Appendix B-3-6: Photographs of PIMS Site

Substation No.1

Substation No.2

Substation No.3

Substation No.4

Substation No.5

Open space from building roof (Facing east)

Source: JICA Study Team

Situation of waterway 1

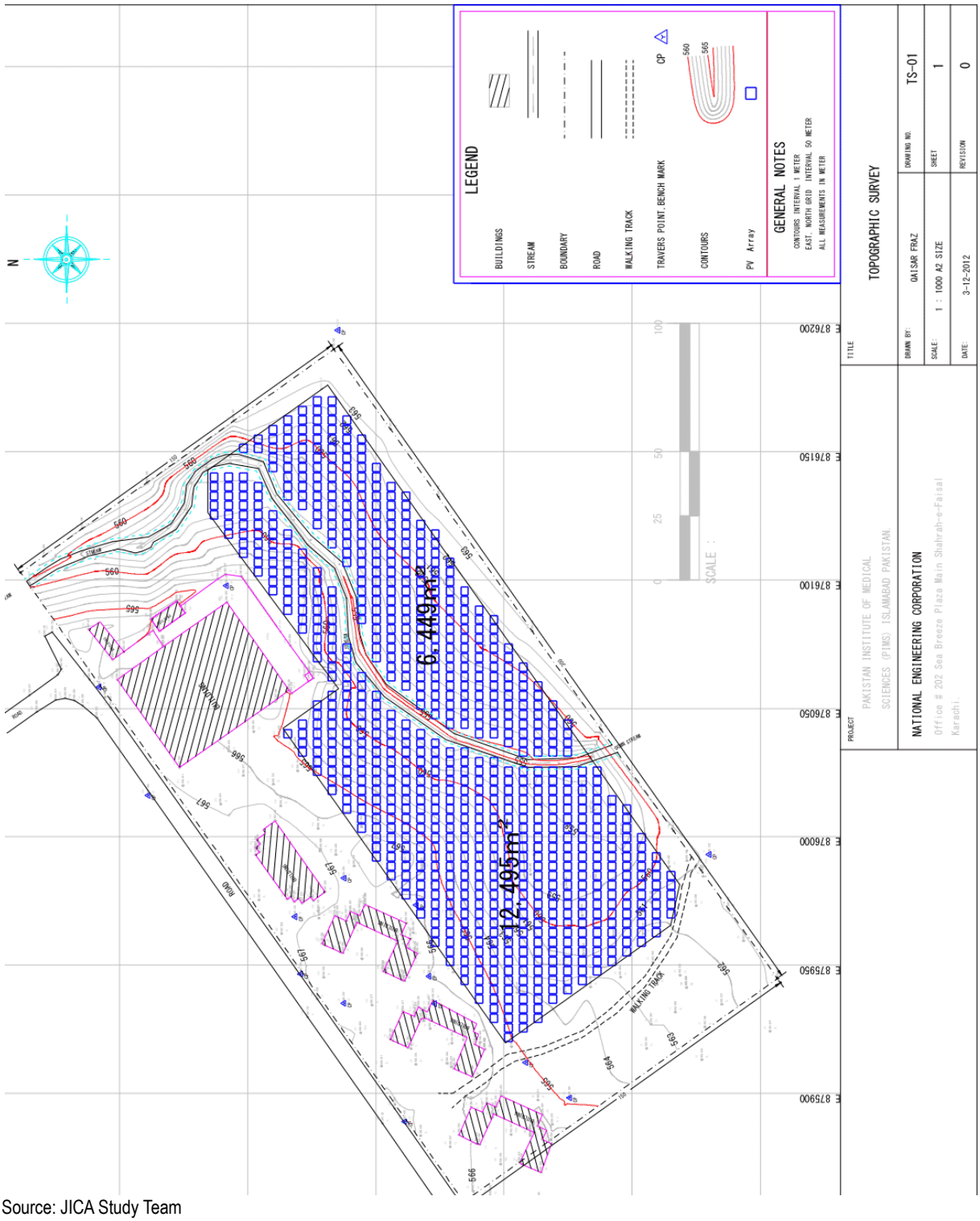
Situation of waterway 2

Box culvert of downstream side

Pipes of road surface drainage

Source: JICA Study Team

Appendix B-3-7: Open Space for Installation



Source: JICA Study Team

Appendix B-4

Site Reconnaissance Report

Longlist of the Candidate Sites for the Field Survey of Hospitals

Appendix B-4-1

S. No.	Name of Hospital	Address	Location	Remarks
Islamabad (Capital City)				
1	Capital Development Authority (CDA) Hospital	G-6, Islamabad	Lies within city, easy access	Insufficient open space, approx. 15 min. one way drive from city
2	Federal Government Services Hospital (FGSH)	Shaheed Millat Road, Islamabad	Lies within city, easy access	Insufficient open space, approx. 35 min. one way drive from city
3	Khan research Laboratories (KRL) Hospital	G-9, Islamabad, Islamabad	Lies at the periphery of city, difficult access	Insufficient open space, approx. 40 min. one way drive from city
4	National Institute of Health (NIH)	G- 10, Islamabad	Lies in the city, easy access	Open space available, approx. 45 min. one way drive from city
5	Nescom Hospital	Islamabad	Lies at the periphery of city, difficult access	Insufficient open space, works under Pak Army, difficult access, approx. 40 min. one way drive from city
6	Pakistan Atomic Energy Commission (PAEC) Hospital	H-11/4, Islamabad	Lies at the periphery of city, difficult access	Insufficient open space, approx. 40 min. one way drive from city
Punjab Province				
1	Sir Ganga Ram Hospital	Queen's Road Lahore	Lies in the center of the city, easy access	Insufficient open space, approx. 30 min. one way drive from city
2	Combined Military (CHM) Hospital	Abdur Rehman road, Lahore	Lies in the center of the city, easy access	Insufficient open space, approx. 40 min. one way drive from city
3	Data Darbar Hospital	Lower Mall, Lahore	Lies in the center of the city, easy access	Insufficient open space, approx. 50 min. one way drive from city
4	Gulaab Devi Chest Hospital	Flying Club Road, Lahore	Lies at the periphery of city, easy access	Open space available, approx. 60 min. one way drive from city
5	Children Hospital	Flying Club Road, Lahore	Lies at the periphery of city, easy access	Open space available, approx. 60 min. one way drive from city
6	Jaanki Devi Hospital	Mughal Pura, Lahore	Lies in the center of city, easy access	Insufficient open space, approx. 50 min. one way drive from city
7	Jinnah Hospital & Allama Iqbal Medical College	Allama Shabbir Ahmed Usmani Road, Lahore	Lies in the center of the city, easy access	Open space available, approx. 40 min. one way drive from city
8	Lady Aitchison Hospital	Hospital Road, near MAYO hospital, Lahore	Lies in the center of the city, crowdy area, difficult access	Insufficient open space, approx. 30 min. one way drive from city
9	Lady Willingdon Hospital	Data Darbar road, Lahore	Lies in the center of the city, crowdy area, difficult access	Insufficient open space, approx. 30 min. one way drive from city
10	Lahore General Hospital	Ayoub Road, near feroz pur road, Lahore	Lies at the periphery of the city, easy access	Insufficient open space, approx. 60 min. one way drive from city

S. No.	Name of Hospital	Address	Location	Remarks
11	Mayo Hospital	Hospital Road, Lahore	Lies in the center of the city, easy access	Open space available, approx. 30 minutes from city
12	Punjab Institute of Cardiology	Jail road, Lahore, Punjab	Lies in the centre of the city, easy access	Insufficient open space, approx. 30 min. one way drive from city
13	Railway Cairns Hospital	Allama Iqbal Road, near Lahore railway station	Lies in the center of the city, easy access	Insufficient open space, approx. 40 min. one way drive from city
14	Services Hospital	Jail road, Lahore	Lies in the center of the city , easy access	Insufficient open space, approx. 30 min. one way drive from city
15	Shadman Mental Hospital	Jail road, Lahore	Lies in the center of the city , easy access	Insufficient open space, approx. 35 min. one way drive from city
16	Shaukat Khanum Memorial Cancer Hospital	Johar Town, Lahore	Lies in the city, easy access	Open space available, charity hospital for cancer patients, approx. 60 min. one way drive from city
17	Sheikh Zayed Hospital	University road, canal bank, Lahore	Lies in the city, easy access	Open space available, approx. 45 min. one way drive from city
18	Wapda Hospital	Feroz pur road, Lahore	Lies in the city, easy access	Insufficient open space, approx. 60 min. one way drive from city
Sindh Province				
1	Abbasi Shaheed Hospital	Tabish Dehlavi Road, Karachi	Lies in the unsecure area of city, easy access	Unsecure, Insufficient open space, approx. 23 min. one way drive from City
2	Civil Hospital	Khaliq-uz-Zaman Road, Karachi	Lies in the city, easy access	Insufficient open space, approx. 20 min. one way drive from city
3	Jinnah Postgraduate Medical Centre (JPMC) Karachi	Sir Ghulam Road, Karachi	Lies in the city, easy access	Open space available, approx. 20 min. one way drive from city
4	Sindh Government Hospital	North Karachi	Lies in the city, easy access	Insufficient open space, approx. 50 min. one way drive from city
5	Sindh Government Qatar Hospital, Karachi	Orangi Town, Karachi	Lies in the city, easy access	Insufficient open space, approx. 60 min. drive from city
6	National Institute of Child Health	Cantonment Karachi, Sindh	Lies in the city, easy access	Open space available, approx. 20 min. one way drive from city
7	Pakistan Naval Station Shifa, PNS Shifa	Defence Housing society, Karachi	Lies in the city, easy access	Insufficient open space, works under Pakistan Navy, approx. 30 min. one way drive from city
8	Karachi Medical & Dental Collage (KMDC)	Block M, North Nazimabad, Karachi	Lies in the city, easy access	Insufficient open space, approx. 30 min. one way drive from city
9	Lyari General Hospital	Layari, Karachi	Lies in the city, easy access	Unsecure, Insufficient open space, approx. 40 min. one way drive from city

Longlist of the Candidate Sites for the Field Survey of Hospitals

S. No.	Name of Hospital	Address	Location	Remarks
10	Spencer Eye Hospital	Siddique Wahab Road Lea Market, Karachi	Lies in the city, easy access	Insufficient open space, approx. 30 min. one way drive from city
11	Sobhraj Maternity Hospital	Burns road, ratan talo, Saddar, Karachi, Sindh	Lies in the city, easy access	Insufficient open space, approx. 20 min. one way drive from city
12	Children Hospital	Sector 15-A/3, Karachi	Lies in the city, easy access	Open space available, 50 minutes one way drive from city
13	Sindh Government Hospital Ibrahim Hyderi	Ibrahim Hyderi, Karachi	Lies in the city, easy access	Insufficient open space, approx. 40 min. one way drive from city
14	Sindh Government Hospital Saudabad	East Karachi	Lies in the city, easy access	Insufficient open space, approx. 30 min. one way drive from city
15	Sindh Government Hospital Liaquatabad	Liaquatabad, Karachi	Lies in the city, easy access	Insufficient open space, approx. 25 min. one way drive from city
16	Ojha Institute of Chest Diseases	Gulshan-e- Iqbal town, SUPARCO head quarter,	Lies in the city, easy access	Open space available, approx. 50 min. one way drive from city
17	Karachi Institute of Heart Diseases (KIHD), Federal B. Area	Federal B Area, Karachi	Lies in the city, easy access	Open space available, approx. 50 min. one way drive from city

Source: Prepared by JICA Study Team based on Information collected from:
(1) List of Hospitals in Lahore collected from the Website of the Government of Punjab
(2) List of Hospitals in Karachi collected from the Website of the Government of Sindh

Note: The institutes in green-colored row are shortlisted site.

Longlist of the Candidate Sites for the Field Survey of Universities

S. No.	Name of University	Address	Location/ Access	Remarks
Islamabad (Capital City)				
1	Federal Urdu University of Arts, Sciences & Technology (FUUAST)	G-7/1, Islamabad	Lies within City, easy access	Open space available, approx. 15 min. one way drive from city
2	Pakistan Institute of Engineering & Applied Sciences	P.O. Nilore, Islamabad	Lies within city, easy access	Open space available, approx. 40 min. one way drive from city
3	Quaid-i-Azam University	3rd Avenue, Islamabad	Lies within city, easy access	Open space available, approx. 20 min one way drive from city.
4	National University of Science and Technology (NUST)	H-8, Islamabad	Lies within city, easy access	Open space available, approx. 20 min. one way drive from city
Punjab Province				
1	King Edward Medical University (KEMU)	Lahore	Lies within city, easy access	Insufficient open space, approx. 30 min. one way drive from city.
2	Kinnaird College for Women (KC)	Jail Road, Lahore	Lies within city, easy access	Open space available, approx. 15 min. one way drive from city
3	Lahore College for Women University (LC)	Jail Road, Lahore	Lies within city, easy access	Open space available, approx. 15 min. one way drive from city
4	University of Engineering & Technology (UET), Lahore	G.T. Road, Lahore	Lies within city, easy access	Open space available, approx. 20 min. one way drive from city.
5	Punjab University, Lahore	Campus Road, Lahore	Lies within city, easy access	Open space available, approx. 40 min. drive one way drive from city
6	University of Health Sciences, Lahore	Campus Road, Lahore	Lies within city, easy access	Insufficient open space, approx. 40 min. one way drive from city
7	University of Veterinary & Animal Sciences, Lahore	Band Road, Lahore	Lies within city, easy access	Insufficient open space, approx. 40 min. one way drive from city.
9	University of Engineering & Technology (UET), kala Shah Kaku (KSK) Campus	kala Shah Kaku, Lahore	Lies on the periphery of Lahore, easy access	Open space available, approx. 40 min. one way drive from city
Sindh Province				
1	Nadirshaw Eduljee Dinshaw (NED) University of Engineering & Technology	Karachi	Lies within city, easy access	Open space available, approx. 45 min. one way drive from city
2	University of Karachi	Karachi	Lies within city, easy access	Open space available, approx. 60 min. one way drive from city

Source: Prepared by JICA Study Team, based on Information collected from the Website of Higher Education Commission (HEC)
Note: The institutes in green-colored row are shortlisted site.

Appendix B-4-3: Airport

This appendix shows reconnaissance of proposed candidate site for installation of solar power generation in airport. Benazir Bhutto International airport is except from this study, hence three airports are showed in section as follows:

- New Benazir Bhutto International Airport (Islamabad)
- Jinnah International Airport (Karachi)
- Allama Iqbal International Airport (Lahore)

The source of all photographs prepared by JICA Study Team and the source of all plan drawings are prepared by JICA Study Team based on collected information at the site.

1. New Benazir Bhutto International Airport (Islamabad)

Location

New Benazir Bhutto International Airport is located in south-west of Islamabad. This airport is under construction aiming to open in 2015. CAA has master plan to extend in the future. There is a land which purpose is not determined between constructing runway and planning runway. Candidate site is in this land as shown in **Figures 1-1**, **1-2** and **1-3**.

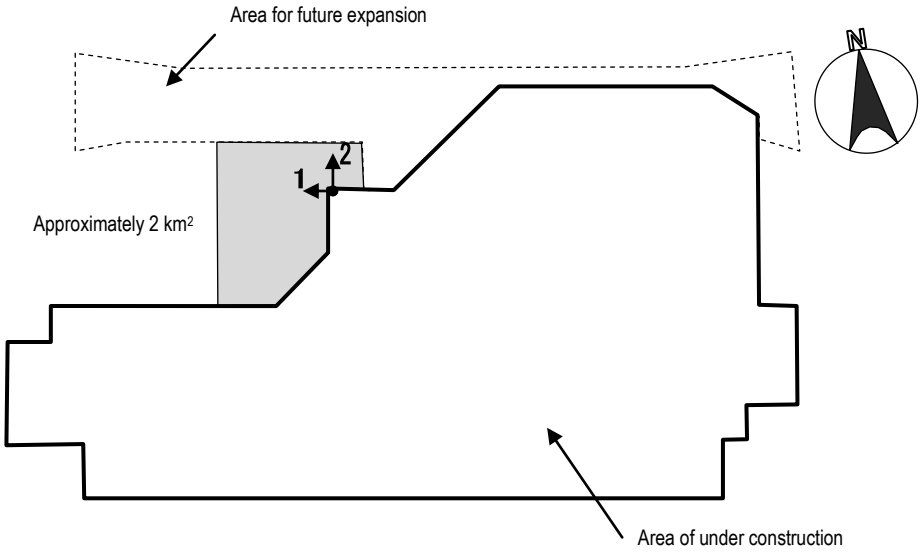


Figure 1-1: Simplified plan view

Figure 1-2: Photo from point 1

Figure 1-3: Photo from point 2

Topographic situation

Candidate is undulating land. But this area would be leveled by CAA for purpose of security.

Geologic situation

Topsoil of the site is sandy soil or rock. It seems that there is no problem for directly foundation of light structures.

2. Jinnah International Airport (Karachi)

Location

Location of candidate site is near to east boundary of Jinnah International Airport as shown in F**igure 2-1.** This area is unused but substation only exists as shown in **Figure 2-2** and **2-3**.

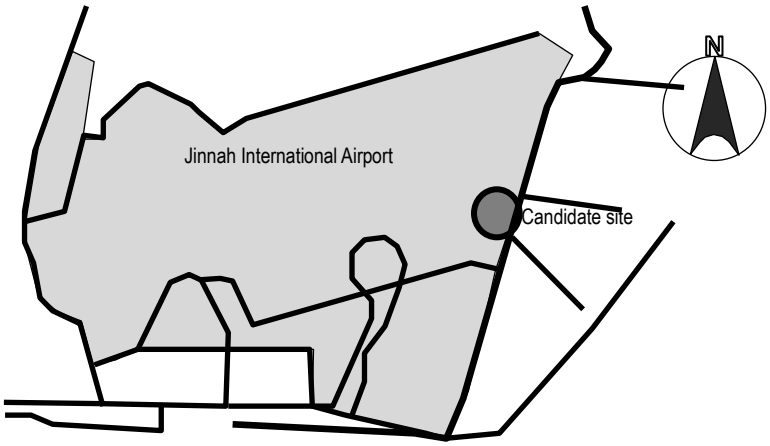
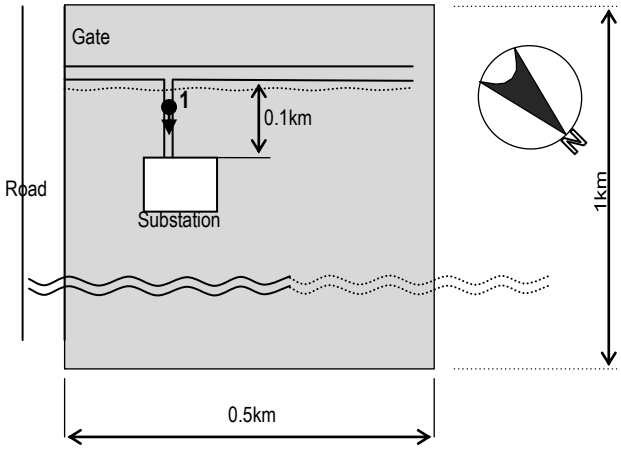


Figure 2-1: Location of candidate site



Distances in figure are approximate.

Figure 2-2: Simplified plan view

Figure 2-3: Photograph from viewpoint 1

Topographic situation

Candidate site is approximately flat land.

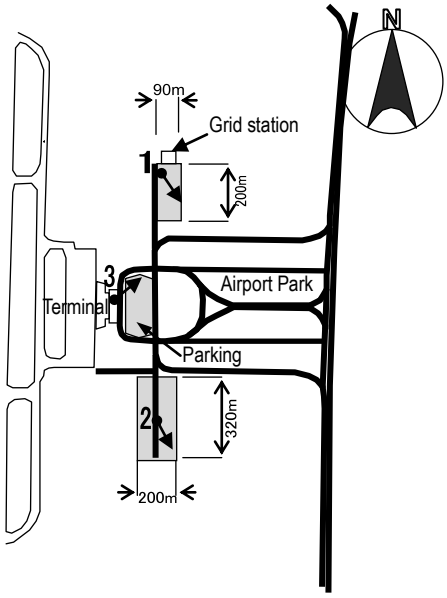
Geologic situation

Topsoil of the site is sandy soil with containing small rubble. It seems that there is no problem for directly foundation of light structures.

3. Allama Iqbal International Airport (Lahore)

Location

Locations of candidate sites are east of terminal building of Allama Iqbal International Airport as shown in **Figure 3-1**. Two areas are unused and one area is using for parking. These situations are shown in **Figure 3-2**, **3-3** and **3-4**.



Distances in figure are approximate.

Figure 3-1: Simplified plan view

Figure 3-2: Photo from point 1

Figure 3-3: Photo from point 2

Figure 3-4: Photo from point 3

Topographic situation

Candidate site is approximately flat land.

Geologic situation

Topsoil of the site is sandy soil with containing small rubble. It seems that there is no problem for directly foundation of light structures.

Appendix B-4-4: Hospital

This appendix shows reconnaissance of proposed candidate site for installation of solar power generation in Hospital.

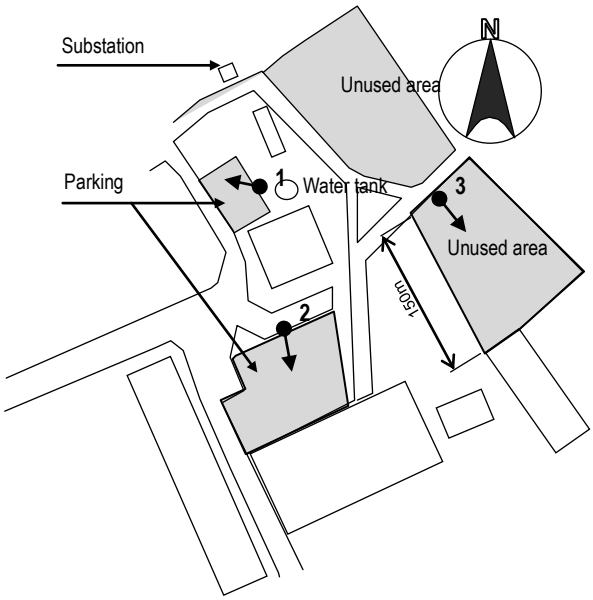
- Jinnah Post Graduate Medical Hospital (Karachi)
- Ojha Medical Hospital (Karachi)
- Children Hospital (Lahore)
- Gulaab Devi Hospital (Lahore)
- Jinnah Hospital (Lahore)
- Mayo Hospital (Lahore)
- Sheikh Zaid Hospital (Lahore)

The source of all photographs prepared by JICA Study Team and the source of all plan drawings are prepared by JICA Study Team based on collected information at the site.

1. Jinnah Post Graduate Medical Hospital (Karachi)

Location

Locations of candidate sites are inside of hospital area as shown in **Figure 1-1**. There are four candidate sites in the hospital. 2 sites is used on parking, other 2 site is unused area. These situations are shown in **Figure 1-2**, **1-3** and **1-4**.The hospital doesn't have any plan in unused areas so far.



Distances in figure are approximate.

Figure 1-1: Simplified plan view

Figure 1-2: Photo from point 1

Figure 1-3: Photo from point 2

Figure 1-4: Photo from point 3

Topographic situation

The parking area is step-formed, higher than unused area. These are approximately flat land.

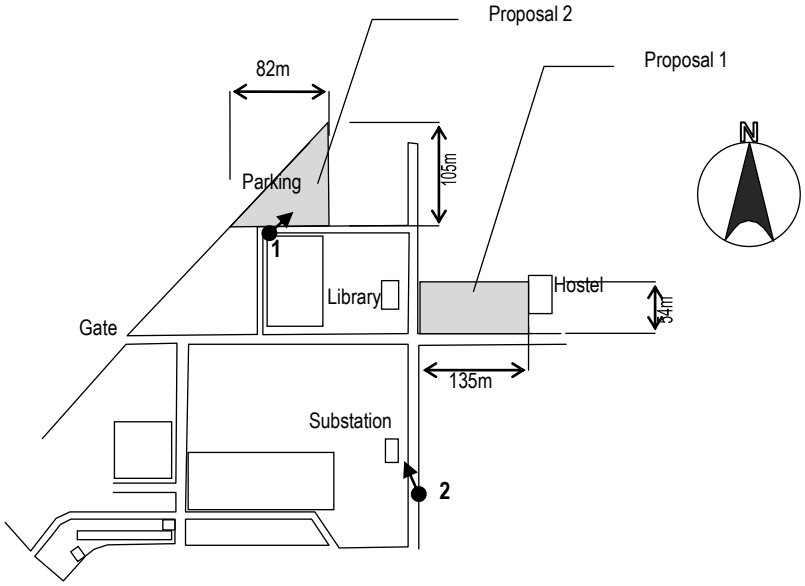
Geologic situation

Topsoil of the site is sandy-soil or pavement. Since parking areas have different levels from under area, it seems that special consideration would be needed at the edge of the parking. At the unused area, there is no problem for directly foundation of light structures.

2. Ojha Medical Hospital (Karachi)

Location

Locations of candidate sites are inside of hospital area. There are two proposal sites in the hospital as shown in **Figure 2-1**, **2-2** and **2-3**.



Distances in figure are approximate.

Figure 2-1: Simplified plan view

Figure 2-2: Photo from point 1

Figure 2-3: Photo from point 2

Topographic situation

Proposal sites are approximately flat land.

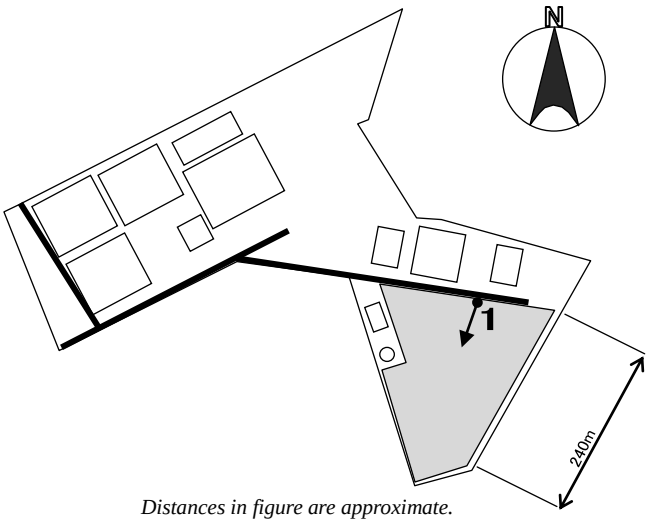
Geologic situation

Topsoil of the site is sandy-soil. It seems that there is no problem for directly foundation of light structures.

3. Children Hospital (Lahore)

Location

Children hospital is next to Gulaab Devi Hospital as shown in **Figure 3-1**. A location of candidate site is near the east boundary of hospital. This is unused area now.



Distances in figure are approximate.

Figure 3-1: Simplified plan view

Figure 3-2: Photo from point 1

Topographic situation

Candidate site is approximately flat land.

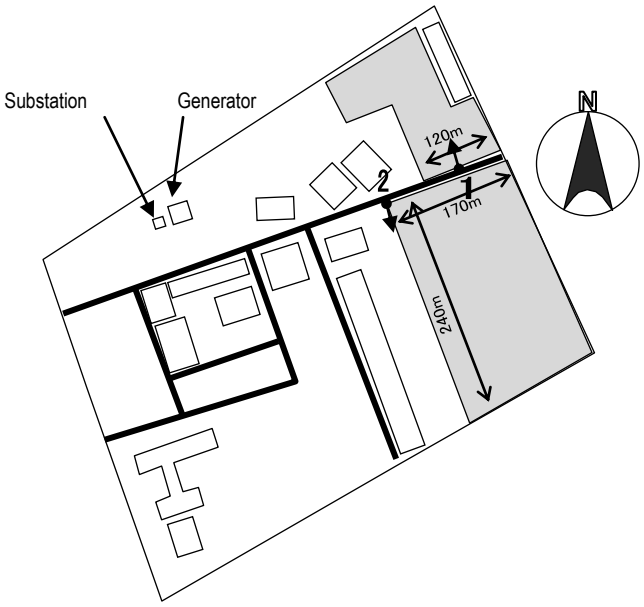
Geologic situation

Topsoil of the site is sandy-soil. It seems that there is no problem for directly foundation of light structures.

4. Gulaab Devi Hospital (Lahore)

Location

Locations of candidate sites are inside hospital as shown in **Figure 4-1**. There are two candidate sites in this area. Both of them are unused area. One site is glass covered land other one is covered by bush. These situations are shown in **Figure 4-2** and **4-3**.



Distances in figure are approximate.

Figure 4-1: Simplified plan view

Figure 4-2: Photo from point 1

Figure 4-3: Photo from point 2

Topographic situation

These are approximately flat land.

