

DORDI KHOLA HYDROPOWER PROJECT

LAMJUNG, NEPAL



Monthly Progress Report

July 2016



Himalayan Power Partner Limited
Energy Sector Research, Development & Consulting Services

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1 Introduction

Dordi Khola Hydropower Project is a Run-of-River type hydroelectric project with generating capacity of 27 MW in Lamjung. The project is being developed by Himalayan Power Partner Ltd. (HPPL) Kathmandu, Nepal.

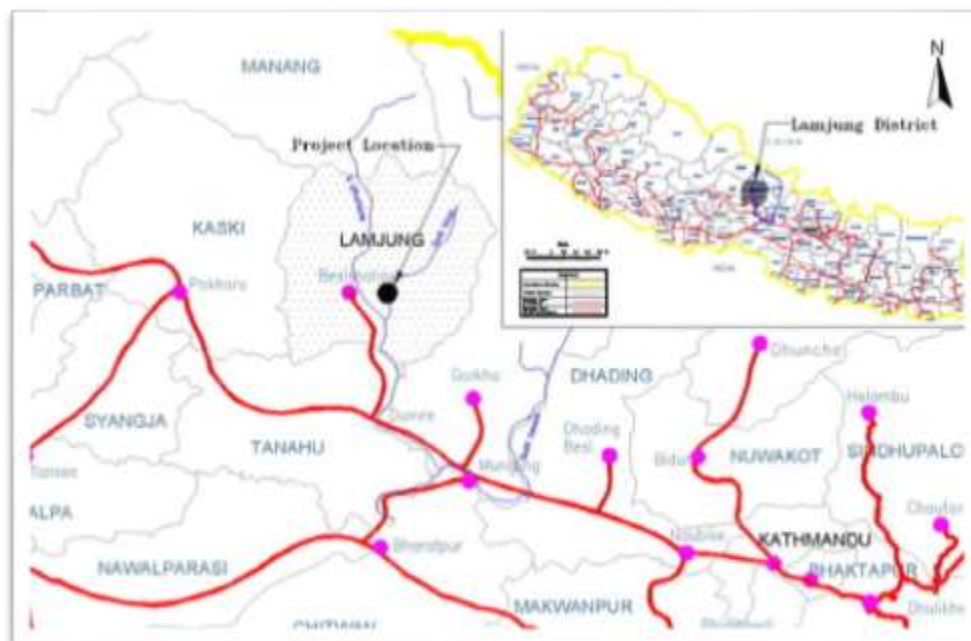
2 Project Development Milestones

- Survey License Issued : 26 May 2005
- Grid Connection Agreement : 7 July 2010
- IEE Approved : 4 October 2010
- Generation License Obtained : 7 July 2011
- PPA Signed : 15 June 2012
- Detailed Project Report Completed : August 2013
- Facility Agreement Signed : 7 November 2013
- Construction Works Started : April 2014
- Required Commercial Operation Date (RCOD) : 15 June 2017

3 Project Description

3.1 Location and Access

The whole project area lies in Chiti, Dhodeni and Bansar VDCs in Lamjung district in western Nepal. It is connected from Kathmandu by 170 km all weather metallic roads.



