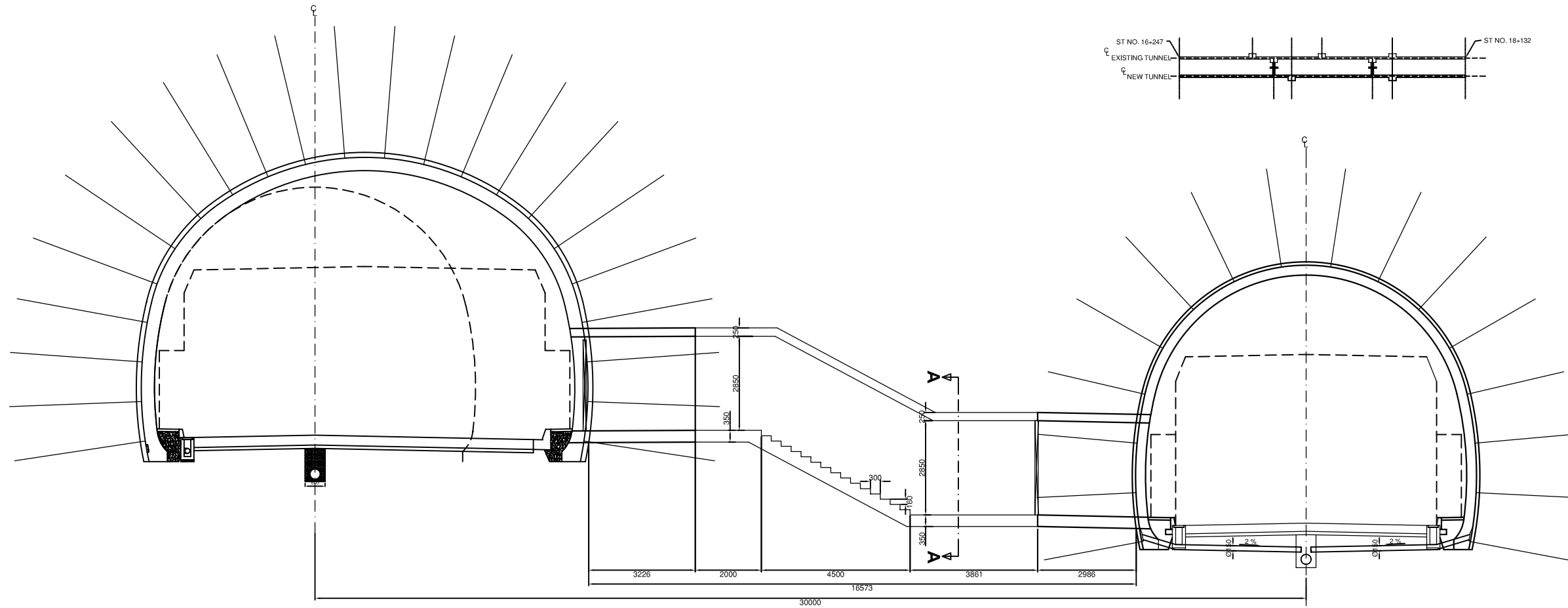
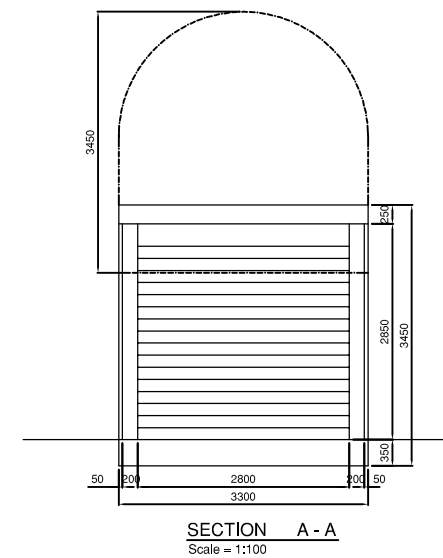
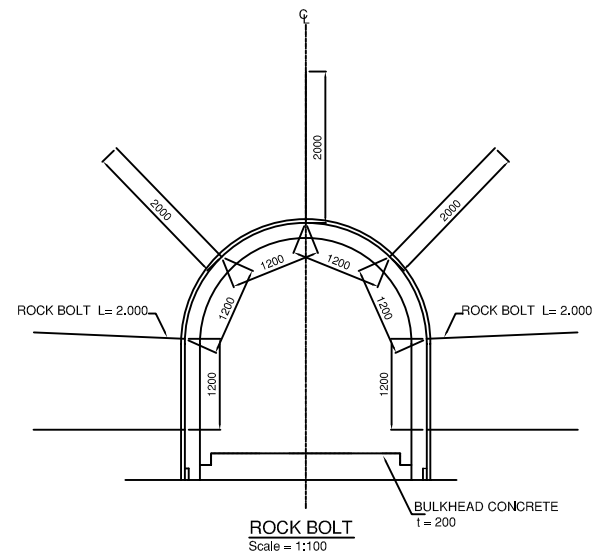
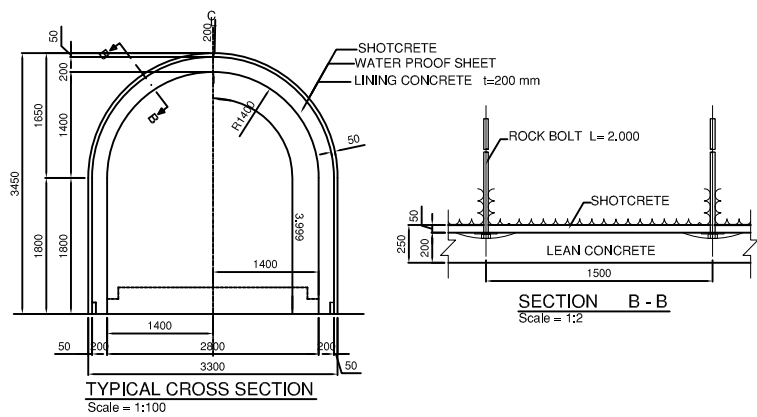


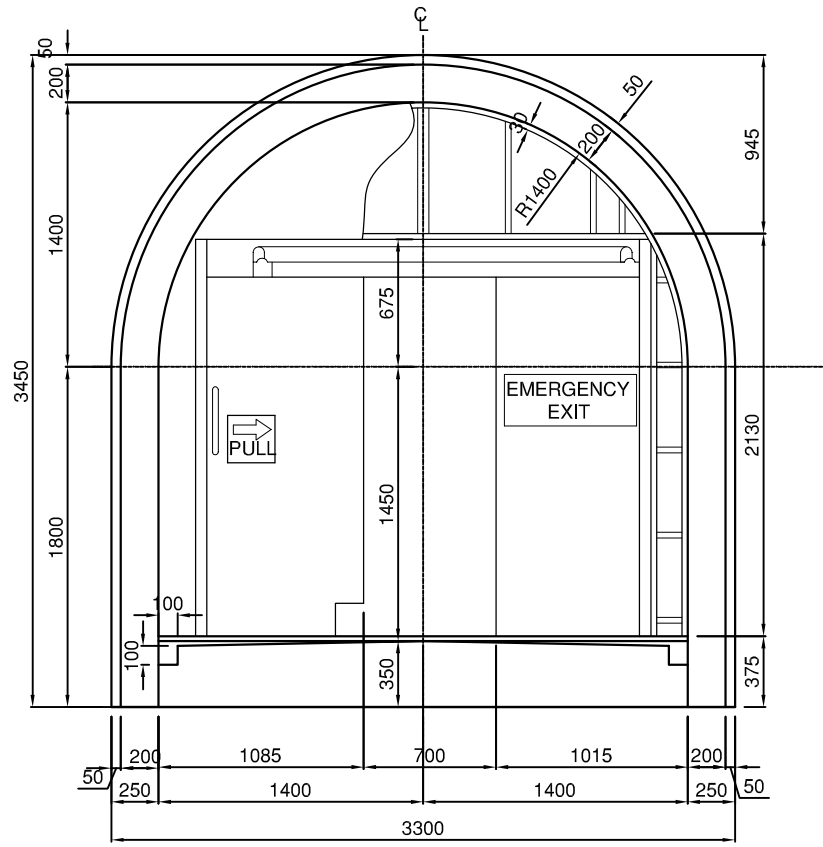
PROJECT NAME	CLIENTS	CONSULTANTS	DRAWING TITLE	SCALE	DWG NO
FEASIBILITY STUDY ON THE 2ND KOHAT TUNNEL AND ACCESS ROADS PROJECT	 GOVERNMENT OF PAKISTAN MINISTRY OF COMMUNICATIONS NATIONAL HIGHWAY AUTHORITY	 JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO., LTD AND ALMEC CORPORATION	DETAILS OF EMERGENCY AREA	1:120