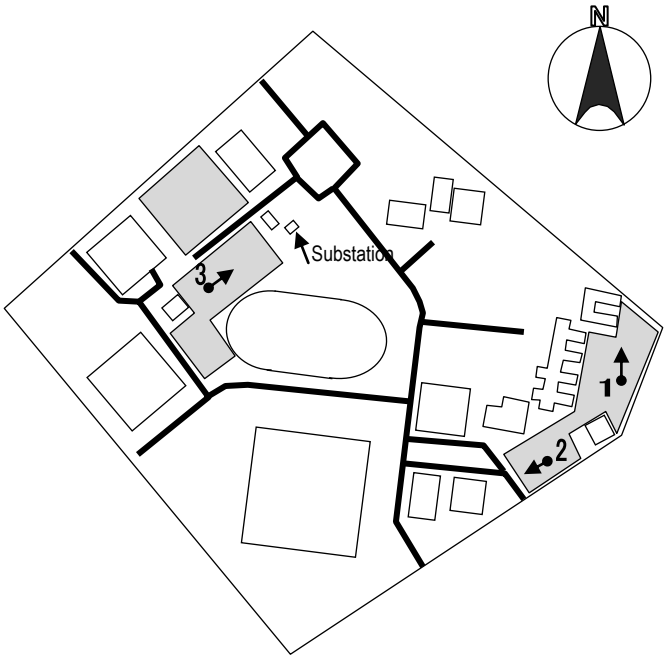
Geologic situation

Topsoil of the site is sandy-soil. It seems that there is no problem for directly foundation of light structures.

5. Jinnah Hospital (Lahore)

Location

Locations of candidate sites are inside of collage area. There are few candidate sites in this area as shown in **Figure 5-1**. These situations are shown in **Figure 5-2**, **5-3** and **5-4**.



Distances in figure are approximate.

Figure 5-1: Simplified plan view

Figure 5-2: Photo from point 1

Figure 5-3: Photo from point 2

Figure 5-4: Photo from point 3

Topographic situation

These are approximately flat land.

Geologic situation

Topsoil of the site is sandy-soil. It seems that there is no problem for directly foundation of light structures.

6. Mayo Hospital (Lahore)

Location

Locations of candidate sites are inside of Hospital as shown in **Figure 6-1**. There are three candidate sites using for Parking, park and unused land on the ground. And another one site is on the roof of the building. These situations are shown in **Figure 6-2** to **6-5**.

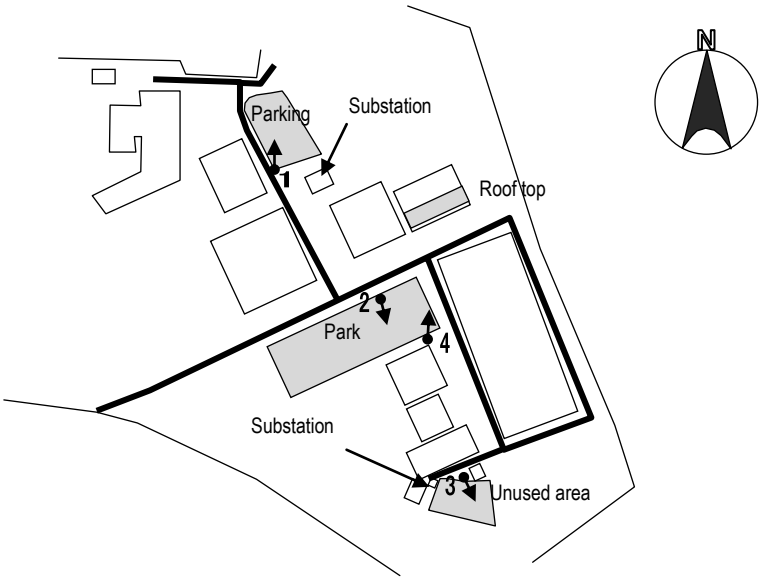


Figure 6-1: Simplified plan view

Figure 6-2: Photo from point 1

Figure 6-3: Photo from point 2

Figure 6-4: Photo from point 3

Figure 6-5: Photo from point 4

Topographic situation

These ground sites are approximately flat land.

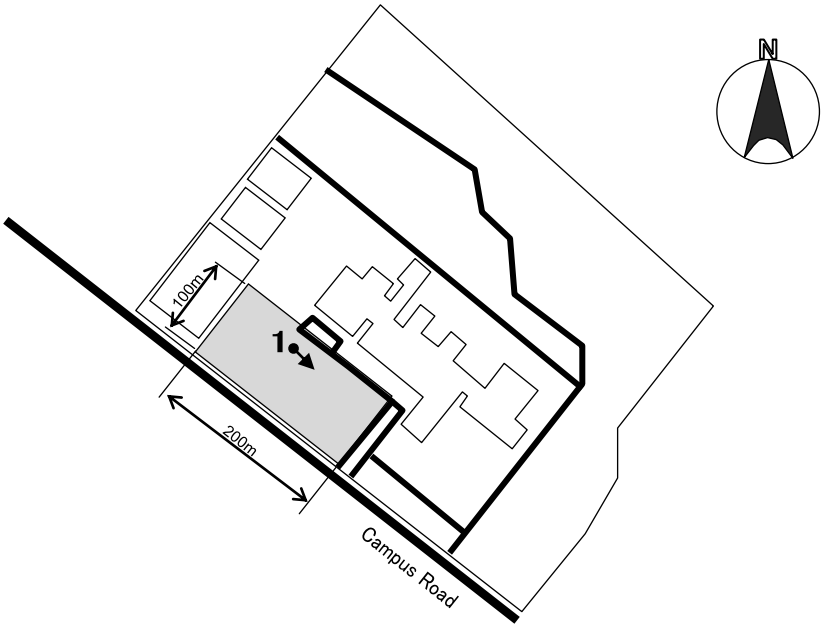
Geologic situation

Topsoil of the site is sandy-soil. It seems that there is no problem for directly foundation of light structures.

7. Sheikh Zaid Hospital (Lahore)

Location

Sheikh Zaid Hospital is opposite site of Punjab University. A location of candidate site is south west of hospital as shown in **Figure 7-1**. This area is using for parking and would be relocated to new parking which is under construction.



Distances in figure are approximate.

Figure 7-1: Simplified plan view

Figure 7-2: Photo from point 1

Topographic situation

Candidate site is flat land.

Geologic situation

Topsoil of the site is pavement. It seems that there is no problem for directly foundation of light structures.

Appendix B-4-5: University

This appendix shows reconnaissance of proposed candidate site for installation of solar power generation in University.

- National University of Science and Technology (Islamabad)
- Quaid -i-Azam University (Islamabad)
- NED University of Engineering & Technology (Karachi)
- University of Karachi (Karachi)
- Punjab University (Lahore)
- University of Engineering and Technology (Lahore)

The source of all photographs prepared by JICA Study Team and the source of all plan drawings are prepared by JICA Study Team based on collected information at the site.

1. National University of Science and Technology (Islamabad)

Location

National University of Science and Technology (NUST) is located west of Islamabad. The following **Figure 1-1** shows candidate site that have been presented to the university.

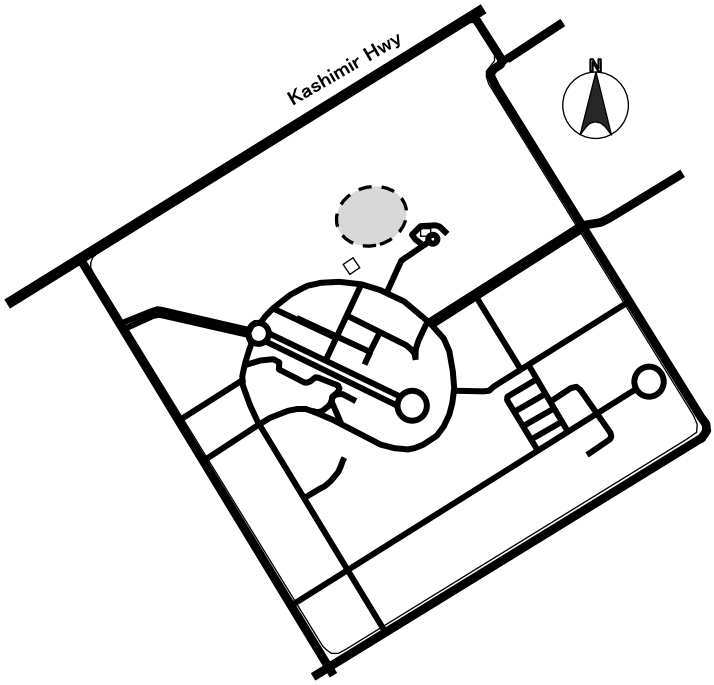


Figure 1-1: Simplified plan view

Figure 1-2: Candidate site

Topographic situation

Ground of university is undulating land.

Geologic situation

Topsoil of the site is sandy soil or rock. It seems that there is no problem for directly foundation of light structures.

2. Quaid -i-Azam University (Islamabad)

Location

Quaid -i-Azam University is located in east of Islamabad. University has master plan aim to 2050. Various facilities are planned but details have not determined yet. It seems that many open areas would appear. The following figure shows one of the areas that have been presented to the university. (**Figure 2-1** to **2-4**)

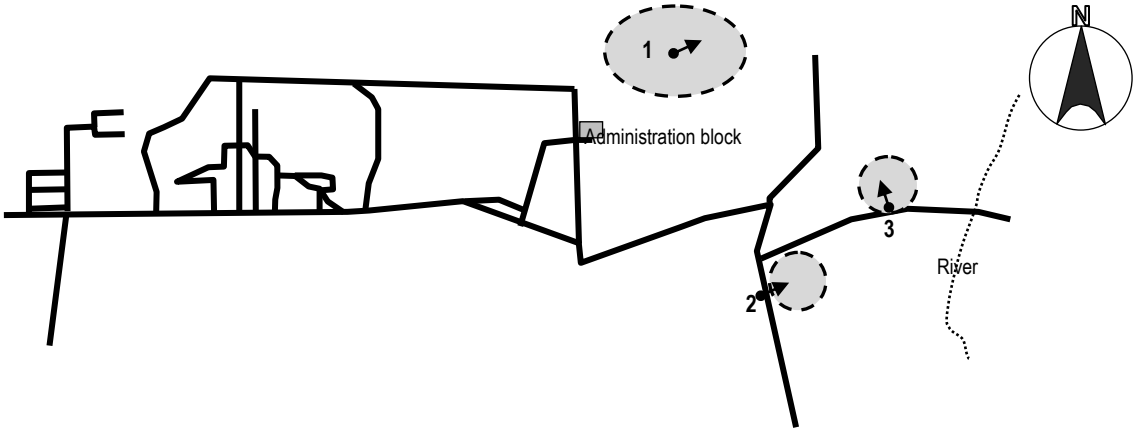


Figure 2-1: Simplified plan view

Figure 2-2: Photo from point 1

Figure 2-3: Photo from point 2

Figure 2-4: Photo from point 3

Topographic situation

Ground of university is often undulating land. Especially the land near the hill or mountain is lumpy and rocky area. (See the **Figure 2-2**) But there is also flat land in the university. (See the **Figure 2-3** and **2-4**)

Geologic situation

Topsoil of the site is sandy soil or rock. It seems that there is no problem for directly foundation of light structures.

3. NED University of Engineering & Technology (Karachi)

Location

Location of candidate site is near to south boundary of the university campus (ground site). And roof top of classroom building (roof top site) as shown in **Figure3-1**. Ground site are used as a parking and convocation ground now as shown in **Figure3-2**. The university doesn't have any plan in these ground areas so far.

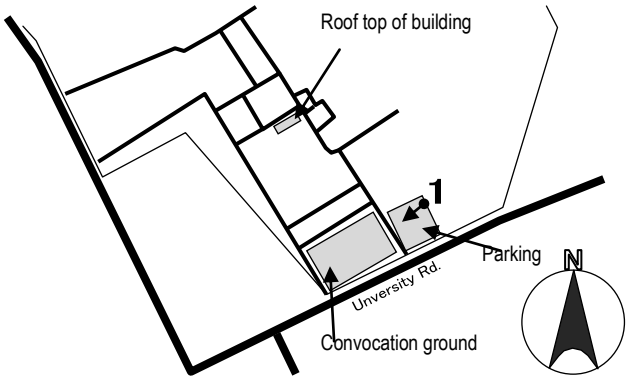


Figure 3-1: Simplified plan view

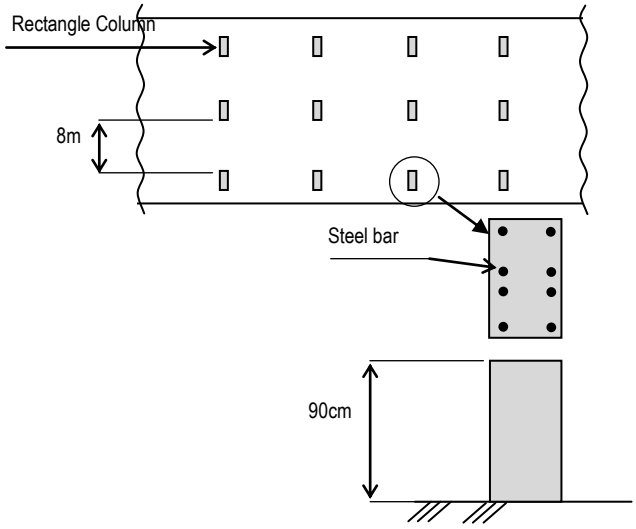
Figure 3-2: Photograph from viewpoint 1

Topographic situation

These areas are almost flat land. The parking area is step-formed (higher than other ground).

Roof top site

Candidate on the roof top is recommended by the university. This site is on the roof of one-storied building of classroom. There are many existed columns and other equipment on the roof. These rectangle column would use for increasing next floor. This situation is shown in **Figure 3-3** and **3-4**.



Sizes in figure are approximate.

Figure 3-3: Rectangle column

Figure 3-4: Photograph of roof top

On roof top site, structural study of class room building must be necessary, therefore blueprint of this building is needed. If it has not already lost, structural survey would be needed. One example of installing PV panel is shown in **Figure 3-5**.

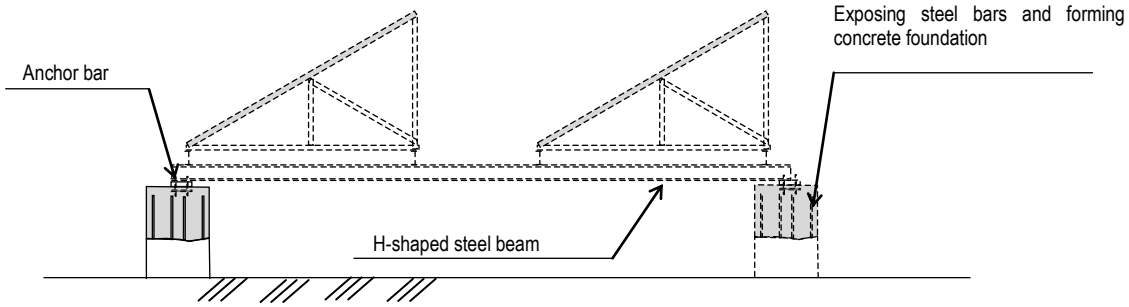


Figure 3-5: Example of installing PV panel on rooftop

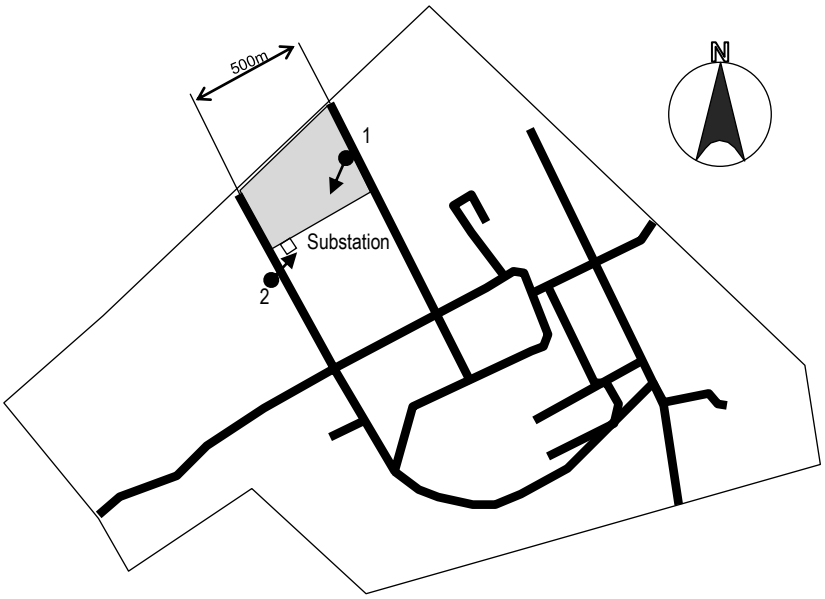
Geologic situation

Topsoil of the ground site is sandy-soil. Since surface of the parking area may be embankment, it seems that bearing test would be needed. In Convocation ground, there is no problem for directly foundation of light structures.

4. University of Karachi (Karachi)

Location

University of Karachi has master plan aim to 2050. Various facilities are planned but details have not determined yet. It seems that many open areas would appear. The following figure shows one of the areas that have been presented to the university. (**Figure 4-1**, **4-2** and **4-3)**



Distances in figure are approximate.

Figure 4-1: Simplified plan view

Figure 4-2: Photo from point 1

Figure 4-3: Photo from point 2

Topographic situation

This area is unused grassland now.

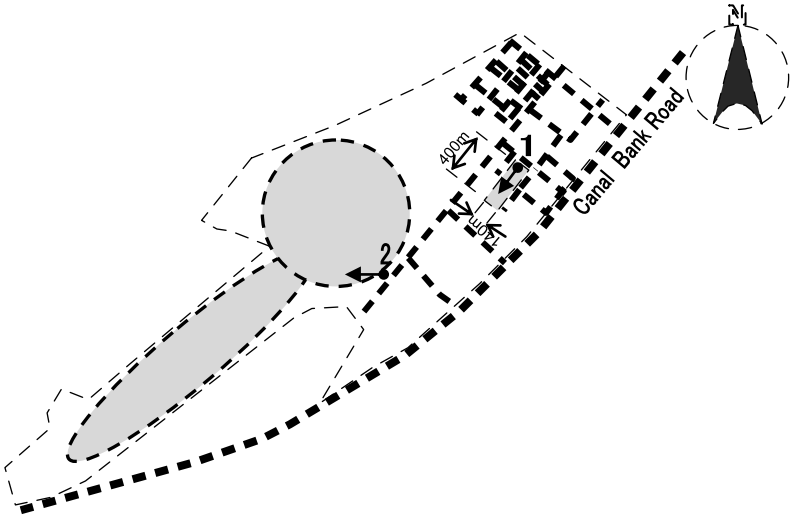
Geologic situation

Topsoil of the site is sandy-soil. It seems that there is no problem for directly foundation of light structures.

5. Punjab University (Lahore)

Location

Punjab University is the oldest and largest university in Pakistan which is located in middle area of Lahore. University has master plan aim to 2050. Various facilities are planned but details have not determined yet. It seems that many open areas would appear. The following **Figure 5-1** shows one of the areas that have been presented to the university. One presented site is located near the existing building. This area is unused now. Other site is located south west of university. This area is using for farmland. These situations are shown in **Figure 5-2** and **5-3**.



Distances in figure are approximate.

Figure 5-1: Simplified plan view

Figure 5-2: Photo from point 1

Figure 5-3: Photo from point 2

Topographic situation

These are approximately flat land.

Geologic situation

It seems that the top soil of farmland is so softly that compaction is needed for foundation of Solar Power generation equipment.

6. University of Engineering and Technology (Lahore)

Location

University of Engineering and Technology is located in middle area of Lahore. The following **Figure 6-1** shows areas that have been presented to the university. These situations are shown in **Figure 6-2** and **6-3**.

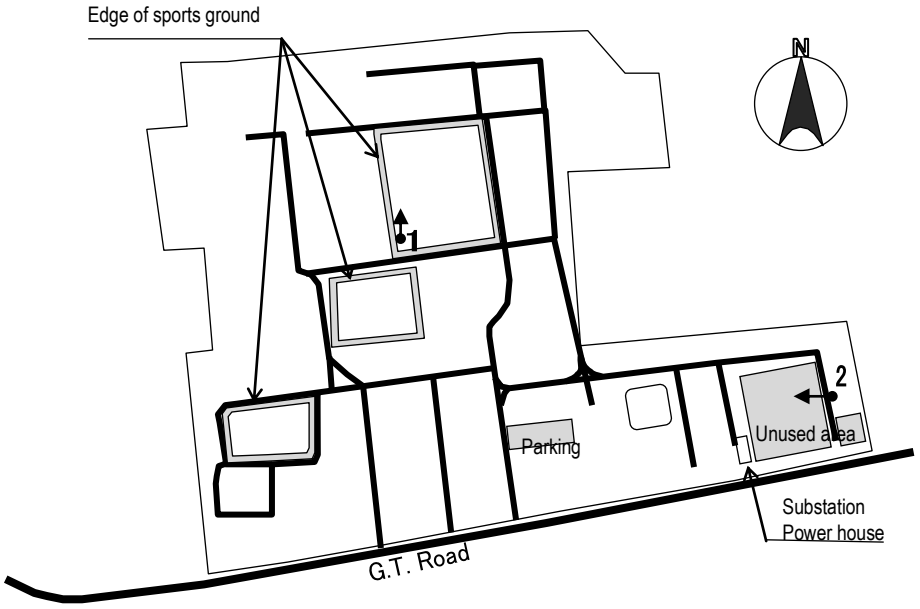


Figure 6-1 Simplified plan view

Figure 6-2 Photo from point 1

Figure 6-3 Photo from point 2

Topographic situation

These are flat land.

Geologic situation

Topsoil of the site is sandy-soil. It seems that there is no problem for directly foundation of light structures.

Edge of sports ground site

University suggests that edge of sports ground can be used for solar power generation. One example of install solar panel is shown in following figure.

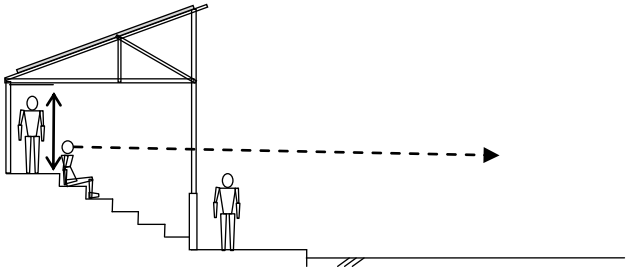


Figure 6-4 Example of installing PV panel

Summarized Information collected from Hospitals and Universities

Sr. No.	Name of Institution	Location	Total area (approx.)	Available open space (approx.)	Total no. of a) Student/Annual	Feeder and Connection Voltage of DISCO	Sub-stations (No.)	Total Demand (/day)	Transformer Capacity (kVA)	Diesel Generators (kVA)	Remarks
	University in Islamabad										
1	National University of Science and Technology (NUST)	H-8, Islamabad	1,500 acres (Approx. 6,070,000 sq,m)	50,000 sq.m	a) 12,000 b) 3,492	Feeders: 1 (one) 11 kV incoming feeder. Load Shedding not exempted. For Billing: One Energy Meter is installed at 11 kV side.	No Sub-station exist. All transformer are either pole mounted or bed mounted. Connected by 11 kV feeder of University.	6 MWh	Total: 46 nos. 5000 x 1, 1000 x 1 630 x 19, 400 x 10 200 x 6, 100 x 9	Total: 42 nos. 500 x 1, 400 x 4, 250 x 21, 200 x 4, 250 x 1, 100 x 3 60 x 1, 55 x 2, 30 x 1, 16 x 1, 5 x 3	Abundant open space is available within university. University have 11 kV ring arrangement within university.
2	Quaid-e-Azam University	Islamabad	1,680 acres (Approx. 6,799,000 sq.m)	3 (Three) major site is visited. Large open space is available but no definite space is allocated.	a) 6,854 b) 1,380	Feeders: 3 (Three) 11 kV incoming feeders. All feeders are Load Shedding not exempted. For Billing: Total 46 nos. of Energy Meter are installed at 400 V side.	No Sub-station exists. Only 11 kV feeder connection change point controlled by DISCO exists. All transformer are either pole mounted or bed mounted, connected by 11 kV feeder.	5 MWh	Total: 57 nos. 630 x 1, 400 x 4 300 x 1, 200 x 38 100 x 8, 63 x 1 50 x 4	Total: 8 nos. 100 x 2, 66 x 1 27 x 1, 25 x 1 20 x 2, 17 x 1	Abundant open space is available within university to connect Transformer allocated near by each facility. University have 11 kV ring arrangement within university. Ready to allocate space based on system deigning.
	Hospital in Karachi, Sindh Province										
1	Jinnah Post Graduate Medical Center (JPMC)	Rafique Shaheed Road, Karachi	75 acres (Approx. 304,000 sq.m)	Proposed sites: 4 places (Exact scale of open space is not available)	a) 5,000 approx. b) 3,000 approx.	Feeders: 2 (two) 11 kV incoming feeders. Both are Load Shedding exempted. For Billing: One Energy Meter installed at 11 kV side.	5	3.5 MWh	Total : 7 nos. 1500 x 4, 1000 x 2 200 x 1	1000 x 3	Available space is parking area and open space within hospital premise. There is existing structures around the proposed site. Need to consider shadows.
2	OJHA Medical Hospital	Gulshan-e-Iqbal Town, Karachi	55 Acres (Approx. 223,000 sq.m)	Proposed sites: 2 places 1) 7,480 sq.m 2) 4,410 sq.m	a) 172,900 b) 5,000	Feeders: 3 (three) 11 kV incoming feeders. One feeder is Load Shedding exempted. For Billing: Total 7 Energy Meters 1) 11 kV x 1 no. 2) 3 Phase, 400V x 6 nos.	7	3.5 MWh	Total : 7 nos. 1000 x 1, 750 x 1 500 x 2, 200 x 3	Total: 4 nos. 750 x 1 500 x 2 100 x 1	Available space is parking area and open space within hospital premise. There is a axis road to facility at south of open space between existing structure.
	University in Karachi, Sindh Province										
1	NED University	Gulshan-e-Iqbal Town, Karachi	150 acres (Approx. 607,000 sq.m)	Proposed sites: 3 1) 15,000 sq.m in convocation ground. 2) 18,000 sq.m at car parking. 3) 3,000 sq.m around cricket ground.	a) 8,775 b) 730	Feeders: 2 (two) 11 kV incoming feeders. Both are Load Shedding not exempted. For Billing: Bill on 400 V side. Total 6 (six) Energy Meter is installed.	7	3.5 MWh	Total: 7 nos. 500 x 6, 200 x 1	Total: 26 nos. 180 x 1, 75 x 3 60 x18, 50 x 1 22 x 1, 19 x 1 9.5 x 1	Available space is parking area, space around the cricket ground and convocation ground.
2	University of Karachi	Gulshan-e-Iqbal Town, Karachi	No information	No information	No information	No information	Existing: 7 Newly build: 5 (Waiting for Commissioning).	No information	Total: 8 nos. 750 x 5, 500 x 3	Total: Unnone Size: 5 to 300 kVA	Abundant open space is available.
	Hospital in Lahore, Punjab Province										
1	Children Hospital	Flying Club, Lahore	52 Acres (Approx. 210,000 sq.m)	13,200 sq.m	a) 75,000 b) 2,675	Feeders: 2 (two) 11 kV incoming feeders. Both are Load Shedding not exempted. For Billing: One Energy Meter installed at 11 kV side.	3 (Three) Existing Sub-stations. 1 (One) new is under construction.	3 MWh	Total : 5 nos. 1600 x 1, 1250 x 2 1000 x 2	Total: 4 nos. 750 x 1, 500 x 1 150 x 1, 24 x 1	The proposed land is triangular in shape and south side is open. There is water tank tower toward East direction.
2	Gulab Devi Hospital	Flying Club, Lahore	127 Acres (Approx. 514,000 sq.m)	Proposed sites: 2 a) 13,240 sq.m b) 40,800 sq.m	a) 500,000 b) 716	Feeders: 2 (two) 11 kV incoming feeders. Both are Load Shedding not exempted. For Billing: 3 (Three) Energy Meter at 3 Phase, 400 V side.	Only 1(One) Sub-station exists. Other two transformer are pole mounted	1 MWh	Total : 3 nos. 630 x 1, 400 x 1 200 x 1	Total : 7 nos. 550 x 1, 500 x 1 400 x 1, 250 x 1 100 x 3	The proposed space is at the northeast end of the Hospital premise. Open toward south and no tall building around the open space.