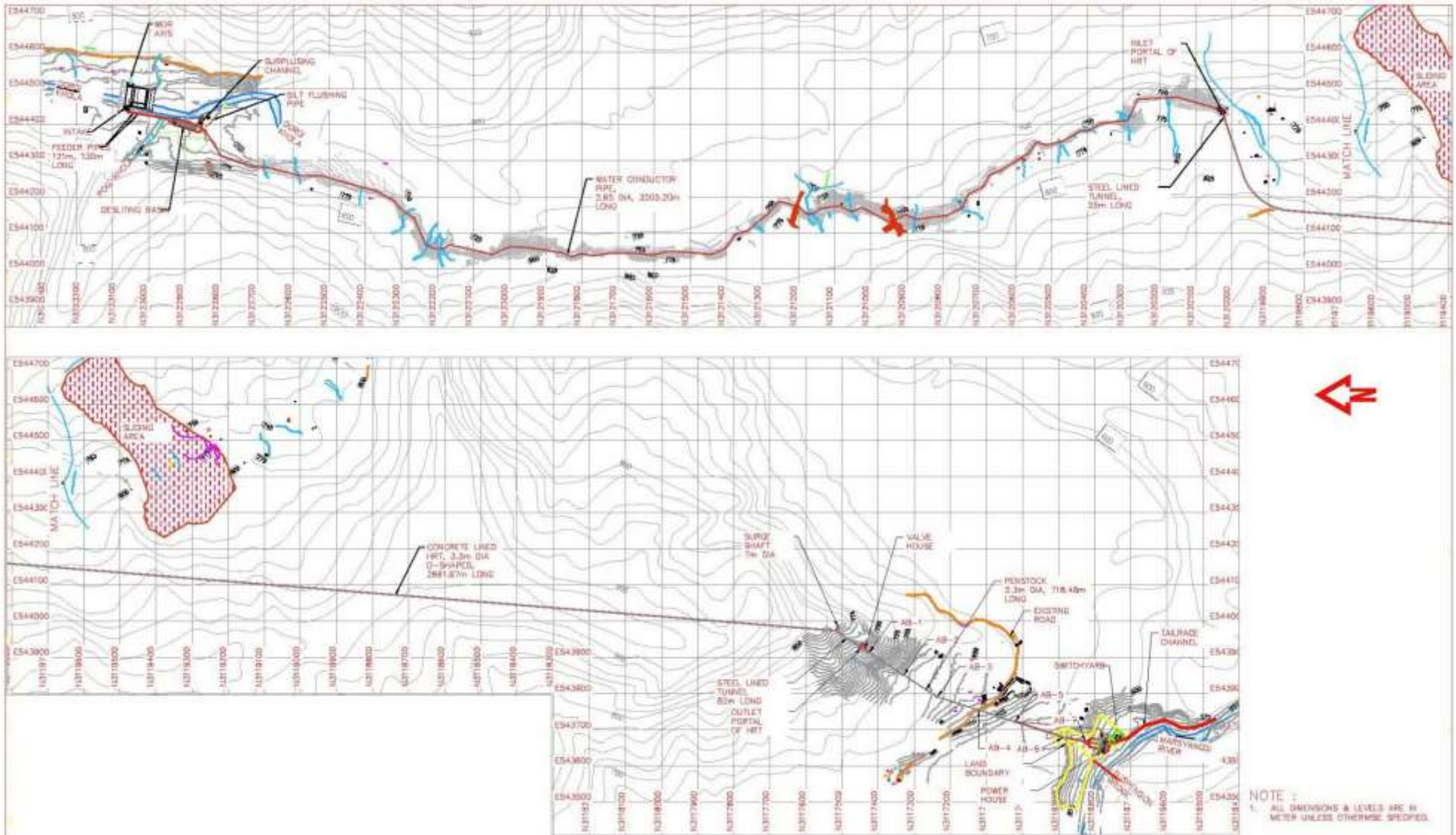
3.2 Project Features

- Gross Head : 212.0 m
- Design Discharge : 15.28 m³/sec
- Installed Capacity : 27.0 MW
- Total Annual Energy : 148.697GWh
- Total Annual Contract Energy : 142.319GWh
 - Dry Season Energy* : 21.367 GWh
 - Wet Season Energy* : 120.952 GWh
- Power Purchase Agreement (PPA) Rate :
 - Dry Season Energy : 8.40/unit
 - Wet Season Energy : 4.80/unit
 - Price Escalation : @ 3% 8 times
- Water Ways
 - Closed Conduit/Steel pipe (Ø2.65m) : 3237 m
 - Headrace Tunnel (Ø3.3m) : 2662 m
 - Penstock Pipe (Ø2.3m) : 700 m
 - Tailrace : 330 m
- Powerhouse Type : Surface
- Turbine Type : Horiz.Francis (3x9 MW)
- Grid Connection Point : Udipur Hub/Lamjung
- Transmission Line
 - Voltage Level : 132 kV Single Circuit
 - Length : 1.2 km