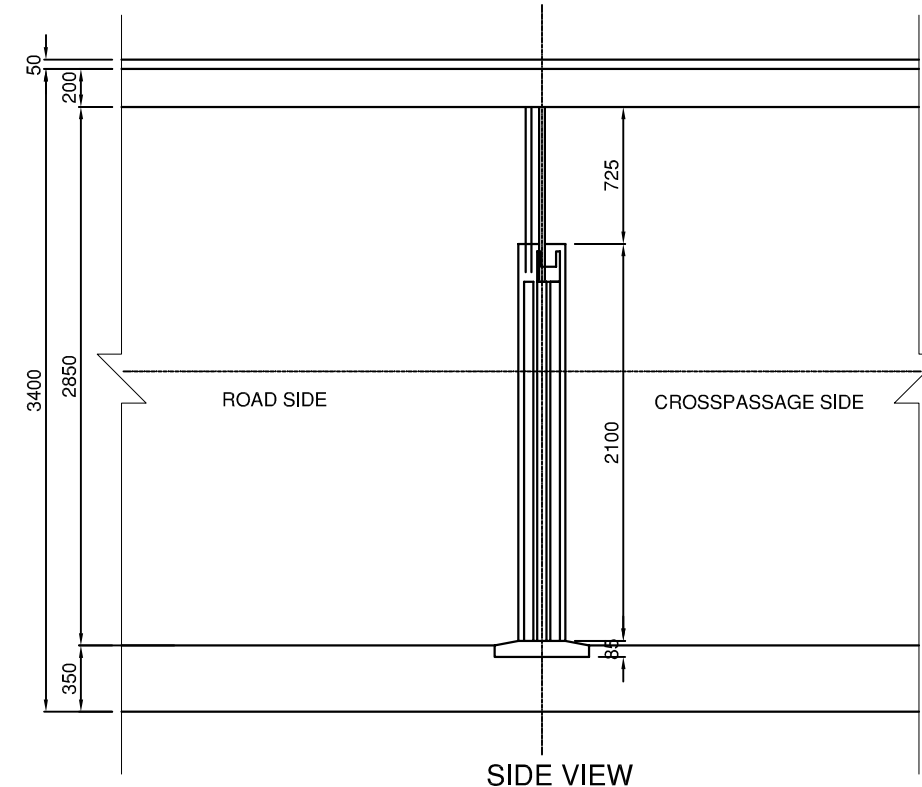
CROSS SECTION
Scale = 1:150



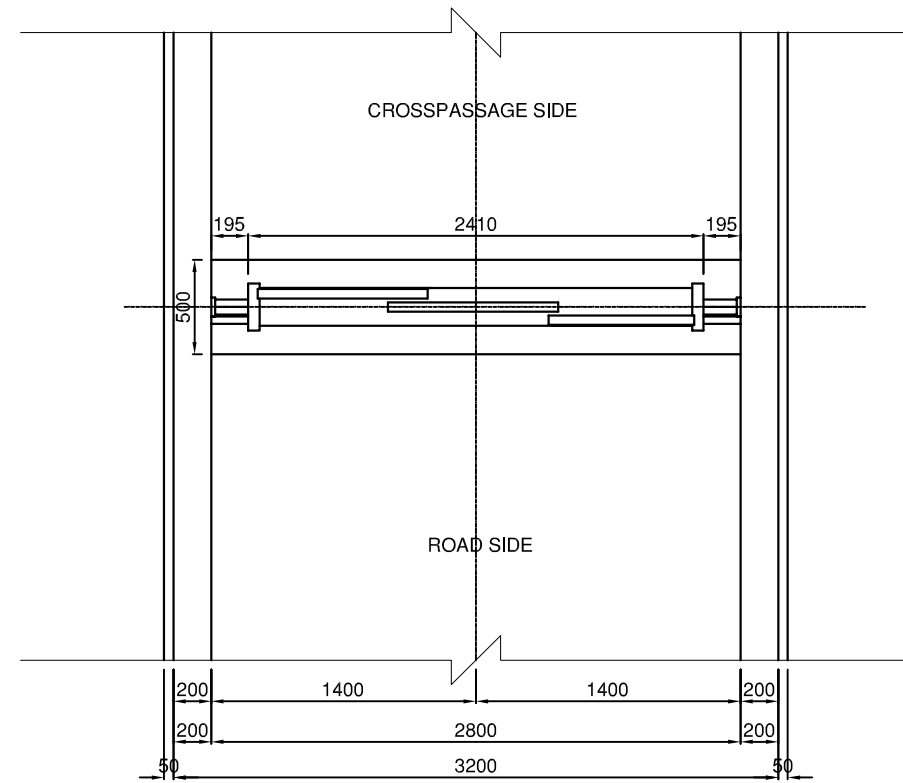
PROJECT NAME	CLIENTS	CONSULTANTS	DRAWING TITLE	SCALE	DWG NO	
FEASIBILITY STUDY ON THE 2ND KOHAT TUNNEL AND ACCESS ROADS PROJECT	 GOVERNMENT OF PAKISTAN MINISTRY OF COMMUNICATIONS NATIONAL HIGHWAY AUTHORITY	 JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO., LTD AND ALMEC CORPORATION	TYPICAL CROSS SECTION CROSS PASSAGE	AS SHOWN	T-17



FRONT VIEW

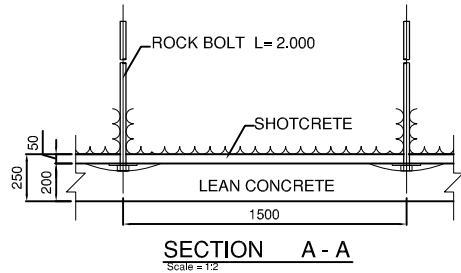
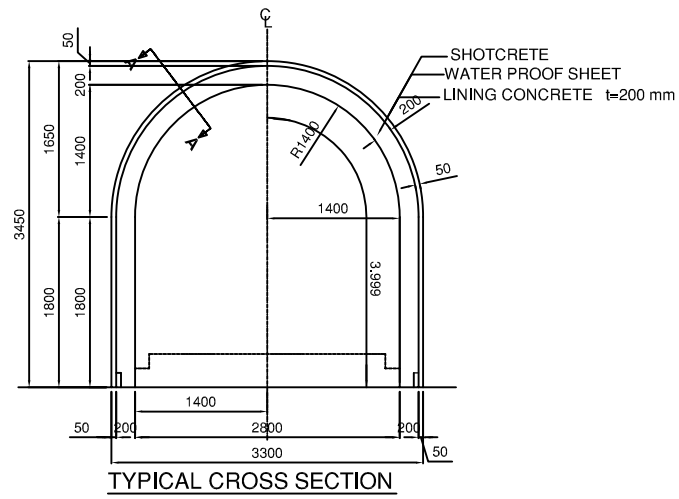