Sr. No.	Name of Institution	Location	Total area (approx.)	Available open space (approx.)	Total no. of a) Student/Annual	Feeder and Connection Voltage of DISCO	Sub-stations (No.)	Total Demand (/day)	Transformer Capacity (kVA)	Diesel Generators (kVA)	Remarks
3	Jinnah Hospital & Allama Iqbal Medical College	Allama Shabbir Ahmed Usmani Road, Lahore	86 Acres (Approx. 348,000 sq.m)	Proposed sites: 4 places Total around 29,805 sq.m	a) 277,680 b) 3,027	Feeders: 2 (two) 11 kV incoming feeders. Both are Load Shedding not exempted. For Billing: 1 (One) Energy Meter at 11 kV side.	1	3.5 MWh	Total : 6 nos. 1500 x 4, 1250 x 2	Total : 6 nos. 500 x 2, 470 x 1 200 x 1, 150 x 1 114 x 1	Available space is scattered at two area East and West of Hospital premise. The space at West is near to existing Sub-station. The open space includes squash ground and area behind stadium. There are many tall trees around the available open space.
4	Mayo Hospital	Hospital Road, Lahore, Punjab	54 Acers (Approx. 219,000 sq.m)	Proposed sites: 4 Total area is around 12800 sq.m, scattered within the Hospital premise.	a) 1,579,870 b) 5,372	Feeders: 2 (Two) 11 kV incoming feeder, one of them is Load Shedding exempted. For Billing: 1 (One) Energy meter installed at 11 kV side and others are connected by Hospitals 11 kV feeder.	4 Sub-stations. Other transformers are either pole mounted or pad mounted	2.4 MWh	Total : 27 nos. 1000 x 1, 630 x 6 400 x 2, 300 x 1 200 x 8, 100 x 6 50 x 1, 25 x 2	Total : 10 nos. 380 x 1, 280 x 3 250 x 4, 150 x 1 100 x 1	Available space is scattered within the Hospital premise. In available open space the park area (5480 sq.m) is also included. There is structures and buildings available open space.
5	Sheikh Zaid Hospital	New Muslim Town	50 Acres (Approx. 202,000 sq.m)	20,000 sq.m	a) 34,600 b) 2,144	Feeders: 2 (two) 11 kV incoming feeders. One of them is Load Shedding exempted. For Billing: 1 (One) Energy Mater at 11 kV side .	4	2.5 MWh	Total : 7 nos. 1500 x 2, 1000 x 2 700 x 1, 630 x 1 200 x 1	Total : 5 nos. 725 x 1, 500 x 1 250 x 1, 135 x 1 100 x 1	
	University in Lahore, Punjab Province										
1	Punjab University	New Muslim Town, Canal Road. Lahore	1,781 Acres (Approx. 7,207,000 sq.m)	60,000 sq.m	a) 30,618 b) 6,748	Feeders: 2 (Two) incoming 11 kV feeders. One is Load Shedding exempted. For Billing: Bill on 11 kV side.	16	10 MWh	Total : 53 nos. 1530 x 1, 1000 x 1, 750 x 10, 630 x 1, 400 x 9, 300 x 1, 200 x 28, 100 x 1, 50 x 1	Total : 29 nos. 300 x 1, 200 x 1 150 x 1, 100 x 17 60 x 2, 50 x 7	Abundant open space is available.
2	University of Engineering and Technology (UET), Lahore	G.T. Road Lahore	165 Acres (Approx. 668,000 sq.m)	Proposed sites: 5 a) 24,780 sq.m b) 9,110 sq.m c) 6,000 sq.m (car parking area) d) 3,000 sq.m (Space around cricket stadium) e) 3,500 sq.m (Space around football stadium)	a) 8,775 b) 730	Feeders: 2 (Two) incoming 11 kV feeders. Both feeders are Load Shedding not exempted. For Billing: Bill on 11 kV side.	2 existing Sub-stations. Most of the Transformer (Tr.) are pole mounted.	2 MWh	Total : 46 nos. 200 x 46	Generators: Total : 7 nos. 1) By Gas : 1100 x 3 2) By Diesel: 500 x 4	Open space available in four areas; 1) Ground. 2) Parking Area. 3) Space around the cricket stadium. 4) Space around the foot ball stadium.

Source : Prepared by JICA study Team, on the base of provided information by institutions.
Note: DISCO means distribution company.

Appendix C-1

Monthly Benchmark Wind Speeds

(Source: AEDB)

Monthly Benchmark Wind Speeds for Khuttikun and Bhanbore Sites

Month	Monthly Benchmark Wind Speed (m/s)					
	30m	50m	60m	67m	80m	85m
January	4.7	5.1	5.2	5.3	5.4	5.5
February	5.1	5.4	5.5	5.6	5.7	5.8
March	5.3	5.7	5.8	5.9	5.9	6
April	7	7.3	7.4	7.6	7.6	7.7
May	8.9	9.4	9.6	9.7	9.8	9.9
June	10.3	10.9	11.1	11.2	11.3	11.4
July	8.4	8.9	9	9.2	9.2	9.3
August	9.3	9.8	10	10.2	10.3	10.4
September	7.6	8.1	8.2	8.3	8.4	8.5
October	4.3	4.6	4.7	4.7	4.8	4.9
November	3.8	4.1	4.2	4.3	4.4	4.5
December	4.6	4.9	5.1	5.2	5.3	5.4
Annual Average	**6.6**	**7**	**7.1**	**7.2**	**7.3**	**7.4**

Source: "Benchmark Wind Speed Table", downloadable at http://www.aedb.org/downloads.htm

Monthly Benchmark Wind Speeds for Jhimpir Sites

Month	Monthly Mean Wind Speeds (m/s)					
	30m	50m	60m	67m	80m	85m
January	4.25	4.70	4.90	5.02	5.24	5.30
February	4.50	4.98	5.18	5.32	5.55	5.70
March	4.77	5.28	5.50	5.64	5.89	6.00
April	6.39	7.03	7.29	7.46	7.75	7.90
May	8.29	9.05	9.36	9.56	9.90	10.00
June	8.79	9.50	9.78	9.96	10.25	10.40
July	8.83	9.59	9.89	10.08	10.40	10.50
August	8.20	8.89	9.16	9.34	9.63	9.60
September	6.63	7.28	7.54	7.72	8.01	8.10
October	4.22	4.68	4.87	5.00	5.22	5.30
November	3.59	3.98	4.14	4.24	4.43	4.50
December	3.96	4.38	4.56	4.67	4.88	5.00
Annual Average	**6.0**	**6.6**	**6.8**	**7.0**	**7.3**	**7.4**

Source: "Benchmark Wind Speed Table", downloadable at http://www.aedb.org/downloads.htm

Appendix C-2

GPS Coordinates for Wind Masts installed in Sindh Province

(Source: AEDB)

GPS Coordinates for Wind Masts installed in Sindh Province

Pakistan Meteorological Department (PMD)		
PMD Gharo Mast (30m)	24° 44.307' N	68° 36.423' E
PMD Nooriabad Mast (30m)	25° 10.906' N	67° 48.719' E
AEDB-UNDP		
AEDB-UNDP-Baburband Mast (80m)	25° 07' 36.08" N	67° 38' 06.89" E
AEDB-UNDP HawksBay Mast (80m)	24° 52' 2.025" N	66° 51' 41.983" E
AEDB-UNDP Ketibandar Mast (80m)	24° 11' 49.18" N	67° 37' 38.67" E
AEDB-UNDP Jamshoro Mast (80m)	25° 21' 5.90" N	68° 10' 31.30" E
AEDB-UNDP Islamkot Mast (80m)	24° 41' 16.94" N	70° 09' 7.52" E
AEDB-UNDP Chachro Mast (80m)	25° 07' 4.84" N	70° 14' 57.30" E
AEDB-UNDP Umerkot Mast (80m)	25° 19' 50.74" N	69° 47' 43.04" E
AEDB-UNDP- Kotri Mast (80m)	25° 16' 19.03" N	68° 13' 6.47" E
AEDB-UNDP Haleji Mast (80m)	24° 54' 41.76" N	67° 27' 41.04" E
AEDB-UNDP Sijawal Mast (80m)	24° 31' 45.30" N	68° 09' 21.85" E
AEDB-UNDP Bhanbhore mast (80m)	24° 45' 6.70" N	67° 30' 59.60" E
Private Investors		
FFCEL Mast (80m)	25° 04' 33.20" N	67° 58' 22.20" E
Zorlu Mast A (80m)	25° 03' 58.50" N	67° 58' 3.10" E
Zorlu Mast B (80m)	25° 02' 11.80" N	68° 00' 0.30" E
Tenaga Mast (80m)	24° 37' 34.47" N	67° 26' 42.31" E
Lucky Energy Mast (80m)	25° 08' 0.80" N	67° 59' 46.90" E
Master Energy Mast (80m)	25° 05' 43.30" N	67° 59' 6.80" E
Gul-Ahmed Energy Mast –I (80m)	25° 08' 33.21" N	68° 00' 45.82" E
Gul-Ahmed Energy Mast –II (80m)	25° 08' 53.67" N	67° 59' 35.29" E
Gul-Ahmed Energy Mast –III (80m)	25° 09' 10.97" N	67° 58' 17.82" E
Gul-Ahmed Energy Mast –IV (80m)	25° 09' 42.10" N	67° 56' 52.14" E
Gul-Ahmed Energy Mast –V (80m)	25° 10' 13.27" N	67° 54' 24.03" E
ZPPL Mast (50m)	24° 41.133' N	67° 30.021' E
Tapal Mast (60m)	24° 34.400' N	67° 29.916' E
Beacon Mast (80m)	24° 36.841' N	67° 23.568' E

Source: AEDB

Appendix C-3

List of Letter of Intent (LOI) Holder Project Developers

(Source: AEDB)

List of Letter of Intent (LOI) Holder Project Developers

Sr. #	Date of Issue	Project Capacity (MW)	Developer
1	Aug 26, 2004	49.5	New Park Energy Ltd
2	Sep 20, 2004	50	Tenaga Generasi Ltd.
3	Sep 22, 2004	50	Foundation Wind Energy -II Pvt. Ltd (Formerly: Green Power (Pvt) Ltd)
4	Nov 22, 2004	50	Dawood Power Ltd. (Formerly: WIN Power Ltd)
5	Jan 26, 2005	50	Master Wind Energy Ltd
6	Feb 17, 2005	50	ZEPHYR POWER LTD
7	Apr 25, 2005	50	Foundation Wind Energy -I Ltd. (formerly: Beacon Energy Ltd.)
8	Jun 29, 2005	50	China Three Gorges First Wind Farm Pakistan Ltd (Formerly : CWE)
9	Sep 15, 2005	50	Sachal Energy Development Pvt Ltd
10	Sep 30, 2005	50	FFC Energy Ltd.
11	May 6, 2006	50	Yunus Energy Ltd (Formerly: Lucky Energy Ltd)
12	May 13, 2006	50	Metro Power Co. (Pvt) Ltd,
13	May 13, 2006	50	Gul Ahmed Energy Ltd
14	Jul 4, 2006	56.4	Zorlu Enerji Pakistan Ltd
15	Jul 4, 2006 / Oct 5, 2006	50x2	Wind Eagle Ltd.
16	Aug 10, 2006	50	Sapphire Wind Power Company (Pvt) Ltd
17	Feb 2, 2009	50	Zeni Wind Power Pvt. Ltd.
18	Jan 12, 2010	50x2	Abbas Steel Group
19	Jan 21, 2010	50	Fauji Foundation
20	Aug 18, 2010 / Dec 27, 2010	5x2	Pakistan Wind Energy Generation Pvt. Ltd.
21	Aug 18, 2010	10	Titan Energy Pakistan (Pvt.) Ltd.
22	Aug 18, 2010	10	Ismail Power (Pvt.) Ltd.
23	Oct 12, 2010	50	Engro PowerGen Limited
24	Dec 27, 2010 / Jun 20, 2012	2.4+50	China Sunnec Energy (Pvt.) Ltd.
25	Feb 15, 2011	10	Tapal Energy (Pvt.) Ltd
26	Jul 30, 2011	100x3	Hydro China Xiebei Engineering Corporation
27	Aug 15, 2011	250x2	NBT Wind Power Pakistan (Pvt.) ltd
28	Oct 25, 2011	50x3	Tricon Boston Consulting Corporation
29	Nov 15, 2011 / May 5, 2012	150+350	United Energy Pakistan Ltd.
30	Feb 1, 2012	100	Associated Technologies Ltd.
31	Feb 1, 2012	50	Fina Enerji Holding AS
32	Feb 1, 2012	200	Anadolu Wind Pakistan
33	Feb 6, 2012	50	Hawa Holding Limited
34	Feb 17, 2012	150	System Wind Energy
35	Mar 19, 2012	10	Akhtar Energy Pvt. Ltd.
36	Jul 13, 2012	50	Hartford Alternative Energy
37	Jul 19, 2012	10	Trident Energy Pvt Ltd

Source: AEDB

Appendix C-4

Summary of Existing Projects (Wind Power)

Summary of Existing Projects (Wind Power)

Sr. No	Company	Location of Land	Generation License	Project Details			Tariff	
				Project Capacity (MW)	Total Project Cost (million US$)	Wind Turbines Type	Cost (US Cent/kWh)	Date
1	Dawood Power Ltd.	Bhambore	Y	49.5	120.336	Goldwind GW77, 1.5 MW x 33 WTGs	11.875	Dec 6, 2008
2	Arabian Sea Wind Energy (Pvt.) Ltd	Buhara	Y	49.5	126.735	Nordex S77, 1.5 MW x 33 WTGs	11.9201	May 12, 2010
3	Fauji Fertilizer Company Energy Ltd.	Jhimpir	Y	49.5	133.557	Nordex S77, 1.5 MW x 33 WTGs	16.109	Aug 10, 2010
4	Zorlu Enerji Pakistan Ltd.	Jhimpir	Y	56.4	161.88	VENSYS 62, 5 x 1.2 MW WTGs (6 MW) VESTAS V90, 28 x 1.8 MW WTGs (50.4 MW)	13.3456	Dec 13, 2011
5	Three Gorges First Wind Farm Pakistan Pvt. Ltd (CWE)	Jhimpir	Y	49.5	130.279	GW 1500/77, 1.5 MW x 33 WTGs	13.9399	Dec 15, 2011
6	Yunus Energy Limited	Jhimpir	Y	50	134.568	Nordex N100/2500, 2.5MW x 20 WTGs	17.3672	Feb 15, 2012
7	Foundation Wind Energy – I Ltd. (Beacon Energy Ltd)	Kuttikun	Y	50	125.899	Nordex N100/2500, 2.5MW x 20 WTGs	14.1359	Mar 16, 2012
8	Foundation Wind Energy – II Pvt Ltd. (Green Power Pvt Ltd)	Kuttikun	Y	50	124.907	Nordex N100/2500, 2.5MW x 20 WTGs	14.1164	Mar 16, 2012
9	Tenaga Generasi Ltd.	Kuttikun	Y	49.5	124.82	GE 1.5 XLE, 1.5 MW x 33 WTGs	13.6205	Apr 26, 2012
10	Gul Ahmed Energy Ltd,	Jhimpir	Y	50	124.684	Nordex N100, 2.5 MW x 20 WTGs	14.6098	May 8, 2012
11	Sapphire Wind Power Company (Pvt) Ltd,	Jhimpir	Y	49.5	124.943	GE 1.5 XLE, 1.5 MW x 33 WTGs	13.2483	May 8, 2012
12	Metro Power Co.(Pvt) Ltd.	Jhimpir	Y	50	125.236	Nordex N100, 2.5 MW x 20 WTGs	14.5236	May 15, 2012
13	Zephyr Power Ltd	Bhambore	Y	49.5	134.099	Sinovel SL 82, 1.5 MW x 33 WTGs	15.9135	May 24, 2012
14	Master Wind Energy Ltd	Jhimpir	Y	49.5	125.767	GE 1.5XLE, 1.5 MW x 33 WTGs	14.532	Jun 29, 2012
15	Sachal Energy Development Pvt Ltd	Jhimpir	Y					
16	Pakistan Wind Energy Generation Company (Pvt.)	Owner land (Jhimpir)	Y					
17	Wind Eagle I Ltd.	Jhimpir						
18	Wind Eagle II Ltd.	Jhimpir						

Source: Prepared by JICA Study Team based on the Data from AEDB and Tariff Petition Documents by NEPRA

Appendix C-5

Photographs of the Sites of Wind Power

Appendix C-5-1: Photographs of the Wind Farms in Jhimpir

Overview of the Wind Farms

VESTAS V90, 1.8 MW Wind Turbine Generators

Wind Farms

VESTAS Wind Turbines in Commissioning Phase

Wind Farm Site for M/s Zorlu Enerji

Source: JICA Study Team

Wind Turbine Tower Erection at Site for VESTAS V90 1.8 MW

Under Construction of Grid Sub-Station for M/s Zorlu Wind Farm

Grid Sub-Station for M/s Zorlu Wind Farm

Source: JICA Study Team

Appendix C-5-2: Photographs of the Wind Masts visited during the Survey

Wind Mast owned by Investor

Overview of Wind Mast at Kuttikun Area

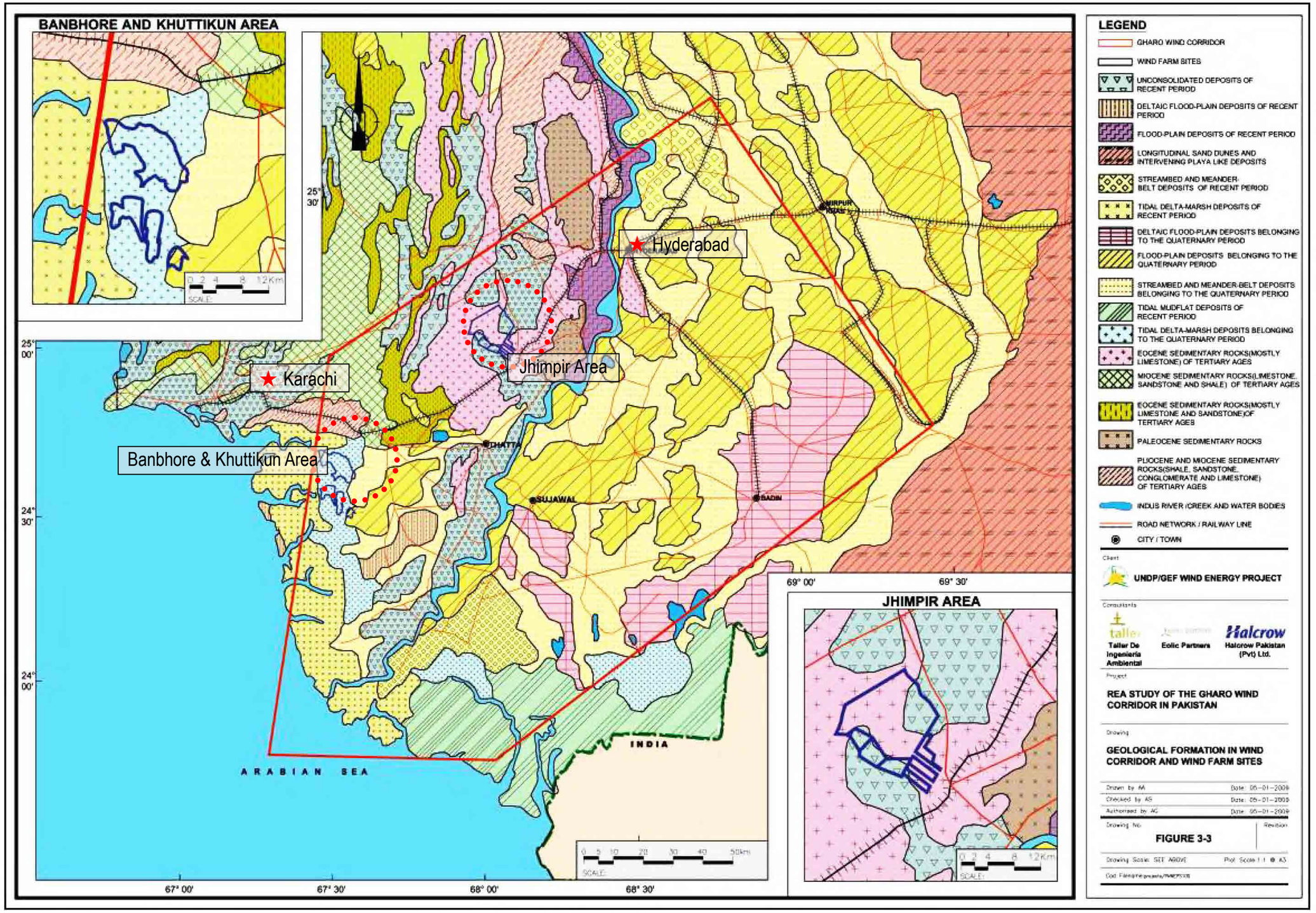
Wind Mast with Solar PV Panel and Data Logger

Source: JICA Study Team

Appendix C-6

Geological Map of Gharo-Keti Bandar Wind Corridor and Wind Farm Sites

Appendix C-6: Geological Map of Gharo-Keti Bandar Wind Corridor and Wind Farm Sites



Source: Prepared by JICA Study Team based on the Map on Regional Environmental Assessment Study of the Gharo Wind Corridor in Pakistan, AEDB-UNDP

Photographs of the Wind Masts visited during the Survey

Appendix D-1

Small Hydro Power Potential on Rivers and Canal Falls in Punjab

(Source: PPDB)

Small Hydro Power Potential on Rivers and Canal Falls in Punjab

Sr. #	Barrage	Canal System	Canal	Type P/NP	R.D.1000 FT.	FALL (meters) (A)	F.S.D. (U/S) (m^3/s)	Power Potential (KW)	Remarks
			RIVER INDUS						
			1- JINNAH BARRAGE CANALS						
1		**Jinnah Hydropower**						**96,000**	**Under Constrution by WAPDA**
2	Jinnah	Thal M.Line upper	Thal M.Line upper	**P**	0+000	1.97	283.45	**4,467**	
3	Jinnah	Thal M.Line upper	Mohajir Branch canal	**P**	0+000	2.11	41.42	**699**	
4	Jinnah	Thal M.Line upper	Mohajir Branch canal	**P**	87+200	1.20	28.85	**277**	
5	**Jinnah**	**Thal M.Line upper**	**Main Line Lower**	**P**	**0+000**	**1.52**	**144.13**	**1,753**	
6	**Jinnah**	**Thal M.Line upper**	**Main Line Lower**	**P**	**27+000**	**1.08**	**144.00**	**1,244**	
7	**Jinnah**	**Thal M.Line upper**	**Main Line Lower**	**P**	**68+500**	**1.43**	**144.00**	**1,647**	
8	**Jinnah**	**Thal M.Line upper**	**Main Line Lower**	**P**	**237+000**	**1.47**	**92.00**	**1,082**	
9	Jinnah	Thal M.Line upper	Main Line Lower	**P**	317+000	1.34	91.00	**976**	
10	Jinnah	Thal M.Line upper	Main Line Lower	**P**	373+000	1.34	87.00	**933**	
11	Jinnah	Thal M.Line upper	Dullewala Branch	**P**	0+000	1.92	24.60	**378**	
12	Jinnah	Thal M.Line upper	Tibbi Disty	**P**	0+000	1.40	0.50	**6**	
13	Jinnah	Thal M.Line upper	Kundian Disty	**P**	0+000	1.65	1.84	**24**	
14	Jinnah	Thal M.Line upper	Sultana Disty	**P**	33+000	1.30	0.22	**2**	
15	Jinnah	Thal M.Line upper	Ghulaman Disty	**P**	0+000	1.19	12.00	**114**	
16	Jinnah	Thal M.Line upper	Ghulaman Disty	**P**	57+343	1.60	4.00	**51**	
17	Jinnah	Mohajir Branch canal	Bhonki Disty	**P**	46+500	1.86	0.42	**6**	
18	Jinnah	Mohajir Branch canal	Gunjial Dy	**P**	0+000	1.07	0.50	**4**	
19	Jinnah	Mohajir Branch canal	Bandial Dy	**P**	34+500	1.09	0.65	**6**	
20	Jinnah	Mohajir Branch canal	Bandial Dy	**P**	34+500	1.09	0.34	**3**	
21	**Jinnah**	**Mohajir Branch canal**	**Link channel**	**P**	**3+000**	**4.32**	**16.16**	**558**	**Old Quaidabad HPP(Abondent)**
22	Jinnah	Mohajir Branch canal	Adhi kot Dy	**P**	122+500	1.19	0.31	**3**	
23	Jinnah	Mohajir Branch canal	Bolah Dy	**P**	5+500	1.07	1.78	**15**	
24	Jinnah	Mohajir Branch canal	Khushab dy	**P**	2+500	1.95	5.40	**84**	
25	Jinnah	Thal M.Line Lower	Khokhar dy	**P**	0+000	1.12	4.47	**40**	
26	Jinnah	Thal M.Line Lower	Hukam dy	**P**	24+750	1.22	3.60	**35**	
27	Jinnah	Thal M.Line Lower	Kamal Theem dy	**P**	0+000	1.37	0.88	**10**	
28	Jinnah	Thal M.Line Lower	Sawan dy	**P**	0	1.06	0.82	**7**	
29	Jinnah	Thal M.Line Lower	Mohatta dy	**P**	7+000	1.55	2.25	**28**	
30	Jinnah	Thal M.Line Lower	Mehmood wala dy	**P**	21+000	1.49	4.50	**54**	
31	Jinnah	Thal M.Line Lower	Mehmood wala dy	**P**	36275	1.68	4.00	**54**	
32	Jinnah	Thal M.Line Lower	Mehmood wala dy	**P**	62000	1.36	2.37	**26**	
33	Jinnah	Thal M.Line Lower	Mehmood wala dy	**P**	81000	1.37	2.00	**22**	
34	Jinnah	Thal M.Line Lower	Khan Sar Mr	**P**	41000	1.45	1.78	**21**	
35	Jinnah	Thal M.Line Lower	Khan Sar Mr	**P**	86000	1.14	0.57	**5**	
36	Jinnah	Thal M.Line Lower	Rajan shah dy	**P**	0	1.19	3.20	**30**	
37	Jinnah	Thal M.Line Lower	Moharan dy	**P**	0	1.03	1.07	**9**	
38	Jinnah	Munda Branch canal	Munda Branch canal	**P**	29000	1.07	39.53	**338**	
39	Jinnah	Indus Branch	Indus Branch	**P**	1000	1.15	16.00	**147**	
			2- CHASHMA BARRAGE CANALS						
40	**Chashma**	**C J Link Canal**	**C J Link Canal**	**P**	**0+000**	**2.75**	**614.48**	**13,519**	**Feasibility with IPDF**
41	Chashma	C J Link Canal	C J Link Canal	**P**	34+387	0.16	614.48	787	
42	Chashma	C J Link Canal	C J Link Canal	**P**	98+000	0.30	133.16	320	
43	Chashma	C J Link Canal	C J Link Canal	**P**	188+000	0.91	106.44	775	
44	**Chashma**	**C J Link Canal**	**C J Link Canal**	**P**	**316+622**	**13.40**	**615.00**	**65,928**	**C.J Hydro (Haseeb Khan & Co)**
45	Chashma	C.R.B.C	D-35	**P**	2000	1.22	1.87	18	
46	Chashma	C.R.B.C	D-35	**P**	2500	0.9	1.87	13	
47	Chashma	C.R.B.C	D-35	**P**	4200	1.52	1.87	23	
48	Chashma	C.R.B.C	D-35	**P**	4500	1.52	1.87	23	
49	Chashma	C.R.B.C	D-35	**P**	10500	1.83	1.44	21	
50	Chashma	C.R.B.C	D-35	**P**	11500	1.75	1.44	20	
51	Chashma	C.R.B.C	D-35	**P**	14000	1.52	1.44	18	
52	Chashma	C.R.B.C	D-35	**P**	14400	1.22	1.44	14	
53	Chashma	C.R.B.C	D-35	**P**	16000	4.27	1.44	49	
54	Chashma	C.R.B.C	D-35	**P**	16200	1.14	1.19	11	
55	Chashma	C.R.B.C	D-35	**P**	17000	1.6	1.19	15	
56	Chashma	C.R.B.C	D-37	**P**	12500	1.52	1.16	14	
57	Chashma	C.R.B.C	D40	**P**	3000	1.98	0.17	3	
58	Chashma	C.R.B.C	D40	**P**	3400	1.98	0.28	4	
59	Chashma	C.R.B.C	D40	**P**	5650	3.66	0.28	8	
60	Chashma	C.R.B.C	D40	**P**	7400	3.96	0.28	9	
61	Chashma	C.R.B.C	D40	**P**	7700	1.98	0.28	4	
62	Chashma	C.R.B.C	D40	**P**	8000	1.98	0.4	6	
63	Chashma	C.R.B.C	D-41	**P**	3234	1.66	1.36	18	
64	Chashma	C.R.B.C	D-41	**P**	4194	1.66	1.36	18	
65	Chashma	C.R.B.C	D-41	**P**	8334	1.44	1.36	16	
66	Chashma	C.R.B.C	D-41	**P**	110.4	1.22	1.22	12	
67	Chashma	C.R.B.C	D-41	**P**	12884	1.22	1.13	11	
68	Chashma	C.R.B.C	D-41	**P**	14534	1.52	1.02	12	
69	Chashma	C.R.B.C	D-41	**P**	16834	1.44	1.02	12	
70	Chashma	C.R.B.C	D-41	**P**	19712	1.37	0.71	8	