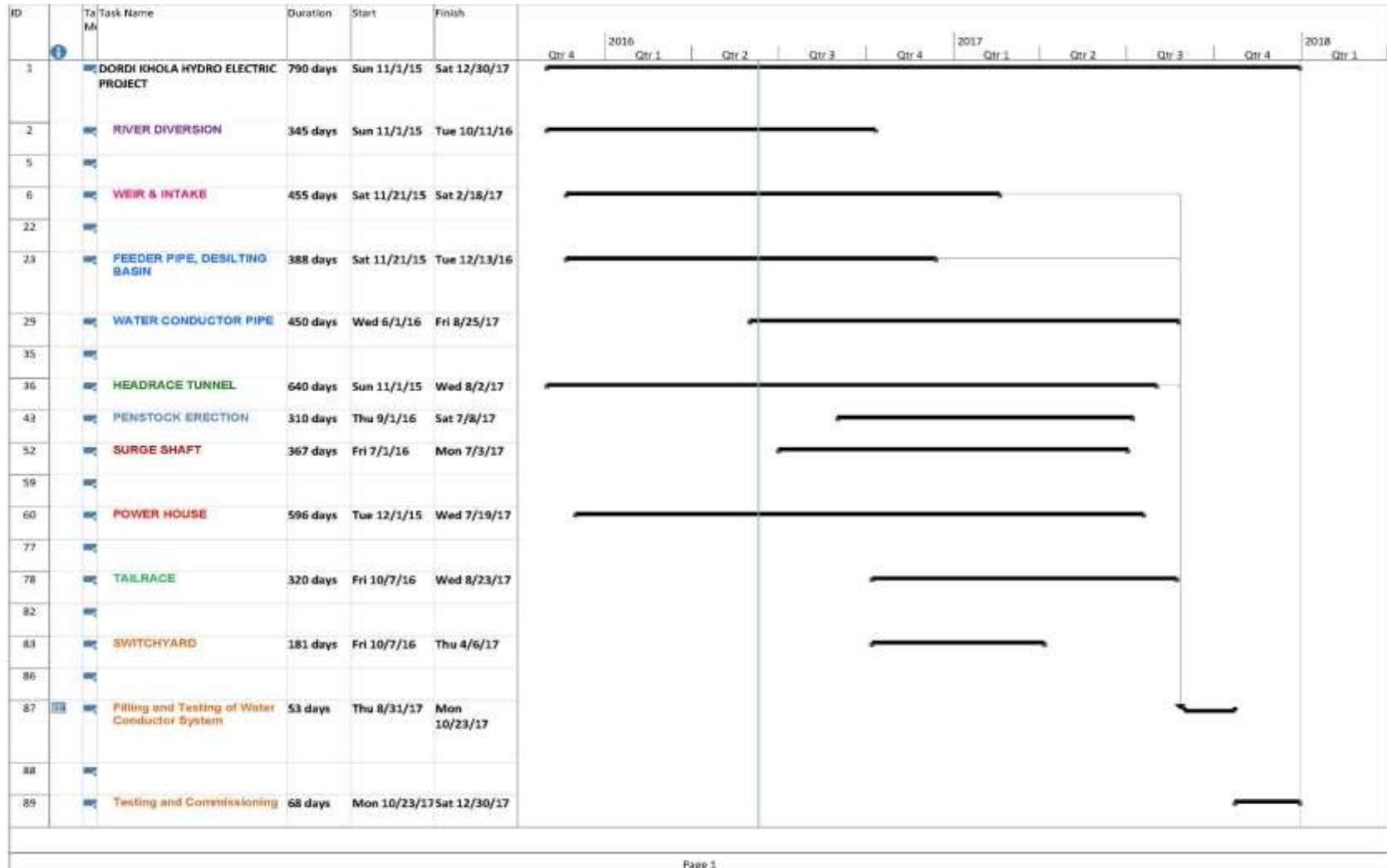
3.3 Project Cost and Financial Indicators