SIDE VIEW

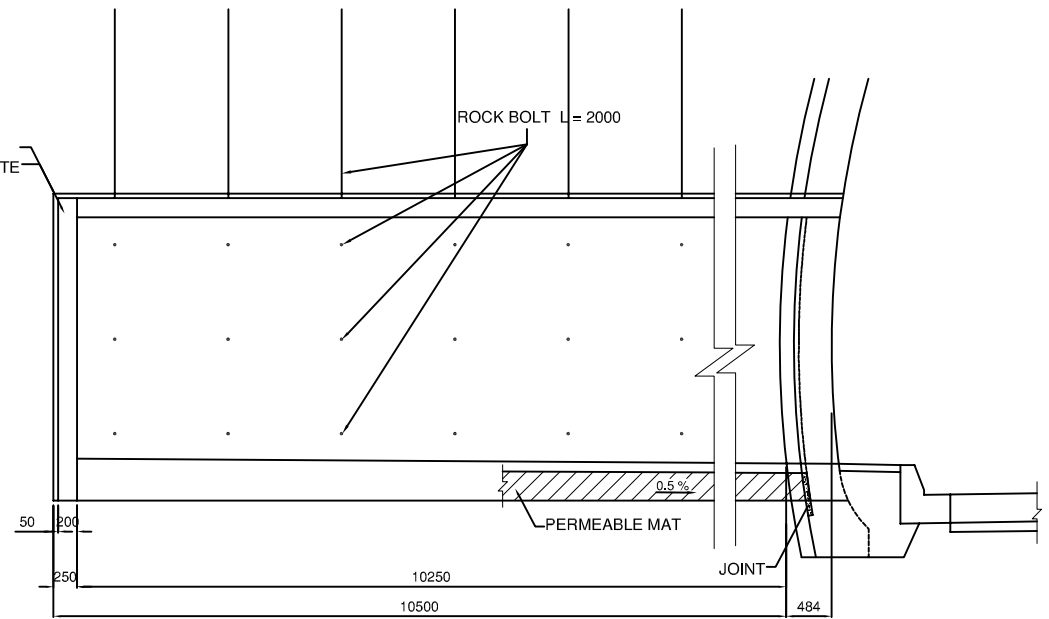


PLANE GIGUE
CROSSPASSAGE DOOR

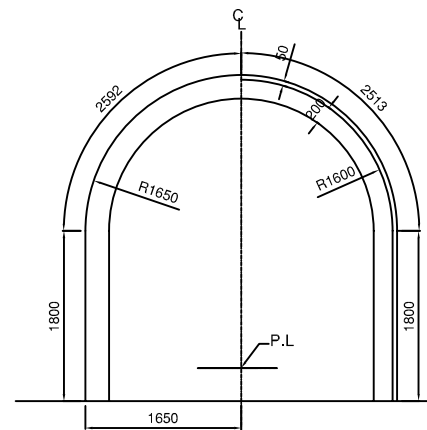
PROJECT NAME	CLIENTS		CONSULTANTS	DRAWING TITLE	SCALE	DWG NO
FEASIBILITY STUDY ON THE 2ND KOHAT TUNNEL AND ACCESS ROADS PROJECT	 GOVERNMENT OF PAKISTAN MINISTRY OF COMMUNICATIONS NATIONAL HIGHWAY AUTHORITY	 JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO., LTD AND ALMEC CORPORATION	CROSS PASSAGE DOOR DETAIL	1:40	T-18



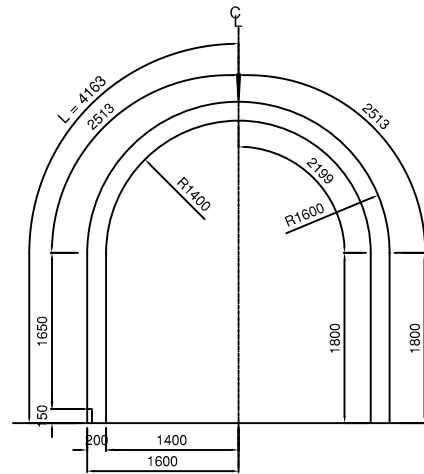
SHOTCRETE t = 50
BULKHEAD CONCRETE t = 200



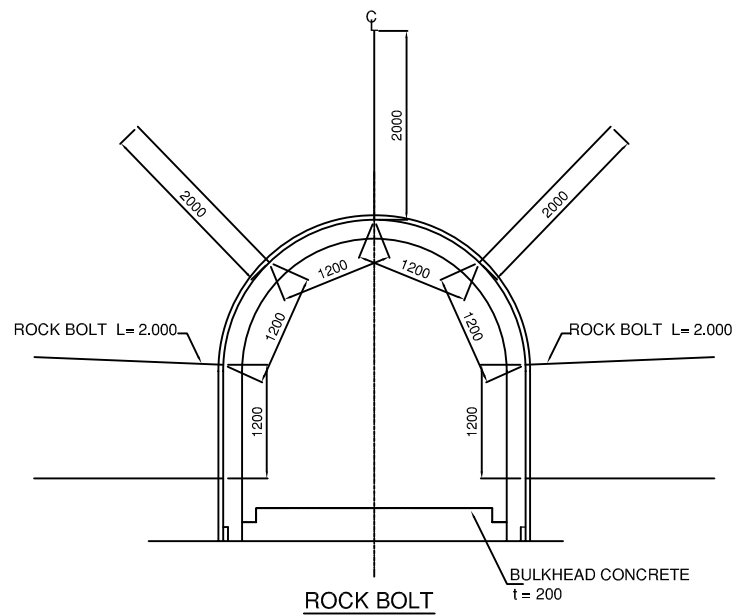
SIDE VIEW



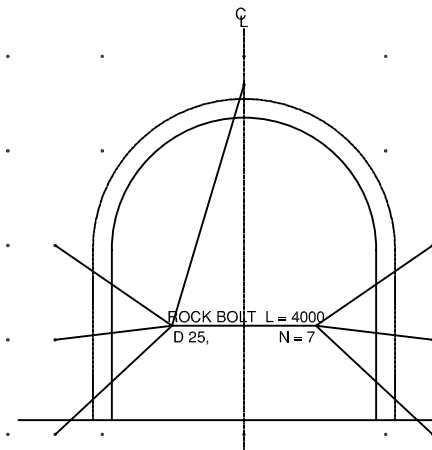
ELEVATION SHOTCRETE



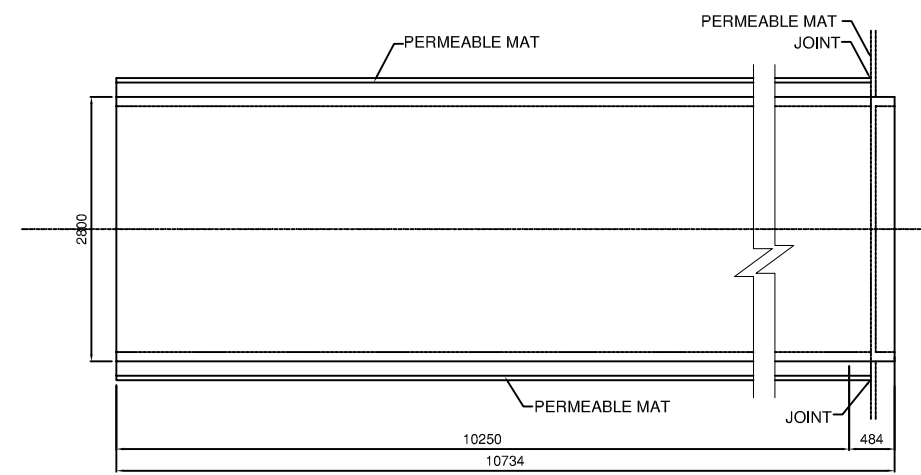
WATER PROOFING LINING CRETE



ROCK BOLT



REINFORCEMENT ROCK BOLT

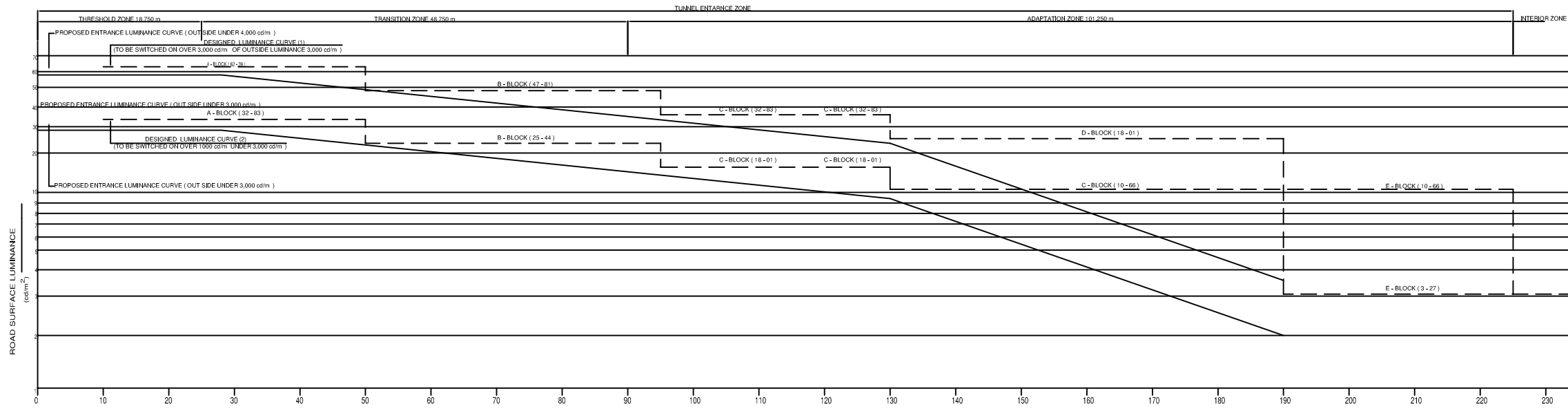


DRAINAGE PLAN

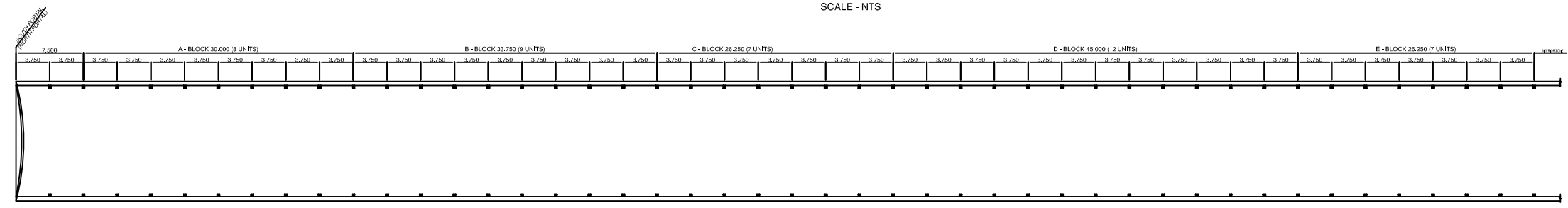
TUNNEL SUBSTATION

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	TUNNEL SUBSTATION	1:80 T-19

