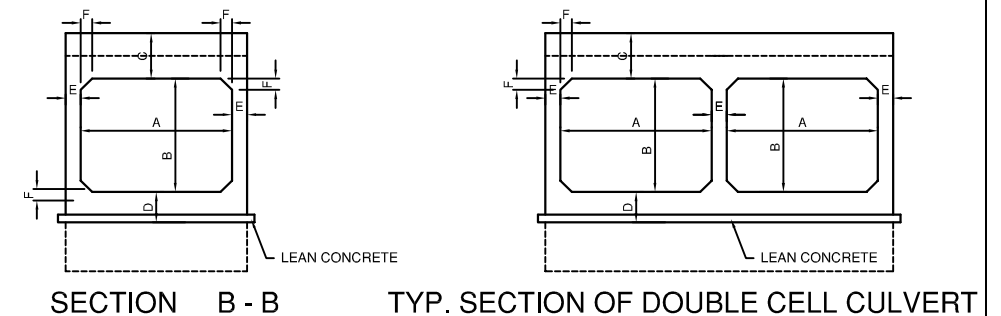
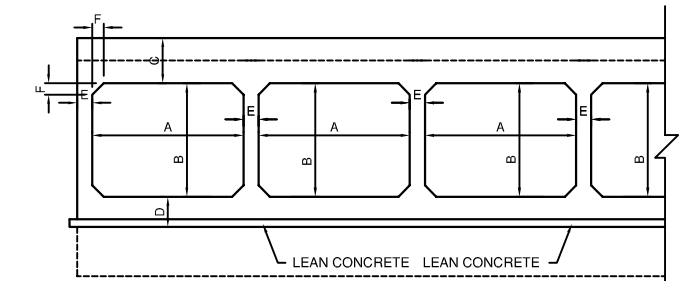


SECTION A - A

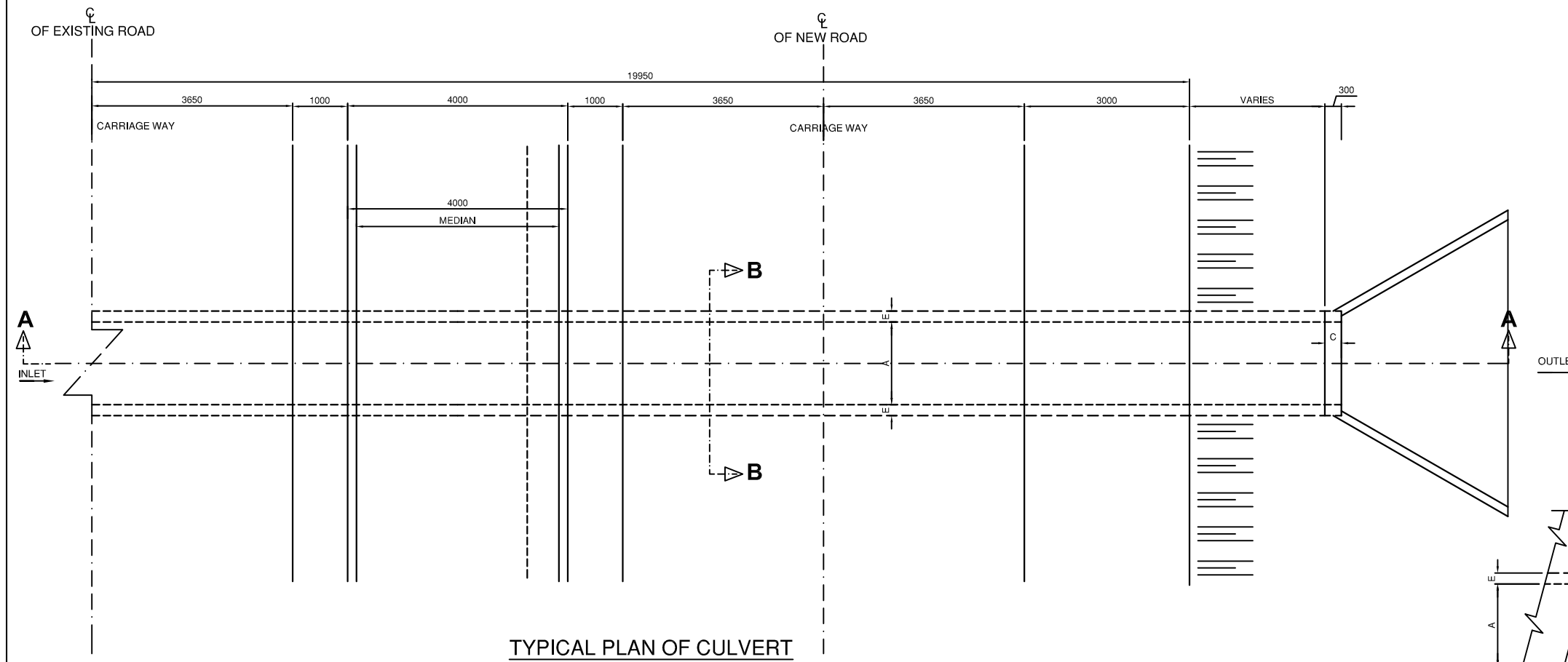


SECTION B - B

TYP. SECTION OF DOUBLE CELL CULVERT



TYP. SECTION OF MULTI CELL CULVERT



TYPICAL PLAN OF CULVERT

NOTE:- SUPER ELEVATION OF CARRIAGE WAY IS VARIABLE

PART PLAN OF APRON SKEW CULVERT

SINGLE CELL							
TYPE	CELL SIZE	A	B	C	D	E	F
I	1.0x1.0	1000	1000	200	200	200	150
II	1.5x1.0	1500	1000	250	250	200	150
III	1.5x1.5	1500	1500	250	250	200	150
IV	2.0x1.5	2000	1500	300	300	250	150
V	2.0x2.0	2000	2000	300	300	250	150
VI	2.5x1.5	2500	1500	300	300	250	150
VII	2.5x2.0	2500	2000	300	300	250	150
VIII	2.5x2.5	2500	2500	300	300	250	150
IX	3.0x2.0	3000	2000	350	350	300	150
X	3.0x2.5	3000	2500	350	350	350	150
XI	3.0x3.0	3000	3000	350	350	350	150

