Pakistan Water and Power Development Authority

Telephones: 042-99202288 &
99202211/2186.
Fax No. : 042-99202159.

Office of the General Manager
(Hydel) Operation, WAPDA,
186 – WAPDA House, Lahore.

No. GMHO/CEHO/G-182-NEPRA/12334-36 Dated: 09-05-2019

Registrar NEPRA
NEPRA Tower, Attaturk Avenue (East),
G-5/1, Islamabad.

Subject: **License Proposed Modification (LPM) in the Existing Generation License of WAPDA Hydroelectric (Changes in the Total Capacity Values of Two (2) Hydropower Projects)**

Ref: NEPRA's Letter No. NEPRA/ADG (Lic)/LAG-23/3060 dated 21. 02. 2019.

It is apprised that the Modification-IV to the Generation License No. GL (Hydel) / 105 / 2004 dated: 03.11.2004 was issued by NEPRA vide its letter No. NEPRA/R/LAG-23/325-30 dated: January 09, 2015 in which two (2) upcoming hydel power stations namely Golen Gol and Keyal Khwar Hydropower Projects were included with their total generation capacity values of 106 MW and 122 MW respectively.

On behalf of WAPDA Hydroelectric, this office now intends to file an application for License Proposed Modification (LPM), as directed by NEPRA vide its above referred letter, for the revision/ change in total generation capacity values of Golen Gol Hydropower Project from 106 MW to 108 MW and for Keyal Khwar Hydropower Project from 122 MW to 128 MW.

S.No	Name of the Project	Generation Capacity as per Modification-IV	Revised Generation Capacity	Difference
1	Golen Gol Hydel Project	106 MW	108 MW	2 MW
2	Keyal Khwar Hydel Project	122 MW	128 MW	6 MW
			Total Difference	**8 MW**

This revision / change shall result in enhancement of capacity of WAPDA Hydroelectric from 17359.96 MW, as recorded in Modification-IV, to 17367.96 MW.

This License Proposed Modification (LPM) is accompanied with necessary attachments as required under NEPRA Licensing (Application and Modification Procedure) Regulations 1999. Authorization letter / Power of Attorney to file the application for Modification-V in the Generation License is also attached. A cross cheque No. 00004653 dated 18-04-2019 amounting to Rs.153,920/- (Habib Bank of Pakistan, Napier Road , Lahore) as License Modification fee is being enclosed for further processing of the case, please.

09/05/19

General Manager (Hydel) Operation

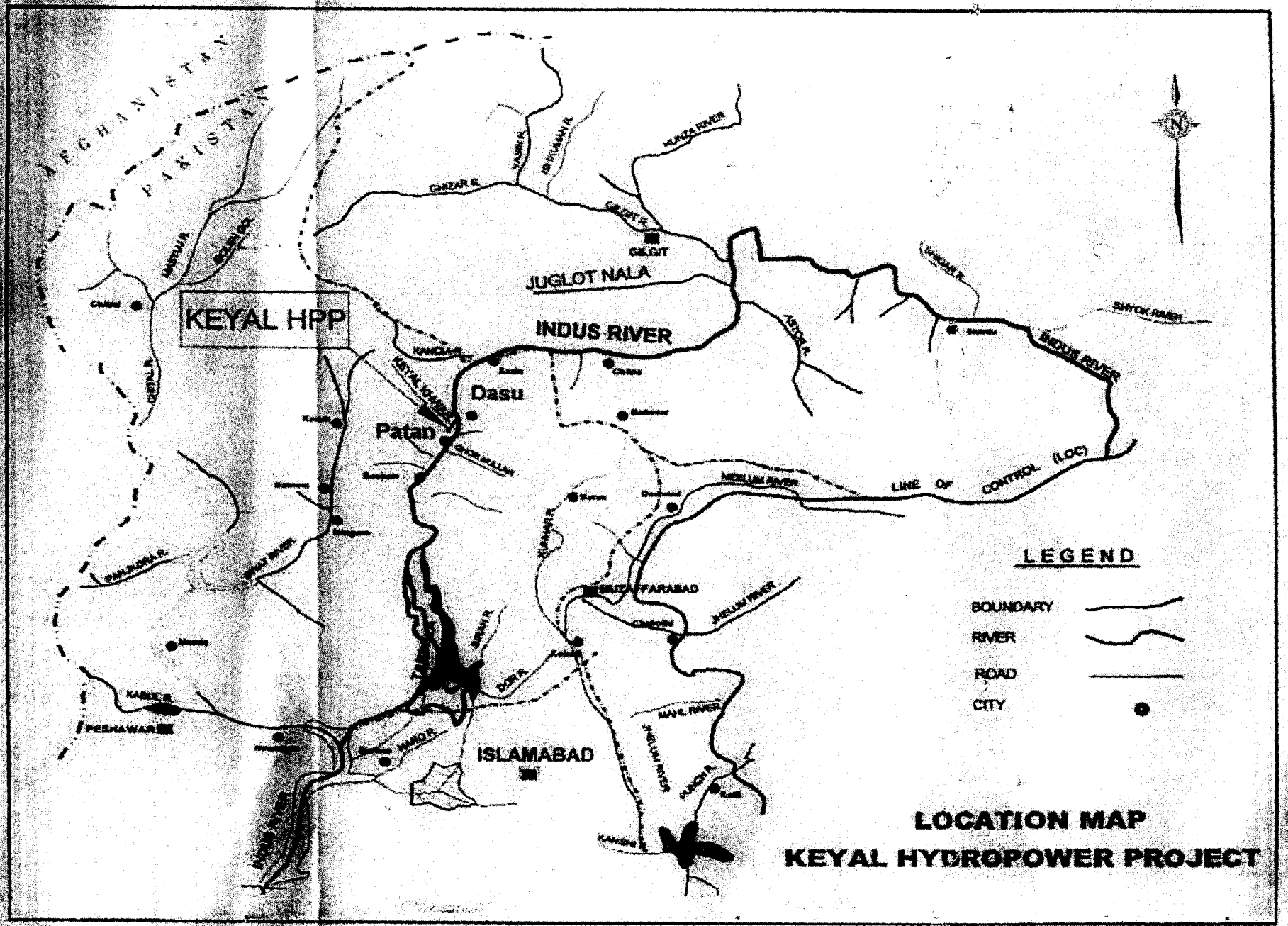
Copy to:

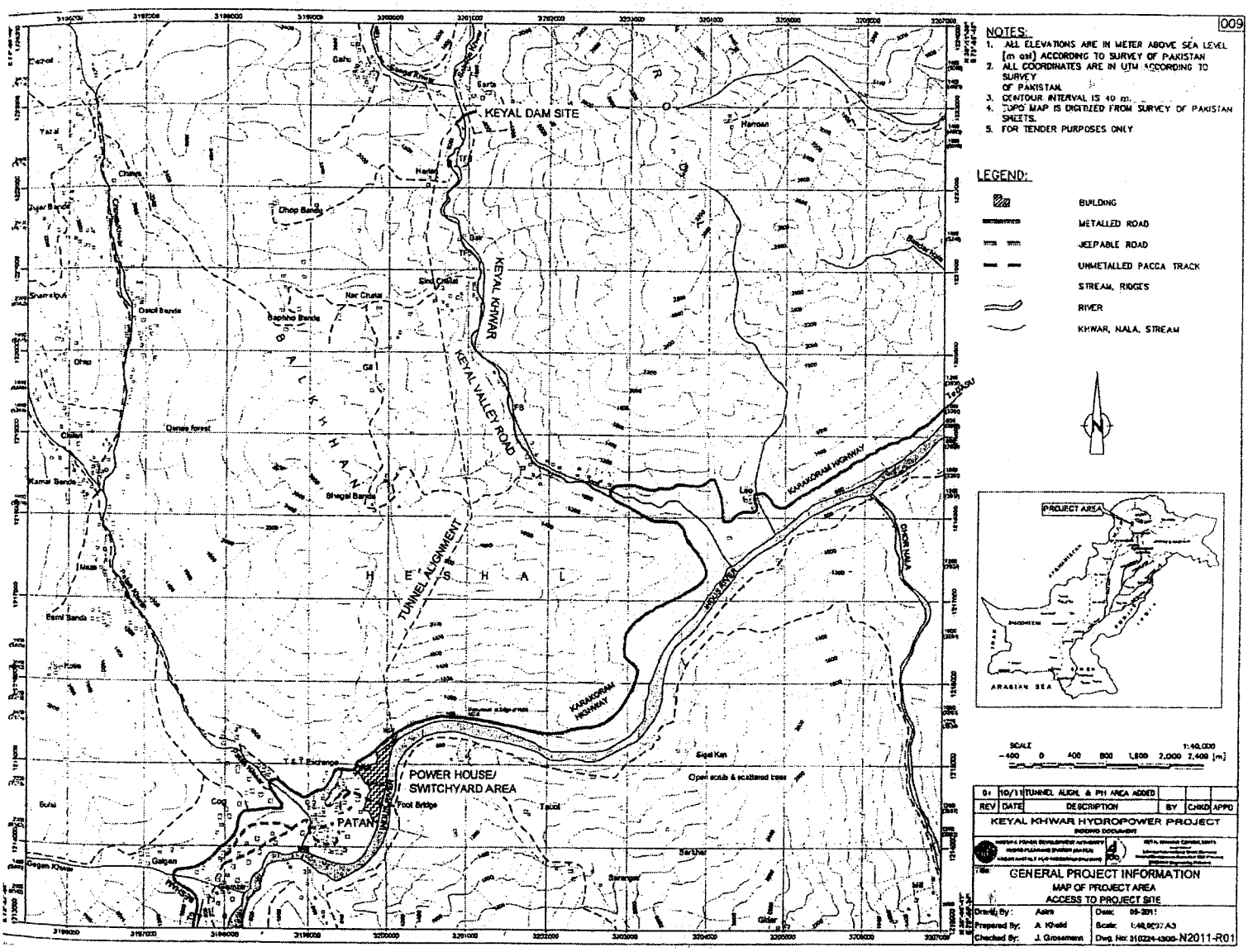
- Member (Power) WAPDA, WAPDA House, Lahore.
- General Manager Finance (Power) WAPDA, WAPDA House, Lahore.

Hydel Power Station, Keyal Khwar

PLANT DETAILS

1	Location	Right tributary of the River Indus at Keyal Khwar Distt. Kohistan in KHYBER PAKHTUNKHWA.			
2	Plant	Type	Total Capacity	No. of Units	
		Storage	128 MW	2	
3	Gross Head	Maximum		Minimum	
		737.5 m		721.5 m	
4	Technology	Pelton Turbine			
5	Tunnel	No.	Length	Diameter	
	Total No. of Tunnel	-	-	At Intake	At Penstock
	(i) No. of Power Tunnel	1	7.16 km	3.2 m	2.2 m
	(ii) No. of Irrigation Tunnel	-	-	-	-
6	Peak / Base Load Operation	Base Load operation as per requirement of NPCC			
7	Minimum Expected Useful Life of the Generation Facility	50 Years			
8	Plant Characteristics	Generator Voltage	11 KV		
		Power Factor	0.85		
		Frequency	50 Hz		
		Automatic Generation Control	Yes		
9	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)	
		Keyal-Duber-I	132	3.00	
		Keyal-Duber-II	132	3.00	


KEYAL HPP
JUGLOT NALA
INDUS RIVER
Dasu
Patan
ISLAMABAD
PESHAWAR
GILGIT
LINE OF CONTROL (LOC)
LEGEND
BOUNDARY
RIVER
ROAD
CITY
LOCATION MAP
KEYAL HYDROPOWER PROJECT



NOTES:

1. ALL ELEVATIONS ARE IN METER ABOVE SEA LEVEL (m asl) ACCORDING TO SURVEY OF PAKISTAN
2. ALL COORDINATES ARE IN UTM ACCORDING TO SURVEY OF PAKISTAN
3. CONTOUR INTERVAL IS 40 m.
4. TOPO MAP IS DIGITIZED FROM SURVEY OF PAKISTAN SHEETS.
5. FOR TENDER PURPOSES ONLY

LEGEND:

- BUILDING
- METALLED ROAD
- JEEPABLE ROAD
- UNMETALLED PACCA TRACK
- STREAM, RIDGES
- RIVER
- KHWAR, NALA, STREAM

REV	DATE	DESCRIPTION	BY	CHKD	APPD
0	10/11	TUNNEL ALIGN. & PH AREA ADDED			

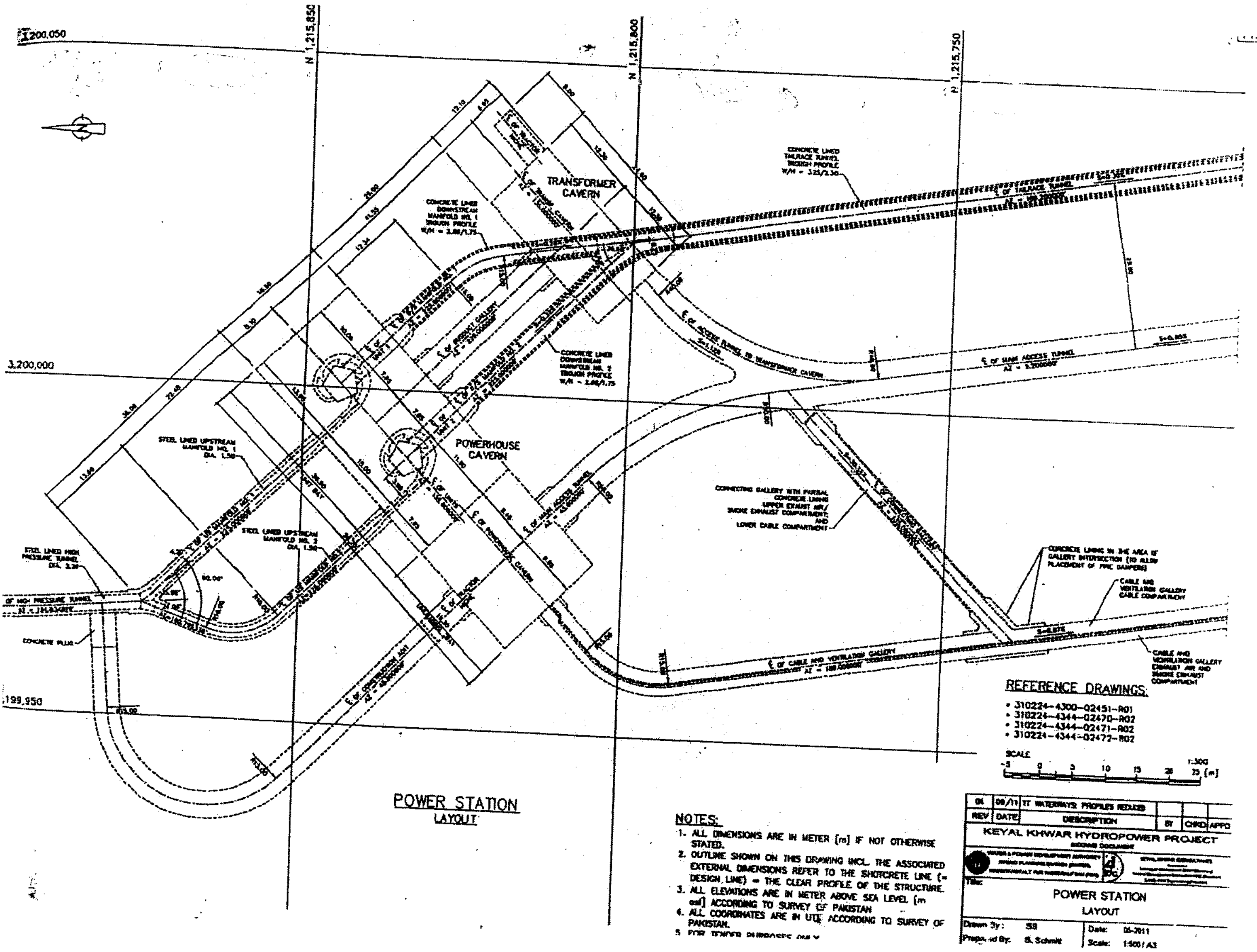
KEYAL KHWAR HYDROPOWER PROJECT

GENERAL PROJECT INFORMATION

MAP OF PROJECT AREA

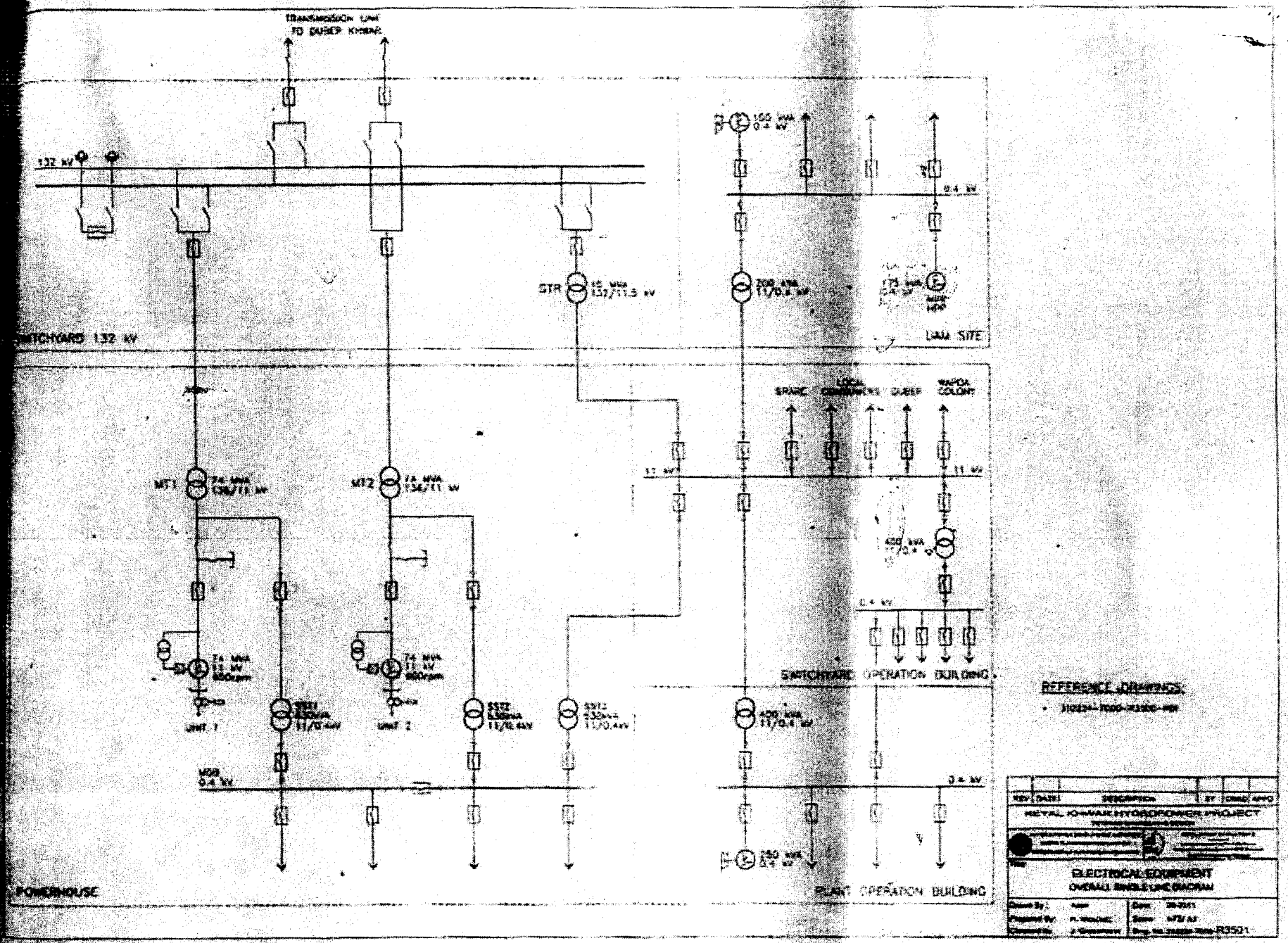
ACCESS TO PROJECT SITE

Drawn By:	Asim	Date:	09-2011
Prepared By:	A. Khalid	Scale:	1:40,000 A3
Checked By:	J. Grossmann	Dwg. No:	310224-4300-N2011-R01



N 1,215,850
N 1,215,800
N 1,215,750
1,200,050
1,200,000
1,199,950
TRANSFORMER CAVERN
POWERHOUSE CAVERN
CONCRETE LINED TAILRACE TUNNEL, TROUGH PROFILE W/H = 3.25/3.30
CONCRETE LINED DOWNSTREAM MANIFOLD NO. 1 TROUGH PROFILE W/H = 2.86/1.75
CONCRETE LINED DOWNSTREAM MANIFOLD NO. 2 TROUGH PROFILE W/H = 2.86/1.75
STEEL LINED UPSTREAM MANIFOLD NO. 1 DIA. 1.50
STEEL LINED UPSTREAM MANIFOLD NO. 2 DIA. 1.50
STEEL LINED HIGH PRESSURE TUNNEL DIA. 2.30
CONCRETE PLUG
CONNECTING GALLERY WITH PARTIAL CONCRETE LINING UPPER EXHAUST AIR/ SMOKE EXHAUST COMPARTMENT; AND LOWER CABLE COMPARTMENT
CONCRETE LINING IN THE AREA OF GALLERY INTERSECTION (TO ALLOW PLACEMENT OF FIRE DAMPERS)
CABLE AND VENTILATION GALLERY CABLE COMPARTMENT
CABLE AND VENTILATION GALLERY EXHAUST AIR AND SMOKE EXHAUST COMPARTMENT
POWER STATION
LAYOUT
REFERENCE DRAWINGS:
• 310224-4300-02451-R01
• 310224-4344-02470-R02
• 310224-4344-02471-R02
• 310224-4344-02472-R02
SCALE
1:500
-5 0 5 10 15 20 25 [m]
NOTES:
1. ALL DIMENSIONS ARE IN METER [m] IF NOT OTHERWISE STATED.
2. OUTLINE SHOWN ON THIS DRAWING INCL. THE ASSOCIATED EXTERNAL DIMENSIONS REFER TO THE SHOTCRETE LINE (= DESIGN LINE) = THE CLEAR PROFILE OF THE STRUCTURE.
3. ALL ELEVATIONS ARE IN METER ABOVE SEA LEVEL [m asl] ACCORDING TO SURVEY OF PAKISTAN
4. ALL COORDINATES ARE IN UTM ACCORDING TO SURVEY OF PAKISTAN.
5. FOR TENDER PURPOSES ONLY
06 | 09/11 | TT WATERWAYS: PROFILES REDUCED
REV | DATE | DESCRIPTION | BY | CHKD | APPD
KEYAL KHWAR HYDROPOWER PROJECT
Title:
POWER STATION
LAYOUT
Drawn By: SS
Prepared By: S. Schmitt
Date: 05-2011
Scale: 1:500 / A3