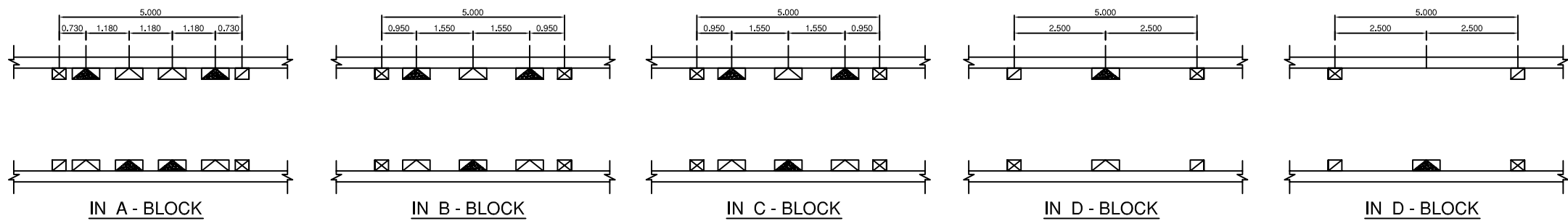
TUNNEL FACILITIES



DESIGNED ENTRANCE LUMINANCE CURVE
SCALE - NTS



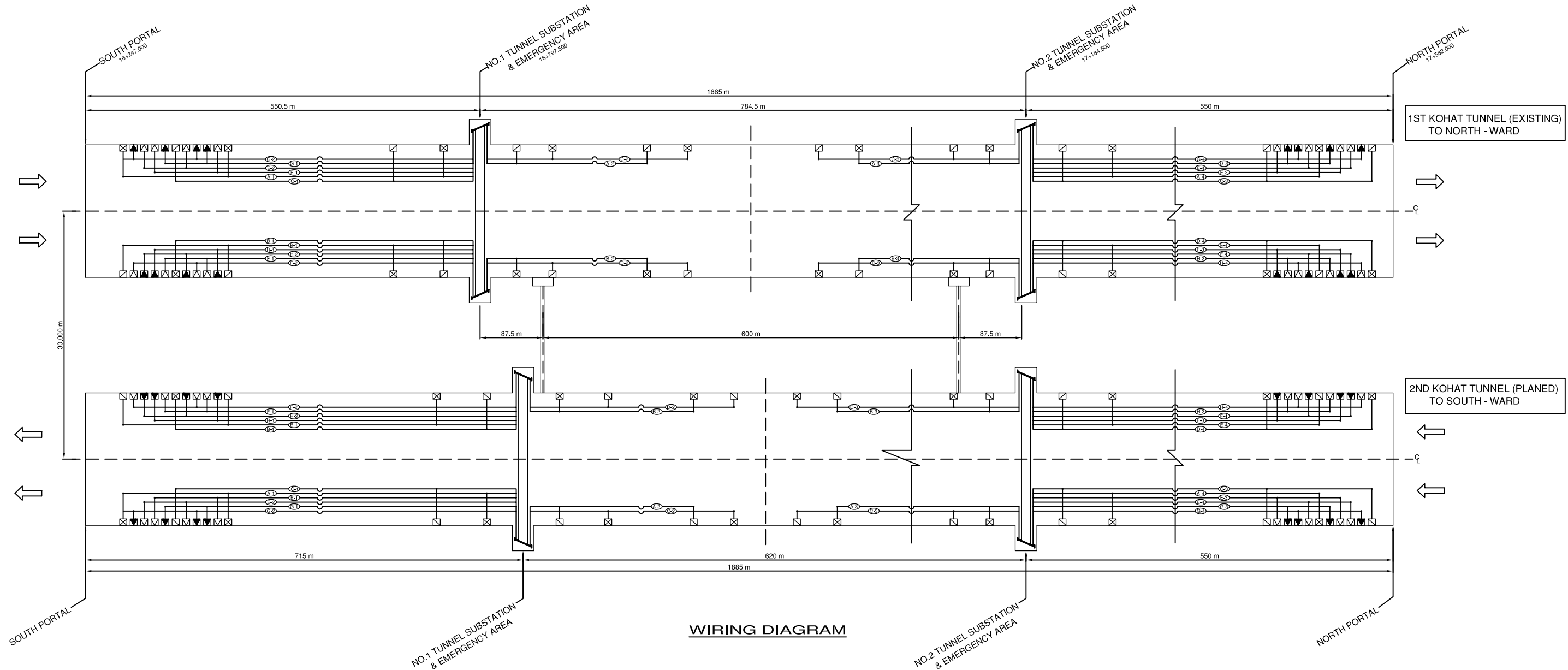
LAYOUT OF LIGHTING LUMINAIRES
SCALE - NTS



LIGHTING LUMINAIRE ARRANGEMENT IN UNIT
SCALE - 1:150

SYMBOL	TYPE OF LUMINAIRES	NIGHT TIME 0 AM - 8 AM	DAY TIME					DAY TIME 6 PM - 12 PM	STAND BY - POWER
			UNDER 1000	UNDER 1000	UNDER 1000	UNDER 1000	UNDER 1000		
☐	SON - T 70 w	YES	YES	YES	YES	YES	YES	YES	YES
▣	SON - T 70 w	NO	YES	YES	YES	YES	YES	NO	NO
▤	SON - T 250 w	NO	NO	YES	YES	YES	NO	NO	NO
▥	SON - T 250 w	NO	NO	NO	YES	NO	NO	NO	NO

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	LAYOUT OF LIGHTING LUMINAIRES AT TUNNEL ENTRANCE	AS SHOWN	L-1



WIRING DIAGRAM

POWER CABLE & EARTH CONDUCTOR DIMENSION

CIRCUIT NO	POWER - CABLE	EARTH WIRE
* G-2	4 ^c - 10 mm ²	2 - 6 mm ² BC
* G-1	4 ^c - 10 mm ²	2 - 6 mm ² BC
* E-2	4 ^c - 10 mm ²	2 - 6 mm ² BC
* E-1	4 ^c - 10 mm ²	2 - 6 mm ² BC
* A-1	4 ^c - 10 mm ²	2 - 6 mm ² BC
* C-1	4 ^c - 10 mm ²	2 - 6 mm ² BC
* D-1	4 ^c - 10 mm ²	2 - 6 mm ² BC
* B-1	4 ^c - 10 mm ²	2 - 6 mm ² BC
* F-1	4 ^c - 10 mm ²	2 - 6 mm ² BC
* F-2	4 ^c - 10 mm ²	2 - 6 mm ² BC
* H-1	4 ^c - 10 mm ²	2 - 6 mm ² BC
* H-2	4 ^c - 10 mm ²	2 - 6 mm ² BC

POWER CABLE & EARTH CONDUCTOR DIMENSION

CIRCUIT NO	POWER - CABLE	EARTH WIRE
* A-2	4 ^c - 10 mm ²	2 - 6 mm ² BC
* C-2	4 ^c - 10 mm ²	2 - 6 mm ² BC
* D-2	4 ^c - 10 mm ²	2 - 6 mm ² BC
* B-2	4 ^c - 10 mm ²	2 - 6 mm ² BC

POWER CABLE & EARTH CONDUCTOR DIMENSION

CIRCUIT NO	POWER - CABLE	EARTH WIRE
* A-3	4 ^c - 10 mm ²	2 - 6 mm ² BC
* C-3	4 ^c - 10 mm ²	2 - 6 mm ² BC
* D-3	4 ^c - 10 mm ²	2 - 6 mm ² BC
* B-3	4 ^c - 10 mm ²	2 - 6 mm ² BC

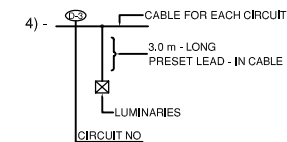
POWER CABLE & EARTH CONDUCTOR DIMENSION

CIRCUIT NO	POWER - CABLE	EARTH WIRE
* G-4	4 ^c - 10 mm ²	2 - 6 mm ² BC
* G-3	4 ^c - 10 mm ²	2 - 6 mm ² BC
* E-4	4 ^c - 10 mm ²	2 - 6 mm ² BC
* E-3	4 ^c - 10 mm ²	2 - 6 mm ² BC
* A-4	4 ^c - 10 mm ²	2 - 6 mm ² BC
* C-4	4 ^c - 10 mm ²	2 - 6 mm ² BC
* D-4	4 ^c - 10 mm ²	2 - 6 mm ² BC
* B-4	4 ^c - 10 mm ²	2 - 6 mm ² BC
* F-3	4 ^c - 10 mm ²	2 - 6 mm ² BC
* F-4	4 ^c - 10 mm ²	2 - 6 mm ² BC
* H-3	4 ^c - 10 mm ²	2 - 6 mm ² BC
* H-4	4 ^c - 10 mm ²	2 - 6 mm ² BC