Sr. #	Barrage	Canal System	Canal	Type P/NP	R.D.1000 FT.	FALL (meters) (A)	F.S.D. (U/S) (m^3/s)	Power Potential (KW)	Remarks
71	Chashma	C.R.B.C	D-41	P	21241	1.14	0.52	5	
72	Chashma	C.R.B.C	D-42	P	6200	1.22	0.42	4	
73	Chashma	C.R.B.C	D-42	P	6000	1.22	0.42	4	
74	Chashma	C.R.B.C	D-42	P	8500	1.22	0.42	4	
75	Chashma	C.R.B.C	D-42	P	9000	1.83	0.42	6	
76	Chashma	C.R.B.C	D-42	P	13300	1.22	0.42	4	
77	Chashma	C.R.B.C	D-42	P	16850	1.22	0.17	2	
78	Chashma	C.R.B.C	D45	P	12800	1.98	1.94	31	
79	Chashma	C.R.B.C	D45	P	23550	1.98	1.2	19	
80	Chashma	C.R.B.C	D45	P	3550	1.6	0.58	7	
81	Chashma	C.R.B.C	D47	P	16400	1.83	0.27	4	
82	Chashma	C.R.B.C	D49	P	3000	1.83	1.13	17	
83	Chashma	C.R.B.C	D49	P	10000	1.96	0.59	9	
84	Chashma	C.R.B.C	D49	P	20730	1.99	0.48	8	
85	Chashma	C.R.B.C	D49	P	22489	1.98	0.48	8	
86	Chashma	C.R.B.C	D-50	P	4200	1.98	1.5	24	
87	Chashma	C.R.B.C	D-50	P	6800	2.29	1.5	27	
88	Chashma	C.R.B.C	D-51	P	9000	1.83	1.5	22	
89	Chashma	C.R.B.C	D-51	P	10500	1.75	1.31	18	
90	Chashma	C.R.B.C	D-51	P	12800	1.9	1.31	20	
91	Chashma	C.R.B.C	D-51	P	19000	1.22	1.15	11	
92	Chashma	C.R.B.C	D-51	P	23760	1.9	0.85	13	
93	Chashma	C.R.B.C	D-51	P	25800	1.9	0.85	13	
94	Chashma	C.R.B.C	D51	P	4550	1.83	2.41	35	
95	Chashma	C.R.B.C	D51	P	10600	1.89	2.18	33	
96	Chashma	C.R.B.C	D51	P	11800	1.83	2	29	
97	Chashma	C.R.B.C	D51	P	12400	1.83	1.98	29	
98	Chashma	C.R.B.C	D51	P	13900	1.83	1.98	29	
99	Chashma	C.R.B.C	D51	P	17596	1.83	1.98	29	
100	Chashma	C.R.B.C	D51	P	22110	1.67	1.74	23	
101	Chashma	C.R.B.C	D51	P	24600	1.9	1.74	26	
102	Chashma	C.R.B.C	D52	P	2400	1.61	1.9	24	
103	Chashma	C.R.B.C	D52	P	3178	1.83	1.9	28	
104	Chashma	C.R.B.C	D52	P	3800	2.82	1.25	28	
105	Chashma	C.R.B.C	D52	P	5400	1.98	1.1	17	
106	Chashma	C.R.B.C	D52	P	7500	3.73	1.28	38	
107	Chashma	C.R.B.C	D52	P	9650	1.83	0.91	13	
108	Chashma	C.R.B.C	D52	P	18000	5.75	0.76	35	
109	Chashma	C.R.B.C	M1D53	P	6800	1.98	0.11	2	
110	Chashma	C.R.B.C	M1D53	P	8000	1.14	0.11	1	
111	Chashma	C.R.B.C	M2D39	P	2300	1.37	0.82	9	
112	Chashma	C.R.B.C	M2D39	P	3050	3.65	0.82	24	
113	Chashma	C.R.B.C	M2D39	P	5300	2.59	0.63	13	
114	Chashma	C.R.B.C	M2D39.	P	6300	1.3	0.63	7	
115	Chashma	C.R.B.C	M2D39.	P	1800	1.52	0.17	2	
116	Chashma	C.R.B.C	M2D39.	P	2200	1.83	0.17	2	
117	Chashma	C.R.B.C	M2D39.	P	3000	1.52	0.17	2	
118	Chashma	C.R.B.C	M2D53.	P	1500	1.98	0.4	6	
119	Chashma	C.R.B.C	M2D53.	P	2750	1.68	0.4	5	
120	Chashma	C.R.B.C	M2D53.	P	4000	1.98	0.34	5	
121	Chashma	C.R.B.C	M2D53.	P	5600	1.83	0.34	5	
122	Chashma	C.R.B.C	M2D53.	P	7000	1.98	0.34	5	
123	Chashma	C.R.B.C	M2D53.	P	8600	1.83	0.26	4	
124	Chashma	C.R.B.C	M2D53.	P	8800	1.22	0.34	3	
125	Chashma	C.R.B.C	M2D53.	P	10600	1.22	0.28	3	
126	Chashma	C.R.B.C	M2D39	P	2300	1.37	0.82	9	
127	Chashma	C.R.B.C	M2D39	P	3050	3.65	0.82	24	
128	Chashma	C.R.B.C	M2D39	P	5300	2.59	0.62	13	
129	Chashma	C.R.B.C	M2D37	P	6300	1.3	0.62	6	
130	Chashma	C.R.B.C	M2D37	P	3100	1.83	1.36	20	
131	Chashma	C.R.B.C	M2D37	P	4500	0.91	1.33	10	
132	Chashma	C.R.B.C	M2D37	P	7500	1.83	1.27	19	
133	Chashma	C.R.B.C	M2D37	P	11200	1.83	1.1	16	
134	Chashma	C.R.B.C	M2D37	P	14500	1.22	1.01	10	
135	Chashma	C.R.B.C	M2D37	P	17500	1.83	0.79	12	
136	Chashma	C.R.B.C	M2D37	P	19500	1.83	0.59	9	
137	Chashma	C.R.B.C	M2D37	P	24500	2	0.6	10	
138	Chashma	C.R.B.C	M1D37	P	7500	1.52	0.57	7	
139	Chashma	C.R.B.C	M1D37	P	9500	1.52	0.37	4	
140	Chashma	C.R.B.C	M1D37	P	11500	0.91	0.37	3	
141	Chashma	C.R.B.C	M3D53	P	1400	1.98	0.59	9	
142	Chashma	C.R.B.C	M3D53	P	2000	1.98	0.59	9	
143	Chashma	C.R.B.C	M3D53	P	2800	1.98	0.59	9	
144	Chashma	C.R.B.C	M3D53	P	6000	1.29	0.59	6	
145	Chashma	C.R.B.C	M3D53	P	12800	1.06	0.57	5	

Sr. #	Barrage	Canal System	Canal	Type P/NP	R.D.1000 FT.	FALL (meters) (A)	F.S.D. (U/S) (m^3/s)	Power Potential (KW)	Remarks
146	Chashma	C.R.B.C	M3D53	P	17000	0.91	0.42	3	
147	Chashma	C.R.B.C	M3D53	P	17400	0.91	0.42	3	
148	Chashma	C.R.B.C	MD43	P	9800	1.98	0.18	3	
149	Chashma	C.R.B.C	M1D41	P	12660	1.83	0.14	2	
150	Chashma	C.R.B.C	M1D41	P	14410	1.83	0.14	2	
151	Chashma	C.R.B.C	M1D47	P	2400	1.83	0.27	4	
152	Chashma	C.R.B.C	M1D47	P	4000	1.83	0.27	4	
153	Chashma	C.R.B.C	M1D52	P	4500	1.02	0.57	5	
154	Chashma	C.R.B.C	M1D52	P	5200	3.88	0.57	18	
155	Chashma	C.R.B.C	M1D52	P	6100	1.98	0.57	9	
156	Chashma	C.R.B.C	M1D52	P	13700	1.83	0.25	4	
			3- TAUNSA BARRAGE CANALS						
139		**Taunsa Hydropower**				**5.30**	**2831.00**	**120,034**	**JDA with CWE**
140	**Taunsa**	**T.P. Link Canal**	**T.P. Link Canal**	**P**	**60+000**	**0.71**	**339.8**	**1,930**	**Non-Feasible by POE**
141	**Taunsa**	**T.P. Link Canal**	**T.P. Link Canal**	**P**	**131+500**	**0.91**	**339.8**	**2,474**	**Non-Feasible by POE**
142	**Taunsa**	**T.P. Link Canal**	**T.P. Link Canal**	**P**	**182+000**	**2.21**	**339.8**	**6,008**	**New Park Energy (Pvt.) Limited**
143	**Taunsa**	**T.P. Link Canal**	**T.P. Link Canal**	**P**	**184+500**	**1.36**	**339.8**	**3,697**	
144	Taunsa	D. G. Khan Canal	D. G. Khan Canal	**NP**	0+000	0.91	73.78	**537**	
145	**Taunsa**	**D.G.Khan Canal**	**Link No.III**	**NP**	**0**	**1.78**	**101.29**	**1,442**	
146	**Taunsa**	**D. G. Khan Canal**	**Link No.III**	**NP**	**3+500**	**3.75**	**75.32**	**2,260**	
147	**Taunsa**	**D.G.Khan Canal**	**Link No.III**	**NP**	**8000**	**3.8**	**75.32**	**2,290**	
148	**Taunsa**	**D.G.Khan Canal**	**Link No.III**	**NP**	**14000**	**3.55**	**75.32**	**2,139**	
149	**Taunsa**	**D.G.Khan Canal**	**Link No.III**	**NP**	**23000**	**2.77**	**72.88**	**1,615**	
150	Taunsa	D.G.Khan Canal	Link No.III	**NP**	58078	1.19	67.7	**645**	
151	Taunsa	D. G. Khan Canal	Link No.III	**NP**	112100	0.34	65.2	**177**	
152	Taunsa	D. G. Khan Canal	Link No.III	**NP**	142100	0.99	64.18	**508**	
153	Taunsa	D. G. Khan Canal	Link No.III	**NP**	168600	1.22	45.25	**442**	
154	Taunsa	D.G.Khan Canal	Lower Hote Disty	**NP**	2250	1.84	4.05	**60**	
155	Taunsa	D.G.Khan Canal	Qabool Disty	**NP**	0	1.79	0.82	**12**	
156	Taunsa	D.G.Khan Canal	Laghore Disty	**NP**	4000	1.22	1.12	**11**	
157	Taunsa	D.G.Khan Canal	Laghore Disty	**NP**	7000	1.07	0.94	**8**	
158	Taunsa	D.G.Khan Canal	Batil Disty	**NP**	3300	1.84	0.96	**14**	
159	Taunsa	D.G.Khan Canal	Batil Disty	**NP**	7000	1.37	0.83	**9**	
160	Taunsa	D.G.Khan Canal	Yaru Disty	**NP**	3000	1.52	1.08	**13**	
161	Taunsa	D.G.Khan Canal	Yaru Disty	**NP**	5000	1.52	0.88	**11**	
162	Taunsa	D.G.Khan Canal	Ghazi Disty	**NP**	0	0.3	6.17	**15**	
163	Taunsa	D.G.Khan Canal	Ghazi Disty	**NP**	14500	2.44	1.77	**35**	
164	Taunsa	D.G.Khan Canal	Civil Station Disty	**NP**	0	1.72	0.47	**6**	
165	Taunsa	D.G.Khan Canal	Chandia Disty	**NP**	3000	2.44	0.62	**12**	
166	Taunsa	D.G.Khan Canal	Rustamani Disty	**NP**	4000	2.44	0.82	**16**	
167	Taunsa	D.G.Khan Canal	Rustamani Disty	**NP**	8000	1.83	0.62	**9**	
168	Taunsa	D.G.Khan Canal	Fatehani Disty	**NP**	14000	0.61	1.27	**6**	
169	Taunsa	D.G.Khan Canal	Talpur Disty	**NP**	3500	3.29	1.44	**38**	
170	Taunsa	D.G.Khan Canal	Talpur Disty	**NP**	10500	1.98	1.29	**20**	
171	Taunsa	D.G.Khan Canal	Talpur Disty	**NP**	13600	1.22	1.12	**11**	
172	Taunsa	D.G.Khan Canal	Talpur Disty	**NP**	18250	1.68	0.76	**10**	
173	Taunsa	D.G.Khan Canal	U Qaim Wala Dy	**NP**	34000	2.59	0.81	**17**	
174	Taunsa	D.G.Khan Canal	Leghari Disty	**NP**	10000	2.13	0.45	**8**	
175	Taunsa	D.G.Khan Canal	Leghari Disty	**NP**	11350	2.93	0.45	**11**	
176	Taunsa	D.G.Khan Canal	Shaheed Disty	**NP**	4250	4.15	0.83	**28**	
177	Taunsa	D.G.Khan Canal	Shaheed Disty	**NP**	11073	2.5	0.64	**13**	
178	Taunsa	D.G.Khan Canal	Shahwali Disty.	**NP**	3000	2.86	1.39	**32**	
179	Taunsa	D.G.Khan Canal	Shahwali Disty.	**NP**	5000	2.74	1.1	**24**	
180	Taunsa	D.G.Khan Canal	Shahwali Disty.	**NP**	11480	1.6	0.95	**12**	
181	Taunsa	D.G.Khan Canal	Ziarat Disty	**NP**	3500	3.96	1.13	**36**	
182	Taunsa	D.G.Khan Canal	Ziarat Disty	**NP**	6750	2.13	1.08	**18**	
183	Taunsa	D.G.Khan Canal	Ziarat Disty	**NP**	12600	1.34	0.93	**10**	
184	Taunsa	D.G.Khan Canal	Mian Wala Disty	**NP**	2000	2.79	1.1	**25**	
185	Taunsa	D.G.Khan Canal	Mian Wala Disty	**NP**	5000	2.9	1.1	**26**	
186	Taunsa	D.G.Khan Canal	Mian Wala Disty	**NP**	26500	1.83	0.51	**7**	
187	Taunsa	D.G.Khan Canal	Mian Wala Disty	**NP**	2100	2.44	0.71	**14**	
188	Taunsa	D.G.Khan Canal	Link No.I	**NP**	4000	1.46	50.4	**589**	
189	Taunsa	D.G.Khan Canal	Link No.I	**NP**	11800	1.41	50.29	**567**	
190	Taunsa	D.G.Khan Canal	Thal Branch	**NP**	0	1.22	28.91	**282**	
191	Taunsa	Dajal Brahch	Kousar Disty	**NP**	19000	1.83	2.46	**36**	
192	Taunsa	Dajal Brahch	Kousar Disty	**NP**	27650	3.35	2.15	**58**	
193	Taunsa	Dajal Brahch	Kousar Disty	**NP**	36525	1.98	0.68	**11**	
194	Taunsa	Kousar Disty	I-L Kousar Minor	**NP**	2500	2.13	0.99	**17**	
195	Taunsa	Kousar Disty	I-L Kousar Minor	**NP**	6000	1.21	0.85	**8**	
196	Taunsa	Dajal Brahch	Zam Zam Disty	**NP**	7148	2.13	2.97	**51**	
197	Taunsa	Dajal Brahch	Zam Zam Disty	**NP**	15240	3.66	2.83	**83**	
198	Taunsa	Dajal Brahch	Zam Zam Disty	**NP**	29500	1.83	1.87	**27**	
199	Taunsa	Dajal Brahch	Zam Zam Disty	**NP**	37626	1.45	1.7	**20**	
200	Taunsa	Zam Zam Disty	I-L Zam Zam Minor	**NP**	11000	1.22	0.42	**4**	
201	Taunsa	Dajal Brahch	Noushera Disty	**NP**	15000	3.05	2.46	**60**	

Sr. #	Barrage	Canal System	Canal	Type P/NP	R.D.1000 FT.	FALL (meters) (A)	F.S.D. (U/S) (m^3/s)	Power Potential (KW)	Remarks
202	Taunsa	Dajal Brahch	Noushera Disty	NP	19500	2.44	2.27	44	
203	Taunsa	Dajal Brahch	Noushera Disty	NP	43080	2.74	1.16	25	
204	Taunsa	Dajal Brahch	Hajipur Disty	NP	2500	2.74	5.55	122	
205	Taunsa	Dajal Brahch	Hajipur Disty	NP	10000	2.44	3.6	70	
206	Taunsa	Dajal Brahch	Hajipur Disty	NP	17000	2.13	3.03	52	
207	Taunsa	Dajal Brahch	Hajipur Disty	NP	20250	1.52	3.03	37	
208	Taunsa	Dajal Brahch	Hajipur Disty	NP	23500	1.83	1.006	15	
209	Taunsa	Dajal Brahch	Hajipur Disty	NP	31000	1.52	0.88	11	
210	Taunsa	Hajipur Disty	I-R Hajipur Minor	NP	14250	2.29	0.99	18	
211	Taunsa	Hajipur Disty	I-R Hajipur Minor	NP	16500	2.74	0.77	17	
212	Taunsa	Hajipur Disty	I-R Hajipur Minor	NP	24250	1.22	0.51	5	
213	Taunsa	Hajipur Disty	2-R Hajipur	NP	10250	2.38	1.44	27	
214	Taunsa	Hajipur Disty	2-R Hajipur	NP	19500	1.52	0.87	11	
215	Taunsa	Dajal Brahch	Islampur Disty	NP	5000	3.05	4.02	98	
216	Taunsa	Dajal Brahch	Islampur Disty	NP	10500	3.05	2.66	65	
217	Taunsa	Dajal Brahch	Islampur Disty	NP	22000	2.29	1.77	32	
218	Taunsa	Dajal Brahch	Islampur Disty	NP	37500	1.52	1.27	15	
219	Taunsa	Dajal Brahch	Abe-Hayat	NP	5200	2.06	2.73	45	
220	Taunsa	Dajal Brahch	Abe-Hayat	NP	10500	3.2	2.57	66	
221	Taunsa	Dajal Brahch	Abe-Hayat	NP	15500	2.43	2.15	42	
222	Taunsa	Dajal Brahch	Abe-Hayat	NP	22500	2.05	1.81	30	
223	Taunsa	Dajal Brahch	Abe-Hayat	NP	28200	1.06	1.47	12	
224	Taunsa	Dajal Brahch	Taskeen Disty	NP	3500	2.43	1.76	34	
225	Taunsa	Dajal Brahch	Taskeen Disty	NP	6500	1.52	1.76	21	
226	Taunsa	Dajal Brahch	Taskeen Disty	NP	9500	2.13	1.62	28	
227	Taunsa	Dajal Brahch	Taskeen Disty	NP	14500	2.13	1.42	24	
228	Taunsa	Dajal Brahch	Taskeen Disty	NP	19500	1.98	1.42	22	
229	Taunsa	Dajal Brahch	Taskeen Disty	NP	24400	1.07	1.08	9	
230	Taunsa	Islampur Disty	Patwali Minor	NP	6000	1.44	0.39	4	
231	Taunsa	Islampur Disty	Malkani Minor	NP	4000	1.83	0.75	11	
232	Taunsa	Islampur Disty	Malkani Minor	NP	8000	1.66	0.62	8	
233	Taunsa	Islampur Disty	Malkani Minor	NP	13150	1.52	0.42	5	
234	Taunsa	Dajal Brahch	Sadiq Feeder	NP	5500	2.44	9.63	188	
235	Taunsa	Dajal Brahch	Sadiq Feeder	NP	10500	2.89	9.43	218	
236	Taunsa	Dajal Brahch	Sadiq Feeder	NP	21032	1.22	8.75	85	
237	Taunsa	Dajal Brahch	Sadiq Feeder	NP	26579	1.52	8.44	103	
238	Taunsa	Dajal Brahch	Fatehpur Disty	NP	8000	3.05	2.41	59	
239	Taunsa	Dajal Brahch	Fatehpur Disty	NP	14008	2.44	2.41	47	
240	Taunsa	Dajal Brahch	Fatehpur Disty	NP	20000	2.44	2.24	44	
241	Taunsa	Dajal Brahch	Fatehpur Disty	NP	26000	2.13	1.13	19	
242	Taunsa	Dajal Brahch	Fatehpur Disty	NP	32500	1.07	1.13	10	
243	Taunsa	Fatehpur Disty	I-L Fatehpur Minor	NP	6500	2.13	0.85	14	
244	Taunsa	Dajal Brahch	Tayyab Disty	NP	0	2.42	0.65	13	
245	Taunsa	Dajal Brahch	Tayyab Disty	NP	1000	3.35	1.56	42	
246	Taunsa	Dajal Brahch	Sultan Disty.	NP	6500	0.91	1.44	10	
247	Taunsa	Dajal Brahch	Sultan Disty.	NP	9000	0.61	1.09	5	
248	Taunsa	Dajal Brahch	Firdous Disty	NP	0	2.6	1.78	37	
249	Taunsa	Dajal Brahch	Firdous Disty	NP	10000	1.67	1.78	24	
250	Taunsa	Dajal Brahch	Firdous Disty	NP	16300	2.18	1.22	21	
251	Taunsa	Dajal Brahch	Firdous Disty	NP	25000	1.93	1.05	16	
252	Taunsa	Firdous Disty	Tareen Minor	NP	0	1.53	0.51	6	
253	Taunsa	Firdous Disty	Tareen Minor	NP	3500	2.09	0.51	9	
254	Taunsa	Firdous Disty	Tareen Minor	NP	9000	1.27	0.35	4	
255	Taunsa	Dajal Brahch	Fathe Disty	NP	0	2.13	0.96	16	
256	Taunsa	Dajal Brahch	Fathe Disty	NP	2000	1.35	0.96	10	
257	Taunsa	Dajal Brahch	Fathe Disty	NP	5000	2.74	0.96	21	
258	Taunsa	Dajal Brahch	Fathe Disty	NP	7850	2.13	0.79	13	
259	Taunsa	Dajal Brahch	Dajal Disty.	NP	0	1	1.44	12	
260	Taunsa	Dajal Brahch	Dajal Disty.	NP	4750	2.7	1.44	31	
261	Taunsa	Dajal Brahch	Dajal Disty.	NP	13500	1.33	1.22	13	
262	Taunsa	Dajal Brahch	Dajal Disty.	NP	18500	1.76	0.96	14	
263	Taunsa	Dajal Brahch	Dajal Disty.	NP	27500	1.22	0.62	6	
264	Taunsa	Link No.I	Shoria Disty	NP	0	1.13	15.46	140	
265	Taunsa	Link No.I	Shoria Disty	NP	64500	1.08	10.96	95	
266	Taunsa	Link No.III	Lower Manka Disty	NP	11820	0.76	2.55	16	
268	Taunsa	Muzzaffargarh Canal	Muzzaffargarh Canal	NP	0+000	0.33	252.2	666	
269	**Taunsa**	**Muzzaffargarh Canal**	**Muzzaffargarh Canal**	NP	**64+357**	**2.4**	**161**	**3,091**	**M/s Muntaha Power (Pvt) Ltd**
270	**Taunsa**	**Muzzaffargarh Canal**	**Muzzaffargarh Canal**	NP	**127+300**	**0.45**	**160**	**576**	
271	**Taunsa**	**Muzzaffargarh Canal**	**Muzzaffargarh Canal**	NP	**147+500**	**0.8**	**160**	**1,024**	
272	Taunsa	Muzzaffargarh Canal	Muzzaffargarh Canal	NP	177+093	0.55	153.16	674	
273	Taunsa	Muzzaffargarh Canal	Muzzaffargarh Canal	NP	206+700	0.76	144.88	881	
274	Taunsa	Muzzaffargarh Canal	Muzzaffargarh Canal	NP	246+800	0.79	124.91	789	
275	Taunsa	Muzzaffargarh Canal	Muzzaffargarh Canal	NP	290+300	0.76	119.78	728	
276	Taunsa	Muzzaffargarh Canal	Muzzaffargarh Canal	NP	329+112	1.11	93.88	834	
277	Taunsa	Muzzaffargarh Canal	Thal Branch	NP	0+000	1.22	28.9	282	

Sr. #	Barrage	Canal System	Canal	Type P/NP	R.D.1000 FT.	FALL (meters) (A)	F.S.D. (U/S) (m^3/s)	Power Potential (KW)	Remarks
278	Taunsa	Muzaffargarh Canal	Jatoi Branch	NP	370000	1.58	64.49	815	
			JEHLUM RIVER						
			4- MANGLA BARRAGE						
279	Mangla	Upper Jhelum Canal	Upper Jhelum Canal	P	107+000	0.73	254.65	1,487	
280	Mangla	Upper Jhelum Canal	Upper Jhelum Canal	P	225+080	0.31	242.79	602	
281	**Mangla**	**Upper Jhelum Canal**	**Gujrat Branch Canal**	**P**	**0+600**	**9.19**	**43.52**	**3,200**	**KhoKhra HPP - M/s Blue Star Energy**
282	Mangla	Upper Jhelum Canal	Gujrat Branch Canal	P	21+000	1.36	40.62	442	
283	Mangla	Upper Jhelum Canal	Gujrat Branch Canal	P	35.005	0.42	36.78	124	
284	Mangla	Upper Jhelum Canal	Gujrat Branch Canal	P	63+000	1.00	27.85	223	
285	Mangla	Upper Jhelum Canal	Gujrat Branch Canal	P	75+000	1.34	20.17	216	
286	Mangla	Upper Jhelum Canal	Gujrat Branch Canal	P	113+000	2.20	15.38	271	
287	Mangla	Upper Jhelum Canal	Gujrat Branch Canal	P	142+000	0.61	4.87	24	
288	Mangla	Gujrat Branch Canal	Sohawa Dy	P	109540.00	1.32	0.93	10	
289	Mangla	Gujrat Branch Canal	Mangat Disty	P	66+000	3.31	0.11	3	
290	Mangla	Gujrat Branch Canal	Khumb Minor	P	9+000	2.10	0.28	5	
291	Mangla	Gujrat Branch Canal	Kakowal Disty	P	24+500	1.18	1.70	16	
292	Mangla	Gujrat Branch Canal	Kakowal Disty	P	100+000	2.99	0.30	7	
293	Mangla	Gujrat Branch Canal	Kakowal Disty	P	100+400	2.33	0.30	6	
294	Mangla	Gujrat Branch Canal	Phalia Disty	P	39+750	1.75	7.53	105	
295	Mangla	Gujrat Branch Canal	Phalia Disty	P	115+750	1.35	5.29	57	
296	Mangla	Gujrat Branch Canal	Haslan Wala Disty	P	40+070	1.48	0.38	4	
297	Mangla	Gujrat Branch Canal	Gumti Disty (8-R)	P	4+500	1.16	0.53	5	
298	Mangla	Gujrat Branch Canal	Gumti Disty (8-R)	P	16+500	1.27	0.21	2	
299	Mangla	Gujrat Branch Canal	Khoja Disty (9-R)	P	29+000	1.39	0.17	2	
300	Mangla	Gujrat Branch Canal	Warriachan Wala Minor	P	10+500	1.06	0.21	2	
301	Mangla	Gujrat Branch Canal	Tapiala Mr	P	10+000	1.75	0.32	4	
302	Mangla	Gujrat Branch Canal	Tapiala Mr	P	24+000	1.25	0.18	2	
303	Mangla	Gujrat Branch Canal	Dhupsari Disty (10-R)	P	12+500	1.19	0.39	4	
304	Mangla	Gujrat Branch Canal	Dhupsari Disty (10-R)	P	17+500	2.01	0.36	6	
305	Mangla	Gujrat Branch Canal	Dhupsari Disty (10-R)	P	28+150	1.03	0.15	1	
306	Mangla	Gujrat Branch Canal	Machiyana Disty (11-R)	P	12+329	1.15	0.50	5	
307	Mangla	Gujrat Branch Canal	Machiyana Disty (11-R)	P	19+000	2.65	0.34	7	
308	Mangla	Gujrat Branch Canal	Machiyana Disty (11-R)	P	25+000	1.65	0.22	3	
309	Mangla	Gujrat Branch Canal	Saroki Disty (13-R)	P	18+100	1.88	0.48	7	
310	Mangla	Gujrat Branch Canal	Maggowal Disty (14-R)	P	8+312	1.86	5.47	81	
311	Mangla	Gujrat Branch Canal	Maggowal Disty (14-R)	P	121+932	1.32	0.52	5	
312	Mangla	Gujrat Branch Canal	Maggowal Disty (14-R)	P	125+500	1.26	0.45	5	
313	Mangla	Gujrat Branch Canal	Chaknawali Disty (15-R)	P	13+040	1.71	3.53	48	
314	Mangla	Gujrat Branch Canal	Chaknawali Disty (15-R)	P	64+170	1.39	2.49	28	
315	Mangla	Gujrat Branch Canal	Deowal Disty	P	27+000	1.22	1.34	13	
			JEHLUM RIVER						
			5- RASUL BARRAGE						
316		**Rasul Hydropower**				**7.00**	**358.00**	**20,048**	**Habib Rafiq (Pvt.) Limited**
317	Rasul	Rasul Qadirabad Link	Rasul Qadirabad Link	P	0+000	0.59	538.02	2,539	
318	Rasul	Rasul Qadirabad Link	Rasul Qadirabad Link	P	145+255	0.48	538.02	2,066	
319	Rasul	L Jhelum Feeder Canal	L Jhelum Feeder Canal	P	0+000	1.52	187.02	2,274	
320	**Rasul**	**L Jhelum Feeder Canal**	**L Jhelum Feeder Canal**	**P**	**8+626**	**3.31**	**187.02**	**4,952**	**M/s The Punjab Power Co**
321	Rasul	L.J.C Main Line	L.J.C Main Line	P	141+400	1.24	155.72	1,545	
322	Rasul	L.J.C Main Line	L.J.C Main Line	P	196+830	1.08	155.72	1,345	
323	Rasul	L.J.C Main Line	Shahpur Branch	NP	0+000	1.12	30.44	273	
324	Rasul	L.J.C Main Line	Shahpur Branch	NP	2+200	1.60	30.44	390	
325	Rasul	L.J.C Main Line	Shahpur Branch	NP	28+200	1.64	30.20	396	
326	Rasul	L.J.C Main Line	Shahpur Branch	NP	49+950	1.30	27.75	289	
327	Rasul	L.J.C Main Line	Shahpur Branch	NP	75+500	0.49	30.66	120	
328	Rasul	L.J.C Main Line	Shahpur Branch	NP	83+985	1.14	29.64	270	
329	Rasul	Shahpur Branch	Rakh Mani Dy	NP	0.00	1.42	0.54	6	
330	Rasul	Shahpur Branch	Kalra Dy	NP	96082.00	1.11	0.22	2	
331	Rasul	Shahpur Branch	Jalal Minor	NP	0.00	1.26	3.00	30	
332	Rasul	Shahpur Branch	Hussain Shah Dy	NP	34500.00	1.08	1.50	13	
333	Rasul	L.J.C Main Line	Northren Branch	P	**10+265**	**1.46**	**58.47**	**683**	**M/s Waleed Power Pvt Limited**
334	Rasul	L.J.C Main Line	Northren Branch	P	**24+320**	**1.46**	**58.47**	**683**	
335	Rasul	L.J.C Main Line	Northren Branch	P	146283.00	1.26	38.94	393	
336	Rasul	L.J.C Main Line	Northren Branch	P	223+350	1.31	21.11	221	
337	Rasul	L.J.C Main Line	Northren Branch	P	276+864	0.72	16.71	96	
338	Rasul	L.J.C Main Line	Northren Branch	P	317+657	0.32	10.71	27	
339	Rasul	L.J.C Main Line	Northren Branch	P	332+423	1.60	6.29	81	
340	Rasul	L.J.C Main Line	Northren Branch	P	343+408	3.05	6.29	153	
341	Rasul	L.J.C Main Line	Northren Branch	P	343+920	1.52	6.29	76	
342	Rasul	Northern Branch	Sulki Branch	P	13+536	1.83	13.59	199	
343	Rasul	Northern Branch	Sulki Branch	P	14+000	1.68	12.60	169	
344	Rasul	Northern Branch	Sulki Branch	P	37+000	1.10	11.66	103	
345	Rasul	Northern Branch	Sulki Branch	P	58+234	1.65	11.66	154	
346	Rasul	Northern Branch	Jhanda Disty	P	17+100	1.25	0.73	7	
347	Rasul	Northern Branch	Jhanda Disty	P	22+380	1.10	0.73	6	
348	Rasul	Northern Branch	Jhanda Disty	P	22+900	1.46	0.73	9	