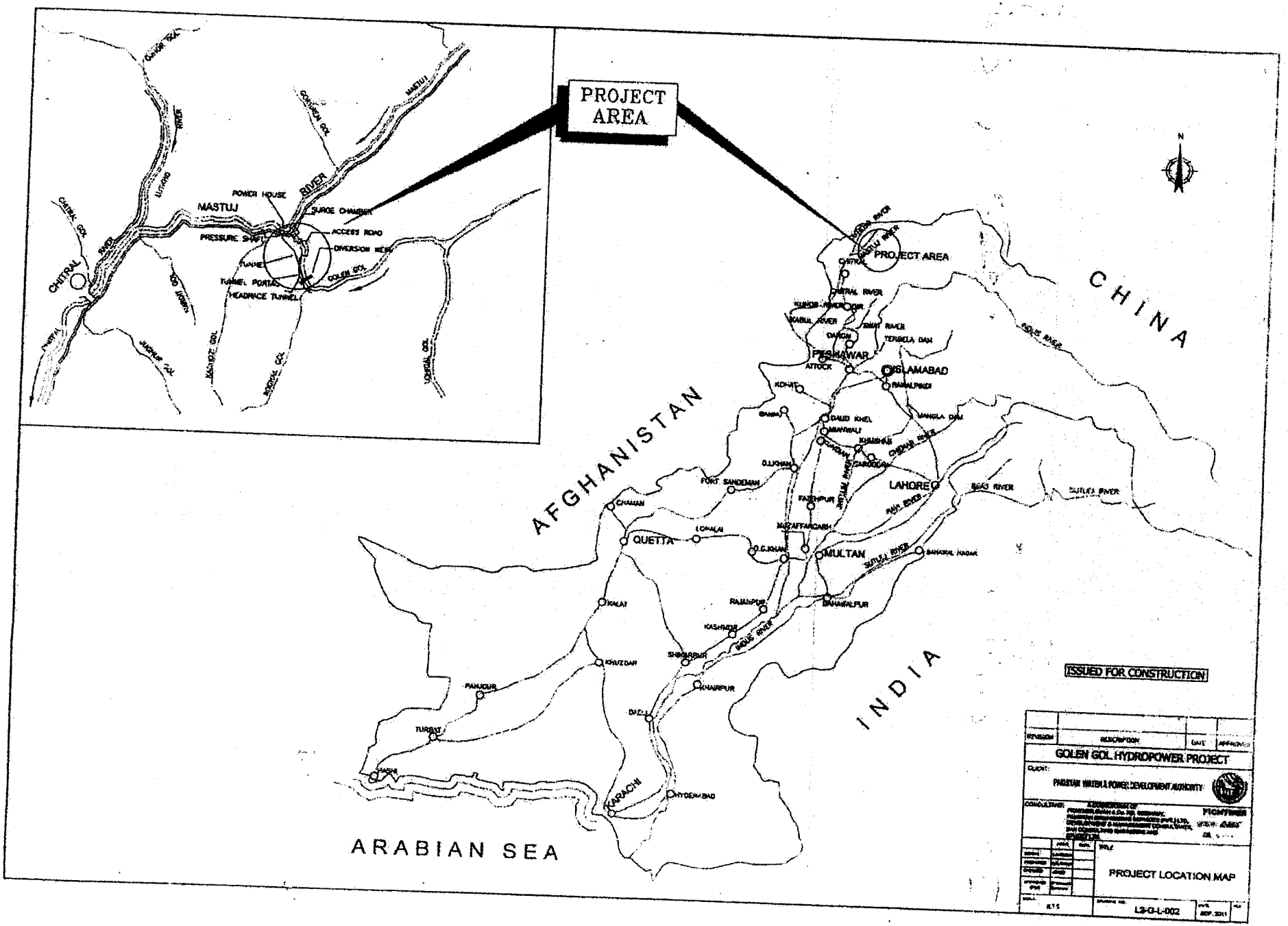

TABLE OF COORDINATES
Dam
NOTES:
LEGEND:
CONCRETE STRUCTURE
PAVED AREA FOR VEHICLE ACCESS
STEEL LINING
REFERENCE DRAWINGS:
DAM
LAYOUT

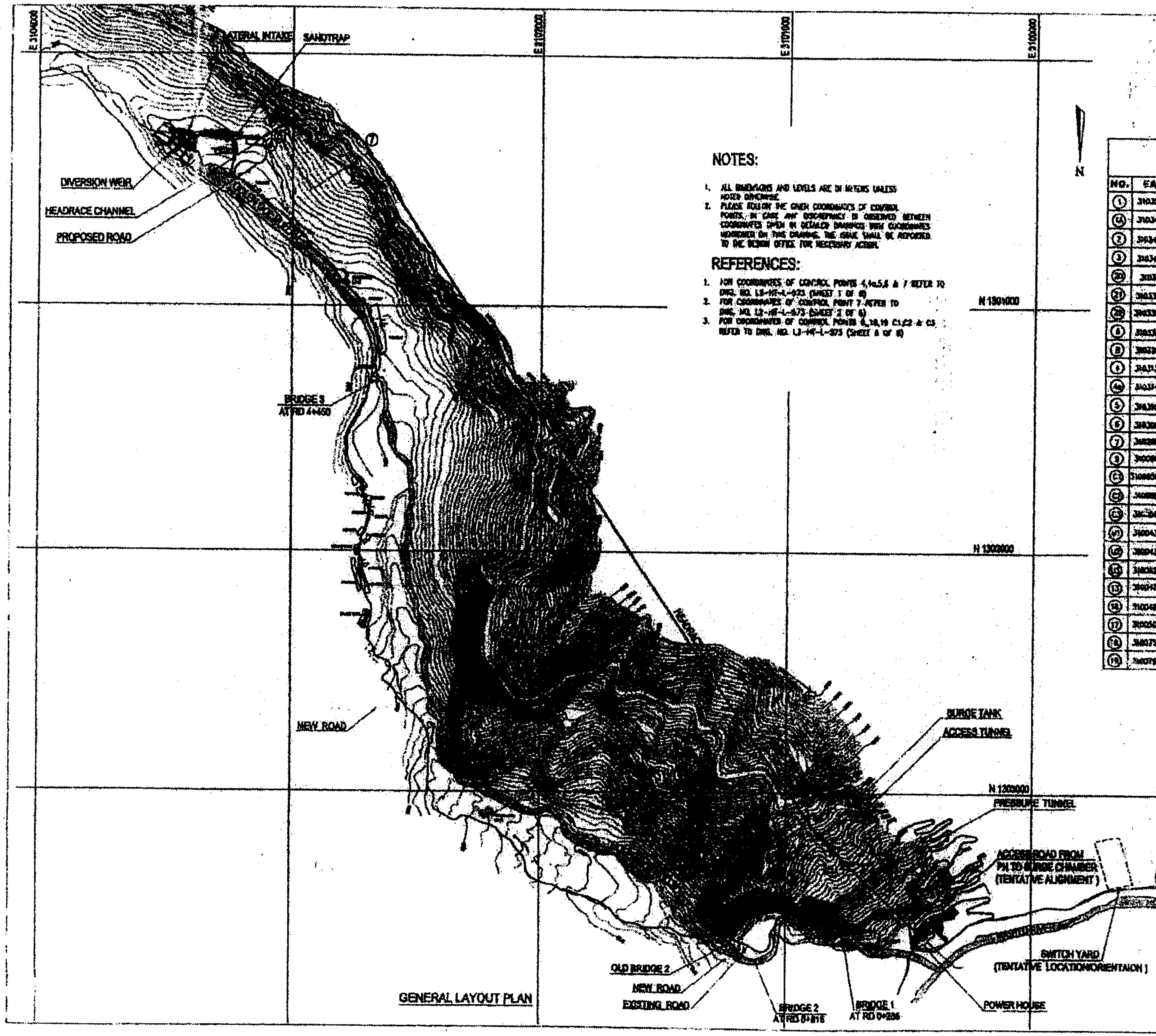

TRANSMISSION LINE
TO DUSEP KYABE
132 kV
SWITCHYARD 132 kV
STR
LAMA SITE
SPARE
DUSEP
WAPDA COLONY
11 kV
MT1
MT2
UNIT 1
UNIT 2
SWITCHYARE OPERATION BUILDING
0.4 kV
POWERHOUSE
PLANT OPERATION BUILDING
REFERENCE DRAWINGS:
ELECTRICAL EQUIPMENT
OVERALL SINGLE LINE DIAGRAM
R3501