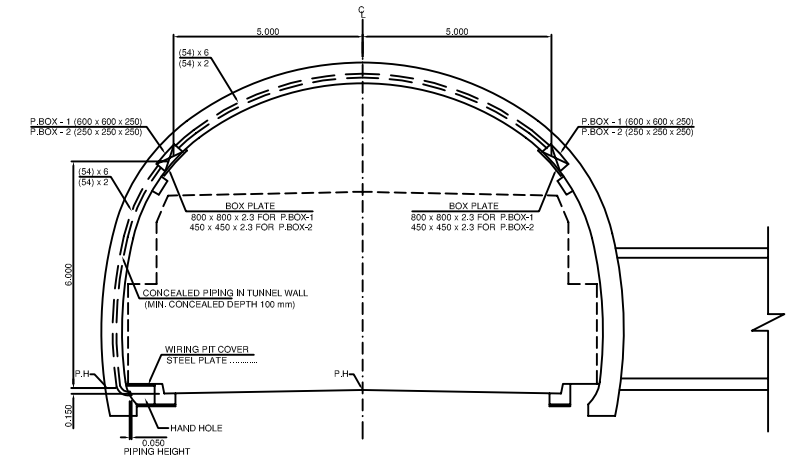
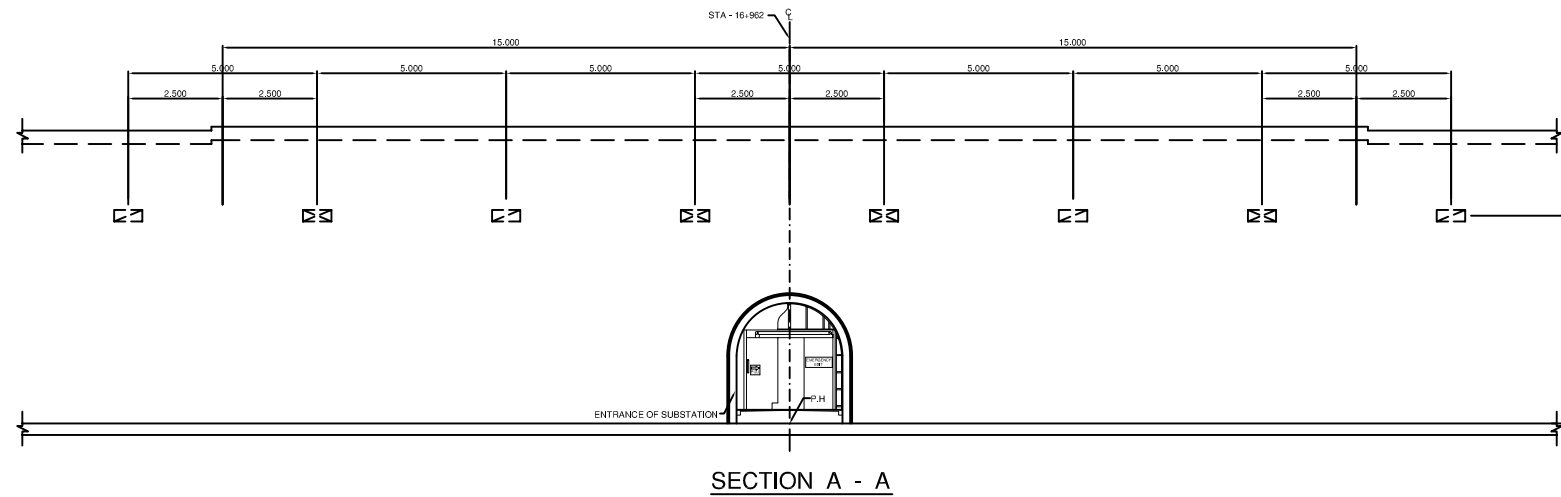
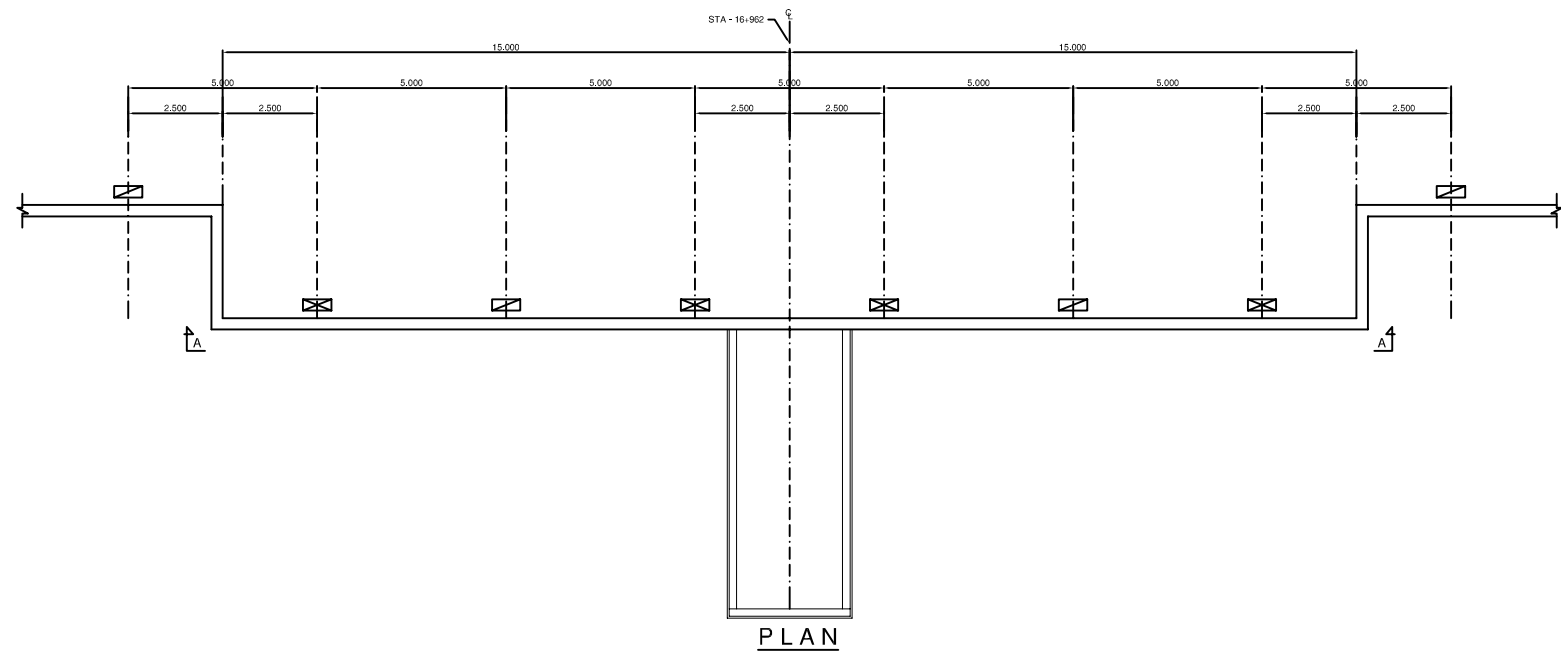
CIRCUIT NO	SYMBOL	TYPE OF LUMINAIRES	NIGHT TIME								STAND BY POWER
			04AM - 8AM				8 AM - 2 PM				
			UNDER 1000	OVER 1000	OVER 1000	OVER 1000	UNDER 1000	UNDER 1000	UNDER 1000	UNDER 1000	
A-1,-2,-3,-4 B-1,-2,-3,-4	☒	SON - T 70 w	YES	YES	YES	YES	YES	YES	YES	YES	YES
C-1,-2,-3,-4 D-1,-2,-3,-4	☒	SON - T 70 w	NO	YES	YES	YES	YES	YES	NO	NO	NO
E-1,-2,-3,-4 F-1,-2,-3,-4	☒	SON - T 250 w	NO	NO	YES	YES	YES	NO	NO	NO	NO
G-1,-2,-3,-4 H-1,-2,-3,-4	☒	SON - T 250 w	NO	NO	NO	YES	NO	NO	NO	NO	NO