DOUBLE CELL							
TYPE	CELL SIZE	A	B	C	D	E	F
xII	1.0x1.0	1000	1000	200	200	200	150
xIII	1.5x1.0	1500	1000	250	250	200	150
xIV	1.5x1.5	1500	1500	250	250	200	150
xV	2.0x1.5	2000	1500	300	300	250	150
xVI	2.0x2.0	2000	2000	300	300	250	150
xVII	2.5x1.5	2500	1500	300	300	250	150
xVIII	2.5x2.0	2500	2000	300	300	250	150
xIX	2.5x2.5	2500	2500	300	300	250	150
xx	3.0x2.0	3000	2000	350	350	300	150
xxI	3.0x2.5	3000	2500	350	350	350	150
xxII	3.0x3.0	3000	3000	350	350	350	150

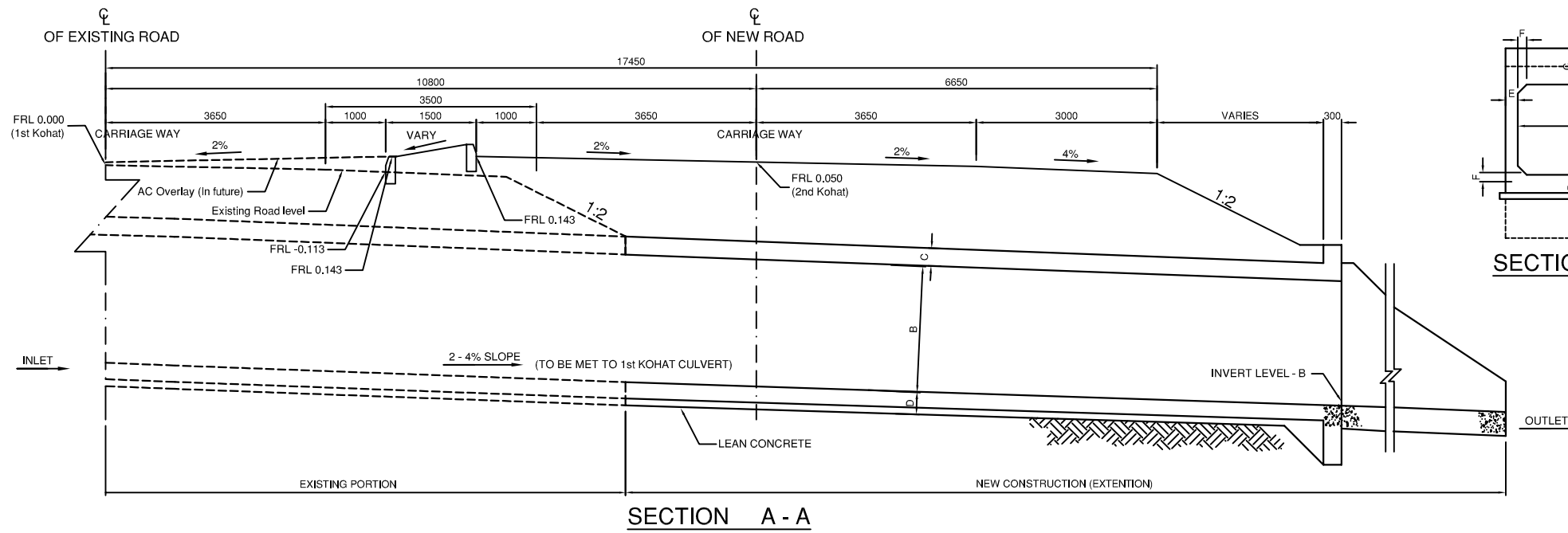
TRIPPLE CELL							
TYPE	CELL SIZE	A	B	C	D	E	F
xxIII	1.0x1.0	1000	1000	200	200	200	150
xxIV	2.0x1.5	1500	1000	250	250	200	150
xxV	2.0x2.0	1500	1500	250	250	200	150
xxVI	2.5x1.5	2000	1500	300	300	250	150
xxVII	2.5x2.0	2000	2000	300	300	250	150
xxVIII	2.5x2.5	2500	1500	300	300	250	150
xxIX	3.0x2.0	2500	2000	300	300	250	150
xxX	3.5x2.5	2500	2500	300	300	300	150
xxXI	3.0x3.0	3000	2000	350	350	300	150

FOUR CELL							
TYPE	CELL SIZE	A	B	C	D	E	F
xxXII	1.5x1.5	1500	1500	250	250	250	150
xxXIII	2.0x2.0	2000	2000	300	300	300	150
xxXIV	2.5x1.5	2500	1500	300	300	250	150
xxXV	2.5x2.0	2500	2000	300	300	250	150
xxXVI	2.5x2.5	2500	2500	300	300	300	150
xxXVII	3.0x2.0	3000	2500	350	350	300	150
xxXVIII	3.0x2.5	3000	2500	350	350	350	150
xxXIX	3.0x3.0	3000	3000	350	350	350	150

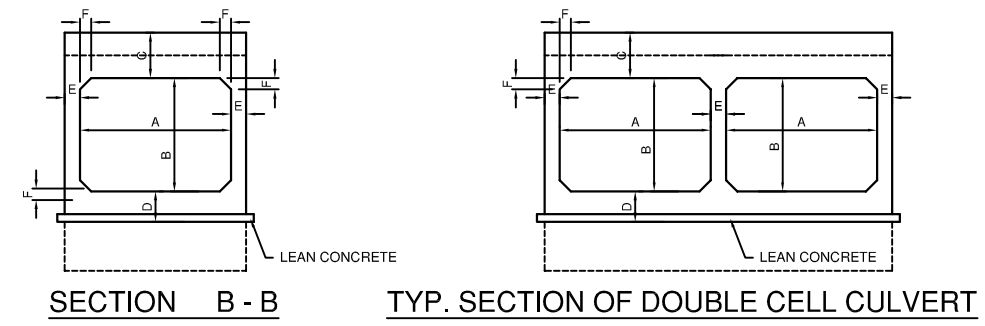
FIVE CELL							
TYPE	CELL SIZE	A	B	C	D	E	F
xxXX	3.0x2.5	3000	2500	350	350	350	150
xxXXI	3.0x3.0	3000	3000	350	350	350	150

SPECIAL CULVERT							
TYPE	CELL SIZE	A	B	C	D	E	F
SP-1	4.0x4.0	4000	4000	400	400	400	150
SP-2	4.8x4.5	4800	4800	450	450	450	150
SP-3	6.15x5.5	6150	5500	550	550	550	200

PROJECT NAME	CLIENTS	CONSULTANTS	DRAWING TITLE	SCALE	DWG NO
FEASIBILITY STUDY ON THE 2ND KOHAT TUNNEL AND ACCESS ROADS PROJECT	 GOVERNMENT OF PAKISTAN MINISTRY OF COMMUNICATIONS NATIONAL HIGHWAY AUTHORITY	 JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO., LTD AND ALMEC CORPORATION	TYPICAL DETAILS OF BOX CULVERT (SOUTH SECTION)	1:100