Total Cost	: NRs. 3,595 million
Total Capitalized Cost (Including IDC/Bank Commission)	: NRs. 4,235 million
NPV	: 1,396 Million
IRR	: 14.35 %
IRR on Equity	: 18.29%

3.4 General Project Layout



3.5 Project Construction Schedule



4 Progress

4.1 Financial Progress

4.1.1 Funding Arrangement

- **Facility agreement**

Facility Agreement to provide Term Loan of amount NPR 3,170 million for construction of the project and working capital of amount 99 million was concluded with Bank Consortium led by Prime Commercial Bank Ltd. on 7 November 2013.

4.1.2 Financial Progress

Total project cost, funding arrangement and provisional expenses/disbursement up to July 15, 2016 (End of Asadh 2073) including mobilization advance and advance payment to the contractors is given in following table:

Figure in NPR '000

SN	Expense/Funding Categories	Project Cost	Expenses			Progress %
			Up to Jeth 2073	Asadh 2073	Up to Asadh 2073	
1	Project Development Cost/Pre-construction	102,980	102,976	-	102,976	100.00
2	Engineering, Administration and Management	145,459	95,440	3,023	98,463	67.69
3	Preparatory Works	153,988	72,362	47	72,409	47.02
4	Civil Works	1,627,625	285,027	17,471	302,498	18.59
5	Hydro-mechanical Works	702,630	197,389	-	197,389	28.09
6	Electro-mechanical Equipment	736,337	64,873	-	64,873	8.81
7	Transmission Line/Power Evacuation	74,126	0	170	170	0.23
8	Environmental Mitigation, Social Support and Land Acquisition	51,490	49,777	450	50,227	97.55
9	IDC, Bank Commission & Fee	640,782	35,900	-	35,900	5.60
	Total	4,235,417	903,744	21,161	924,905	21.84

Fund Arrangement as per Facility Agreement

1	Consortium Bank Term Loan	3,170,000	200,655		200,655	6.33
2	Equity investment from shareholders	1,065,417	703,089	21,161	724,250	67.98
	Total	4,235,417	903,744	21,161	924,905	21.84

4.2 Physical Progress

4.2.1 Civil Works

Surface Works/ Rasuwa Construction Co.

- Head Works

The discharge at the Dordi Khola has raised and frequent raining at the upstream part of the catchment area is inviting the floods since middle of the June. Hence, the construction works progress at the headworks are being impacted and progress has been achieved since June 2016. The wing wall just downstream of the bridge and intake cut off wall have been raised up to the level of 762.0 m. As the discharge on Dordi Khola is increasing, big boulders have been placed just upstream of the intake structure to protect from the flood. The main stream is flowing from the previously diverted part of the river. The construction works will be resumed at the weir site only after this monsoon period. Overall physical progress up to July 2016 of weir is about 20%.



Construction work of Undersluice



Flood at Headworks

- **Desilting Basin**

The desilting basin area is still not affected by the flood of Dordi Khola and the concreting work is in progress. M15 concreting of the base part of desilting basin is going on. The excavation works and lean concreting (PCC) work are completed. Physical progress up to July 2016 of desilting basin is about 18%.



M15 concrete works at the base of desilting basin

- **Water conductor Pipe Alignment**

The levelling along the water conductor pipe alignment has almost completed, however, due to almost everyday raining the side slopes are being affected by occurring small landslides at different places. Bioengineering application is adopted for slope stabilization and greenery along the cut slopes of water conductor pipe/service road alignment. Overall physical progress up to July 2016 of water conductor pipe alignment is about 70%.

- **Power House**

The excavation work at the powerhouse area is still going on, however, due to the presence of large boulders, the progress is not satisfactory. The large boulders encountered during excavation are being removed by using explosives and blasting.



Big boulders at powerhouse and blasting in progress.