NOTE :-

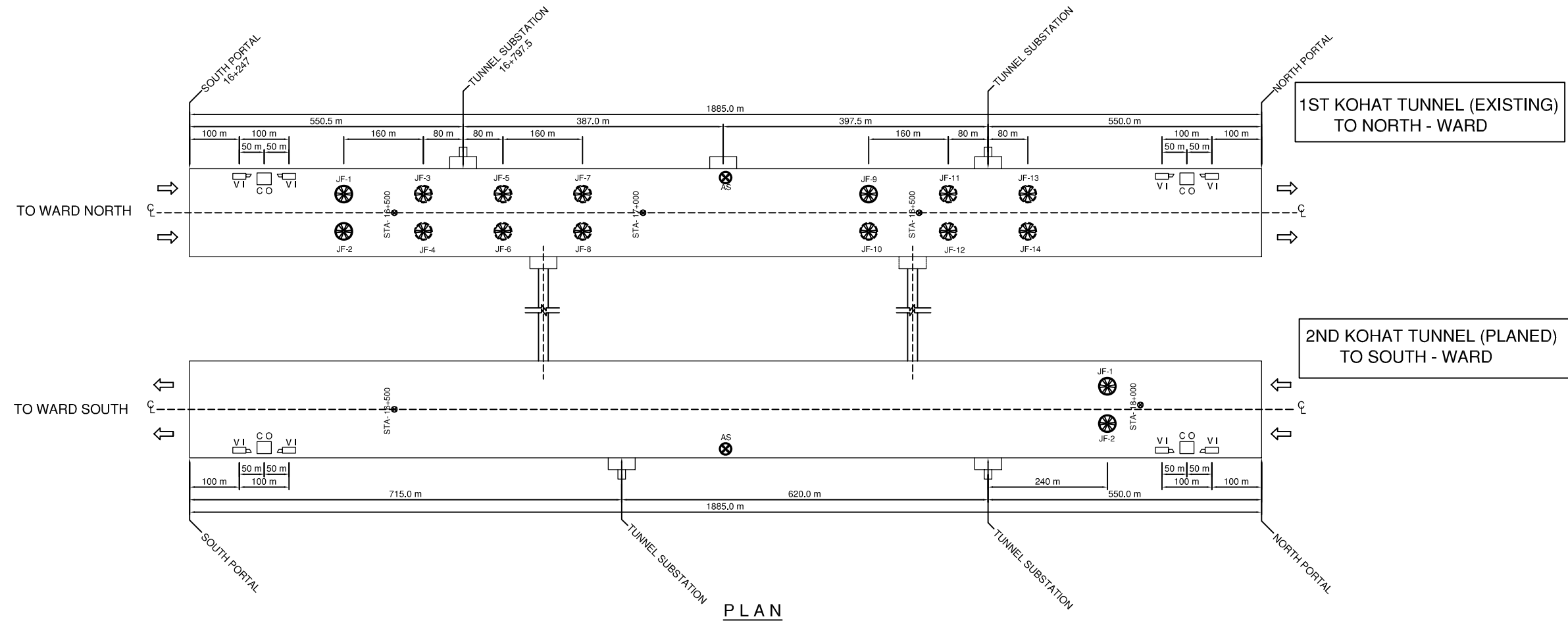
- 1) - POWER CABLES AS SHOWN BE PVC/PVC, PVC/PVC PV INSULATED AND PVC SHEATED.
- 2) - EACH LUMINAIRES SHELL BE FED THOCAM TYPE CABLE AS SHOWN IN THE TABLES.
- 3) - FOR CONNECTION BETWEEN LUMINAIRE AND THE CABLE, A 3-0m - LONG PRESET LEAD - IN CABLE SHALL BE PROVIDED FOR EACH LUMINAIRE ON THE CABLE. THE LEAD - IN CABLES SHOULD BE SET ON AT A CABLE FACTORY.



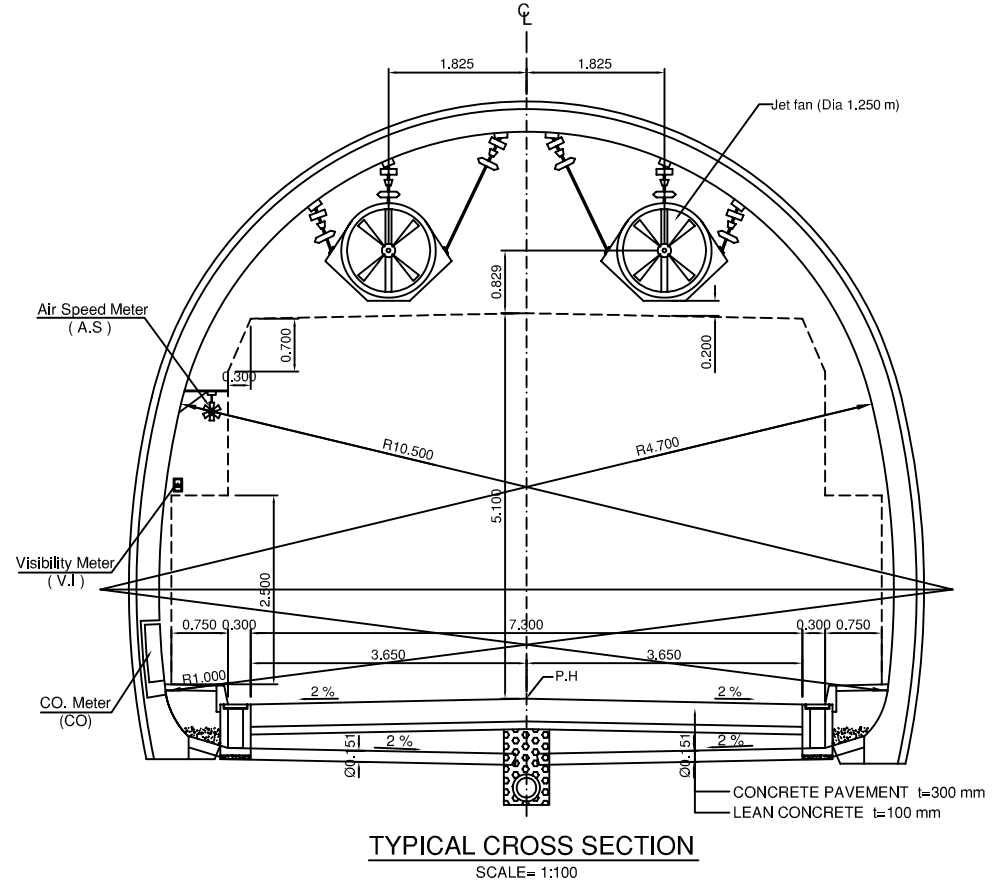
PROJECT NAME	CLIENTS	CONSULTANTS	DRAWING TITLE	SCALE	DWG NO
FEASIBILITY STUDY ON THE 2ND KOHAT TUNNEL AND ACCESS ROADS PROJECT	 GOVERNMENT OF PAKISTAN MINISTRY OF COMMUNICATIONS NATIONAL HIGHWAY AUTHORITY	 JAPAN INTERNATIONAL COOPERATION AGENCY	NIPPON KOEI CO., LTD AND ALMEC CORPORATION	WIRING DIAGRAM OF TUNNEL LUMINAIRE CIRCUITS	NTS



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	LUMINARIES FITTING ARRANGEMENT AT TUNNEL SUBSTATION & EMERGENCY AREA	1:200	L-3