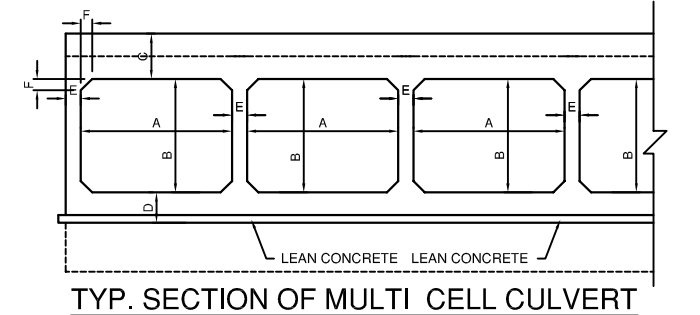


SECTION A - A

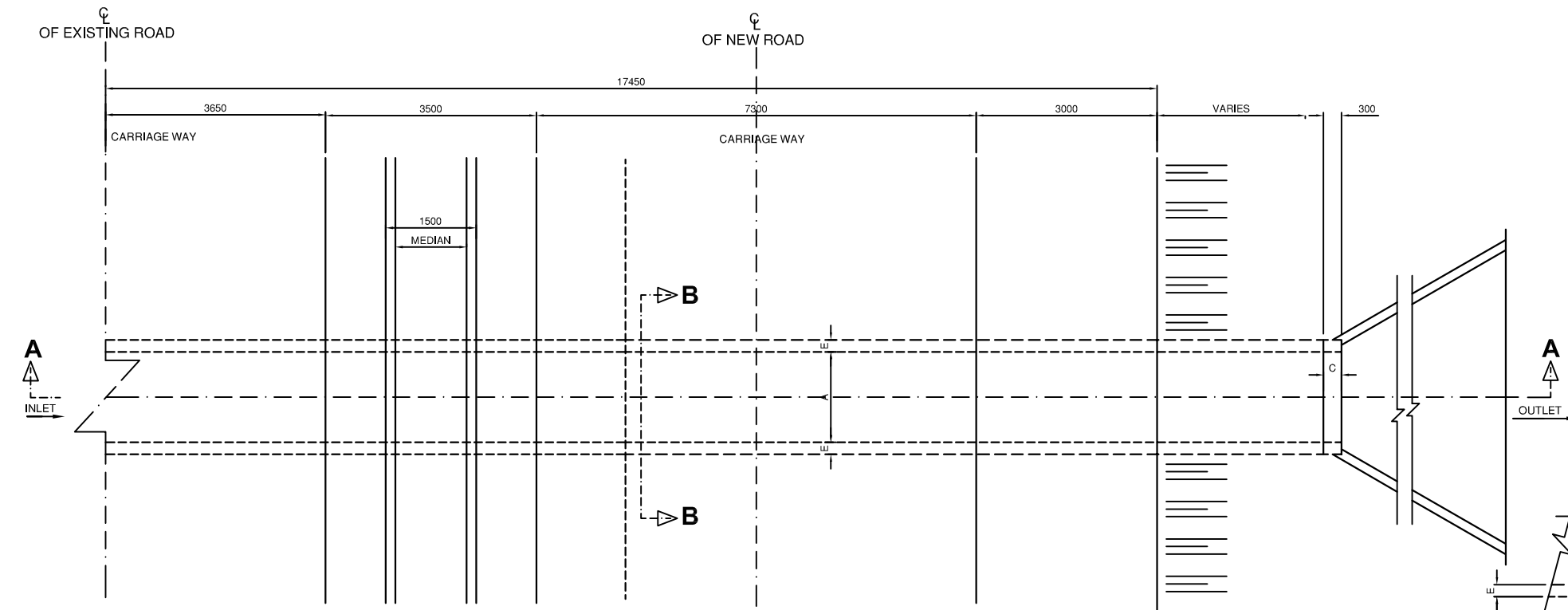


SECTION B - B

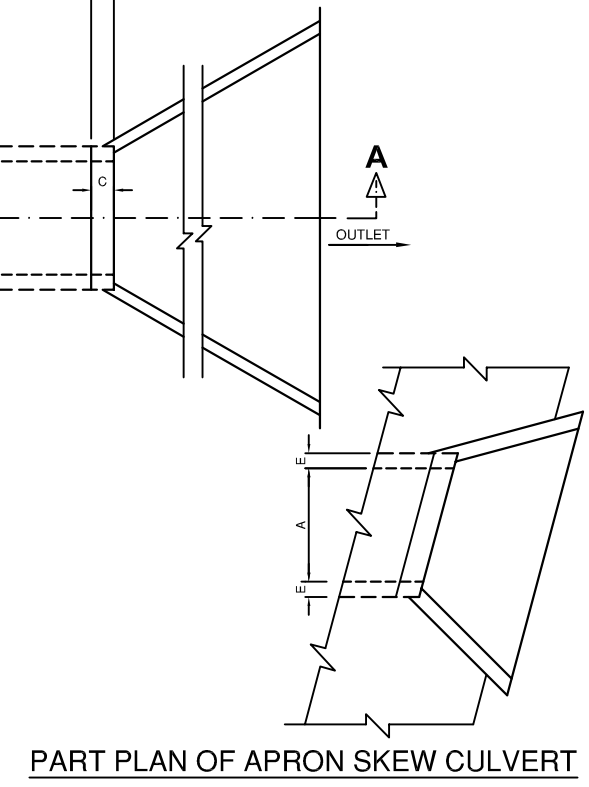
TYP. SECTION OF DOUBLE CELL CULVERT



TYP. SECTION OF MULTI CELL CULVERT



TYPICAL PLAN OF CULVERT



PART PLAN OF APRON SKEW CULVERT

NOTE:- SUPER ELEVATION OF CARRIAGE WAY IS VARIABLE

SINGLE CELL							
TYPE	CELL SIZE	A	B	C	D	E	F
I	1.0x1.0	1000	1000	200	200	200	150
II	1.5x1.0	1500	1000	250	250	200	150
III	1.5x1.5	1500	1500	250	250	200	150
IV	2.0x1.5	2000	1500	300	300	250	150
V	2.0x2.0	2000	2000	300	300	250	150
VI	2.5x1.5	2500	1500	300	300	250	150
VII	2.5x2.0	2500	2000	300	300	250	150
VIII	2.5x2.5	2500	2500	300	300	250	150
IX	3.0x2.0	3000	2000	350	350	300	150
X	3.0x2.5	3000	2500	350	350	350	150
XI	3.0x3.0	3000	3000	350	350	350	150