Sr. #	Barrage	Canal System	Canal	Type P/NP	R.D.1000 FT.	FALL (meters) (A)	F.S.D. (U/S) (m^3/s)	Power Potential (KW)	Remarks
349	Rasul	Northern Branch	Jhanda Disty	P	42+070	1.55	0.25	3	
350	Rasul	Northern Branch	Jhanda Disty	P	18+624	1.16	4.67	43	
351	Rasul	Northern Branch	Jhanda Disty	P	26+675	2.67	4.36	93	
352	Rasul	Northern Branch	Lakhuana MR of Naurang Disty	P	2+600	1.10	0.20	2	
353	Rasul	Northern Branch	Lakhuana MR of Naurang Disty	P	2+750	1.38	0.20	2	
354	Rasul	Northern Branch	Lakhuana MR of Naurang Disty	P	12+500	1.72	0.11	2	
355	Rasul	Northern Branch	Lakhuana MR of Naurang Disty	P	13+250	1.44	0.11	1	
356	Rasul	Northern Branch	Sobhi Disty	P	21+250	1.43	0.28	3	
357	Rasul	Northern Branch	Sobhi Disty	P	23+050	1.30	0.28	3	
358	Rasul	Northren Branch	Ratokala Dy	P	11+070	1.25	2.26	23	
359	Rasul	Northren Branch	Ratokala Dy	P	69+150	1.10	0.27	2	
360	Rasul	Northren Branch	Yar Muhammad dy	P	16+626	1.06	0.37	3	
361	Rasul	Northren Branch	Lak dy	P	58+542	1.73	0.40	6	
362	Rasul	Northren Branch	Dhori dy	P	13+191	1.41	0.13	1	
363	Rasul	L.J.C Main Line	Southren Branch	P	0+000	0.69	36.41	201	
364	Rasul	L.J.C Main Line	Southren Branch	P	53+300	0.85	36.41	248	
365	Rasul	L.J.C Main Line	Southren Branch	P	83+900	1.10	23.12	203	
366	Rasul	Southern Branch	Khadir Branch	P	67+090	1.47	8.32	98	
367	Rasul	Southern Branch	Khadir Branch	P	90+600	1.70	4.73	64	
368	Rasul	Southern Branch	Khadir Branch	P	161+175	1.26	2.43	24	
369	Rasul	Southern Branch	Khadir Branch	P	263+312	1.15	0.11	1	
370	Rasul	Southern Branch	Wan Minor	P	1+100	2.83	0.10	2	
371	Rasul	Southern Branch	Laliyan Disty	P	9+900	1.40	9.97	112	
372	Rasul	Southern Branch	Mangni Minor	P	10+574	1.40	0.17	2	
373	Rasul	Southern Branch	Bhabrana Minor	P	7+479	1.68	0.20	3	
374	Rasul	Southern Branch	Baliyan Sub Minor	P	5+250	1.48	0.14	2	
			CHENAB RIVER						
			6- MARALA BARRAGE						
375		**MaralaHydropower**				4.60	544.00	**20,019**	**Olympus Energy Pvt Ltd**
376	**Marala**	**B. R. B. D. Link Canal**	**B. R. B. D. Link Canal**	**P**	**0+000**	**1.76**	**203.76**	**2,862**	**Tarakai Energy Pvt Ltd**
377	Marala	B. R. B. D. Link Canal	B. R. B. D. Link Canal	P	68+600	0.46	201.50	**742**	
378	Marala	B. R. B. D. Link Canal	B. R. B. D. Link Canal	P	91+400	0.52	189.30	**787**	
379	Marala	B. R. B. D. Link Canal	B. R. B. D. Link Canal	P	337+144	0.50	137.11	**546**	
380	Marala	B. R. B. D. Link Canal	B. R. B. D. Link Canal	P	400+000	0.70	113.34	**630**	
381	Marala	B. R. B. D. Link Canal	B. R. B. D. Link Canal	N P	433+958	2.46	105.30	**2,072**	**Non-Feasible by POE**
382	Marala	B. R. B. D. Link Canal	B. D. Link Canal	N P	465+300	1.34	64.61	**693**	
383	Marala	B. R. B. D. Link Canal	B. D. Link Canal	N P	481+760	1.91	64.61	**987**	**Non-Feasible by POE**
384	Marala	B. R. B. D. Link Canal	B. D. Link Canal	N P	509+712	5.87	64.61	**3,034**	
385	Marala	B. R. B. D. Link Canal	B. D. Link Canal	N P	513+550	0.12	64.61	**62**	
386	Marala	B. R. B. D. Link Canal	Lahore Branch	P	219+000	0.97	11.39	**89**	
387	Marala	B. R. B. D. Link Canal	Lahore Branch	P	240+250	1.11	11.40	**101**	
388	Marala	B. R. B. D. Link Canal	Lahore Branch	P	265+128	1.40	8.28	**93**	
389	Marala	B. R. B. D. Link Canal	Lahore Branch	P	281+000	1.30	7.13	**74**	
390	Marala	B. R. B. D. Link Canal	Lahore Branch	P	304+000	0.40	6.82	**22**	
391	**Marala**	**Upper Chenab Canal**	**Upper Chenab Canal**	P	**0+000**	**2.70**	**476.86**	**10,281**	**PPMU under ADB Marala HPP in Public Sector**
	Marala	**Upper Chenab Canal**	**Upper Chenab Canal**	P	**44+000**	**6.70**	**258.45**	**13,853**	**Nandipur HPP working under WAPDA**
392	**Marala**	**Upper Chenab Canal**	**Upper Chenab Canal**	P	**133+296**	**2.45**	**476.86**	**9,346**	**Feasibility Completed by PPMU under ADB .**
393	**Marala**	**Upper Chenab Canal**	**UCC Lower**	P	**128+000**	**2.14**	**270.80**	**4,636**	**Chianwali HPP**
394	Marala	Upper Chenab Canal	UCC Lower	P	164+400	1.04	255.10	**2,116**	
395	Marala	**Upper Chenab Canal**	UCC Lower	P	220+200	3.96	249.69	**7,904**	**Chichoki Malian HPP working under WAPDA**
396	Marala	**Upper Chenab Canal**	UCC Lower	P	225+508	1.46	249.49	2,914	
397	Marala	**Upper Chenab Canal**	UCC Lower	P	266+000	0.61	230.50	1,125	
398	**Marala**	**Upper Chenab Canal**	**UCC Lower**	P	**283+100**	**2.81**	**230.5**	**5,189**	**PPMU under ADB DEG OUT FALL in Public Sector**
399	Marala	U.C.C. Lower	Talwandi Disty	P	44000	1.01	0.57	**5**	
400	Marala	U.C.C. Lower	Nurpur Disty	P	61+750	1.09	8.36	**73**	
401	Marala	U.C.C. Lower	Nurpurt Disty	P	126400	1.31	1.92	**20**	
402	Marala	U.C.C. Lower	Kamoke Disty	P	55482	1.26	2.55	**26**	
403	Marala	U.C.C. Lower	Machike Minor	P	33780	1.74	0.08	**1**	
404	Marala	U.C.C. Lower	Kuthiali Minor	P	17250	1.21	2.69	**26**	
405	Marala	U.C.C. Lower	Kuthiali Minor	P	54500	1.13	1.47	**13**	
406	Marala	U.C.C. Lower	Kuthiali Minor	P	75000	1.23	0.45	**4**	
407	Marala	U.C.C. Lower	Akbar Disty	P	H/R 163700	1.61	0.91	**12**	
408	Marala	U.C.C. Lower	Harpoke Disty	P	H/R 163300	1.36	1.19	**13**	
409	Marala	U.C.C. Lower	Sheikhupura Dy Upper	P	H/R 162900	1.92	1.78	**27**	
410	Marala	U.C.C. Lower	Sheikhupura Dy Lower	P	H/R 208800	1.20	5.46	**52**	
411	Marala	U.C.C. Lower	Rehman Disty	P	H/R1211500	1.65	0.13	**2**	
412	Marala	U.C.C. Lower	Chichokimillian Disty	P	H/R 220700	1.50	7.10	**85**	
413	Marala	U.C.C. Lower	Chichokimillian Disty	P	RD 500	1.95	7.10	**111**	
414	Marala	U.C.C. Lower	Nokhar Branch	NP	24+500	1.52	14.63	**178**	
415	Marala	U.C.C. Lower	Nokhar Branch	NP	32+000	0.61	14.46	**71**	
416	Marala	U.C.C. Lower	Nokhar Branch	NP	46+500	1.37	13.75	**151**	
417	Marala	U.C.C. Lower	Nokhar Branch	NP	56+590	0.46	13.40	**49**	
418	Marala	U.C.C. Lower	Nokhar Branch	NP	58+850	0.92	5.86	**43**	
419	Marala	U.C.C. Lower	Nokhar Branch	NP	80+195	0.46	5.33	**19**	
420	Marala	U.C.C. Lower	Kot Jaffat	NP	10+254	0.43	4.07	**14**	

Sr. #	Barrage	Canal System	Canal	Type P/NP	R.D.1000 FT.	FALL (meters) (A)	F.S.D. (U/S) (m^3/s)	Power Potential (KW)	Remarks
421	Marala	U.C.C. Lower	Kot Jaffat	NP	34+260	0.49	2.38	**9**	
422	Marala	U.C.C. Lower	Kot Jaffat	NP	37+300	0.62	2.27	**11**	
423	Marala	U.C.C. Lower	Kot Jaffat	NP	70+015	0.62	1.23	**6**	
424	Marala	U.C.C. Lower	Kot Jaffat	NP	100+000	0.77	0.67	**4**	
425	Marala	U.C.C. Lower	Dhounkal Minor	NP	15+140	0.56	0.57	**3**	
426	Marala	U.C.C. Lower	Ghakhar Disty	NP	0+500	0.22	0.96	**2**	
427	Marala	U.C.C. Lower	Ghakhar Disty	NP	7+905	0.63	0.96	**5**	
428	Marala	U.C.C. Lower	Ghakhar Disty	NP	12+900	0.89	0.88	**6**	
429	Marala	U.C.C. Lower	Ghakhar Disty	NP	17+000	0.44	0.81	**3**	
430	Marala	U.C.C. Lower	Kailaske Disty	NP	17+015	0.55	6.74	**30**	
431	Marala	U.C.C. Lower	Kailaske Disty	NP	47+187	0.36	4.15	**12**	
432	Marala	U.C.C. Lower	Kailaske Disty	NP	89+807	0.54	3.22	**14**	
433	Marala	U.C.C. Lower	Kailaske Disty	NP	103+267	0.35	2.71	**8**	
434	Marala	U.C.C. Lower	Nut Minor	NP	12+517	0.27	1.05	**2**	
435	Marala	U.C.C. Lower	Nut Minor	NP	45+357	0.13	0.12	**0**	
436	Marala	U.C.C. Lower	Pathanke Disty	NP	30+288	0.55	0.7	**3**	
437	Marala	U.C.C. Lower	Pathanke Disty	NP	52+200	0.59	0.21	**1**	
438	Marala	U.C.C. Lower	Warpal Disty	NP	4+500	0.58	3.53	**16**	
439	Marala	U.C.C. Lower	Warpal Disty	NP	96+000	0.77	0.19	**1**	
440	Marala	U.C.C. Lower	Wazirke Minor	NP	9+500	0.58	0.28	**1**	
441	Marala	U.C.C. Lower	Wazirke Minor	NP	18+290	0.44	0.23	**1**	
442	Marala	U.C.C. Lower	Bucha Minor	NP	4+170	0.31	0.54	**1**	
443	Marala	U.C.C. Lower	Bucha Minor	NP	10+339	0.70	0.37	**2**	
444	Marala	Marala Ravi Link Canal	Marala Ravi Link Canal	NP	0+000	2.38	622.60	**11,844**	
445	Marala	Marala Ravi Link Canal	Marala Ravi Link Canal	NP	220+120	0.46	580.15	**2,121**	
446	Marala	Marala Ravi Link Canal	Marala Ravi Link Canal	NP	237+230	0.74	580.15	**3,411**	
447	**Marala**	**Marala Ravi Link Canal**	**Marala Ravi Link Canal**	NP	**249+850**	**1.95**	**580.15**	**9,055**	**M/s Zaitoon Power (Pvt) Limited**
448	**Marala**	**Marala Ravi Link Canal**	**Marala Ravi Link Canal**	NP	**265+400**	**2.82**	**566.00**	**12,755**	**M/s Zaitoon Power (Pvt) Limited**
449	Marala	Marala Ravi Link Canal	Marala Ravi Link Canal	NP	302+496	1.04	566.00	**4,709**	
450	**Marala**	**Marala Ravi Link Canal**	**Marala Ravi Link Canal**	NP	**313+500**	**3.05**	**566.00**	**13,806**	**M/s M.R Power Co.**
451	Marala	M.R.Link Canal	Micro Minor	NP	12+184	1.02	0.45	**4**	
452	Marala	M.R.Link Canal	Chelleke Minor	NP	4+480	1.63	0.17	**2**	
453	Marala	M.R.Link Canal	Dalleke Disty	NP	24+000	1.07	0.54	**5**	
454	Marala	M.R.Link Canal	Satrah Disty	NP	42+110	1.53	0.10	**1**	
455	Marala	M.R.Link Canal	Bajhwa Disty	NP	18+500	1.38	0.14	**2**	
456	Marala	M.R.Link Canal	Goraya Disty	NP	42+600	1.10	0.28	**2**	
457	Marala	M.R.Link Canal	Saukindwind Minor	NP	18+225	1.07	0.16	**1**	
458	Marala	M.R.Link Canal	Kotli Disty	NP	25+650	1.37	0.57	**6**	
459	Marala	M.R.Link Canal	Chanderke Disty	NP	11000	1.43	0.52	**6**	
460	Marala	M.R.Link Canal	Phadiar Disty	NP	12000	1.09	0.85	**7**	
461	Marala	M.R.Link Canal	Bhureke Disty	NP	11+280	1.40	0.2	**2**	
462	Marala	M.R.Link Canal	Jiwan Goraya Disty	NP	2000	1.31	0.85	**9**	
463	Marala	B. R. B. D. Link Canal	Upper Depalpur Canal	NP	18+500	0.02	64.64	**10**	
464	Marala	B. R. B. D. Link Canal	Upper Depalpur Canal	NP	35+870	0.04	64.55	**21**	
465	Marala	B. R. B. D. Link Canal	Upper Depalpur Canal	NP	56+728	0.15	53.65	**64**	
466	Marala	B. R. B. D. Link Canal	Upper Depalpur Canal	NP	92+000	1.52	26	**316**	
467	Marala	B. R. B. D. Link Canal	Upper Depalpur Canal	NP	113+412	0.29	21.52	**50**	
468	Marala	B. R. B. D. Link Canal	Upper Depalpur Canal	NP	157+390	1.10	20.75	183	
469	Marala	Upper Depalpur Canal	Attari dy	NP	20+555	0.24	11.78	23	
470	Marala	B.R.BD.	Sadhoke Disty	NP	146618	1.46	0.17	2	
471	Marala	B.R.BD.	Wahndo Minor	NP	29000	1.22	0.17	2	
472	Marala	B.R.BD.	Dholan Minor	NP	19000	1.16	1.26	12	
473	Marala	B.R.BD.	Tamboli Minor	NP	9620	1.00	0.17	1	
474	Marala	B.R.BD.	Dandian Disty	NP	45500	2.15	0.65	11	
475	Marala	B.R.BD.	Shahdara Disty	NP	21750	1.71	5.74	79	
476	Marala	B.R.BD.	Main Branch Lower	P	271+152	1.17	49.43	463	
477	Marala	B.R.BD.	Main Branch Lower	P	304870	1.37	38.01	417	
478	Marala	B.R.BD.	Main Branch Lower	P	375311	1.35	27.68	298	
479	Marala	B.R.BD.	Main Branch Lower	P	359520	0.70	34.72	196	
480	Marala	B.R.BD.	Main Branch Lower	P	446+000	1.71	20.02	274	
481	Marala	Upper Depalpur Canal	Usmanwala Disty	NP	91+500	1.16	1.25	12	
482	Marala	Upper Depalpur Canal	Kull and Kanganpur Dy	NP	157+390	1.24	20.74	206	
483	Marala	B.S.Link 1	Lower Depalpur Canal	NP	27+340	1.20	47.43	455	
484	Marala	B.S.Link 1	Lower Sohag Branch	NP	99+973	1.09	28.38	247	
			7- KHANKI BARRAGE CANALS						
485		**Khanki Hydropower (New Khanki Barrage)**				2.47	600	**11,856**	**Feasibility completed by PPMU**
486	Khanki	L.C.C MAIN LINE	Kot Nikka Branch	P	0+000	1.12	9.91	89	
487	Khanki	L.C.C MAIN LINE	Kot Nikka Branch	P	36+385	0.61	5.55	27	
488	Khanki	L.C.C MAIN LINE	Kot Nikka Branch	P	54+486	0.82	4.98	33	
489	Khanki	L.C.C MAIN LINE	Kot Nikka Branch	P	75+012	0.81	4.22	27	
490	Khanki	L.C.C MAIN LINE	L.C.C MAIN LINE (New)	P	0+000	3.6	240	6,912	**Feasibility completed by PPMU**
491	Khanki	L.C.C MAIN LINE	L.C.C MAIN LINE	P	40+200	1	326.2	2,610	M/s Sarkar Energy (Pvt) Ltd
492	Khanki	L.C.C MAIN LINE	L.C.C MAIN LINE	P	76+380	0.59	319.89	1,510	
493	Khanki	L.C.C MAIN LINE	L.C.C MAIN LINE	P	140+050	1.25	286.08	2,861	
494	Khanki	L.C.C MAIN LINE	L.C.C MAIN LINE	P	161+287	0.75	75.68	454	

Sr. #	Barrage	Canal System	Canal	Type P/NP	R.D.1000 FT.	FALL (meters) (A)	F.S.D. (U/S) (m^3/s)	Power Potential (KW)	Remarks
495	Khanki	L.C.C MAIN LINE	L.C.C MAIN LINE	P	182+95	0.28	68.71	154	**Non-Feasible by POE**
496	Khanki	L.C.C MAIN LINE	Ram Nagar Mr	P	21150	1.4	0.57	6	
497	Khanki	L.C.C MAIN LINE	Vanike Dy	NP	53000	1.42	2.27	26	
498	Khanki	L.C.C MAIN LINE	Upper Gogera Branch	P	215750	1.55	168.62	2,091	**M/s Al-Tauwarki Steel Mills Limited**
499	Khanki	L.C.C MAIN LINE	Upper Gogera Branch	P	220+750	1.49	157.86	1,882	
500	Khanki	Upper Gogera Branch	Burala Branch	P	0+000	1.1	58.27	513	
501	Khanki	Upper Gogera Branch	Burala Branch	P	47+900	0.45	54.87	198	
502	Khanki	Upper Gogera Branch	Burala Branch	P	78+000	0.3	53.11	127	
503	Khanki	Upper Gogera Branch	Burala Branch	P	102+500	0.3	52.38	126	
504	Khanki	Upper Gogera Branch	Burala Branch	P	110+500	0.3	50.73	122	
505	Khanki	Upper Gogera Branch	Burala Branch	P	146+500	0.15	47.96	58	
506	Khanki	Upper Gogera Branch	Burala Branch	P	166+300	2.74	35.82	785	
507	Khanki	Upper Gogera Branch	Burala Branch	P	182+000	0.46	35.14	129	
508	Khanki	Upper Gogera Branch	Burala Branch	P	206+000	0.69	33.19	183	
509	Khanki	Upper Gogera Branch	Burala Branch	P	234+500	0.61	25.71	125	
510	Khanki	Upper Gogera Branch	Burala Branch	P	250+000	0.48	25.71	99	
511	Khanki	Upper Gogera Branch	Burala Branch	P	320+189	0.53	22.36	95	
512	Khanki	Upper Gogera Branch	Burala Branch	P	322+000	0.30	17.29	41	
513	Khanki	Upper Gogera Branch	Burala Branch	P	322+497	0.07	17.29	10	
514	Khanki	Upper Gogera Branch	Burala Branch	P	410+200	0.07	17.12	10	
515	Khanki	Upper Gogera Branch	Burala Branch	P	439+320	0.30	14.11	34	
516	Khanki	Upper Gogera Branch	Burala Branch	P	448+530	0.30	11.65	28	
517	Khanki	Upper Gogera Branch	Burala Branch	P	0+000	1.15	68.45	630	
518	Khanki	Upper Gogera Branch	Burala Branch	P	15+000	0.29	68.45	159	
519	Khanki	Upper Gogera Branch	Burala Branch	P	27+000	1.95	63.72	994	
520	Khanki	Upper Gogera Branch	Burala Branch	P	65+000	1.57	61.65	774	
521	Khanki	Upper Gogera Branch	Burala Branch	P	103+927	0.84	58.25	391	
522	Khanki	Upper Gogera Branch	Burala Branch	P	120+000	1.65	52.18	689	
523	Khanki	Upper Gogera Branch	Burala Branch	P	164000	2.57	47.91	985	
524	Khanki	Upper Gogera Branch	Burala Branch	P	171+000	1.05	49.66	417	
525	Khanki	Upper Gogera Branch	Burala Branch	P	218+000	1.01	46.99	380	
526	Khanki	Upper Gogera Branch	Burala Branch	P	264.7	0.75	43.22	259	
527	Khanki	Upper Gogera Branch	Burala Branch	P	269+000	1.22	31.29	305	
528	Khanki	Upper Gogera Branch	Burala Branch	P	294+000	0.49	31.29	123	
529	Khanki	Upper Gogera Branch	Burala Branch	P	324+000	0.49	24.57	96	
530	Khanki	Burala Branch	Tandilianwala Dy	P	16471	1.61	5.57	72	
531	Khanki	Burala Branch	Bhalak Br	P	30396	1.61	4.10	53	
532	Khanki	Upper Gogera Branch	Lower Gogera Branch	P	0 + 000	1.19	74.98	714	
533	**Khanki**	**Upper Gogera Branch**	**Lower Gogera Branch**	**P**	**27000**	**1.94**	**68.81**	**1,068**	**M/s Muntaha Power (Pvt) Ltd**
534	**Khanki**	**Upper Gogera Branch**	**Lower Gogera Branch**	**P**	**65000**	**1.58**	**66.35**	**839**	
535	Khanki	Upper Gogera Branch	Lower Gogera Branch	P	171000	1.05	53.57	450	
536	Khanki	Lower Gogera Branch	Dabbanwala Dy	P	1500	1.03	2.30	19	
537	Khanki	Lower Gogera Branch	Khanuana Dy	P	0	2.40	34.17	656	
538	Khanki	Lower Gogera Branch	Pir Mohal Dy	P	64613	1.95	3.90	61	
539	Khanki	Lower Gogera Branch	Pir Mohal Dy	P	65409	1.40	3.50	39	
540	Khanki	Lower Gogera Branch	Khikhi Dy	P	500	1.22	7.00	68	
541	Khanki	Lower Gogera Branch	Kuhlwala Mr	P	0	2.62	0.19	4	
542	Khanki	Lower Gogera Branch	Baggiwala Mr	P	12000	1.21	0.45	4	
543	Khanki	Lower Gogera Branch	Baggiwala Mr	P	14554	1.15	0.45	4	
544	Khanki	L.C.C MAIN LINE	Jhang Branch Upper	P	37+025	2.11	83.93	1,417	
545	Khanki	L.C.C MAIN LINE	Jhang Branch Upper	P	68+830	2.15	82.00	1,410	**Alka Power (Pvt) Limited**
546	Khanki	L.C.C MAIN LINE	Jhang Branch Upper	P	178+250	0.44	79.22	279	
547	Khanki	L.C.C MAIN LINE	Jhang Branch Upper	P	216+852	1.16	67.03	622	
548	Khanki	L.C.C MAIN LINE	Jhang Branch Upper	P	260+000	0.88	56.29	396	
549	Khanki	L.C.C MAIN LINE	Jhang Branch Upper	P	277+500	0.67	55.67	298	
550	Khanki	Jhang Branch Upper	Jhang Branch Lower	P	36946	1.00	40.56	324	
551	Khanki	Jhang Branch Upper	Jhang Branch Lower	P	108000	1.00	25.23	202	
552	Khanki	Jhang Branch Upper	Jhang Branch Lower	P	139000	1.62	21.47	278	
553	Khanki	Jhang Branch Upper	Junianwala Dy	P	20491	1.50	0.07	1	
554	Khanki	Jhang Branch Upper	Sarangwala Dy	P	20930	1.00	1.49	12	
555	Khanki	Jhang Branch Upper	Wallanianwala Dy	P	22633	2.59	0.16	3	
556	Khanki	Jhang Branch Upper	Wallanianwala Dy	P	26515	2.50	0.13	3	
557	Khanki	Jhang Branch Upper	Wallanianwala Dy	P	27090	2.59	0.13	3	
558	Khanki	Jhang Branch Upper	Sarwala Mr	P	6046	2.16	0.07	1	
559	Khanki	Jhang Branch Upper	Pabberwala Dy	P	14525	3.79	0.25	8	
560	Khanki	Jhang Branch Upper	Pabberwala Dy	P	15521	3.28	0.25	7	
561	Khanki	Jhang Branch Lower	Chiniot Dy	P	13500	3.25	4.19	109	
562	Khanki	Jhang Branch Lower	Chiniot Dy	P	14445	5.63	4.08	184	
563	Khanki	Jhang Branch Lower	Kot Ghani Br Mr	P	3040	1.48	0.27	3	
564	Khanki	Jhang Branch Lower	Nasrana Dy	P	31997	1.19	6.11	58	
565	Khanki	Jhang Branch Lower	Waghwala Dy	P	30946	3.63	0.58	17	
566	Khanki	Jhang Branch Lower	Waghwala Dy	P	31930	1.51	0.47	6	
567	Khanki	Jhang Branch Lower	Janiwala Mr	P	4785	2.63	0.18	4	
568	Khanki	Jhang Branch Lower	Janiwala Mr	P	5375	1.69	0.17	2	
569	Khanki	Jhang Branch Lower	Bhowana Br	P	7449	2.80	14.33	321	