PLAN



TYPICAL CROSS SECTION
SCALE= 1:100

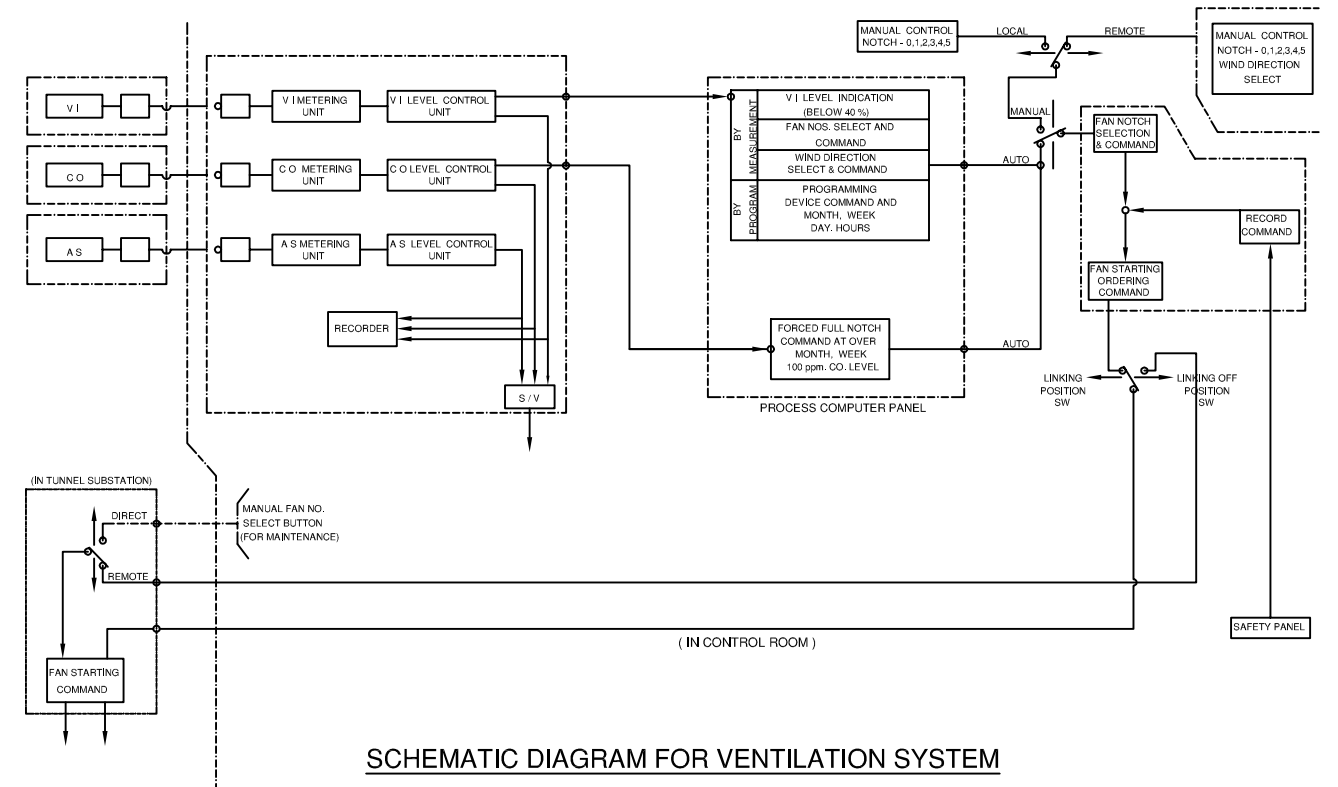
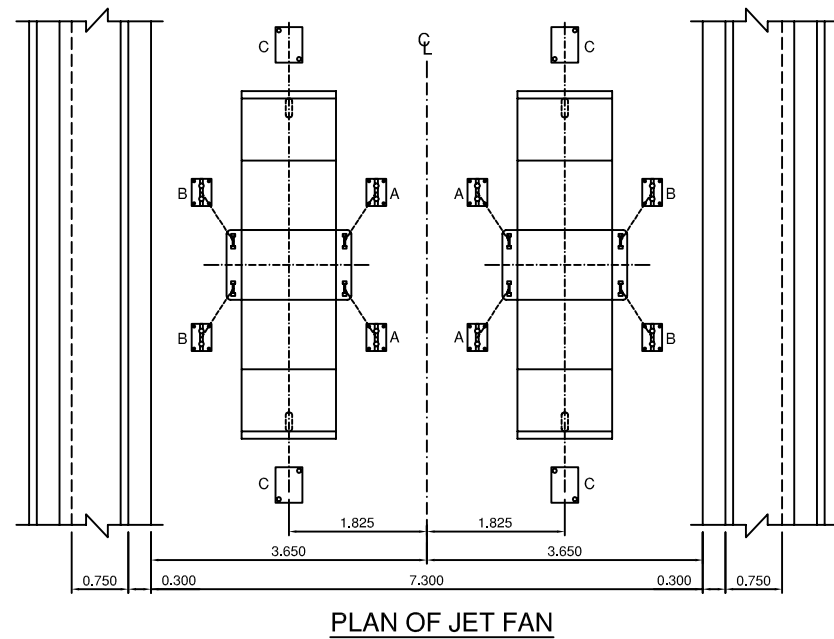
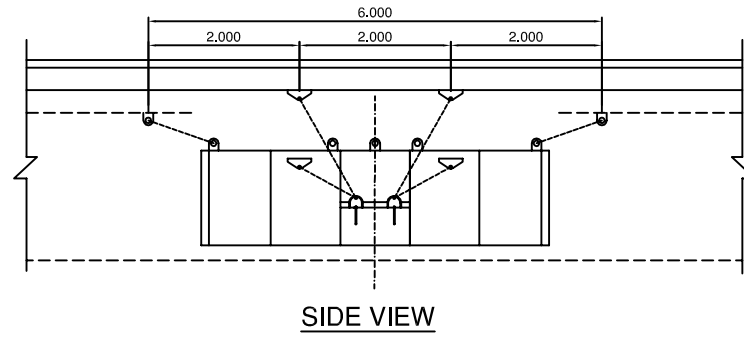
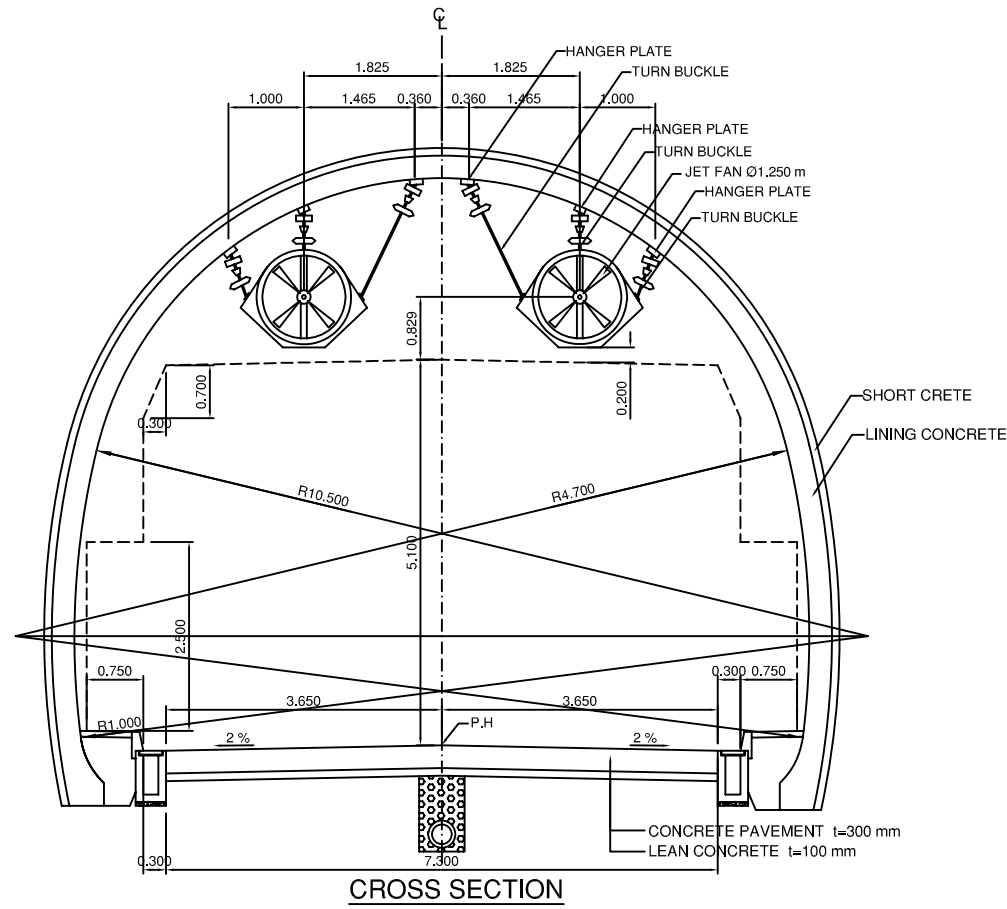
DESIGN CONDITION

ITEM	1ST KOHAT TUNNEL		2ND KOHAT TUNNEL		REMARKS
	CONTENTS		CONTENTS		
TRAFFIC DIRECTION	ONE - WAY	TWO - LANE TRAFFIC (TO NORTH)	ONE - WAY	TWO - LANE TRAFFIC (TO SOUTH)	
TRAFFIC COMPOSITION	WITH DIESEL ENGINE = 40% WITH GASOLINE ENGINE = 60%		WITH DIESEL ENGINE = 40% WITH GASOLINE ENGINE = 60%		
GRADIENT	2.2% UPWARD		2.4% DOWNWARD		
VENTILATION SYSTEM	LONGITUDINAL SYSTEM (JET FAN TYPE)		LONGITUDINAL SYSTEM (JET FAN TYPE)		
ADMISSIBLE CONTENT OF GAS	PERMISSIBLE CO = 100 ppm SMOKE TRANSMITTANCE MEASURED 100 m VISIBILITY = 40%		PERMISSIBLE CO = 100 ppm SMOKE TRANSMITTANCE MEASURED 100 m VISIBILITY = 40%		R = 0.00398
	INITIAL STAGE	FINAL STAGE	INITIAL STAGE	FINAL STAGE	
DESIGN TRAFFIC VOLUME	360	1040	400	1160	Veh/h
AIR VOLUME	160	180	165	184 m ³ /sec	Ar = 61.8 m ² Dr = 8.24 m
AIR SPEED					© 1250 Jet Fan (AXIAL TYPE)
NUMBER OF FANS	2	14	2	2	
SHOWN	● + ●		●		

NOTE: FROM FIRST STAGE TO FINAL STAGE, TIMING OF INCREASE THE NUMBER OF JET FANS AT 1ST KOHAT TUNNEL ARE SHOW FOLLOWING, ACCORDING TO THE ESTIMATED TRAFFIC VOLUME TO NORTHBOND.