DOUBLE CELL							
TYPE	CELL SIZE	A	B	C	D	E	F
xII	1.0x1.0	1000	1000	200	200	200	150
xIII	1.5x1.0	1500	1000	250	250	200	150
xIV	1.5x1.5	1500	1500	250	250	200	150
xV	2.0x1.5	2000	1500	300	300	250	150
xVI	2.0x2.0	2000	2000	300	300	250	150
xVII	2.5x1.5	2500	1500	300	300	250	150
xVIII	2.5x2.0	2500	2000	300	300	250	150
xIX	2.5x2.5	2500	2500	300	300	250	150
xx	3.0x2.0	3000	2000	350	350	300	150
xxI	3.0x2.5	3000	2500	350	350	350	150
xxII	3.0x3.0	3000	3000	350	350	350	150

TRIPPLE CELL							
TYPE	CELL SIZE	A	B	C	D	E	F
xxIII	1.0x1.0	1000	1000	200	200	200	150
xxIV	2.0x1.5	1500	1000	250	250	200	150
xxV	2.0x2.0	1500	1500	250	250	200	150
xxVI	2.5x1.5	2000	1500	300	300	250	150
xxVII	2.5x2.0	2000	2000	300	300	250	150
xxVIII	2.5x2.5	2500	1500	300	300	250	150
xxIX	3.0x2.0	2500	2000	300	300	250	150
xxx	3.5x2.5	2500	2500	300	300	300	150
xxXI	3.0x3.0	3000	2000	350	350	300	150

FOUR CELL							
TYPE	CELL SIZE	A	B	C	D	E	F
xxXII	1.5x1.5	1500	1500	250	250	250	150
xxXIII	2.0x2.0	2000	2000	300	300	300	150
xxXIV	2.5x1.5	2500	1500	300	300	250	150
xxXV	2.5x2.0	2500	2000	300	300	250	150
xxXVI	2.5x2.5	2500	2500	300	300	300	150
xxXVII	3.0x2.0	3000	2500	350	350	300	150
xxXVIII	3.0x2.5	3000	2500	350	350	350	150
xxXIX	3.0x3.0	3000	3000	350	350	350	150

FIVE CELL							
TYPE	CELL SIZE	A	B	C	D	E	F
xxXX	3.0x2.5	3000	2500	350	350	350	150
xxXXI	3.0x3.0	3000	3000	350	350	350	150

SPECIAL CULVERT							
TYPE	CELL SIZE	A	B	C	D	E	F
SP-1	4.0x4.0	4000	4000	400	400	400	150
SP-2	4.8x4.5	4800	4800	450	450	450	150

PROJECT NAME	CLIENTS	CONSULTANTS	DRAWING TITLE	SCALE	DWG NO
FEASIBILITY STUDY ON THE 2ND KOHAT TUNNEL AND ACCESS ROADS PROJECT	 GOVERNMENT OF PAKISTAN MINISTRY OF COMMUNICATIONS NATIONAL HIGHWAY AUTHORITY	 JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO., LTD AND ALMEC CORPORATION	TYPICAL DETAILS OF BOX CULVERT (NORTH SECTION)	1:100 CUL-5

TUNNEL WORKS

SOUTH PORTAL
STA. 16+247.000

NORTH PORTAL
STA. 18+132.000

LEGENDS

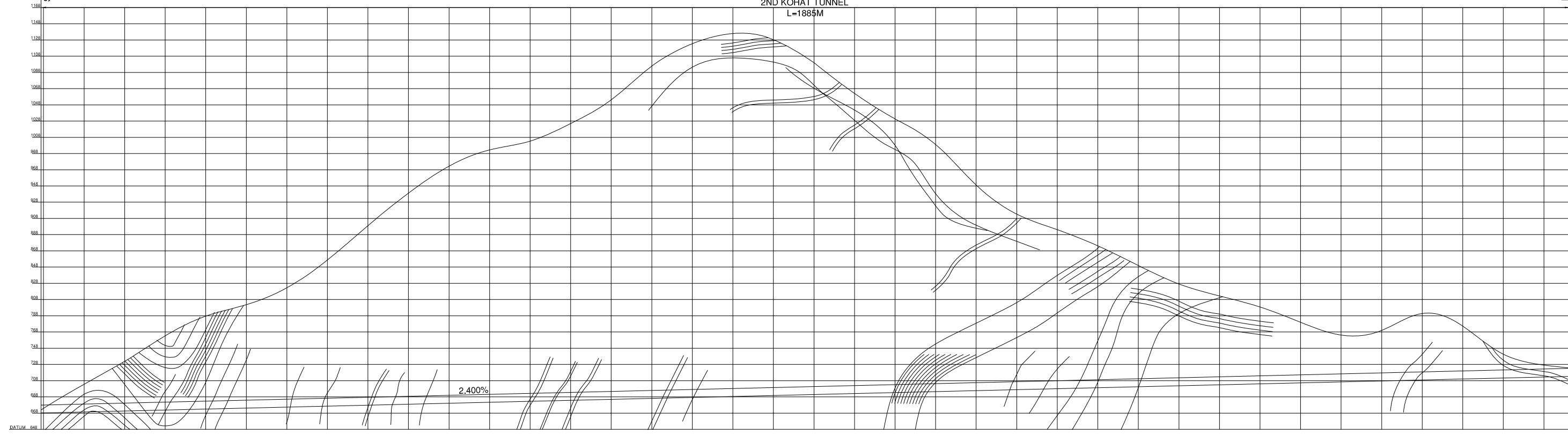
- Sandstone
- Shale
- Limestone
- Sandy Limestone
- Limestone with Shale or Shelly Limestone
- Deformation Zone
- F. Fault (more than 3 meters in width)
- F. Fault
- Boundary of Formation

ROCK CLASSIFICATION

Type	Condition	RQD (%)	Cutting Face
C I	Good	40~70	Face stands by itself.
C II	Moderately Good	10~40	Face stands by itself.
D I	Bad	10>	Face has rock fall.
D II	Very Bad	---	Face has Collapse.