Underground Civil Works/Tunnel/EIB

- Excavation from Inlet

Due to the start of monsoon season the access road to the site is damaged and ultimately impacting in the progress of the tunnel excavation. The lack of construction materials stocking and frequent break down of the deployed equipment and poor geological conditions are the main cause of unsatisfactory progress. Progress achieved up to July 15, 2016 is only 200m.



Poor Rock Condition encountered at Tunnel face @ CH 0+200 m.

- Excavation from Outlet

Tunnel excavation from outlet ported has been started from July 31, 2016. Rock mass at outlet portal is slightly weathered, fine to medium grained, thin to thickly foliated, light grey colored schist with phyllite partings. Foliation are light to weak. Quartz veins are observed being parallel to the foliation. Major three sets of joints are observed. Joints along with rock mass is dry and poor due to shear band and weathering. The contractor has already mobilized another electrical boomer at the outlet and planning to deploy it soon. 11kVA dedicated transmission line is erected up to portal to operate boomer.



Tunnel Excavation from Outlet.

5.2.2 Hydro-mechanical Works

- **Procurement of Steel Plates**

Steel plates required (3308.80 MT) for hydro-mechanical works was procured from M/S Jindal Steel & Power Limited, India in June 2015 and are being transported to the site by contractor Machhapuchhre Metal & Machinery Works Pvt. Ltd.

- **Physical Progress at site**

The contractor has already mobilized at site. Construction of contractor's site camp and workshop continued. Workshop drawings are being reviewed by the consultant and approved for fabrication. Embedded parts of the intake structures such as gates, trash rack frames etc. are being fabricated at the factory in Pokhara and delivered at the site for erection.



HM Workshop and Pipe Rolling Machine

5.2.3 Electro-Mechanical Works

Voith Hydro India is progressing its works as per the schedule provided. The design/drawing works are in the process of approval. Some parts have been already ordered and some parts are being manufactured. As per their information, the equipment/ materials will start dispatching from September. Before dispatching, according to the approved Inspection & Testing Plans (ITPs) the ready equipment is necessary to witness the tests from the client side with necessary expertise and NEA personnel. Spiral casing of turbine and generators are ready for factory inspection tests and voith is inviting to witness the test.

5.2.4 Transmission Line/Power Evacuation

Grid connection agreement with Nepal Electricity Authority was concluded to evacuate the generated power in proposed Udipur Hub by 1.2 km 132 kV single circuit Transmission Line. Construction of Udipur Hub and transmission line along the Marsyangdi Corridor by NEA is delayed and expected to be complete by 2018. Therefore, process is under way to change grid connection point from Udipur Hub to Middle Marsyangdi Switchyard at Siudibar to ensure power evacuation after completion of the project. Study of an alternative contingency plan for power evacuation was also conducted by the Project to arrange interconnection with Upper Marsyangdi- 'A' HEP transmission line, which passes nearby Dordi power house.

5.2.5 Environmental Mitigation, Social Support and Land Acquisition

- **Environmental mitigation**

Geo-environmental Unit in the project site has been already established to address environmental mitigation works. A nursery is established at power house site for application of bio-engineering and slope stability works. Bio-engineering and slope stability works are going on along water conductor/service road alignment.



Bio-engineering Works
Along WCP alignment

- **Social support**

Social support to local communities in project affected areas such as construction/ improvement of local roads, drinking water schemes, support to community schools, rural electrification etc. are going on under this heading.

- **Land acquisition**

Land acquisition for headworks, power house and along the pipe line alignment almost completed (195 out of 200 ropani) by July 2015.

5.2.6 Summary of Physical Progress

(up to July 2016)

SN	Project Headings	Physical Progress %	
		Target	Achievement
1	Preparatory Works	95.00	87.35
2	Civil Works	31.85	17.13
3	Hydro-mechanical Works	56.51	48.97
3	Electro-mechanical Equipment	22.59	22.59
4	Transmission Line/Power Evacuation	15.00	0.00
5	Environmental Mitigation and Land Acquisition	90.00	85.00
	Total Weighted Physical Progress	37.95	28.59

Annex-1: Project Organization Chart