Hydel Power Station, Golen Gol

PLANT DETAILS

1	Location	On Golen Gol Nullah, 25 Km from Distt. Chitral in KHYBER PAKHTUNKHWA.				
2	Plant	Type	Total Capacity	No. of Units		
		Run of River	108 MW	03		
3	Gross Head	Maximum		Minimum		
		439.3 m		423.3 m		
4	Technology	Pelton Turbine				
5	Tunnel	No.	Length	Diameter		
	Total No. of Tunnel	3	-	At Intake	At Penstock	
	(i) No. of Power Tunnel	3	3.81 km	4.1 m	3.2 m	
	(ii) No. of Irrigation Tunnel	-	-	-	-	
6	Peak / Base Load Operation	Base Load Operation Plant				
7	Minimum Expected Useful Life of the Generation Facility	35 Years				
8	Plant Characteristics	Generator Voltage	11 KV			
		Power Factor	0.80			
		Frequency	50 Hz			
		Automatic Generation Control	Yes			
9	Interconnection Arrangements (CCT details, length of Transmission Line, voltage level details etc.)	CCT	Voltage (KV)	Length (KM)		
		Golen Gol to Timergarah	132	145		
		Timergarah to Chakdara	132	53		


PROJECT AREA
MASTUJ
POWER HOUSE
SURGE CHAMBER
PRESSURE SHAFT
ACCESS ROAD
DIVERSION WEIR
TUNNEL
TUNNEL PORTAL
HEADRACE TUNNEL
GOLEN GOL
CHITRAL
MASTUJ RIVER
PROJECT AREA
CHINA
AFGHANISTAN
INDIA
ARABIAN SEA
PESHAWAR
ISLAMABAD
RAWALPINDI
LAHORE
MULTAN
QUETTA
KARACHI
HYDERABAD
ISSUED FOR CONSTRUCTION
GOLEN GOL HYDROPOWER PROJECT
PROJECT LOCATION MAP
L3-G-L-002



NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE.
2. PLEASE FOLLOW THE GIVEN COORDINATES OF CONTROL POINTS. IN CASE ANY DISCREPANCY IS OBSERVED BETWEEN COORDINATES GIVEN IN DETAILED DRAWINGS WITH COORDINATES MENTIONED ON THIS DRAWING, THE ISSUE SHALL BE REPORTED TO THE DESIGN OFFICE FOR NECESSARY ACTION.

REFERENCES:

1. FOR COORDINATES OF CONTROL POINTS 4,4a,5,6 & 7 REFER TO DWG. NO. L3-HT-L-973 (SHEET 1 OF 8)
2. FOR COORDINATES OF CONTROL POINT 7 REFER TO DWG. NO. L2-HT-L-973 (SHEET 2 OF 8)
3. FOR COORDINATES OF CONTROL POINTS 8,18,19 C1,C2 & C3 REFER TO DWG. NO. L3-HT-L-973 (SHEET 8 OF 8)

COORDINATES OF CONTROL POINTS

NO.	EASTING	NORTHING	POINT DESCRIPTION
1	3103507.434026	1300358.744717	WEIR START RIGHT ABUTMENT
1a	3103448.382776	1300418.483441	WEIR END RIGHT ABUTMENT
2	[illegible]	1300344.080008	FLUSHING CHANNEL AXIS, START
3	3103461.749880	1300326.848137	FLUSHING CHANNEL AXIS, INTAKE REACH
20	3103461.405320	1300336.758779	INTERSECTION OF FLUSHING CHANNEL AXIS AND LATERAL INTAKE AXIS
21	[illegible]	[illegible]	INTERSECTION OF LATERAL INTAKE AXIS AND OVERFLOW BYPASS AXIS
22	[illegible]	[illegible]	INTERSECTION OF FLUSHING CHANNEL AXIS AND OVERFLOW BYPASS AXIS
A	[illegible]	[illegible]	START POINT OF SANDTRAP
B	[illegible]	[illegible]	END POINT OF SANDTRAP
4	3103137.348472	1300348.543384	HEADRACE CHANNEL ARC
4a	[illegible]	[illegible]	CENTRE OF HEADRACE CHANNEL ARC
5	[illegible]	[illegible]	HEADRACE TUNNEL PORTAL
6	[illegible]	[illegible]	TUNNEL BEND START, RADIUS 272.85 m
7	[illegible]	[illegible]	TUNNEL BEND END, RADIUS 272.85 m
8	[illegible]	[illegible]	AXIS OF SURGE CHAMBER AND PRESSURE SHAFT
C1	3100856.276343	[illegible]	INTERSECTION OF ACCESS TUNNEL TO PRESSURE SHAFT
C2	[illegible]	[illegible]	TURNING POINT OF ACCESS TUNNEL
C3	[illegible]	[illegible]	INTERSECTION OF HEADRACE TUNNEL AND ACCESS TUNNEL
T1	[illegible]	[illegible]	CENTRE LINE TURBINE-1
T2	[illegible]	[illegible]	CENTRE LINE TURBINE-2
T3	[illegible]	[illegible]	CENTRE LINE TURBINE-3
13	[illegible]	[illegible]	INTERSECTION OF PRESSURE TUNNEL AXIS AND UNITS AXIS
16	[illegible]	[illegible]	ACCESS TUNNEL TO PRESSURE TUNNEL PLATFORM
17	[illegible]	[illegible]	INTERSECTION OF HEADRACE TUNNEL AND ACCESS TUNNEL
18	[illegible]	[illegible]	ACCESS TUNNEL TO HEADRACE TUNNEL PLATFORM
19	[illegible]	[illegible]	[illegible] TUNNEL TO SURGE CHAMBER PLATFORM

SCALE:

0 100 200 400 600 m SCALE A1 1:7500 SCALE A3 1:15000

REVISION	DESCRIPTION	DATE	APPROVED
1	GENERAL REVISION	26-02-13	

GOLEN GOL HYDROPOWER PROJECT

CLIENT: PAKISTAN WATER & POWER DEVELOPMENT AUTHORITY

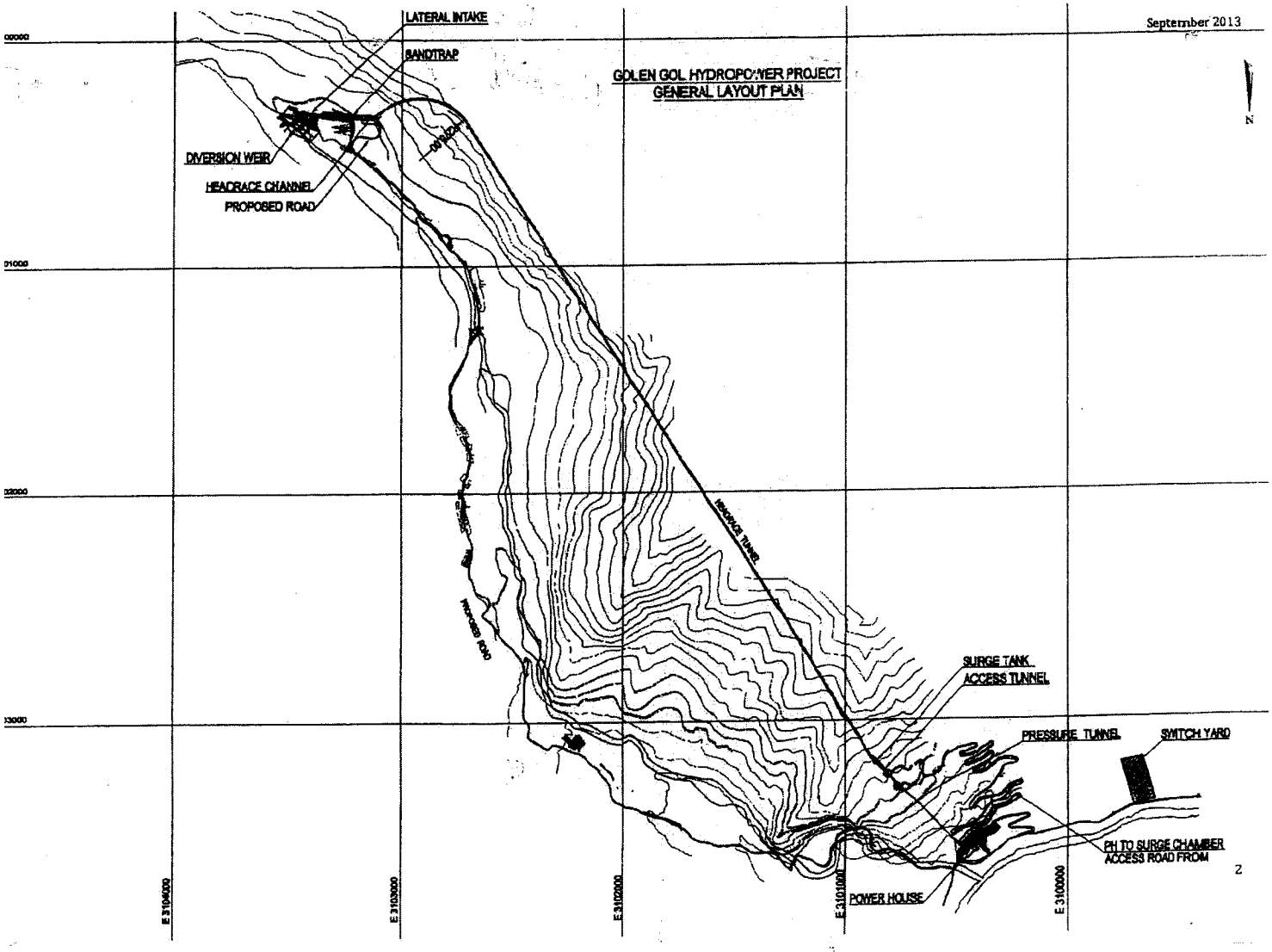
CONSULTANT: FICHTNER

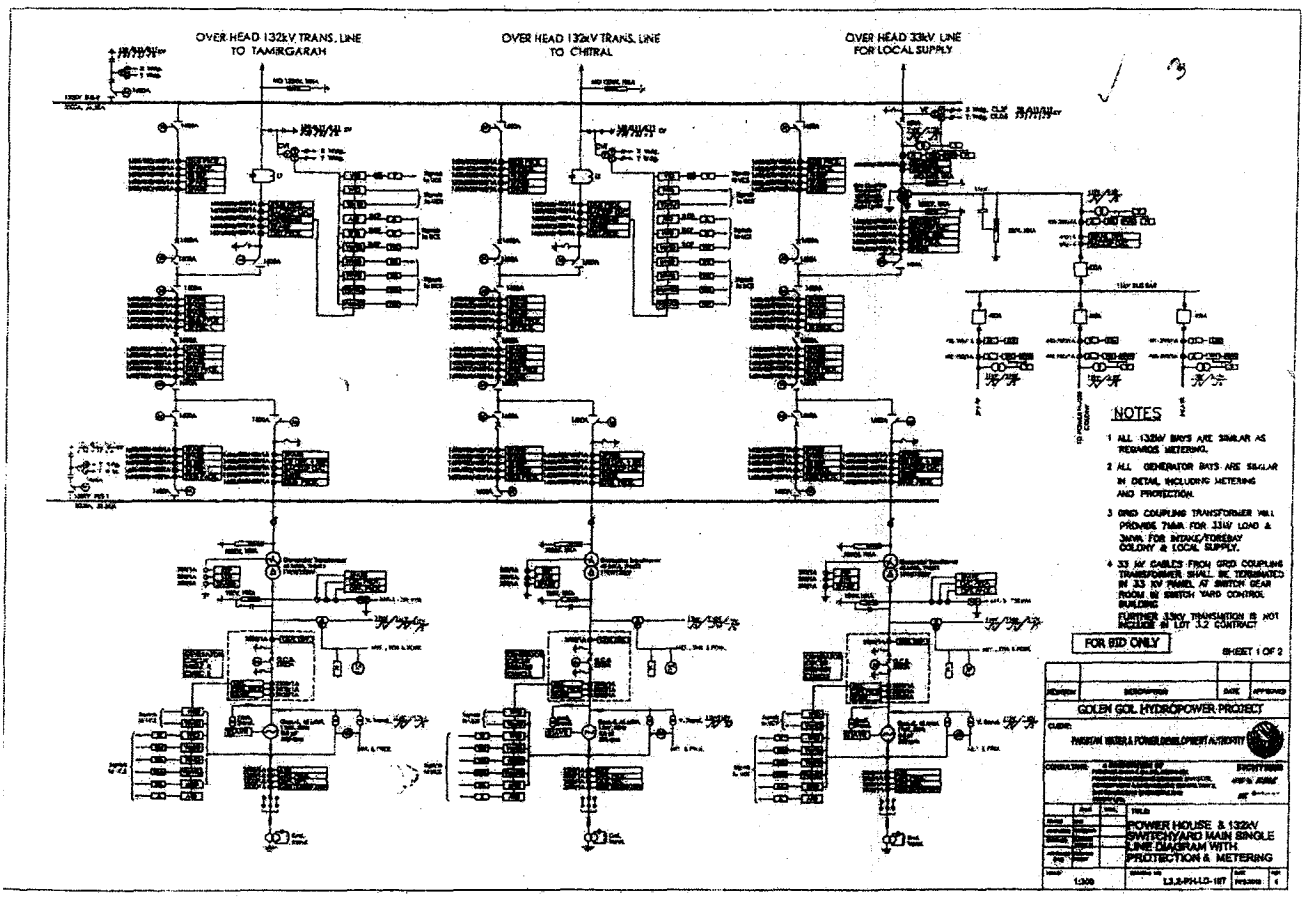
TITLE: PROJECT LAYOUT PLAN

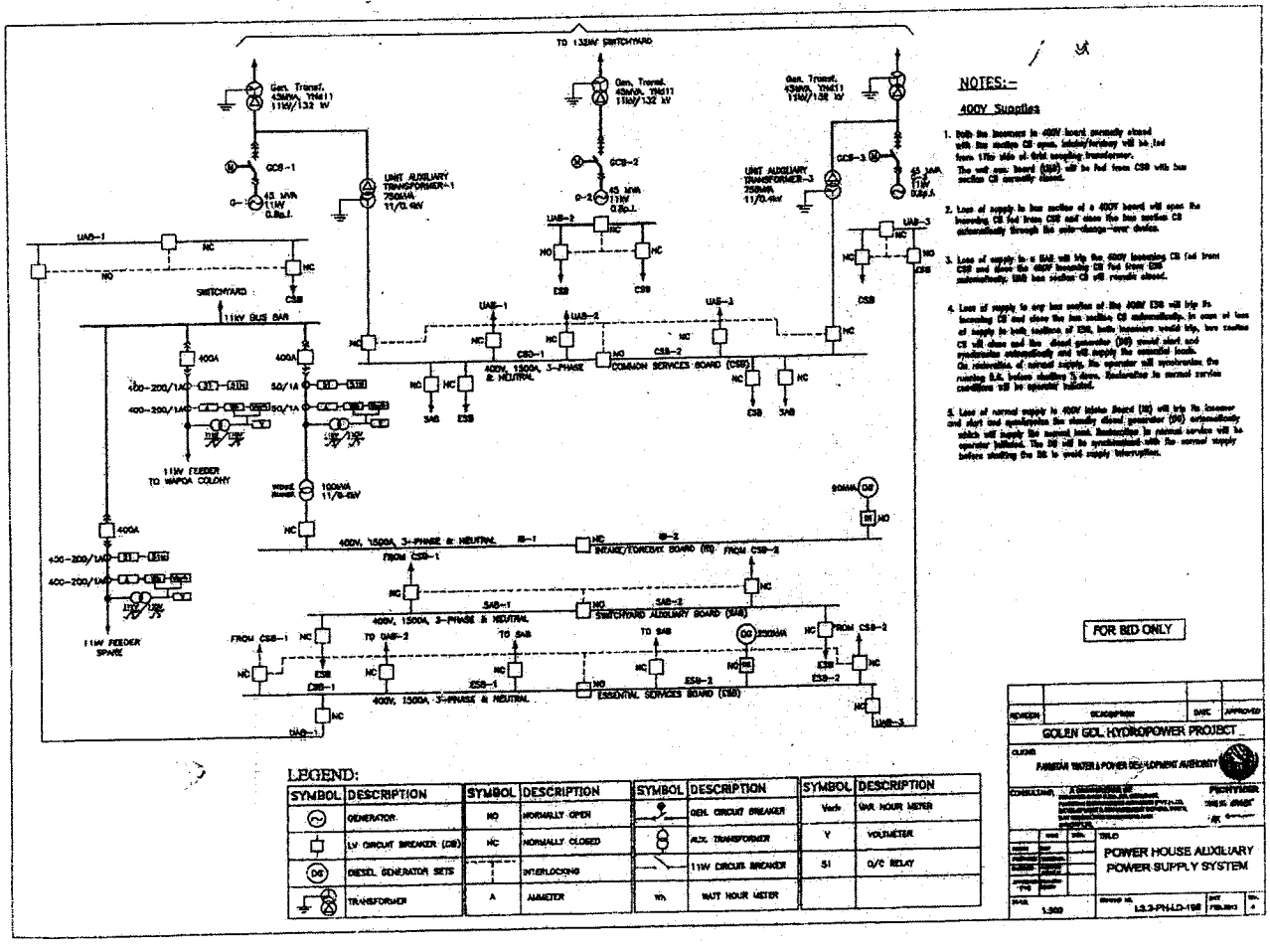
SCALE: A1 1:7,500 A3 1:15,000

Drawing No. L2-G-L-003

REV. 1


September 2013
GOLEN GOL HYDROPOWER PROJECT
GENERAL LAYOUT PLAN
N
LATERAL INTAKE
SANDTRAP
DIVERSION WEIR
HEADRACE CHANNEL
PROPOSED ROAD
HEADRACE TUNNEL
SURGE TANK
ACCESS TUNNEL
PRESSURE TUNNEL
SWITCH YARD
PH TO SURGE CHAMBER
ACCESS ROAD FROM
POWER HOUSE
E 3104000
E 3103000
E 3102000
E 3101000
E 3100000
2


OVER HEAD 132kV TRANS. LINE TO TAMIRGARAH
OVER HEAD 132kV TRANS. LINE TO CHITRAL
OVER HEAD 33kV LINE FOR LOCAL SUPPLY
NOTES
1 ALL 132kV BAYS ARE SIMILAR AS REGARDS METERING.
2 ALL GENERATOR BAYS ARE SIMILAR IN DETAIL INCLUDING METERING AND PROTECTION.
3 GRID COUPLING TRANSFORMER WILL PROVIDE 7MVA FOR 33kV LOAD & 3MVA FOR INTAKE/FOREBAY COLONY & LOCAL SUPPLY.
4 33 kV CABLES FROM GRID COUPLING TRANSFORMER SHALL BE TERMINATED IN 33 kV PANEL AT SWITCH GEAR ROOM IN SWITCH YARD CONTROL BUILDING
FURTHER 33kV TRANSMITTION IS NOT INCLUDE IN LOT 3.2 CONTRACT
FOR BID ONLY
SHEET 1 OF 2
GOLEN GOL HYDROPOWER PROJECT
PROVINCIAL WATER & POWER DEVELOPMENT AUTHORITY
POWER HOUSE & 132kV SWITCHYARD MAIN SINGLE LINE DIAGRAM WITH PROTECTION & METERING
1:100
3.3-PH-LD-107



NOTES:-

400V Supplies

1. Both the incomers in 400V board normally closed with bus section CB open. Intake/forebay will be fed from 11kv side of G+S coupling transformer. The unit aux. board (UAB) will be fed from CSB with bus section CB normally closed.
2. Loss of supply in bus section of a 400V board will open the incoming CB fed from CSB and close the bus section CB automatically through the auto-change-over device.
3. Loss of supply in a SAB will trip the 400V incoming CB fed from CSB and close the 400V incoming CB fed from ESB automatically. SAB bus section CB will remain closed.
4. Loss of supply to any bus section of the 400V CSB will trip its incoming CB and close the bus section CB automatically. In case of loss of supply to both sections of CSB, both incomers would trip, bus section CB will close and the diesel generator (DG) would start and synchronize automatically and will supply the essential loads. On restoration of normal supply, the operator will synchronize the running D.G. before shutting it down. Restoration to normal service conditions will be operator initiated.
5. Loss of normal supply to 400V intake Board (IB) will trip its incomer and start and synchronize the standby diesel generator (DG) automatically which will supply the essential load. Restoration to normal service will be operator initiated. The DG will be synchronized with the normal supply before shutting the DG to avoid supply interruption.