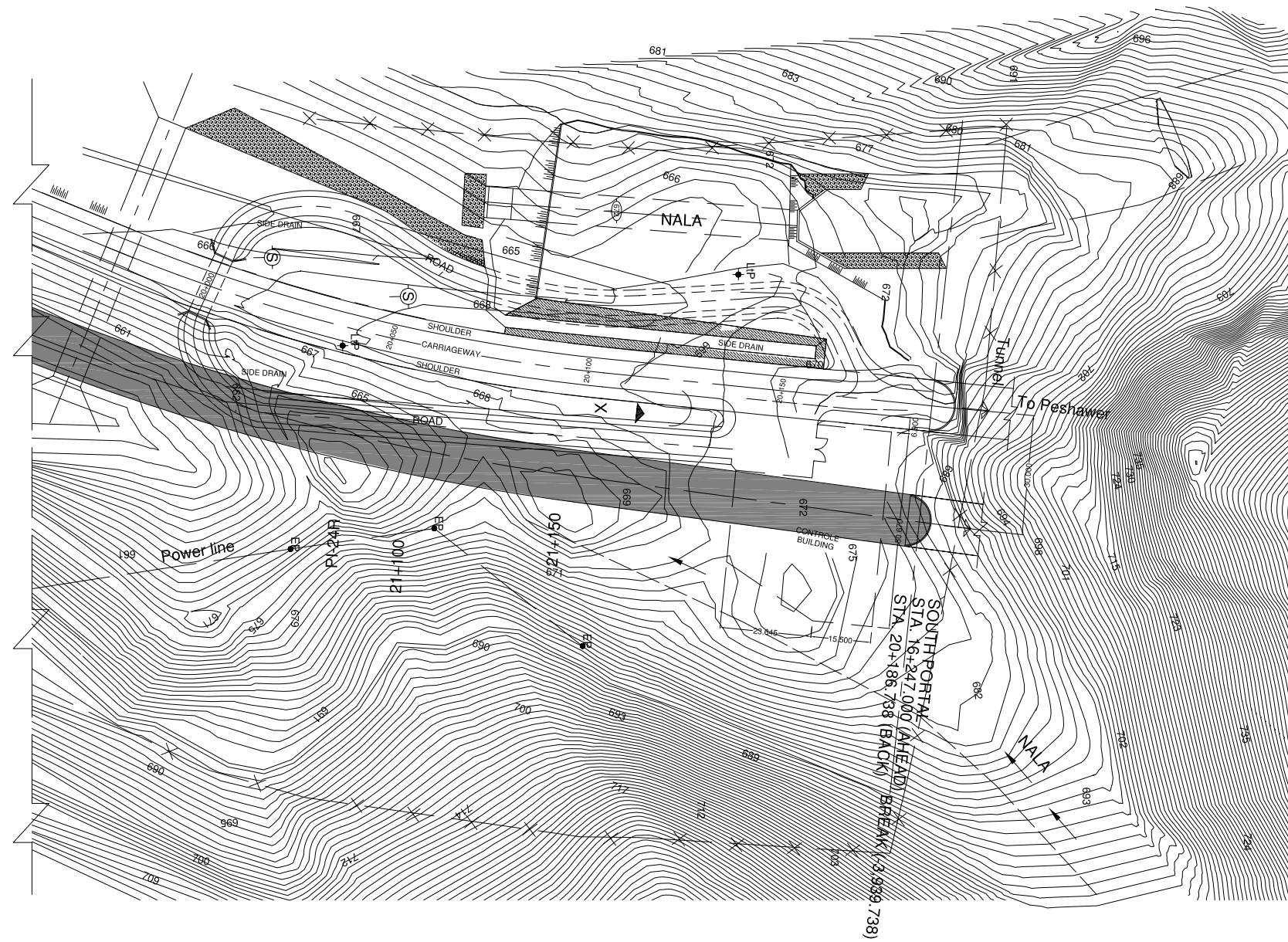
Note: Faults are Classified into D I or D II.