Sr. #	Barrage	Canal System	Canal	Type P/NP	R.D.1000 FT.	FALL (meters) (A)	F.S.D. (U/S) (m^3/s)	Power Potential (KW)	Remarks
570	Khanki	Jhang Branch Lower	Bhowana Br	P	8950	2.53	14.24	288	
571	Khanki	Jhang Branch Lower	Kallar Dy	P	23000	1.08	0.53	5	
572	Khanki	Jhang Branch Lower	Khewera Dy	P	8000	1.48	13.11	155	
573	Khanki	Jhang Branch Lower	Chooti Dy	P	0	1.04	0.24	2	
574	Khanki	Jhang Branch Lower	Gilotran Dy	P	13000	1.18	0.85	8	
575	Khanki	Jhang Branch Lower	Faqeersar Dy	P	0	1.66	2.12	28	
576	Khanki	Jhang Branch Lower	Faqeersar Dy	P	49652	1.00	0.52	4	
577	Khanki	Jhang Branch Lower	Faqeersar Dy	P	54481	2.46	0.24	5	
578	Khanki	Jhang Branch Lower	Faqeersar Dy	P	54974	2.06	0.24	4	
579	Khanki	Jhang Branch Lower	Lahore Mr	P	10000	2.63	0.25	5	
580	Khanki	Jhang Branch Lower	Lahore Mr	P	14006	2.08	0.20	3	
581	Khanki	Jhang Branch Lower	Dhaular Dy	P	0	1.19	9.90	94	
582	Khanki	Jhang Branch Lower	Dhaular Dy	P	30000	1.15	9.51	87	
583	Khanki	Jhang Branch Lower	Dhaular Dy	P	44000	2.18	7.14	125	
584	Khanki	Jhang Branch Lower	Dhaular Dy	P	46000	1.50	6.90	83	
585	Khanki	Jhang Branch Lower	Darsana Dy	P	24000	2.63	1.64	35	
586	Khanki	Jhang Branch Lower	Darsana Dy	P	36000	1.12	1.10	10	
587	Khanki	L.C.C MAIN LINE	Rakh Branch	P	38+585	1.03	31.12	256	
588	Khanki	L.C.C MAIN LINE	Rakh Branch	P	49+898	0.70	30.18	169	
589	Khanki	L.C.C MAIN LINE	Rakh Branch	P	61+288	0.42	29.87	100	
590	Khanki	L.C.C MAIN LINE	Rakh Branch	P	86+105	0.83	26.56	176	
591	Khanki	L.C.C MAIN LINE	Rakh Branch	P	137+073	1.83	30.60	448	
592	Khanki	L.C.C MAIN LINE	Rakh Branch	P	170+500	1.70	26.33	358	
593	Khanki	L.C.C MAIN LINE	Rakh Branch	P	192+936	0.75	16.31	98	
594	Khanki	L.C.C MAIN LINE	Rakh Branch	P	229+520	0.63	10.70	54	
595	Khanki	L.C.C MAIN LINE	Rakh Branch	P	246+080	0.30	10.33	25	
596	Khanki	Rakh Branch	Arruri Dy	P	23993	1.45	0.62	7	
			8- QADIRABAB BARRAGE						
597		**Qadirabad Hydropower**				3.83	700.00	21,448	**Feasibility completed by PPMU**
598	Qadirabad	L.C.C Feeder	L.C.C Feeder	P	0+000	0.59	708.6	3,345	
599	Qadirabad	Q.B.Link Canal	Q.B.Link Canal	P	0+000	0.97	708.6	5,499	**M/s Haaeeb Khan & Co**
600	Qadirabad	Q.B.Link Canal	Q.B.Link Canal	P	182+102	0.61	592.4	2,891	
601	Qadirabad	Q.B.Link Canal	Q.B.Link Canal	P	271+655	1.13	591.82	5,350	**Unviable due to SKP-FSD Road structure**
602	Qadirabad	Q.B.Link Canal	Q.B.Link Canal with ponding	P	304+985	2.08	450	7,488	**Feasibility completed by PPMU**
603	Qadirabad	Q.B.Link Canal	Q.B.Link Canal	P	379+265	0.33	591.82	1,562	
			9- TRIMMU BARRAGE						
604		**Trimmu Hydropower**				5.1	471	19,217	**SOQ under Evaluation**
605	Trimmu	T.S Link Canal	T.S Link Canal	P	0+000	0.87	311.49	2,168	
606	Trimmu	Haveli Canal	Haveli Canal	NP	0+000	1.43	208.78	2,388	
607	Trimmu	Haveli Canal	Shorkot dy	NP	36750	1.34	9.7	104	
608	Trimmu	Rangpur Canal	Rangpur Canal	NP	0+000	0.49	76.74	301	
609	Trimmu	Rangpur Canal	Rangpur Canal	NP	49+000	0.79	57.99	366	
610	Trimmu	Rangpur Canal	Rangpur Canal	NP	70+000	0.73	57.26	334	
611	Trimmu	Rangpur Canal	Rangpur Canal	NP	100+500	1.22	56.24	549	
612	Trimmu	Rangpur Canal	Rangpur Canal	NP	138+180	0.89	54.14	385	
613	Trimmu	Rangpur Canal	Rangpur Canal	NP	170+000	1.05	41.91	352	
614	Trimmu	Rangpur Canal	Rangpur Canal	NP	189+500	0.58	41.31	192	
615	Trimmu	Rangpur Canal	Rangpur Canal	NP	218+000	0.98	35.37	277	
616	Trimmu	Rangpur Canal	Rangpur Canal	NP	249+500	0.85	34.52	235	
617	Trimmu	Rangpur Canal	Rangpur Canal	NP	281+500	0.99	31.86	252	
			10- PANJNAD BARRAGE						
618		**Panjnad Hydropower**				5.20	360.00	**14,976**	**Habib Rafiq (Pvt) Limited**
619	Panjnad	Abbasia Link Canal	Abbasia Link Canal	P	0+000	2.32	245.57	**4,558**	**Habib Rafiq (Pvt) Limited**
620	Panjnad	Abbasia Canal	Abbasia Canal	P	313+235	1.52	61.84	**752**	
621	Panjnad	Panjnad Canal	Panjnad Canal	P	0+000	2.84	270.91	**6,155**	
622	Panjnad	Panjnad Canal	Panjnad Canal	P	150+000	1.09	218.41	**1,905**	
623	Panjnad	Panjnad Canal	Panjnad Canal	P	203+966	0.45	191.82	**691**	
624	Panjnad	Panjnad Canal	Panjnad Canal	P	229+000	1.21	140.34	**1,358**	
625	Panjnad	Panjnad Canal	Sadiq (B)	P	0+000	1.1	39.14	**344**	
626	Panjnad	Panjnad Canal	Sadiq (B)	P	62+486	0.76	39.14	**238**	
			RAVI RIVER						
			11- BALLOKI BARRAGE						
627		**Balloki Hydropower**				4	129	4,128	
628	Balloki	B. S. Link Main Line	B. S. Link Main Line	P	0+000	0.74	523.86	3,101	
629	Balloki	B. S. Link 1	B. S. Link 1	P	0+000	0.40	523.86	1,676	
630	Balloki	B. S. Link 1	B. S. Link 1	P	73+201	0.39	523.86	1,634	
631	Balloki	B. S. Link 1	B. S. Link 1	P	106+250	424.69	3.22	10,940	**Olympia HPP, 23-Davis Road, Lahore**
632	Balloki	B.S.Link 1 (Tail).	B. S. Link 1	P	266+000	424.69	2.11	7,169	**New Park Energy Ltd,**
633	Balloki	B. S. Link - II	B. S. Link - II	NP	0+000	0.38	184.06	560	
634	Balloki	B. S. Link - II	B. S. Link - II	NP	33+430	5.44	269.00	11,707	**M/s Aqua Power (Pvt) Ltd**
635	Balloki	B. S. Link - II	B. S. Link - II	NP	193+339	2.44	184.06	3,593	**SOQ under Evaluation**
636	Balloki	B. S. Link 1	Lower Depalpur Canal	NP	1+410	0.15	56.20	67	
637	Balloki	Depalpur Canal Lower	Sohag Branch Lower	NP	0+000	1.21	41.20	399	
638	Balloki	Depalpur Canal Lower	Sohag Branch Lower	NP	99+979	1.22	28.38	277	
639	Balloki	Depalpur Canal Lower	Sohag Branch Lower	NP	8+430	0.48	40.84	157	

Sr. #	Barrage	Canal System	Canal	Type P/NP	R.D.1000 FT.	FALL (meters) (A)	F.S.D. (U/S) (m^3/s)	Power Potential (KW)	Remarks
640	Balloki	Depalpur Canal Lower	Sohag Branch Lower	NP	85+074	0.54	30.79	133	
641	Balloki	Depalpur Canal Lower	Sohag Branch Lower	NP	78+224	0.42	33.65	113	
642	Balloki	Depalpur Canal Lower	Sohag Branch Lower	NP	137+410	0.37	25.27	75	
643	Balloki	Lower Bari Doab Canal	L.B.D.C	P	0+000	0.67	278.00	1,490	
644	Balloki	Lower Bari Doab Canal	L.B.D.C	P	27+173	0.49	274.00	1,074	
645	Balloki	Lower Bari Doab Canal	L.B.D.C	P	62+713	0.36	247.00	711	
646	Balloki	Lower Bari Doab Canal	L.B.D.C	P	108+954	0.83	236.00	1,567	
647	Balloki	Lower Bari Doab Canal	L.B.D.C	P	161+732	2.03	222.00	3,605	**Old Renala HPP_ Sir Ganga Ram HPP**
648	Balloki	Lower Bari Doab Canal	L.B.D.C	P	196+954	0.92	211.00	1,553	**PPMU under ADB OKARA HPP**
649	Balloki	Lower Bari Doab Canal	L.B.D.C	P	227+454	1.90	207.00	3,146	
650	Balloki	Lower Bari Doab Canal	L.B.D.C	P	258+654	1.98	195.00	3,089	
651	Balloki	Lower Bari Doab Canal	L.B.D.C	P	285+454	1.66	193.00	2,563	
652	Balloki	Lower Bari Doab Canal	L.B.D.C	P	329+058	2.61	165.00	3,445	**Chenab Energy Pvt. Ltd. Faisalabad**
653	Balloki	Lower Bari Doab Canal	L.B.D.C	P	340+850	0.80	165.00	1,056	
654	Balloki	Lower Bari Doab Canal	L.B.D.C	P	391+454	0.30	129.75	311	
655	Balloki	Lower Bari Doab Canal	L.B.D.C	P	430+500	1.00	119.38	955	
656	Balloki	Lower Bari Doab Canal	L.B.D.C	P	450+500	0.30	101.49	244	
657	Balloki	Lower Bari Doab Canal	L.B.D.C	P	461+550	1.43	101.06	1,156	**Alka Power (Pvt) Limited.**
658	Balloki	Lower Bari Doab Canal	L.B.D.C	P	493+890	2.64	95.00	2,006	
659	Balloki	Lower Bari Doab Canal	L.B.D.C	P	527+216	0.44	87.67	309	
660	Balloki	Lower Bari Doab Canal	L.B.D.C	P	542+168	1.70	86.45	1,176	
661	Balloki	Lower Bari Doab Canal	L.B.D.C	P	571+200	0.42	42.93	144	
662	Balloki	Lower Bari Doab Canal	L.B.D.C	P	585+900	0.98	42.62	334	
663	Balloki	Lower Bari Doab Canal	L.B.D.C	P	601+200	3.37	39.00	1,051	**Al-Rehman Energy (Pvt) Ltd.**
664	Balloki	Lower Bari Doab Canal	L.B.D.C	P	640+200	1.34	36.00	386	
665	Balloki	Lower Bari Doab Canal	L.B.D.C	P	660+700	0.95	28.00	213	**Tail LBDC**
666	Balloki	Lower Bari Doab Canal	Gugera Branch	P	0+000	1.34	27.70	297	
667	Balloki	Lower Bari Doab Canal	Gugera Branch	P	46+600	1.06	24.06	204	
668	Balloki	Lower Bari Doab Canal	Gugera Branch	P	102+000	1.01	15.57	126	
669	Balloki	LBDC	2-L Kalasan Disty	P	0+000	1.40	1.84	21	
670	Balloki	5-L Disty	5-L Disty	P	40+377	3.05	1.08	26	
671	Balloki	9-L Disty	9-L Disty	P	112+784	1.17	3.87	36	
672	Balloki	9-L Disty	1-L/9-L Minor	P	30+000	1.19	1.34	13	
673	Balloki	9-L Disty	1-L/9-L Minor	P	49+000	1.59	0.96	12	
674	Balloki	9-L Disty	1-L/9-L Minor	P	50+550	1.64	0.88	12	
675	Balloki	9-L Disty	1-L/9-L Minor	P	52+650	1.72	0.80	11	
676	Balloki	Lower Bari Doab Canal	2L / 1L-9L Sub Minor	P	13+000	1.13	0.91	8	
677	Balloki	Lower Bari Doab Canal	2L / 1L-9L Sub Minor	P	16+000	1.11	0.91	8	
678	Balloki	Lower Bari Doab Canal	2L / 1L-9L Sub Minor	P	17+500	1.58	0.75	9	
679	Balloki	Lower Bari Doab Canal	2L / 1L-9L Sub Minor	P	18+500	1.00	0.70	6	
680	Balloki	Lower Bari Doab Canal	1L / 2L-9L Sub Minor	P	14+035	2.10	0.30	5	
681	Balloki	Lower Bari Doab Canal	3L / 9L Minor	P	38+500	2.71	0.42	9	
682	Balloki	Lower Bari Doab Canal	3R / 9L Minor	P	5+500	1.57	0.14	2	
683	Balloki	Lower Bari Doab Canal	Bahab Disty	P	4+665	1.01	2.75	22	
684	Balloki	Lower Bari Doab Canal	3L / 11L Minor	P	7+400	2.03	0.18	3	
685	Balloki	Lower Bari Doab Canal	3L / 11L Minor	P	8+410	1.93	0.18	3	
686	Balloki	Lower Bari Doab Canal	2R / 7R Minor	P	4+500	2.41	0.26	5	
687	Balloki	Lower Bari Doab Canal	1R / 2R / 7R Sub Minor	P	1+000	1.66	0.17	2	
688	Balloki	Lower Bari Doab Canal	12L Disty	P	24+700	1.58	10.00	126	
689	Balloki	Lower Bari Doab Canal	12L Disty	P	121+000	1.66	3.09	41	
690	Balloki	Lower Bari Doab Canal	13L Disty	P	12+000	1.37	2.81	31	
691	Balloki	Lower Bari Doab Canal	13L Disty	P	29+528	0.99	1.32	10	
692	Balloki	Lower Bari Doab Canal	14L Disty	P	112+325	1.88	0.23	3	
693	Balloki	Lower Bari Doab Canal	7ER Disty	P	3+000	1.34	0.65	7	
694	Balloki	Lower Bari Doab Canal	2R / 15L Minor	P	39+868	1.84	0.86	13	
695	Balloki	Lower Bari Doab Canal	1L / 2R-15L Sub Minor	P	12+525	1.46	0.30	4	
696	Balloki	Lower Bari Doab Canal	3L / 15L Minor	P	2+533	1.84	0.22	3	
697	Balloki	Lower Bari Doab Canal	3AL / 15L Minor	P	3+500	1.32	0.63	7	
698	Balloki	Lower Bari Doab Canal	8-R Disty	P	6+000	1.79	4.90	70	
699	Balloki	Lower Bari Doab Canal	8-R Disty	P	12+000	1.54	4.85	60	
700	Balloki	Lower Bari Doab Canal	9-R Disty	P	50+500	2.01	0.40	6	
701	Balloki	Lower Bari Doab Canal	K.F.S Feeder	P	6+000	2.05	17.49	287	
702	Balloki	K.F.S Feeder	Bupri Minor	P	2+965	1.37	0.35	4	
703	Balloki	Lower Bari Doab Canal	10-R Branch	P	9+000	2.17	28.30	492	
704	Balloki	Lower Bari Doab Canal	10-R Branch	P	58+000	1.55	19.30	239	
705	Balloki	Lower Bari Doab Canal	10-R Branch	P	144+150	1.05	8.29	69	
706	Balloki	Lower Bari Doab Canal	1-L/10-R Reli Mr	P	44+182	1.52	1.19	14	
707	Balloki	Lower Bari Doab Canal	1-L/10-R Reli Mr	P	50+000	1.28	0.76	8	
708	Balloki	Lower Bari Doab Canal	1-R/2-R - 10-R S-Mr	P	8+500	1.40	1.26	14	
			RAVI RIVER						
			12- SIDHNAI BARRAGE						
709		**Sidhnai Hydropower**				5.20	112.00	4,659	
710	Sidhnai	S. M. B. Link	S. M. B. Link	P	0+014	0.74	286.00	**1,693**	**Non-Feasible by POE**
711	Sidhnai	Sidhnai Canal	Sidhnai Canal	P	44+077	0.68	57.49	313	
712	Sidhnai	Sidhnai Canal	Sidhnai Canal	P	61+077	0.31	50.23	125	

Sr. #	Barrage	Canal System	Canal	Type P/NP	R.D.1000 FT.	FALL (meters) (A)	F.S.D. (U/S) (m^3/s)	Power Potential (KW)	Remarks
713	Sidhnai	Sidhnai Canal	Sidhnai Canal	P	78+050	0.70	49.31	276	
714	Sidhnai	Sidhnai Canal	Sidhnai Canal	P	117+117	0.70	44.74	251	
715	Sidhnai	Sidhnai Canal	Sidhnai Canal	P	140+000	0.58	36.53	169	
716	Sidhnai	Sidhnai Canal	Shujabad Branch	NP	0+000	0.36	112.32	323	
717	Sidhnai	Sidhnai Canal	Shujabad Branch	NP	19+500	0.85	54.28	369	
718	Sidhnai	Sidhnai Canal	Shujabad Branch	NP	41+000	1.17	53.77	503	
719	Sidhnai	Sidhnai Canal	Shujabad Branch	NP	54+100	0.74	53.20	315	
720	Sidhnai	Sidhnai Canal	Shujabad Branch	NP	62+000	1.37	53.20	583	
721	Sidhnai	Sidhnai Canal	Shujabad Branch	NP	163+800	0.66	42.56	225	
722	Sidhnai	Sidhnai Canal	Shujabad Branch	NP	197+755	1.19	37.24	355	
723	Sidhnai	Shujabad Branch	Multan Branch	P	24100	1.84	17.31	255	
			SUTLEJ RIVER						
			13- SULMANKI BARRAGE						
724		**Sulemanki Hydropower**				2.70	216.00	4,666	
725	Sulemanki	Eastern Saddiqia Canal	Eastern Saddiqia Canal	P	0+000	0.86	193.12	1,329	
726	Sulemanki	Eastern Saddiqia Canal	HR Malik Branch	P	0+000	1.30	52.84	550	
727	Sulemanki	Eastern Saddiqia Canal	HR Sirajwah	P	0+000	0.45	6.46	23	
728	Sulemanki	Eastern Saddiqia Canal	HR Hakara Branch	P	0+000	1.24	82.03	814	
729	Sulemanki	Eastern Saddiqia Canal	Malik Branch	P	0+000	1.22	129.30	1,262	
730	Sulemanki	Eastern Saddiqia Canal	Malik Branch	P	22+900	0.52	52.08	217	
731	Sulemanki	Eastern Saddiqia Canal	Malik Branch	P	38+900	0.52	40.10	167	
732	Sulemanki	Eastern Saddiqia Canal	Malik Branch	P	95+900	1.08	36.44	315	
733	Sulemanki	Hakara Branch	HR Gulab Ali	P	89+750	1.30	57.51	598	
734	Sulemanki	Hakara Branch	HR 8R Disty	P	229+250	1.12	24.94	223	
735	Sulemanki	Hakara Branch	HR 9R Disty	P	254+300	1.26	18.18	183	
736	Sulemanki	Ahmadpur Branch	Ahmadpur Branch	P	0+000	1.39	67.39	749	
737	Sulemanki	Ahmadpur Branch	Ahmadpur Branch	P	98+000	2.45	60.57	1,187	
738	Sulemanki	P. I. Link	P. I. Link	P	0+000	1.49	54.17	646	
739	Sulemanki	P. I. Link	P. I. Link	P	113+600	0.46	30.75	113	
740	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	0+000	0.85	184.70	1,256	
741	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	52+000	0.69	186.72	1,031	
742	**Sulemanki**	**Upper Pak Patten Canal**	**UpperPak Patten Canal**	**P**	**112+350**	**3.31**	**160.16**	**4,241**	
743	**Sulemanki**	**Upper Pak Patten Canal**	**UpperPak Patten Canal**	**P**	**124+950**	**0.70**	**97.89**	**548**	**PPMU under ADB Pakpattan HPP**
744	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	191+642	0.92	97.89	720	
745	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	218+272	0.31	87.58	217	
746	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	241+500	0.31	87.58	217	
747	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	266+400	0.53	69.23	294	
748	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	304+340	1.83	64.45	944	**AB POWER & PARTNERS JV.**
749	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	322+843	1.83	62.33	913	
750	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	354+172	1.22	56.29	549	
751	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	406+828	1.31	51.06	535	
752	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	469+310	0.30	43.07	103	
753	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	476+730	1.49	37.38	446	
754	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	548+310	0.45	36.78	132	
755	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	606+829	0.54	27.07	117	
756	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	607+000	0.73	29.70	173	
757	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	631+000	0.27	21.60	47	
758	Sulemanki	Upper Pak Patten Canal	UpperPak Patten Canal	P	647+000	0.24	21.28	41	
759	Sulemanki	Fordhwah Canal	Fordhwah Canal	NP	0+000	0.13	97.60	102	
760	Sulemanki	Fordhwah Canal	Fordhwah Canal	NP	77+500	1.92	55.16	847	
761	Sulemanki	Fordhwah Canal	Fordhwah Canal	NP	129+000	1.37	45.76	502	
762	Sulemanki	Fordhwah Canal	Fordhwah Canal	NP	199+812	1.18	34.07	322	
763	Sulemanki	Fordhwah Canal	Fordhwah Canal	NP	353+000	1.07	11.92	102	
764	Sulemanki	Upper Pak Patten Canal	Khadir Branch	NP	26080	1.47	50.00	588	
765	Sulemanki	Upper Pak Patten Canal	Khadir Branch	NP	57+340	0.64	47.65	244	
766	Sulemanki	Upper Pak Patten Canal	Khadir Branch	NP	68+170	0.76	47.11	286	
767	Sulemanki	Upper Pak Patten Canal	Khadir Branch	NP	82+370	0.57	44.21	202	
768	Sulemanki	Upper Pak Patten Canal	Khadir Branch	NP	114+000	1.07	41.59	356	
769	Sulemanki	Upper Pak Patten Canal	Khadir Branch	NP	143+000	1.14	39.47	360	
770	Sulemanki	Upper Pak Patten Canal	Khadir Branch	NP	176+500	1.41	36.46	411	
771	Sulemanki	Upper Pak Patten Canal	Khadir Branch	NP	201+860	1.49	33.09	394	
772	Sulemanki	Upper Pak Patten Canal	Khadir Branch	NP	302500	1.13	15.33	139	
773	Sulemanki	Khadir Branch	Ferozpur dy	NP	45500	1.01	2.16	17	
774	Sulemanki	Upper Pak Patten Canal	3 L Dy	P	24550	1.01	13.33	108	
775	Sulemanki	Upper Pak Patten Canal	1R/3L Mr	P	8000	1.01	2.38	19	
776	Sulemanki	L Pak Patten Canal	Tail Dy	P	0	1.66	10	133	
			SUTLEJ RIVER						
			14- ISLAM BARRAGE						
777		**Islam Hydropower**				6.50	128.00	6,656	
778	Islam	Bahawal Canal Upper	Bahawal Canal Upper	P	0+000	0.77	77.58	478	
779	Islam	Bahawal Canal Upper	Bahawal Canal Upper	P	43+500	1.24	77.58	770	
780	Islam	Bahawal Canal Upper	Bahawal Canal Upper	P	81+000	1.21	143.01	1,384	
781	Islam	Bahawal Canal Upper	Bahawal Canal Upper	P	86+100	0.61	143.03	698	
782	Islam	Mailsi Canal	Mailsi Canal	NP	0+000	0.91	96.95	706	
783	Islam	Mailsi Canal	Mailsi Canal	NP	40+500	1.21	100.00	968	

Sr. #	Barrage	Canal System	Canal	Type P/NP	R.D.1000 FT.	FALL (meters) (A)	F.S.D. (U/S) (m^3/s)	Power Potential (KW)	Remarks
784	Islam	Mailsi Canal	Mailsi Canal	**NP**	11+500	0.86	96.22	662	
785	Islam	Qaimpur Canal	Qaimpur Canal	**NP**	12+600	0.52	5.95	25	
786	Islam	Qaimpur Canal	Qaimpur Canal	**NP**	0+000	0.16	13.68	18	
Total								**846,379**	**kW**

Legend:-

(i) **P:** Perennial, means the canal operates for 11 months a year.

(ii) **RD:** Reduce Distance, mean the distance from origin of the channel.

(iii) **FSD:** Full Supply Discharge, means design flow of water.

(iv) **U/S:** Upstream, upstream of any fall of bridge.