FOR BID ONLY

LEGEND:

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
G	GENERATOR	NO	NORMALLY OPEN		GEN. CIRCUIT BREAKER	Varh	VAR HOUR METER
	LV CIRCUIT BREAKER (CB)	NC	NORMALLY CLOSED		AUX. TRANSFORMER	V	VOLTMETER
DG	DIESEL GENERATOR SETS		INTERLOCKING		11kV CIRCUIT BREAKER	51	O/C RELAY
	TRANSFORMER	A	AMMETER	Wh	WATT HOUR METER		

REVISION	DESCRIPTION	DATE	APPROVED

GOLEN GOL HYDROPOWER PROJECT

CLIENT: PAKISTAN WATER & POWER DEVELOPMENT AUTHORITY

CONSULTANT: [illegible] PENTAMAR

POWER HOUSE AUXILIARY POWER SUPPLY SYSTEM

SCALE: 1:300

DRAWING NO. LS-3-PH-LD-198

SHT. NO. [illegible]

REV. NO. 0

I. Text of Proposed Modification

A. NEPRA granted Generation License No. GL (Hydel)/05/2004 Modification-IV to WAPDA Hydroelectric on January 09, 2015 for following twenty four (24) Hydel Power Stations having total installed capacity of 17359.96 MW;

i.	Tarbela	3478 MW
ii.	Mangla	1000 MW
iii.	Warsak	242.96 MW
iv.	Ghazi Barotha	1450 MW
v.	Chashma	184 MW
vi.	Renala	1.1 MW
vii.	Chichoki	13.2 MW
viii.	Nandipur	13.8 MW
ix.	Shadiwal	13.5 MW
x.	Rasul	22 MW
xi.	Dargai	20 MW
xii.	Chitral	1 MW
xiii.	Kurram Garhi	4 MW
xiv.	Gomal Zam	17.40 MW
xv.	Jinnah	96 MW
xvi.	Allai Khwar	121 MW
xvii.	Duber Khwar	130 MW
xviii.	Khan Khwar	72 MW
xix.	Tarbela, 4th Extension	1410 MW
xx.	**Keyal Khwar**	**122 MW**
xxi.	**Golen Gol**	**106 MW**
xxii.	Jabban	22 MW
xxiii.	Diamer Basha	4500 MW
xxiv.	Dasu	4320 MW
	Total	**17359.96 MW**

B. "WAPDA Hydroelectric has requested for further modification in its Generation License (Modification-V) for revision / correction of the installed capacity of two Hydel Power Stations namely **Keyal Khwar (Sr. No. xx in the above list) from 122 MW to 128 MW and for Golen Gol (Sr. No. xxi in the above list) from 106 MW to 108 MW and as a result of the requested changes, the total installed capacity of WAPDA Hydroelectric shall increase from 17359.96 MW to 17367.96 MW".**

National Electric Power Regulatory Authority

(NEPRA)

Islamabad — Pakistan

GENERATION LICENCE

GL (HYDEL)/05/2004

In exercise of the Powers conferred upon the National Electric Power Regulatory Authority (NEPRA) under Section-26 of the Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997 the Authority hereby modifies the Generation Licence granted to WAPDA (on November 03, 2004 and expiring on November 02, 2034), to the extent of changes mentioned as hereunder:

(i). Installed capacity mentioned in the **Face Sheet** may be **read** as **17367.96 MW** instead of **17359.96 MW;**

(ii). Changes in **Schedule-I** attached as Modified/Revised Schedule-I; and

(iii). Changes in **Schedule-II** attached as Modified/Revised Schedule-II.