2ND KOHAT TUNNEL
L=1885M

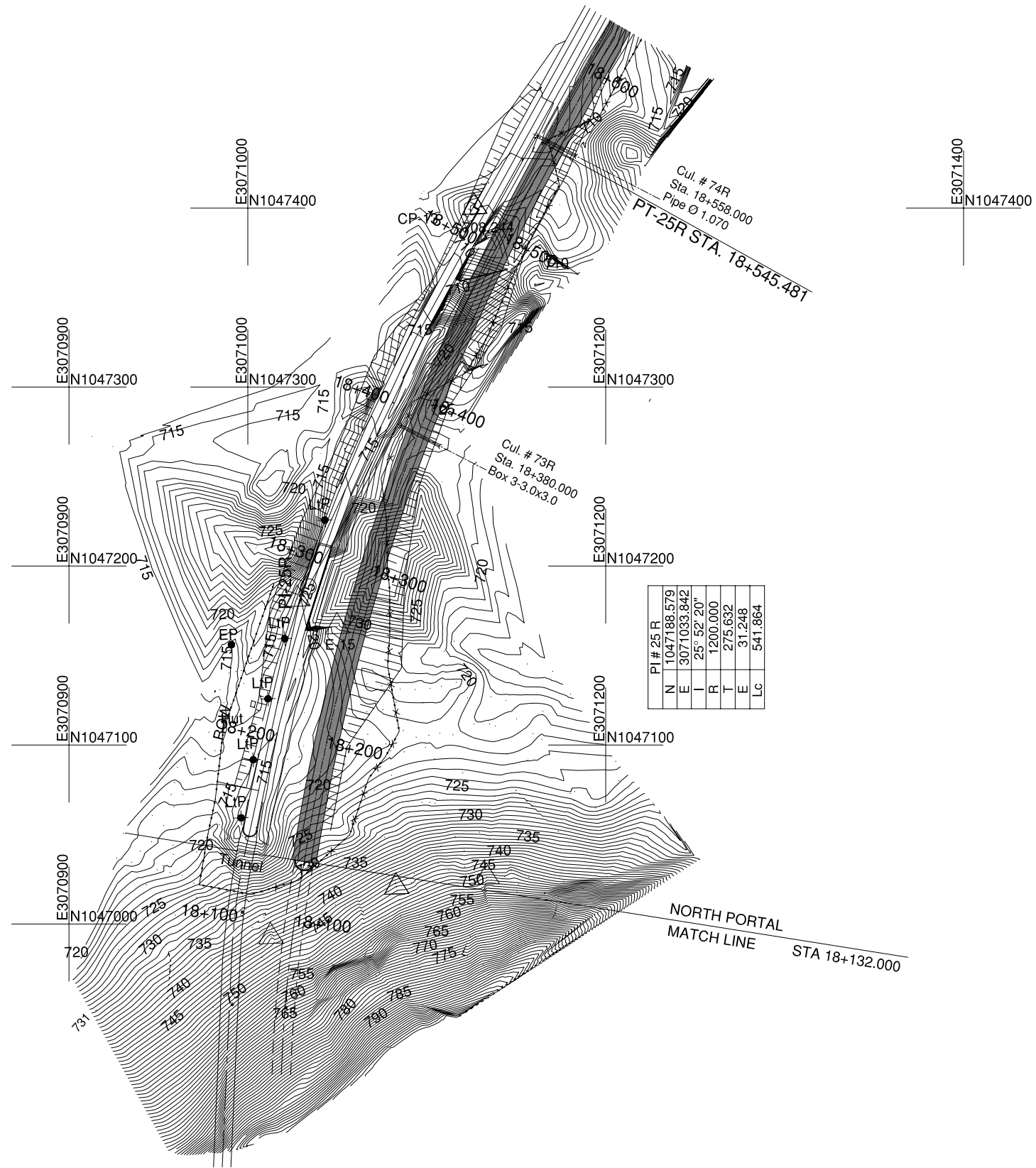


Station No.	16+247	16+250	16+300	16+350	16+400	16+450	16+500	16+550	16+600	16+650	16+700	16+750	16+800	16+850	16+900	16+950	17+000	17+050	17+100	17+150	17+200	17+250	17+300	17+350	17+400	17+450	17+500	17+550	17+600	17+650	17+700	17+750	17+800	17+850	17+900	17+950	18+000	18+050	18+100	18+132
Rock Classification	D I	C II	C I	C II	C I										D I	C I					D I			C II	C I	C II	C I			D I	C II	C I	C II	D I						
Geological Characteristics	High Weathered Sandy, oolitic limestone, with clay along bedding planes and shale intercalation.				Micritic Limestone, moderate weathering features.	Dark, Greenish gray colored, glauconitic sandstone.	Highly weathered micritic limestone.	Sandy Limestone or calcareous sandstone.	Micritic undulated limestone, slightly weathering features.	Sandstone with shale band. Micritic limestone.	Nodular limestone accompanied with thin shale. F14 has a big fractured zone being 5 m in width. Total quantity of ingress water is less than 1 ton/min.(2006).					Sandstone with shale.	Sandy Shale.	Sandy limestone, sandstone and shale Crown Collapsed.	Deformed shale accompanied with conglomeratic sandstone.	Deformed Shale. Micritic limestone, accompanied with sandstone.	Sheared and weathered limestone, Nodular with minor deflection.			Shale and sandy shale accompanied with sandstone, High Deflection.	Highly weathered limestone widely open bedding and dissolution cavities.	Highly weathered sandy shale.														
FINISHED ROAD ELEVATIONS	668.087	668.159	669.359	670.559	671.759	672.959	674.159	675.359	676.559	677.759	678.959	680.159	681.359	682.559	683.759	684.959	686.159	687.359	688.559	689.759	690.959	692.159	693.359	694.559	695.759	696.959	698.159	699.359	700.559	701.759	702.959	704.159	705.359	706.559	707.759	708.959	710.159	711.359	712.559	713.327
EXISTING ROAD / GROUND ELEVATIONS	16+247 672.039	16+250 685.339	16+300 705.000	16+350 730.000	16+400 765.000	16+450 790.000	16+500 800.000	16+550 820.000	16+600 855.000	16+650 890.000	16+700 940.000	16+750 975.000	16+800 995.000	16+850 1000.000	16+900 1025.000	16+950 1050.000	17+000 1100.000	17+050 1125.000	17+100 1140.000	17+150 1135.000	17+200 1100.000	17+250 1060.000	17+300 1030.000	17+350 1005.000	17+400 945.000	17+450 910.000	17+500 895.000	17+550 875.000	17+600 850.000	17+650 825.000	17+700 812.500	17+750 800.000	17+800 780.000	17+850 760.000	17+900 765.000	17+950 800.000	18+000 780.000	18+050 735.000	18+100 726.809	18+132 726.652
CUMULATIVE DISTANCE (CD)	16+247	16+250	16+300	16+350	16+400	16+450	16+500	16+550	16+600	16+650	16+700	16+750	16+800	16+850	16+900	16+950	17+000	17+050	17+100	17+150	17+200	17+250	17+300	17+350	17+400	17+450	17+500	17+550	17+600	17+650	17+700	17+750	17+800	17+850	17+900	17+950	18+000	18+050	18+100	18+132
HORIZONTAL ALIGNMENT	R=∞																																							
SUPPER ELEVATION % AGE	N.C.																																							