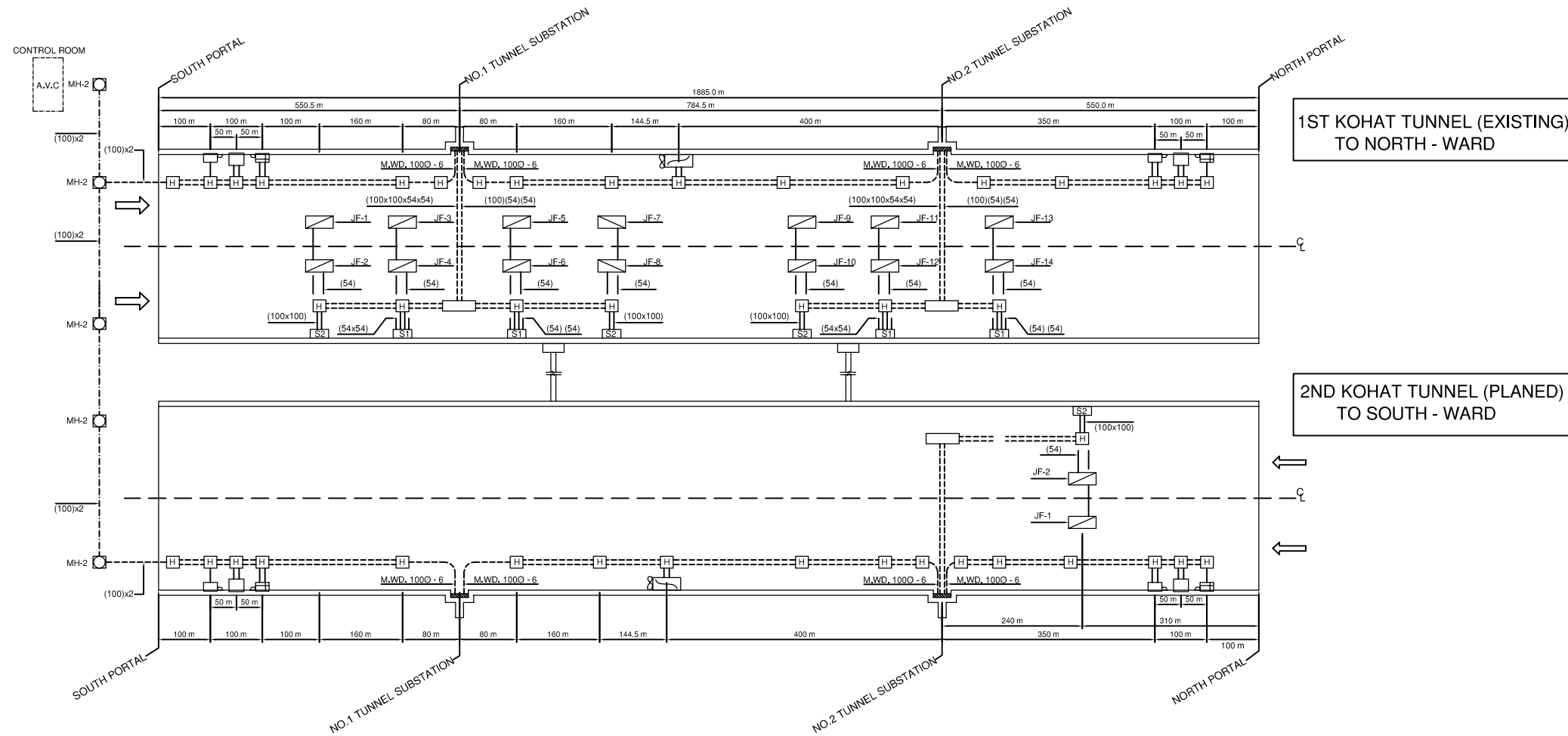
YEAR	ESTIMATED TRAFFIC VOL./DAY	NOS OF JET FAN TO BE ADDED	TOTAL NOS.
2020	8,500	+2	4
2025	10,800	+4	8
2030	13,800	+6	14

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	LAYOUT OF JET FAN AND OTHER EQUIPMENT	AS SHOWN	V - 1

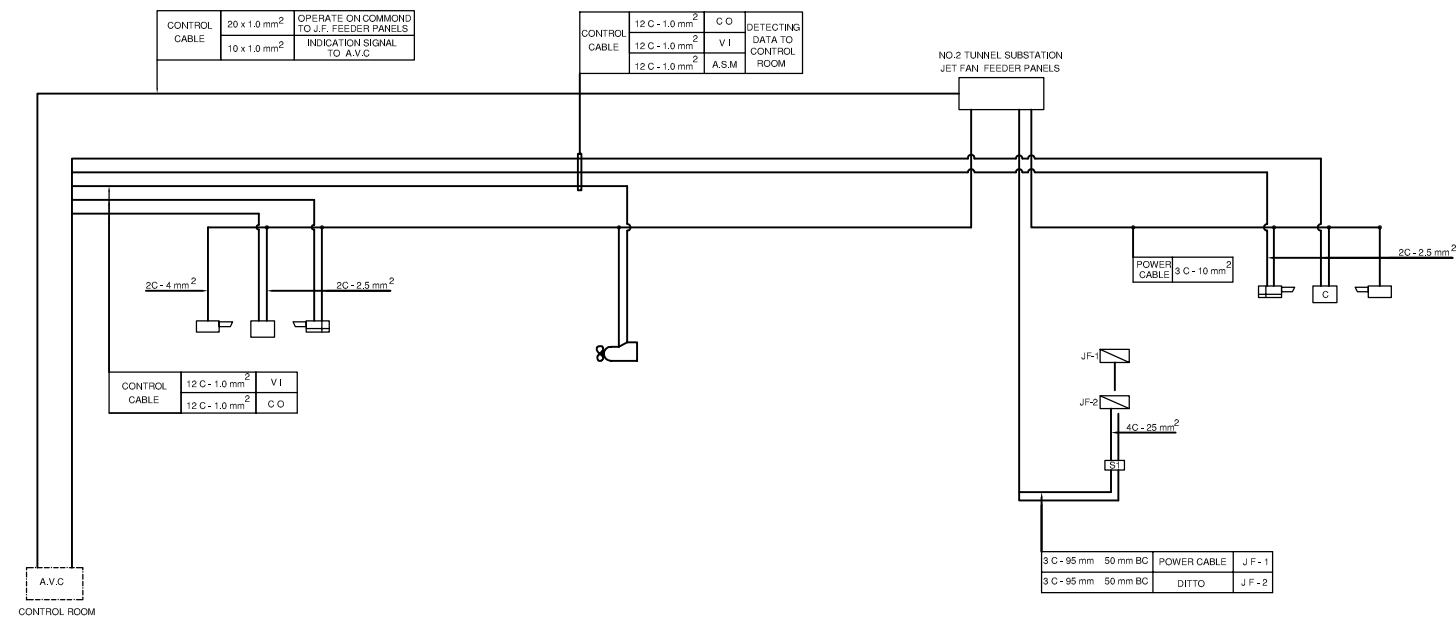


INSTALLATION OF JET FAN

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	INSTALLATION OF JET FAN AND SCHEMATIC DIAGRAM FOR VENTILATION SYSTEM	1:100	V - 2



GENERAL PLAN OF TUNNEL FANS AND AIR CONTROL DEVICES



SCHEMATIC WIRING DIAGRAM FOR FANS AND AIR CONTROL DEVICES

LEGEND	
SYMBOL	DESCRIPTION
JF-1	JET FAN Ø 1.250 m AXIAL TYPE 3 Ø 3 × 400 V 37 KW
[S1] [S2]	SWITCH BOXES
[CO]	C.O. METER (CO)
[V1]	VISIBILITY METER (PROJECTOR UNIT) (V1)
[V2]	VISIBILITY METER (RECEIVER UNIT) (V2)
[ANEMO]	ANEMO METER
[HH]	HAND HOLE
[M.W.D.]	(M.W.D.) MULTIPLE WIRING DUCT
A.V.C.	VENTILATION CONTROL PANEL & PROCESS CONTROL PANEL
(100)	STEEL CONDUIT PIPE INNER DIA = 100 mm
[HH]	HAND HOLE TYPE
[WIRING]	WIRING

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	GENERAL PLAN OF TUNNEL AND SCHEMATIC WIRING DIAGRAM FOR FANS AND AIR CONTROL DEVICES	NTS	V-3