This **Modification-V** is given under my hand this ____ of _____ _____ **&** _____

_____

Registrar

II. **The Statement of Reason in Support of Modification in Generation License**

- While filing the application for Modification-IV in the Generation License of WAPDA Hydroelectric, the Installed Capacity values of two (2) hydropower projects namely Golen Gol Hydropower Project and Keyal Khwar Hydropower Project were taken as 106 MW and 122 MW respectively from PC-I documents as the electro-mechanical equipment design parameters were yet to be finalized at that time.

- Later on, the design parameters were finalized for Golen Gol Hydropower Project and the installed capacity was computed as 108 MW (36 MW × 3) and this Project has already been commissioned with this nameplate capacity of 108 MW. Therefore NEPRA is requested to modify Generation License of WAPDA Hydroelectric (Modification-V) ***to the extent of recording the total capacity value of Golen Gol Hydropower Project as 108 MW instead of 106 MW.***

- With regards to Keyal Khwar Hydropower Project, though the project is yet to be commissioned; however, its design parameters have been finalized and the contracted capacity value is 128 MW instead of 122 MW. Therefore, NEPRA is requested to ***incorporate the revised total capacity value of Keyal Khwar Hydropower Project as 128 MW, in place of 122 MW*** as recorded in Modification-IV, through this License Proposed Modification request.

PAKISTAN
WATER AND POWER DEVELOPMENT AUTHORITY

Tel: 042 - 99202717
042 - 99202661
Fax:042-99202722

Office of SE/Project Director,
Keyal Khwar Hydropower Project,
WAPDA Sunny View, Kashmir Road,
Lahore.

No. SE/PD Keyal HPP/K-24/2192-92 Dated: 18.07. 2014.

Chief Engineer (Hydel) Operation,
WAPDA, 105-Wapda House,
Lahore.

Subject: **LICENCE PROPOSED MODIFICATION (LPM) IN THE EXISTING GENERATION LICENCE OF WAPDA HYDRO-ELECTRIC (INCLUSION OF NEW HYDEL PROJECTS UNDER CONSTRUCTION).**

With reference to your office Letter No. GMHO/CEHO/G-182/14206-13 dated 08.07.2013; Please find enclosed herewith the following documents regarding Keyal Khwar Hydropower Project, for onward submission to the concerned quarter as desired.

1. Due Diligence Report.
2. Location Map.
3. Single Line Diagram.
4. Project Layout.
5. Auxiliary Consumption.

SE/Project Director KKHPP
(Muhammad Rafique)

D/A as above

CC.

1. TO to General Manager (Hydro), Planning, Wapda Sunny View, Lahore.

EXISTING GENERATION FACILITIES HYDEL POWER STATION

1	Location	On the right Bank tributary of River Indus at Pattan District Kohistan, in Province of Khyber pakhtoon khawa (KPK).					
2	Plant	Type		Total Capacity		No of Units	
		Run of River		128MW		02	
3	Head	Maximum		Minimum			
		737.5 m		721.5 m			
4	Technology	Pelton Turbine					
5	Tunnel	No.	Length	Dia			
	Total No. of Tunnel	01		At Intake		At Penstock	
	i) No of Power tunnels	01	7.16 Km.	3.2 m		2.2 m	
	ii) No of Irrigation Tunnels		Nil				
6	Due diligence report/ Expected Life	Attached/50 Years					
7	Rehabilitation Plan	Nil					
8	Operation record for last five years	Nil					

Year	Energy Produced MKEH	Running Hours (%)	Forced Outage Hours (%)	Maintenance Hours (%)	Stand by Hours (%)	Operation Availability (%)

	Operation Constraints			
9-	Consents	Nil		
10-	Length of Transmission Line	CCT	Voltage (KV)	Length (KM)
		Double Circuit Transmission line	132	2.780
11-	Peaking/Base Operation	Peak load		
12-	Plant Characteristics	Generator Voltage	Power Factor	
		11 kV	Unit(s) 01	= 0.85
			Unit(s) 02	= 0.85
			Unit(s)	=
			Frequency	= 50 Hz
			Automatic Control = Computerized Control System (CCS)	
13-	Unit wise expected (Latest) Commissioning dates	Unit Nos.	Dates	
		01	March, 2018	
		02	July, 2018	
14-	Training and Development	Training facilities are available at Hydel Training Centre,Mangla for the whole Hydel		

GG
HC

Golen Gol
Hydropower Consultants JV

19th July 2014

GOLEN GOL HYDROPOWER PROJECT

Due Diligence Report

1.	Location	On left bank of Mastuj River, downstream of the Golen Gol mouth, near Koghuzi, Chitral, in Province of Khyber Pakhtoon Khwa (KPK).			
2.	Plant	Type	Total Capacity	No. of Units	
		Run of River	108 MW	3	
3.	Head	Gross	Net		
		439.30 m	423.30 m		
4.	Technology	Pelton Turbines			
5.	Tunnel/Shaft	No.	Length	Dia.	
	Total No. of tunnels	6		At Intake	At Penstock
	No. of power tunnels	3	HT = 3,805.8 m PS = 396.9 m PT = 561.2 m (+ Manifold = 76 m)	4.1~4.7 m	3.2 m 3.2~3.7 m 3.1 m
	No. of access tunnels	3	AT = 67.5 m AT-HT = 179.0 m AT-PT = 87.0 m	4.1 m	
	Surge Chamber	1	Height = 40.6 m	Dia. = 16.2 m	
6.	Minimum expected useful life of the generation facility	50 years			
7.	Peaking/Base operation	Operated for base load (no storage capacity for peaking)			
8.	Plant characteristics	Generator Voltage	Power factor		
		11 kV	0.8		
		Frequency = 50 Hz.	Automatic control: SCADA		
9.	Transmission Lines	CCT	Voltage	Length	
		Golen Gol to Timergara D/C Line	132 kV	145 km	
		Timergara to Chakdara S/C Line	132 kV	53 km	

III. **A statement of the impact on the tariff, quality of service and performance by the licensee of its obligations under the license.**

- As for quality of service and performance is concerned, WAPDA Hydroelectric is already maintaining highest level of performance and quality of services which can be confirmed from the plant availability factor of existing Hydel Power Stations. The same spirit will be followed in future as well.

- Through this modification, the notional capacity (fixed) charge figure shall be reduced as the total capacity in MWs of WAPDA Hydroelectric shall increase from 17359.96 MW to 17367.96 MW, ***however the total tariff in Rs/kWh shall remain the same,*** if computed for the same amount of costs & expenditures considered while computing the tariff on the basis of earlier recorded total capacity value of 17359.96 MW.

- After this modification, WAPDA's desired performance delivery levels shall be stretched and become compatible with industry standards as it shall then become liable to generate and deliver the rated generating capacity in respect of these two power projects (Golen Gol Hydropower Project and Keyal Khwar Hydropower Project) and the cushion of now available 8 MW shall be vanished. Furthermore, the issue of non-conformity with regards to actual capacity values and NEPRA's recognized capacity values, mentioned in the latest modification (Modification-IV) of the Generation License granted to WAPDA, shall also be addressed / settled which currently has been consuming significant efforts and resources of the Licensee unnecessarily.