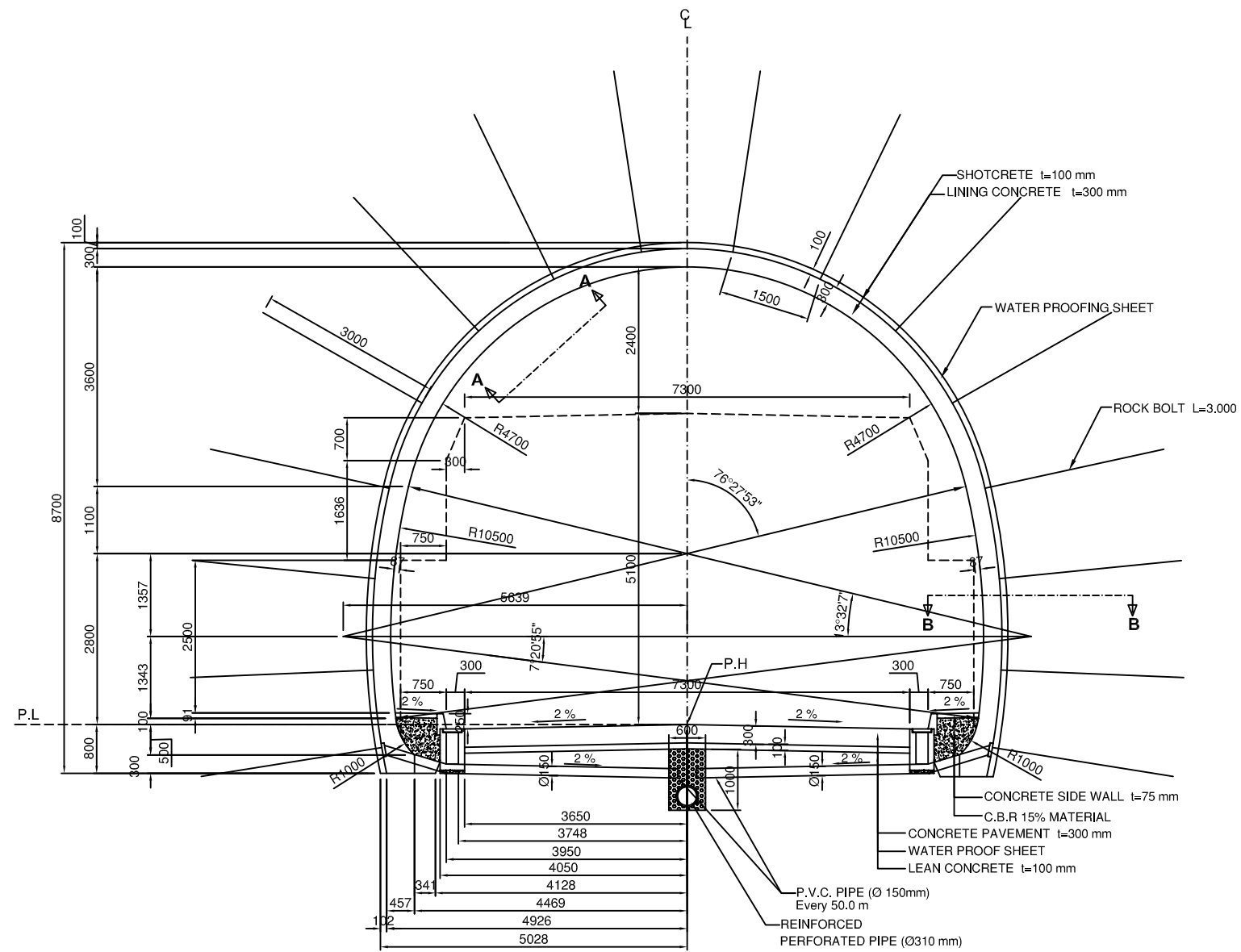
PROJECT NAME FEASIBILITY STUDY ON THE 2ND KOHAT TUNNEL AND ACCESS ROADS PROJECT	CLIENTS GOVERNMENT OF PAKISTAN MINISTRY OF COMMUNICATIONS NATIONAL HIGHWAY AUTHORITY	CONSULTANTS NIPPON KOEI CO., LTD AND ALMEC CORPORATION	DRAWING TITLE GEOLOGICAL PROFILE OF THE 2ND KOHAT TUNNEL	SCALE H=1:5000	DWG NO T-1
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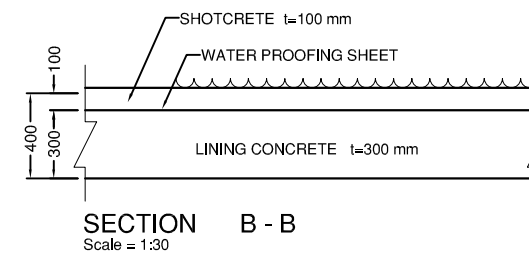
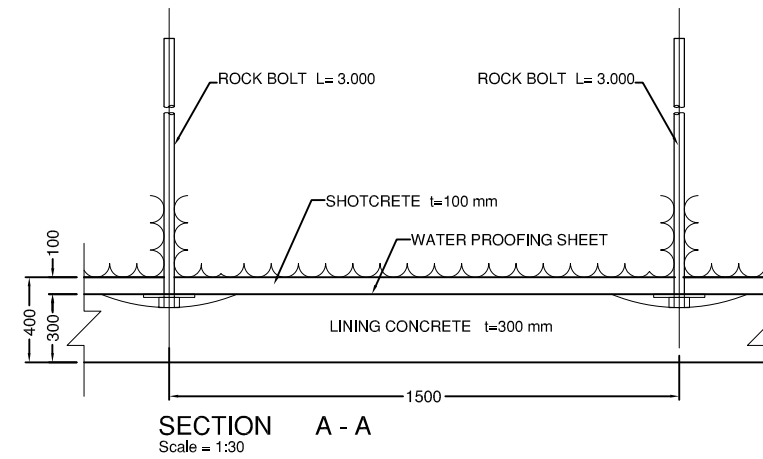
PROJECT NAME	CLIENTS		CONSULTANTS	DRAWING TITLE	SCALE	DWG NO
FEASIBILITY STUDY ON THE 2ND KOHAT TUNNEL AND ACCESS ROADS PROJECT	 GOVERNMENT OF PAKISTAN MINISTRY OF COMMUNICATIONS NATIONAL HIGHWAY AUTHORITY	 JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO., LTD AND ALMEC CORPORATION	PLAN OF TUNNEL SOUTH PORTAL	1:1,500	T-2