Appendix D-2

Selected Field Sites

Site Selection of Small Hydro Power Potential on Rivers and Canal Falls in Punjab

								Max.	3.8m	Max.	700m3/s	Max.	21,448kW								21,448	<== Max.P (kW)
								Ave.	2.2m	Ave.	198m3/s	Ave.	3,924kW								4,049	<== Ave.P (kW)
								Min.	1.5m	1.5m	34m3/s	10m3/s	656kW	500kW				4hr	Sites=	22	656	<== Min.P (kW)
	Sr. #	Barrage	Canal System	Canal	Name of City/ Town	Type P/NP	Judge of P/NP (NP=X)	R.D.1000 FT.	FALL HEAD (m)	Rank of Head (h<1.5; X)	F.S.D. (U/S) (m^3/s)	Rank of Q (Q<10; X)	Power Potential (kW)	Rank of Potential (P<500; X)	Sponsored / Non Feasible Project	Distance from Major Demand Site/ City	Distance from Major Demand Site/ City	Rank of Distance (L<4; X)	Ranking Point	Selected Ranking	Selected Potential (kW)	Distance from Major Demand Site (Large City)	Remarks
							(A)			(B)		(C)		(D)	(E)	(F)		(G)	A<>X, F<4, (H)=B+C+D+G	Ranked by small (H)			
				RIVER INDUS																			
				1- JINNAH BARRAGE CANALS																			
1	2	Jinnah	Thal M.Line upper	Thal M.Line upper	Mianwalli	P		0+000	1.97	15	283.45	5	4,467	7		3.5	3.5	8	35	9	4,467	3.0 hr drive from Islamabad	
2	3	Jinnah	Thal M.Line upper	Mohajir Branch canal	Mianwalli	P		0+000	2.11	10	41.42	21	699	21		3.0	3.0	3	55	17	699	3.0 - 3.5 hr drive from Islamabad	
3	5	Jinnah	Thal M.Line upper	Main Line Lower	Mianwalli	P		0+000	1.52	23	144.13	12	1,753	12		3.0	3.0	3	50	14	1,753	3.0 - 3.5 hr drive from Islamabad	
				CHENAB RIVER																			
				6- MARALA BARRAGE																			
4	376	Marala	B. R. B. D. Link Canal	B. R. B. D. Link Canal	Daska (near Sialkot town)	P		0+000	1.76	17	203.76	9	2,862	11		2.5	2.5	O	37	10	2,862	2.0 - 2.5 hr drive from Lahore	Tarakai Energy Pvt Ltd (Canceled)
5	392	Marala	Upper Chenab Canal	Upper Chenab Canal		P		133+296	2.45	7	476.86	3	9,346	4		2.5	2.5	O	14	3	9,346	2.0 - 2.5 hr drive from Lahore	Feasibility Completed by PPMU under ADB , (ADB-4)
				7- KHANKI BARRAGE CANALS																			
6	485		Khanki Hydropower (New Khanki Barrage)						2.47	6	600.00	2	11,856	3		3.0	3.0	3	11	2	11,856	3.0 - 3.5 hr drive from Lahore	Feasibility completed by PPMU (ADB-2)
7	490	Khanki	L.C.C MAIN LINE	L.C.C MAIN LINE (New)		P		0+000	3.60	2	240.00	6	6,912	6		3.0	3.0	3	14	3	6,912	3.0 - 3.5 hr drive from Lahore	Feasibility completed by PPMU (ADB-1)
8	506	Khanki	Upper Gogera Branch	Burala Branch	Khanki	P		166+300	2.74	3	35.82	22	785	19		3.5	3.5	8	52	16	785	3.0 - 3.5 hr drive from Lahore	
9	519	Khanki	Upper Gogera Branch	Burala Branch	Khanki	P		27+000	1.95	16	63.72	16	994	16		3.5	3.5	8	56	18	994	3.0 - 3.5 hr drive from Lahore	
10	520	Khanki	Upper Gogera Branch	Burala Branch	Khanki	P		65+000	1.57	22	61.65	17	774	20		3.5	3.5	8	67	21	774	3.0 - 3.5 hr drive from Lahore	
11	522	Khanki	Upper Gogera Branch	Burala Branch	Khanki	P		120+000	1.65	20	52.18	19	689	22		3.5	3.5	8	69	22	689	3.0 - 3.5 hr drive from Lahore	
12	523	Khanki	Upper Gogera Branch	Burala Branch	Khanki	P		164000	2.57	5	47.91	20	985	17		3.5	3.5	8	50	14	985	3.0 - 3.5 hr drive from Lahore	
13	534	Khanki	Upper Gogera Branch	Lower Gogera Branch	Khanki	P		65000	1.58	21	66.35	15	839	18		3.5	3.5	8	62	19	839	3.0 - 3.5 hr drive from Lahore	
14	537	Khanki	Lower Gogera Branch	Khanuana Dy	Khanki	P		0	2.40	9	34.17	23	656	23		3.5	3.5	8	63	20	656	3.0 - 3.5 hr drive from Lahore	
15	544	Khanki	L.C.C MAIN LINE	Jhang Branch Upper	Khanki	P		37+025	2.11	10	83.93	14	1,417	13		3.5	3.5	8	45	11	1,417	3.0 - 3.5 hr drive from Lahore	
				8- QADIRABAB BARRAGE																			
16	597 (ADB-3)		Qadirabad Hydropower						3.83	1	700.00	1	21,448	2		3.5	3.5	O	4	1	21,448	more than 6.0 hr drive from Lahore	Feasibility completed by PPMU (ADB-3)
17	602 (ADB-5)	Qadirabad	Q.B.Link Canal	Q.B.Link Canal with ponding		P		304+985	2.08	12	450.00	4	7,488	5		3.5	3.5	8	21	6	7,488	more than 6.0 hr drive from Lahore	Feasibility completed by PPMU (ADB-5)
				RAVI RIVER																			
				11- BALLOKI BARRAGE																			
18	647	Balloki	Lower Bari Doab Canal	L.B.D.C (Renala Khurd)	Near Habibabad Dataki	P		161+732	2.03	13	222.00	7	3,605	9		3.0	3.0	3	29	7	3,605	3.0 - 3.5 hr drive from Lahore	Old Renala HPP_ Sir Ganga Ram HPP
19	650	Balloki	Lower Bari Doab Canal	L.B.D.C	Near Habibabad Dataki	P		258+654	1.98	14	195.00	10	3,089	10		3.5	3.5	8	34	8	3,089	3.0 - 3.5 hr drive from Lahore	
20	651	Balloki	Lower Bari Doab Canal	L.B.D.C	Near Habibabad Dataki	P		285+454	1.66	19	193.00	11	2,563	11		3.5	3.5	8	49	13	2,563	3.0 - 3.5 hr drive from Lahore	
21	660	Balloki	Lower Bari Doab Canal	L.B.D.C	Near Habibabad Dataki	P		542+168	1.70	18	86.45	13	1,176	15		O						3.0 - 3.5 hr drive from Lahore	
				SUTLEJ RIVER																			
				13- SULMANKI BARRAGE																			
22	724		Sulemanki Hydropower			P			2.70	4	216.00	8	4,666	7		3.5	3.5	8	19	5	4,666	3.5hr Drive from Lahore	Near border with India & Pakistan
23	737	Sulemanki	Ahmadpur Branch	Ahmadpur Branch	Near from Chunian	P		98+000	2.45	7	60.57	18	1,187	14		3.5	3.5	8	47	12	1,187	3.5hr Drive from Lahore	
				Total									**90,256**								89,081		

Source: Prepared by JICA Study Team based on the Potential List of Small Hydropower by Punjab Power Development Board (PPDB)

Legend:-

(i) **P:** Perennial, means the canal operates for 11 months a year.

(ii) **RD:** Reduce Distance, mean the distance from origin of the channel.

(iii) **FSD:** Full Supply Discharge, means design flow of water.

(iv) **U/S:** Upstream, upstream of any fall of bridge.

Appendix D-3

Photographs of Potential Sites of Small Hydro

Appendix D-3: Photographs of Potential Sites of Small Hydro

#627 Balloki Barrage
(Nov.10, 2012)

#628 Balloki Sulemanki Link Canal RD 0+000
(Nov.10, 2012)

#643 Lower Bari Doab Canal (LDBC) RD 0+000
(Nov.10, 2012)

#602 (ADB-5) Quiderabad Balloki Link RD 304+985
(Nov.10, 2012)

#643 Q.Obs. at LBDC
(Nov.10, 2012)

#650 LBDC RD 258+654
(Nov.11, 2012)

Source: JICA Study Team

#651 LBDC RD 285+454
(Nov.11, 2012)

#647 Existing Renala Khurd HPP (1.1MW) by WAPDA
(Nov.11, 2012)

#597 (ADB-3) Quiderabad Barrage
(Nov.12, 2012)

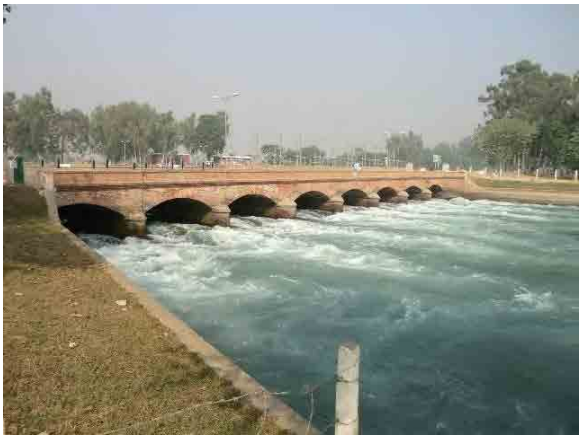
#392 (ADB-4) Upper Chenab Canal (UCC) RD 133+296
(Nov.13, 2012)

#376 Bombanwala Ravi Bedian Diapur (B. R. B. D.) Link Canal
RD 0+000 (Nov.13, 2012)

Bobanwala Barrage
(Nov.13, 2012)

Source: JICA Study Team

#392 (ADB-4) Upper Chenab Canal (UCC) RD 133+296 (Nov.13, 2012)



#376 Bombanwala Ravi Bedian Diapur (B. R. B. D.) Link Canal RD 0+000 (Nov.13, 2012)

#485 (ADB-2) Khanki Barrage (Chenab River) Weir Length = 4,386ft = 1,337m (Nov.14, 2012)

#485 (ADB-2) Khanki Barrage (Existing) (Nov.14, 2012)

#485 (ADB-2) D/S of Existing Khanki Barrage (Chenab River) (Nov.14, 2012)

#485 (ADB-2) Leveling Survey at Proposed New Khanki Barrage Intake Site (Nov.14, 2012)

Source: JICA Study Team

#490 (ADB-1) Lower Chenab Canal (RD 0+000) Main Regulator
(Nov.14, 2012)

#490 (ADB-1) Q.Obs. at LCC
(Nov.14, 2012)

Jinnah Barrage (Indus River) Weir Length = 3780ft = 1152m
(Nov.15, 2012)

#2 Thal Main Line Upper RD 0+000
L = 1576.62ft = 480m (Nov.15, 2012)

#2 Thal Main Line Upper W.L. Gauge
(Nov.15, 2012)

#5 Thal Main Line Lower RD 0+000 U/S Pond
(Nov.16, 2012)

Source: JICA Study Team

#5 Thal Main Line Lower RD 0+000 D/S Canal
(Nov.16, 2012)

#5 Thal Main Line Lower RD 0+000 Q.Obs. at D/S Bridge
(Nov.16, 2012)

#17 Dullewala Branch RD 0+000
(Nov.16, 2012)

#18 Mahajir Branch RD 0+000
(Nov.16, 2012)

#5 Thal Main Line Lower RD 0+000 W.L. Gauge
(Nov.16, 2012)

D/S Water Fall at Escape Channel of Thal Main Line Upper Canal
(Nov.16, 2012)

Source: JICA Study Team

Appendix D-4

Project Summery Sheets

(Site No. in the summery sheets is same as the Site No. in Table 8.3.1-1. Project summery sheets of Site No.5 and No. 17 to 20 are not included since F/S on Site No.5 was conducted by WAPDA and the expected capacities of Site No. 17 to 20 are relatively smaller than other sites.)

Project Summary — 1. (#627) Ravi River Balloki Barrage 0+000

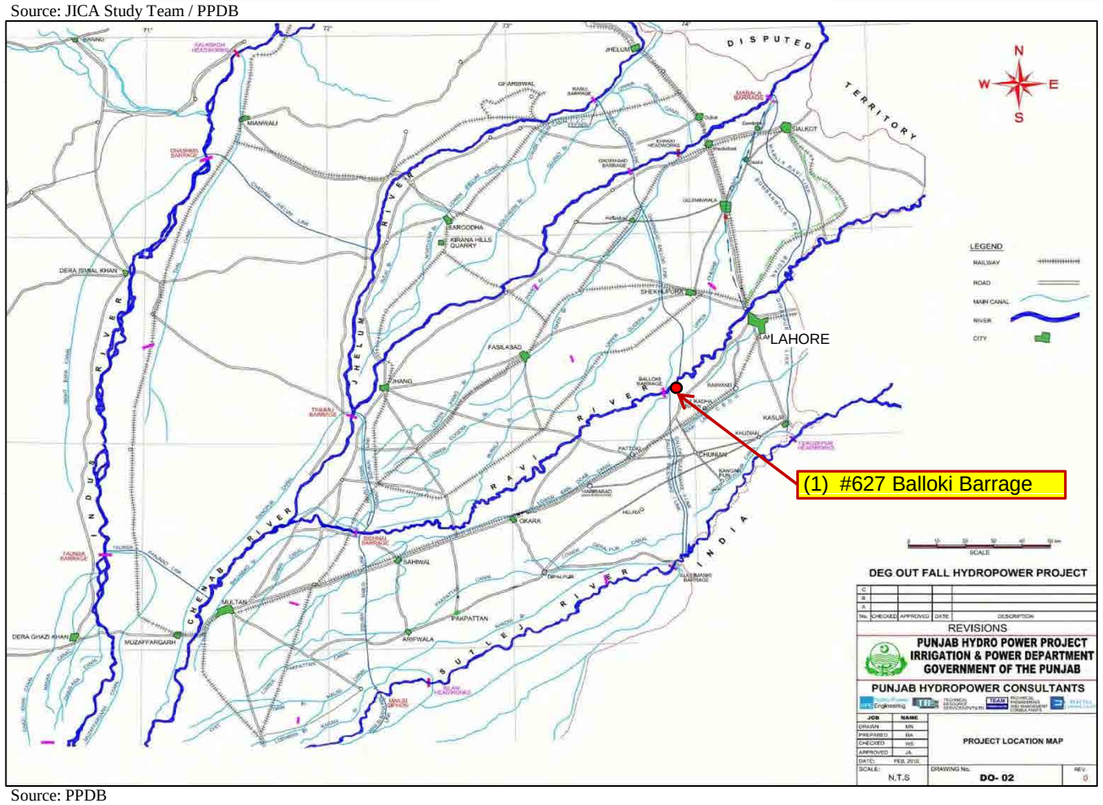
Name of Project: **Ravi River Balloki Barrage 0+000**

Site No.: **1** Serial No. of PPDB List : **627** Type of Canal/River: **Natural River**

Location

Province :	**Punjab**	District :	**Nankana Sahib**	Name of City :	**Pjoolnaar (Radha Kishan)**
Latitude (N):	**31º 13.208'**	Longitude (E):	**73º 51.709'**	Distance from City:	**83 km from Lahore**
Source of River:	**RAVI**	Canal System:	**Balloki Barrage**		
Barrage :	**Balloki**	Canal/River :	**Ravi River**		
R.D.1000 ft :	**Balloki Barrage 0+000**	Type of Flow (Perennial / Not Perennial)			**Not Perennial**

Source: JICA Study Team / PPDB



Source: PPDB

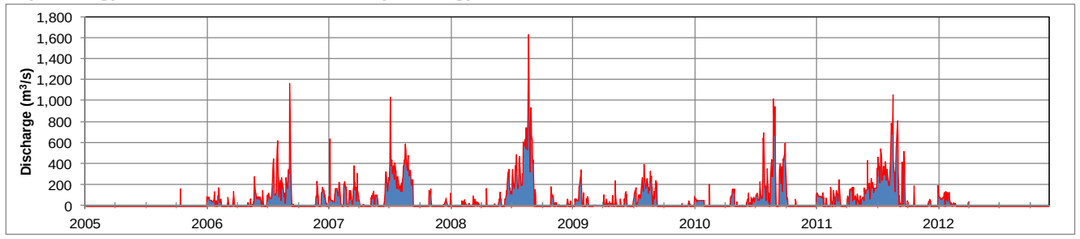
Location Map

Salient Features

Rated Design Discharge (m^3/s)	271.7	Plant Factor (%)	17.41%
Mean Annual Discharge (m^3/s)	69.0	Base Cost (Million US$)	-
Rated Head / Maximum Head (m)	5.50	EIRR (%)	-
Average Head (m)	4.48	FIRR (%) Public: -	PPP Mode: -
Installed Capacity (MW)	13.12	Levelized Tariff (US Cents/kWh)	
Annual Energy Generation (GWh/year)	20.01	Public: -	PPP Mode: -
Nos. of Turbine & Generator Units	4	Probability of Occurrence (%)	-
Proposed Type of Turbine	Kaplan pit turbine or S-type draft tube Tubular turbine		
Transmission Line	-		
Notes:	Not Perennial Flow to D/S		

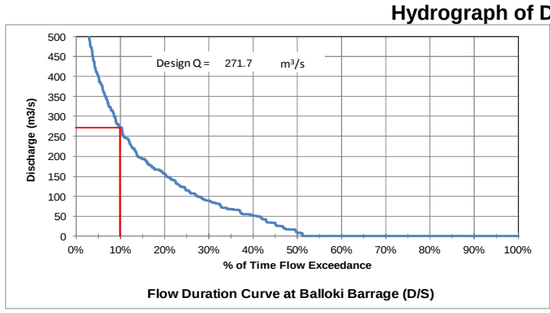
Source: JICA Study Team

Hydrology & Estimated Mean Daily Energy Generation

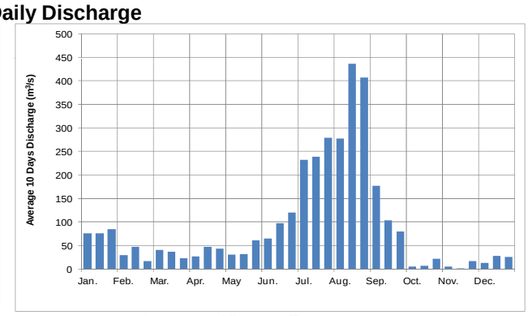


Source: Irrigation Department, Government of Punjab

Hydrograph of Daily Discharge

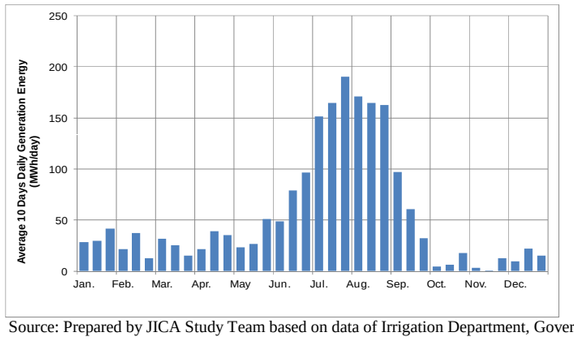


Flow Duration Curve at Balloki Barrage (D/S)



Average 10 days Discharge

Flow Duration Curve



Source: Prepared by JICA Study Team based on data of Irrigation Department, Government of Punjab

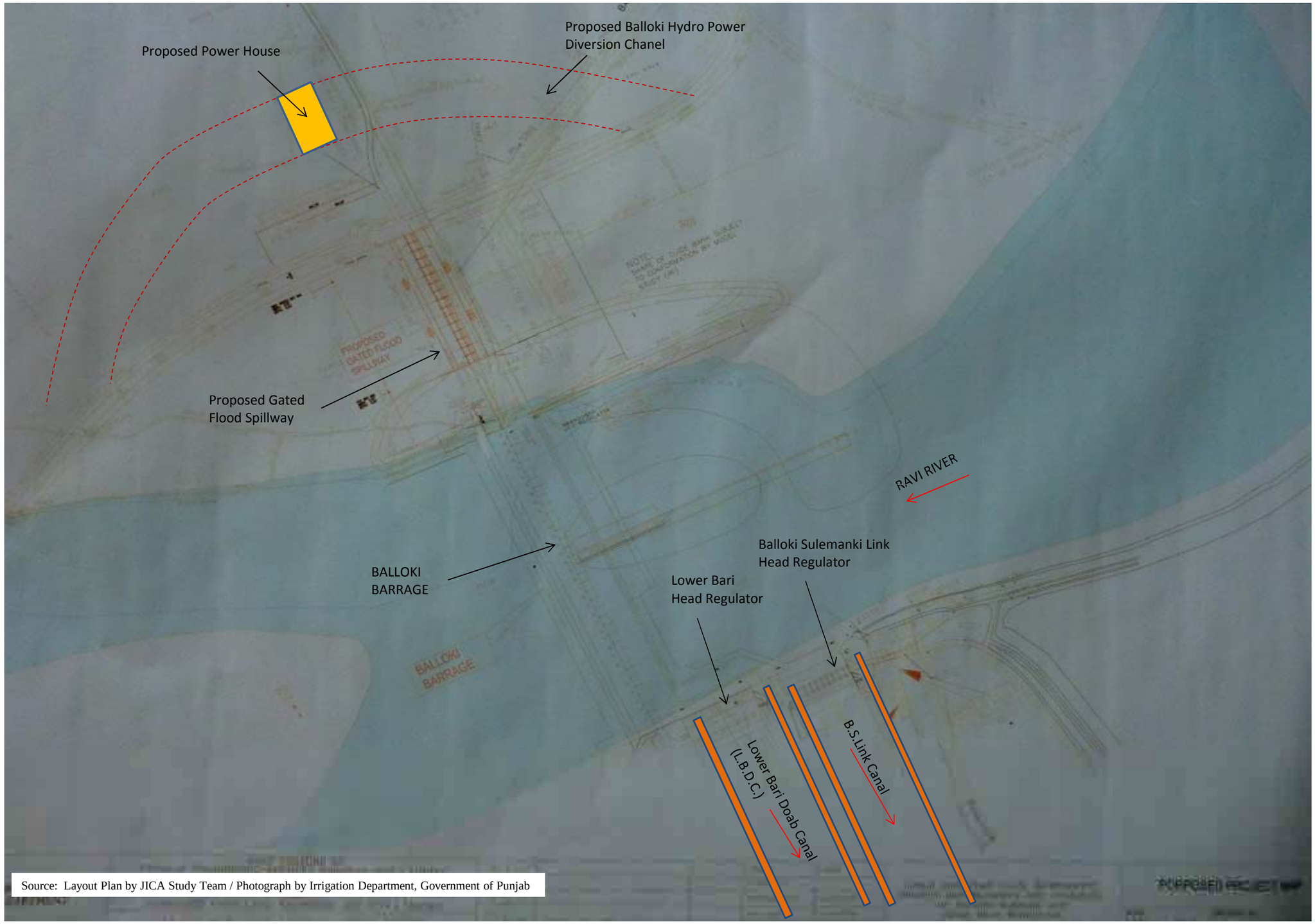
Estimated Mean Daily Energy Generation (10 days Average)

Photos

Balloki Headworks Upstream View (from Left Bank)

Balloki Headworks Downstream (from Left Bank)

Drawings 1. (#627) Ravi River Balloki Barrage 0+000



Plan of Balloki Headworks, B.S. Link Canal and L.B.D.C

Appendix D-4: Project Summary Sheets of Proposed Small Hydro Power Projects

Project Summary

2. (#628) B. S. Link Main Line 0+000

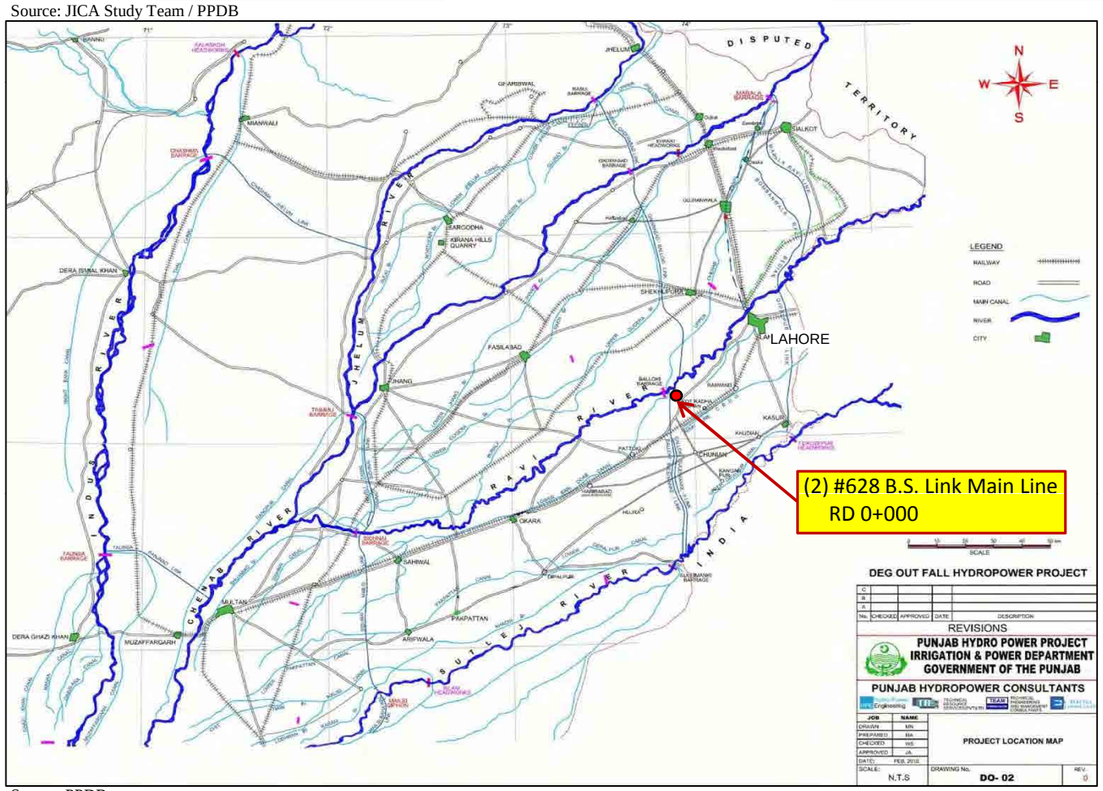
Name of Project: **B. S. Link Main Line 0+000**

Site No.: **2** Serial No. of PPDB List : **628** Type of Canal/River: **Canal**

Location

Province :	**Punjab**	District :	**Kasur**	Name of City :	**Pjoolnaar (Radha Kishan)**
Latitude (N):	**31º 13.208'**	Longitude (E):	**73º 51.709'**	Distance from City:	**83 km from Lahore**
Source of River:	**RAVI**	Canal System:	**Balloki Sulemanki Link Main Line**		
Barrage :	**Balloki**	Canal/River :	**B. S. Link Main Line**		
R.D.1000 ft :	**0+000**	Type of Flow (Perennial / Not Perennial)			**Perenial**

Source: JICA Study Team / PPDB



Source: PPDB

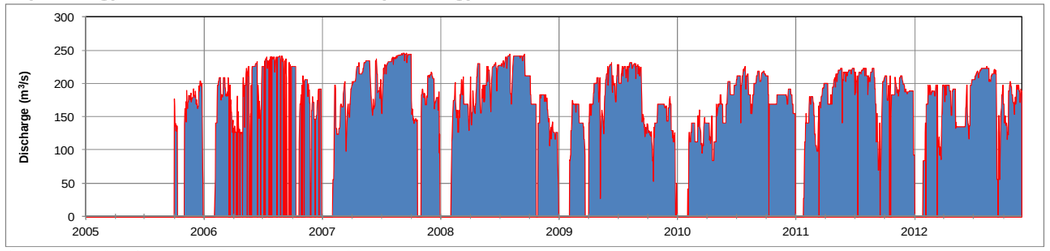
Location Map

Salient Features

Rated Design Discharge (m^3/s)	218.0	Plant Factor (%)	50.63%
Mean Annual Discharge (m^3/s)	197.3	Base Cost (Million US$)	-
Rated Head / Maximum Head (m)	3.50	EIRR (%)	-
Average Head (m)	1.86	FIRR (%) Public: -	PPP Mode: -
Installed Capacity (MW)	6.70	Levelized Tariff (US Cents/kWh)	
Annual Energy Generation (GWh/year)	29.71	Public: -	PPP Mode: -
Nos. of Turbine & Generator Units	4	Probability of Occurrence (%)	-
Proposed Type of Turbine	Kaplan pit turbine or S-type draft tube Tubular turbine		
Transmission Line	-		
Notes:	New B.S. Link Barrage will be constructed		

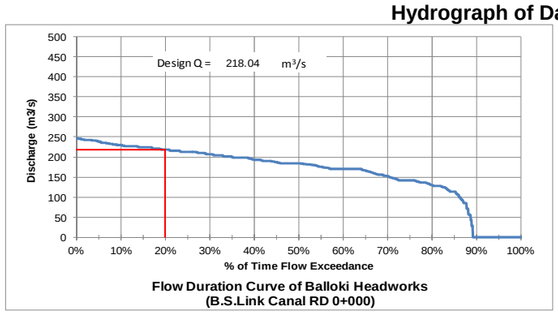
Source: JICA Study Team

Hydrology & Estimated Mean Daily Energy Generation

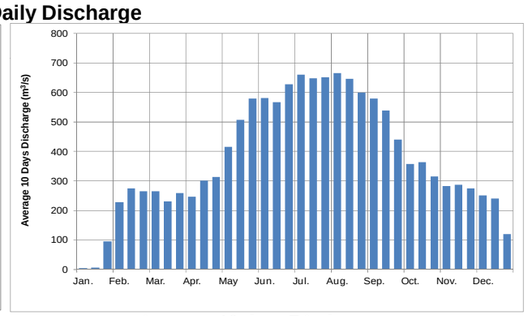


Source: Irrigation Department, Government of Punjab

Hydrograph of Daily Discharge

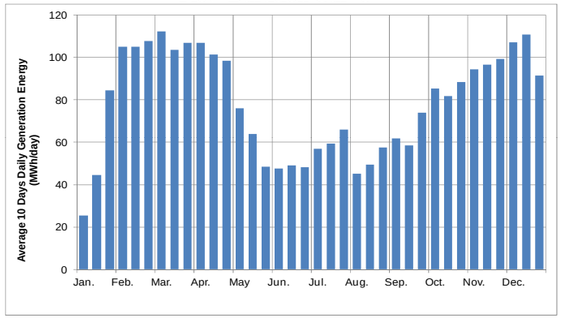


Flow Duration Curve of Balloki Headworks
(B.S.Link Canal RD 0+000)



Average 10 days Discharge

Flow Duration Curve



Source: Prepared by JICA Study Team based on data of Irrigation Department, Government of Punjab

Estimated Mean Daily Energy Generation (10 days Average)

