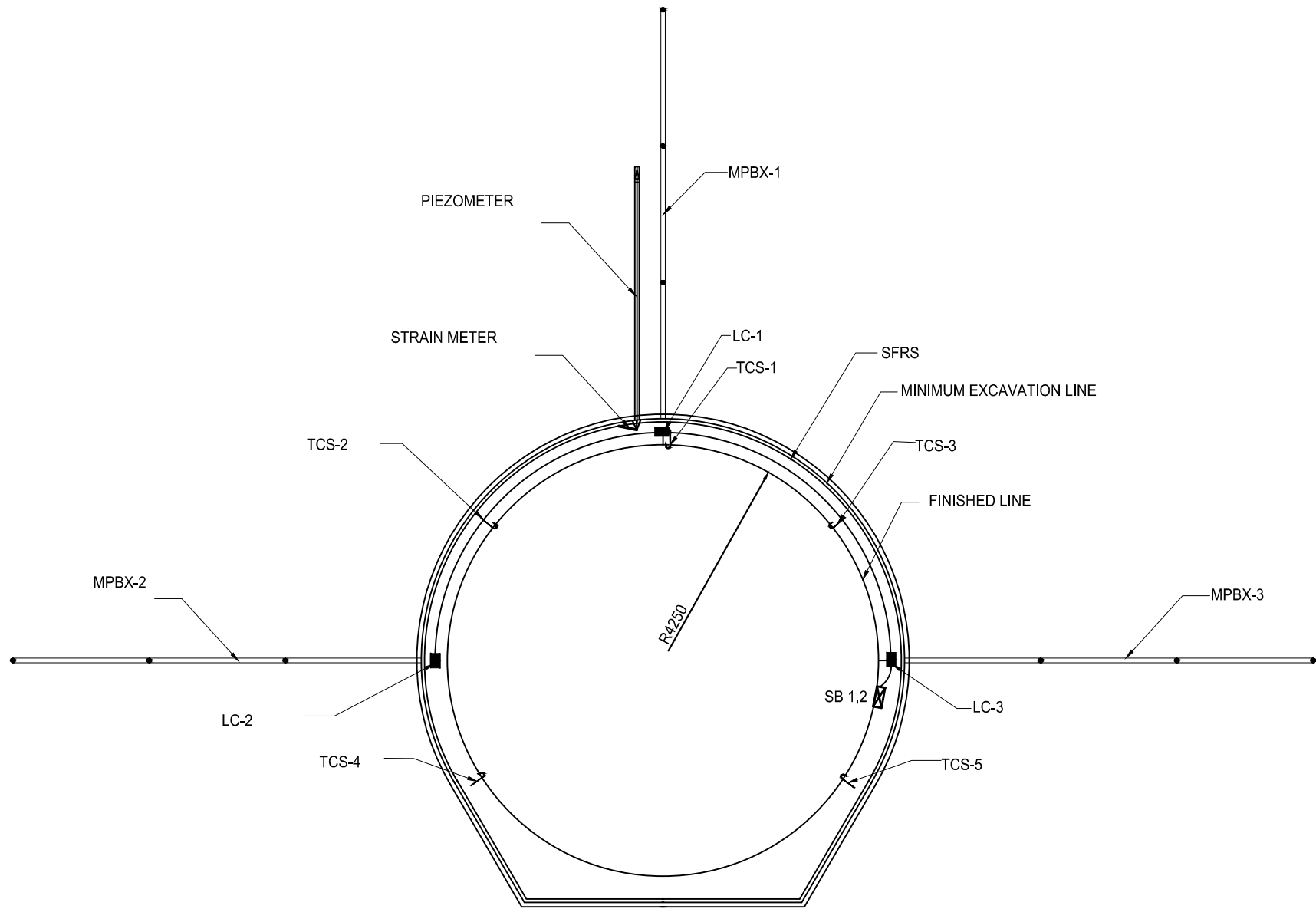
CD



TYPICAL MULTI-POINT BOREHOLE
EXTENSOMETER (MPBX)
(NOT TO SCALE)



TYPICAL LOAD CELL
(NOT TO SCALE)



TYPICAL SECTION OF HRT

- NOTES
1. ALL DIMENSIONS ARE IN MILLIMETRES & ELEVATIONS IN METRES UNLESS OTHERWISE SPECIFIED.
 2. NO DIMENSION SHALL BE SCALED OUT, ONLY WRITTEN DIMENSIONS ARE TO BE TAKEN AS CORRECT.
 3. INSTRUMENTS SHOWN IN THIS DRAWING ARE INDICATIVE ONLY.
 4. MPBX SHALL BE PROVIDED ONLY IN REACHES WITH POOR AND VERY POOR ROCK, WHERE SIGNIFICANT DEFORMATIONS ARE NOTICED, STRETCH OF 300 M, ONE OR TWO LOCATIONS CAN BE CHOSEN FOR MEASUREMENT THROUGH MPBX IN CONSULTATION WITH RESIDENT GEOLOGIST, SUCH SECTION IN VERY POOR ROCK SHALL ALSO BE INSTRUMENTED WITH ROCK BOLTS LOAD CELLS.
 5. IN THE REACHES WHERE STEEL RIBS ARE PROVIDED, A FEW SECTIONS (ONE OR TWO IN A STRETCH OF 300 M MAY BE INSTRUMENTED WITH LOAD CELL IN CONSULTATION WITH RESIDENT GEOLOGISTS

LEGENDS:

	TCS-TAPE CONVERGENCE STUD
	LOAD CELL
	MULTI-POINT BORE HOLE EXTENSOMETER
	V-W STRAIN METER
	V-W PIEZOMETER

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HEAD RACE TUNNEL INSTRUMENTATION DETAILS		
अभिवादनित DSGN. Er. ASHOK KUMAR	समीक्षा CHKD. Er. PRIYANKA	अनुमोदित APPD. Er. L.M. VERMA
रेखांकित DRWN. B.S. BANYAL	प्रस्तुत SUBM. Er. M.S. THAKUR	
DESIGN FOREIGN PROJECTS		
DRG.NO. HT-WP-DPR-05/00		FEB,2014