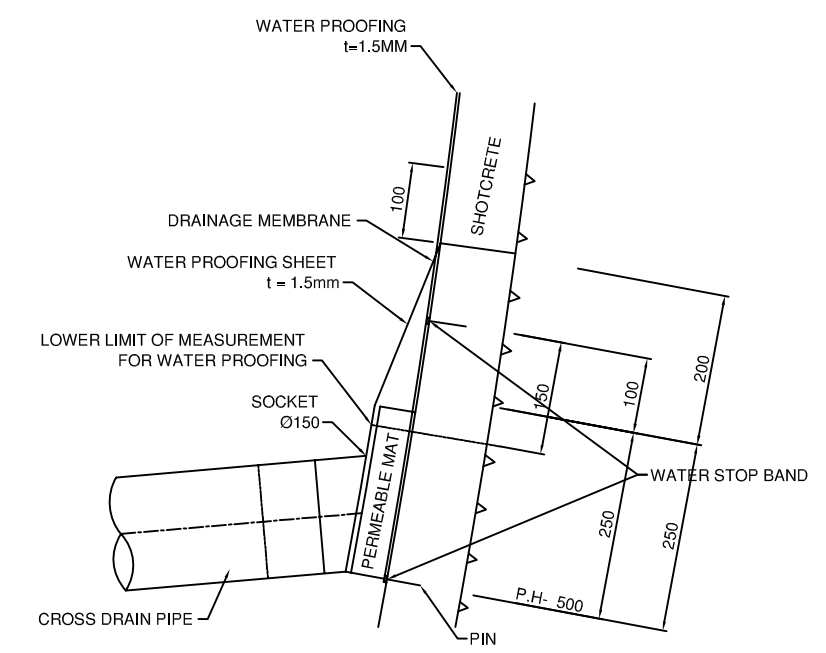
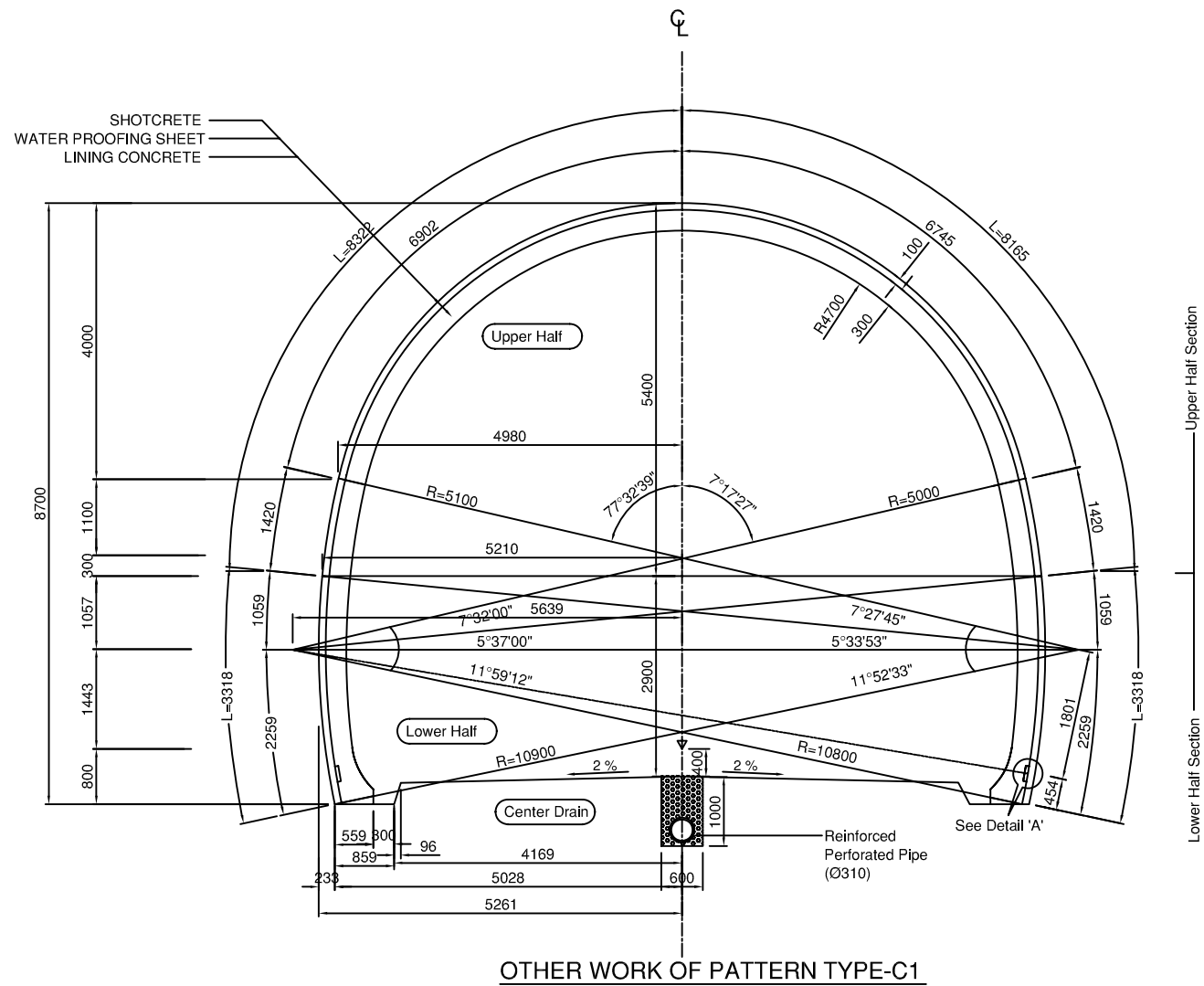
PROJECT NAME	CLIENTS		CONSULTANTS	DRAWING TITLE	SCALE	DWG NO
FEASIBILITY STUDY ON THE 2ND KOHAT TUNNEL AND ACCESS ROADS PROJECT	 GOVERNMENT OF PAKISTAN MINISTRY OF COMMUNICATIONS NATIONAL HIGHWAY AUTHORITY	 JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO., LTD AND ALMEC CORPORATION	PLAN OF TUNNEL NORTH PORTAL	1:3,000	T-3



TYPICAL CROSS SECTION PATTERN TYPE - C I



PROJECT NAME	CLIENTS	CONSULTANTS	DRAWING TITLE	SCALE	DWG NO	
FEASIBILITY STUDY ON THE 2ND KOHAT TUNNEL AND ACCESS ROADS PROJECT	 GOVERNMENT OF PAKISTAN MINISTRY OF COMMUNICATIONS NATIONAL HIGHWAY AUTHORITY	 JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO., LTD AND ALMEC CORPORATION	TYPICAL CROSS SECTION PATTERN TYPE - C I	1:100	T-4



DETAIL 'A'
Scale=1:1

SUPPORTING SYSTEM

ITEM	PATTERN	UNIT	C I	C II	D I	PORTAL	EMERGENCY AREA
ONE BLASTING PROGRESS	UPPER HALF	m	1.5	1.2	1.0	1.0	1.5
	LOWER HALF	m	3.0	2.4	2.0	2.0	3.0
ROCK BOLT	LENGTH	m	3.0	3.0	4.0	4.0	4.0
	TRANSVERSAL SPACE	m	1.5	1.5	1.2	1.2	1.2
	LONGITUDINAL SPACE	m	1.5	1.2	1.0	1.0	1.5
STEEL RIB	UPPER HALF	---	---	H-125	H-125	H-200	---
	LOWER HALF	---	---	---	H-125	H-200	---
	SPACE	m	---	1.2	1.0	1.0	---
SHOTCRETE CONCRETE	THICKNESS	cm	10	10	15	25	15
	---	---	---	---	---	---	---
WIRE MESH	UPPER HALF	---	---	---	PROVIDE	PROVIDE	---
	ARCH THICKNESS	cm	30	30	30	35	40
LINING CONCRETE	---	---	---	---	---	---	---
	INVERT THICKNESS	cm	---	---	45	50	---

PROJECT NAME	CLIENTS	CONSULTANTS	DRAWING TITLE	SCALE	DWG NO	
FEASIBILITY STUDY ON THE 2ND KOHAT TUNNEL AND ACCESS ROADS PROJECT	 GOVERNMENT OF PAKISTAN MINISTRY OF COMMUNICATIONS NATIONAL HIGHWAY AUTHORITY	 JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO., LTD AND ALMEC CORPORATION	OTHER WORK (CI PATTERN)	1:100	T-5