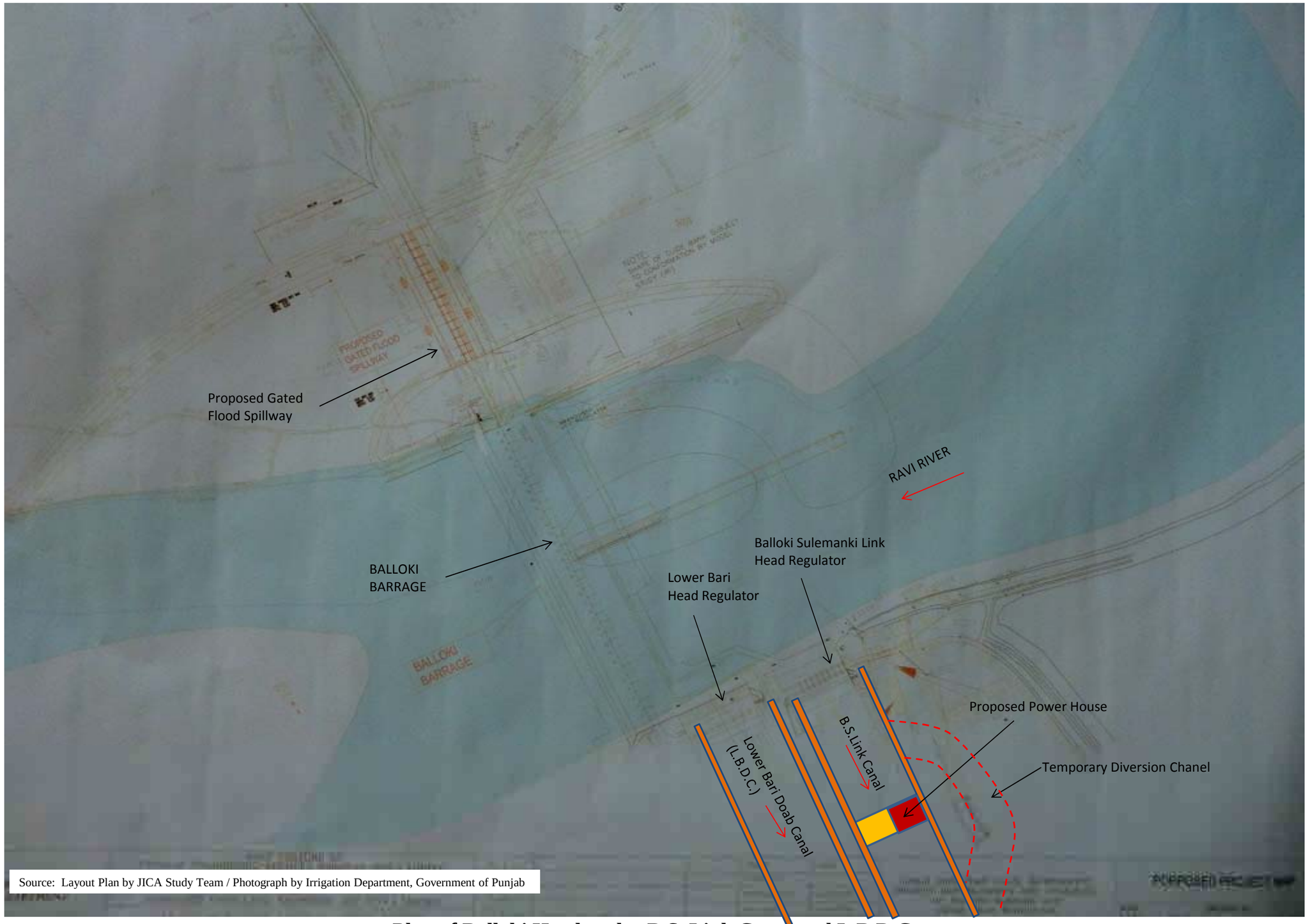
Photos

Balloki Sulemanki Link Canal RD.0+000 (from Right Bank)

Balloki Sulemanki Link Canal RD.0+000 (D/S)

Drawings

2. (#628) B. S. Link Main Line 0+000



Source: Layout Plan by JICA Study Team / Photograph by Irrigation Department, Government of Punjab

Plan of Balloki Headworks, B.S. Link Canal and L.B.D.C

Appendix D-4: Project Summary Sheets of Proposed Small Hydro Power Projects

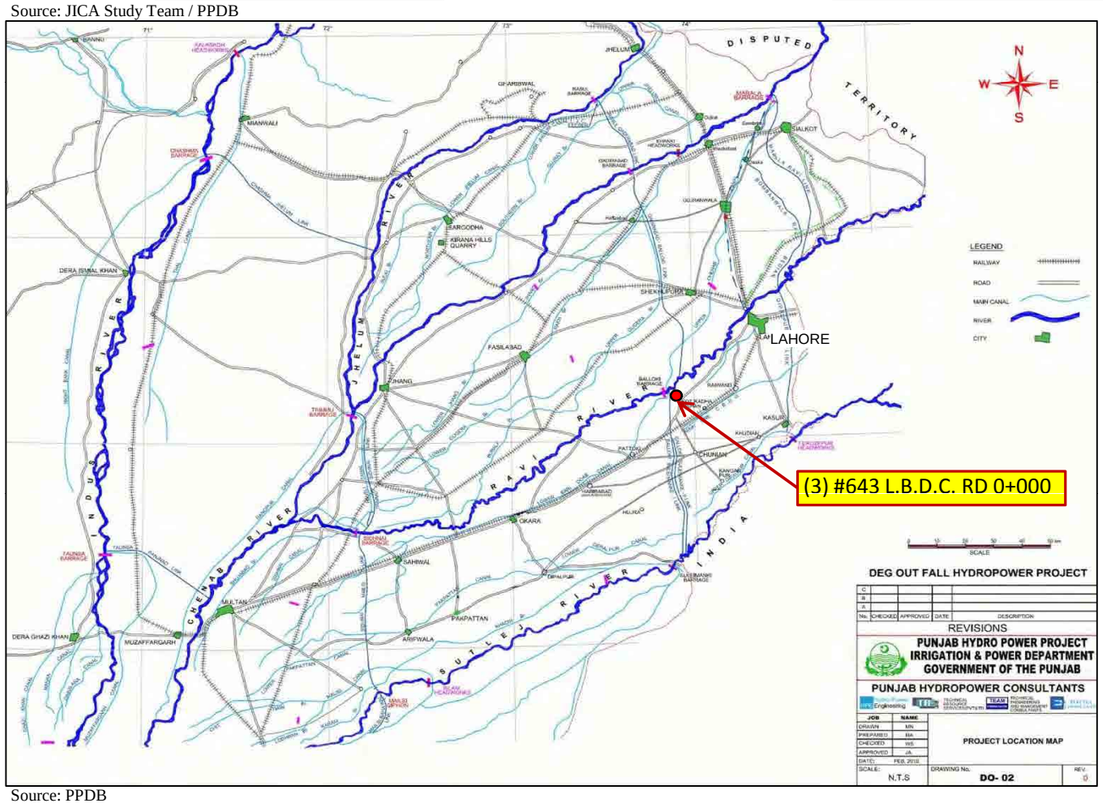
Project Summary 3. (#643) L.B.D.C 0+000

Name of Project:	**L.B.D.C 0+000**				
Site No.:	**3**	Serial No. of PPDB List :	**643**	Type of Canal/River:	**Canal**

Location

Province :	**Punjab**	District :	**Kasur**	Name of City :	**Pjoolnaar (Radha Kishan)**
Latitude (N):	**31º 13.208'**	Longitude (E):	**73º 51.709'**	Distance from City:	**83 km from Lahore**
Source of River:	**RAVI**	Canal System:	**Lower Bari Doab Canal (L.B.D.C.)**		
Barrage :	**Balloki**	Canal/River :	**L.B.D.C**		
R.D.1000 ft :	**0+000**		Type of Flow (Perennial / Not Perennial)		**Perenial**

Source: JICA Study Team / PPDB



Source: PPDB

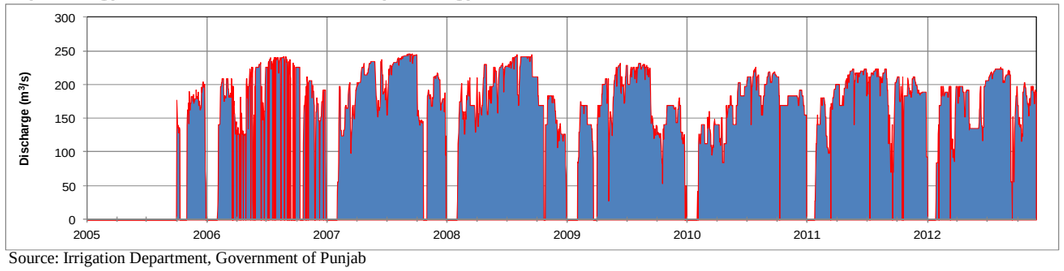
Location Map

Salient Features

Rated Design Discharge (m^3/s)	218.0	Plant Factor (%)			28.89%
Mean Annual Discharge (m^3/s)	161.1	Base Cost (Million US$)			-
Rated Head / Maximum Head (m)	2.80	EIRR (%)			-
Average Head (m)	1.01	FIRR (%)	Public: -	PPP Mode:	-
Installed Capacity (MW)	5.36	Levelized Tariff (US Cents/kWh)			
Annual Energy Generation (GWh/year)	13.57		Public: -	PPP Mode:	-
Nos. of Turbine & Generator Units	4	Probability of Occurrence (%)			-
Proposed Type of Turbine	Kaplan pit turbine or S-type draft tube Tubular turbine				
Transmission Line	-				
Notes:	Good condition, P/H will be in canal.				

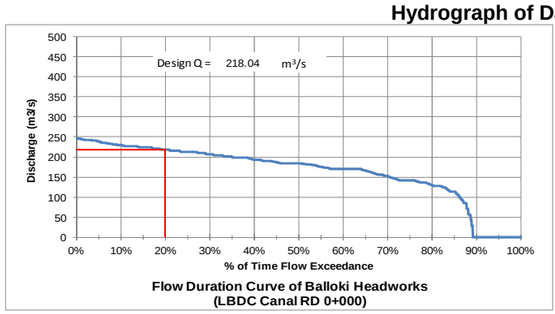
Source: JICA Study Team

Hydrology & Estimated Mean Daily Energy Generation

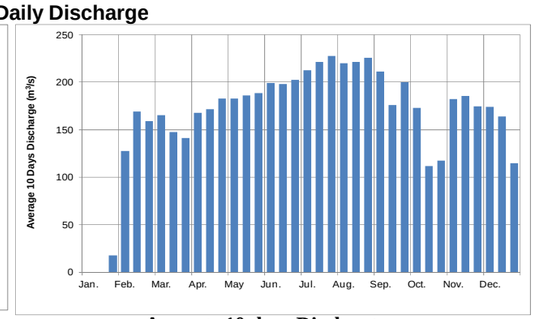


Source: Irrigation Department, Government of Punjab

Hydrograph of Daily Discharge

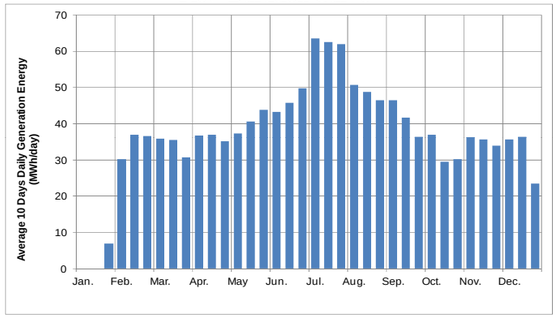


Flow Duration Curve of Balloki Headworks (LBDC Canal RD 0+000)



Average 10 days Discharge

Flow Duration Curve



Source: Prepared by JICA Study Team based on data of Irrigation Department, Government of Punjab

Estimated Mean Daily Energy Generation (10 days Average)

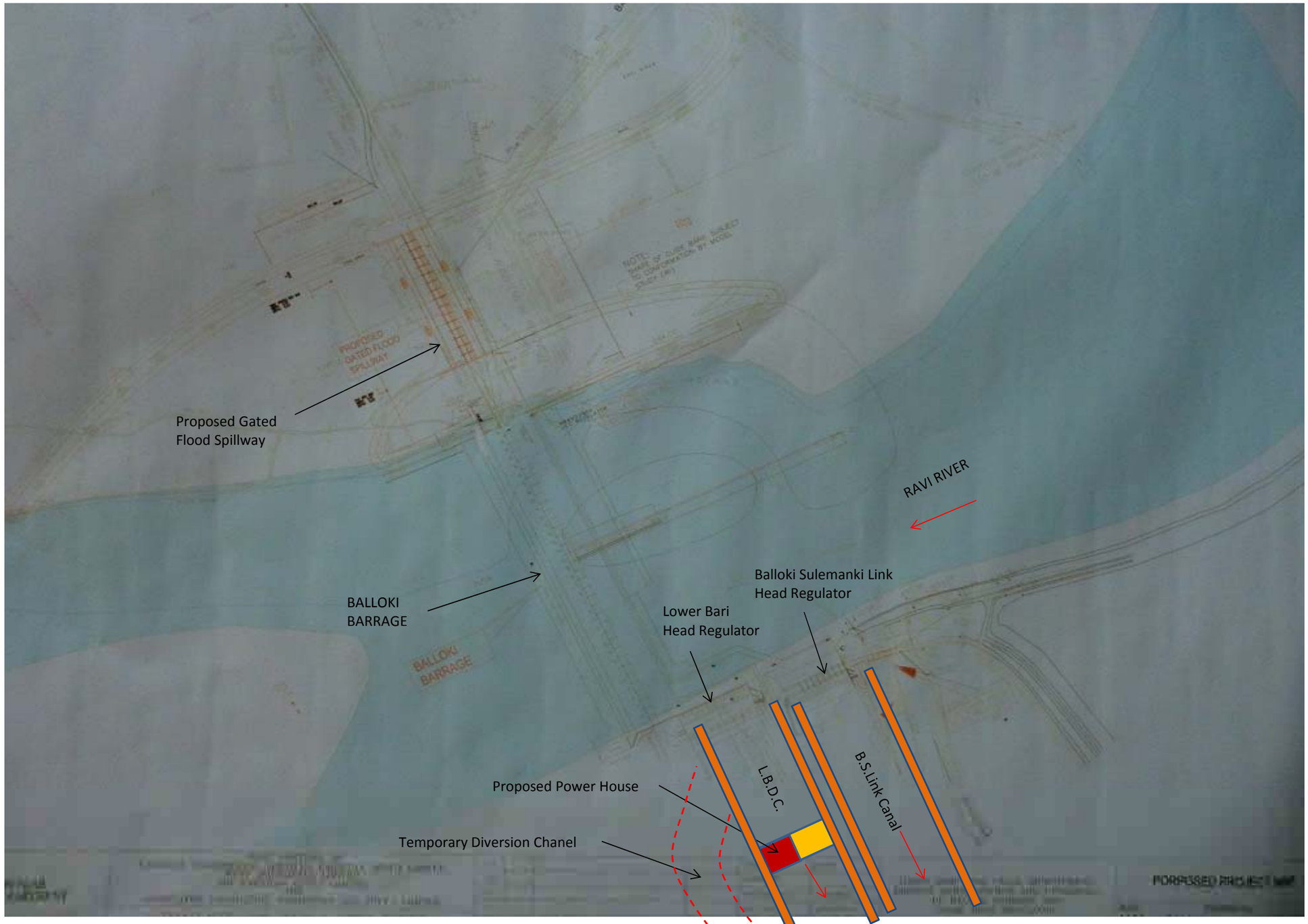
Photos

Lower Bari Doab Canal RD.0+000 (from Left Bank)

Lower Bari Doab Canal RD.0+000 (D/S)

Drawings

3. (#643) L.B.D.C 0+000



Source: Layout Plan by JICA Study Team / Photograph by Irrigation Department, Government of Punjab

Plan of Balloki Headworks, B.S. Link Canal and L.B.D.C

Project Summary — 4. (#602(ADB-5)) Qaiderabad Balloki Link Canal 304+985

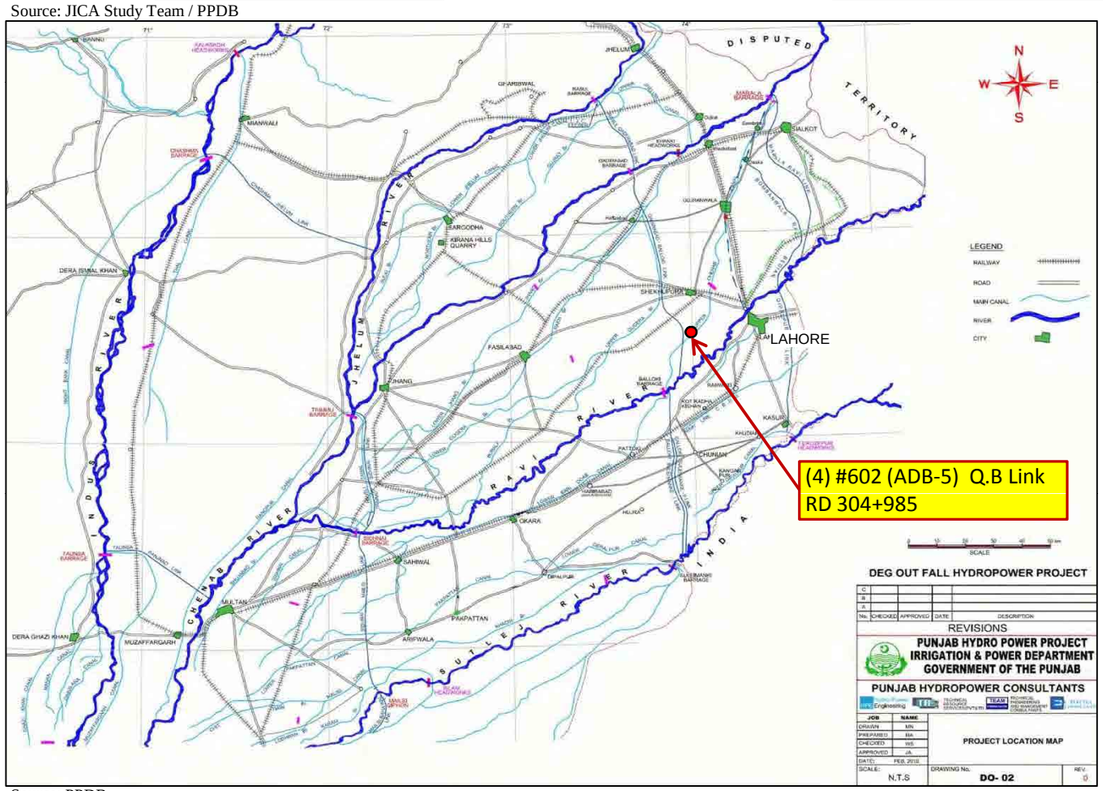
Name of Project: **Qaiderabad Balloki Link Canal 304+985**

Site No.: **4** Serial No. of PPDB List : **602(ADB-5)** Type of Canal/River: **Canal**

Location

Province :	**Punjab**	District :	**Nankana Sahib**	Name of City :	**Miranpur**
Latitude (N):	**31º 32.007'**	Longitude (E):	**73º 56.483'**	Distance from City:	**144 km from Lahore**
Source of River:	**RAVI**	Canal System:	**Qaiderabad Balloki Link Canal (QB Link)**		
Barrage :	**Balloki**	Canal/River :	**Qaiderabad Balloki Link Canal**		
R.D.1000 ft :	**304+985**	Type of Flow (Perennial / Not Perennial)			**Perenial**

Source: JICA Study Team / PPDB



Source: PPDB

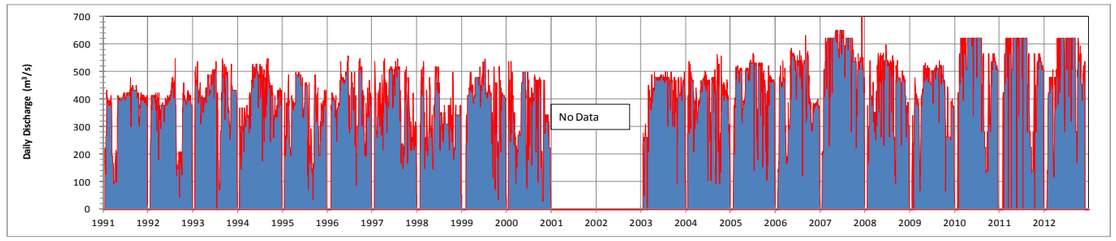
Location Map

Salient Features

Rated Design Discharge (m^3/s)	450	Plant Factor (%)	78.17%
Mean Annual Discharge (m^3/s)	391	Base Cost (Million US$)	33.96
Rated Head (m)	2.04	EIRR (%)	25.64
Average Head (m)	-	FIRR (%) Public: 18.98	PPP Mode: 18.86
Installed Capacity (MW)	7.68	Levelized Tariff (US Cents/kWh)	
Annual Energy Generation (GWh/year)	52.59	Public: 6.89	PPP Mode: 9.32
Nos. of Turbine & Generator Units	4	Probability of Occurrence (%)	33.5
Proposed Type of Turbine	Horizontal shaft double regulated Kaplan pit turbine		
Transmission Line	16 km long 33 kV line will connect to 132 kV Warburton, nearest Grid Station		
Notes:	Proposed P/H will be in canal		

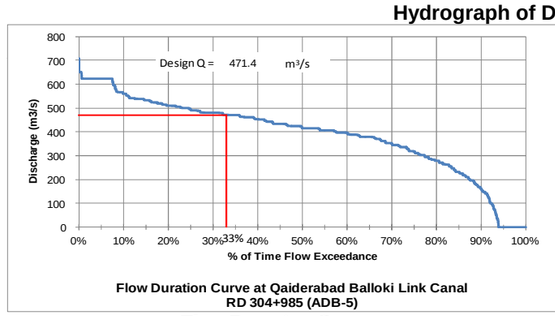
Source: Feasibility Studies of Hydel Power Stations in Punjab (Task 2), ADB, Government of Punjab, NESPAK, 2011.

Hydrology & Estimated Mean Daily Energy Generation

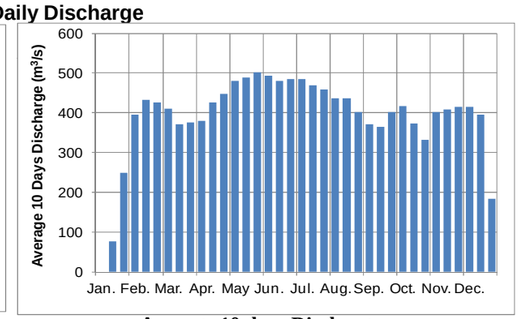


Prepared by JICA Study Team. Source: Feasibility Studies of Hydel Power Stations in Punjab (Task 2), ADB, GOP, NESPAK, 2011. / Irrigation Dept. Gov. of Punjab.

Hydrograph of Daily Discharge

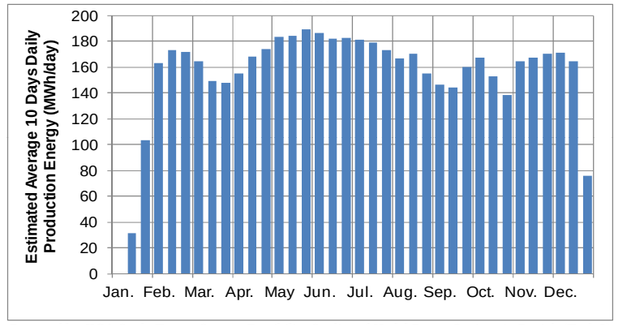


Flow Duration Curve at Qaiderabad Balloki Link Canal RD 304+985 (ADB-5)



Average 10 days Discharge

Flow Duration Curve



Prepared by JICA Study Team. Source: Feasibility Studies of Hydel Power Stations in Punjab (Task 2), ADB, GOP, NESPAK, 2011. / Irrigation Dept. Gov. of Punjab.

Estimated Mean Daily Energy Generation (10 days Average)

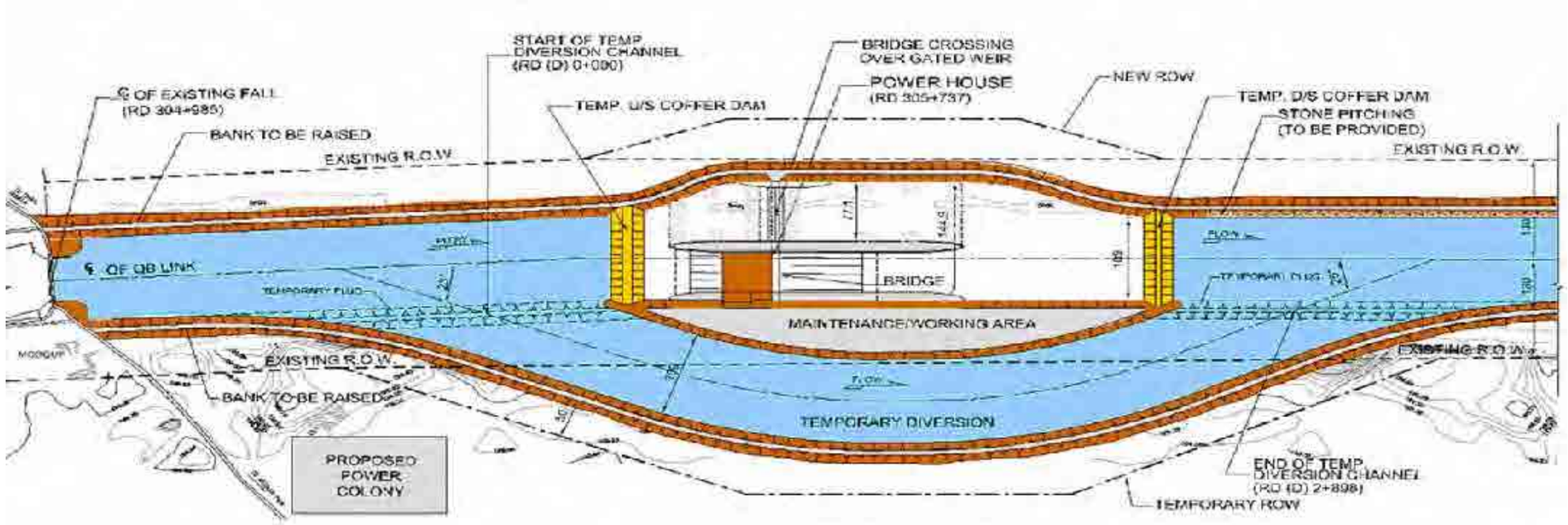
Photos

Qaiderabad Balloki Link Canal RD.304+985 (Fall)

Qaiderabad Balloki Link Canal RD.304+985 (D/S)

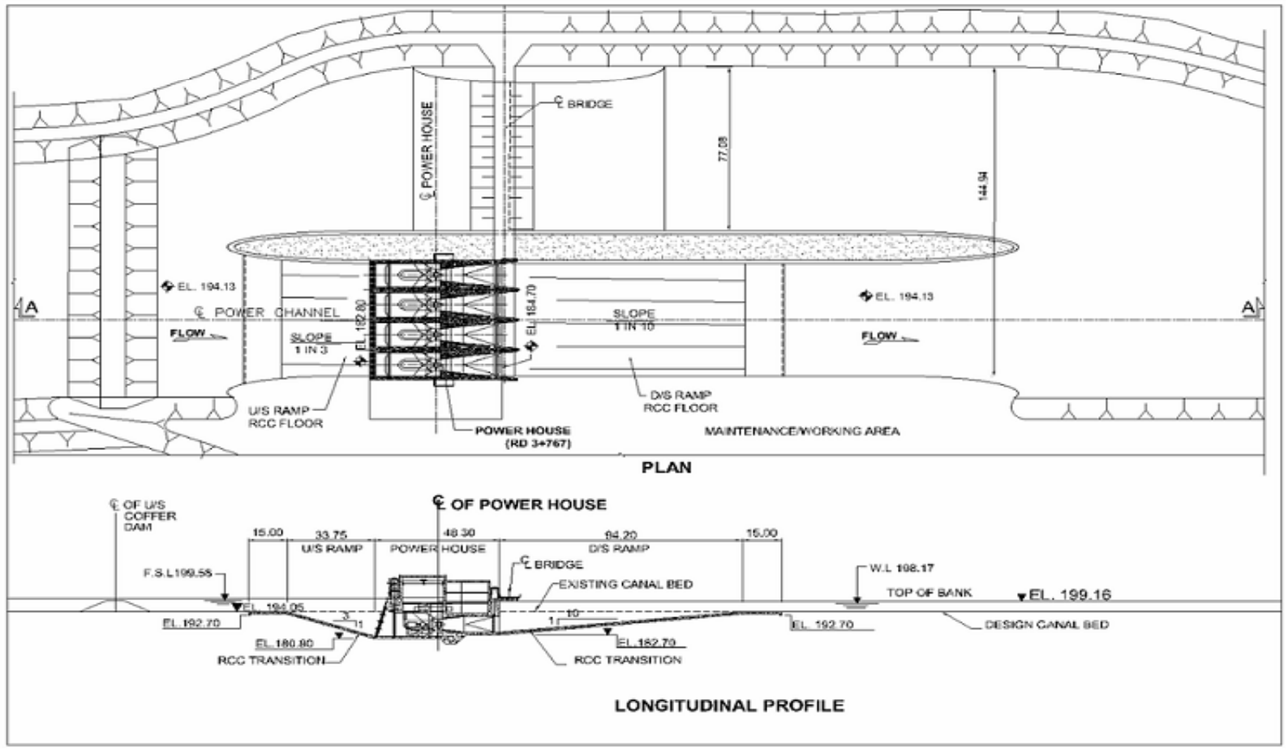
Drawings

4. (#602(ADB-5)) Qaiderabad Balloki Link Canal 304+985



Source: Feasibility Studies of Hydel Power Stations in Punjab (Task 2), ADB, Government of Punjab, NESPAK, 2011.

Plan of Proposed Qaiderabad Balloki Link Canal RD.304+985 HPP



Source: Feasibility Studies of Hydel Power Stations in Punjab (Task 2), ADB, Government of Punjab, NESPAK, 2011.

Power Channel Part Plan and Section