UPPER KHUDI HYDROPOWER PROJECT

Lamjung, Gandaki Province

Progress Report

(Jun 2025)

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1 Introduction

1.1 Background

Super Khudi Hydropower Ltd. aims to develop Upper Khudi Hydropower Project in Lamjung district of Gandaki Province and is dedicated to supply the power to the national grid to fulfill the present energy demand. It is a run of river type project in the Khudi River with 21.21 MW installed capacity as per PPA. The Khudi River is a snow-fed Perennial River originating from Lamjung Himal situated at an elevation of nearly 5000m amsl in Lamjung District. It is one of the tributaries of the Marsyangdi River. The river flows through dense and undisturbed forest and joins the Marsyangdi River at Khudi Bazaar. The catchment area is elongated from North-West to South-East direction draining toward the south. The catchment area at the proposed intake is 72.3 km^2.

1.2 Location and Access

The project is located in ward no 2 & 3 of Marshyangdi Rural Municipality of Lamjung district. The headworks area of the project lies near the Probi village and the powerhouse area lies at Batase Odar. The approximate distance of the powerhouse and headworks of the project from Beshisahar, the district headquarter of Lamjung, is 9 km and 15 km respectively. Geographically the project area lies within 84^{0}18'32" E / 84^{0}19'26" E to 84^{0}20'44" E and 28^{0}18'22" N to 28^{0}21'19" N/ 28^{0}21'50" N.

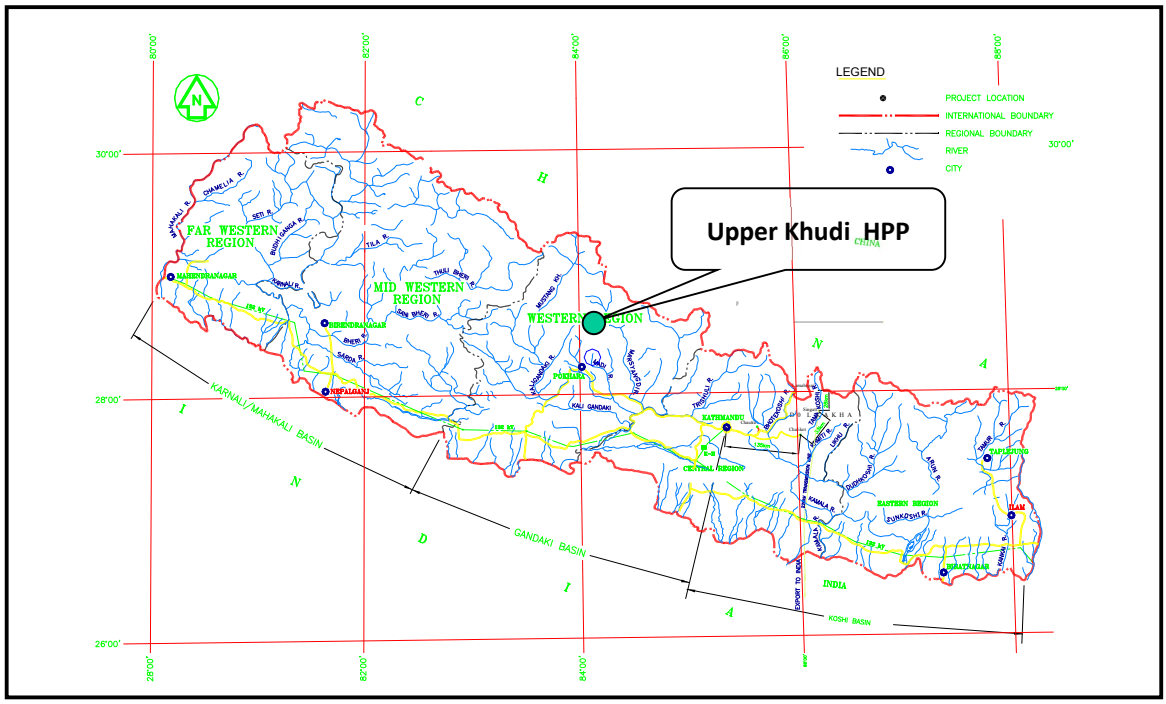

Figure 1: Project Location

1.3 Brief Project Description

The main structures of the project are an overflow weir, undersluice, side intakes, gravel trap, approach tunnel, settling basin, headrace tunnel, forebay, penstock, anchor blocks, saddle supports, power house and tailrace canal. The project diverts water from the Khudi River to the intake by means of the weir which passes through a 3.5 km long headrace tunnel and 2.5 km long penstock and is finally released to the Khudi River after power generation. The power generated from the Khudi river is evacuated to the Tadikuna Substation of NEA by means of approximately 5 km long 132 kV transmission line.

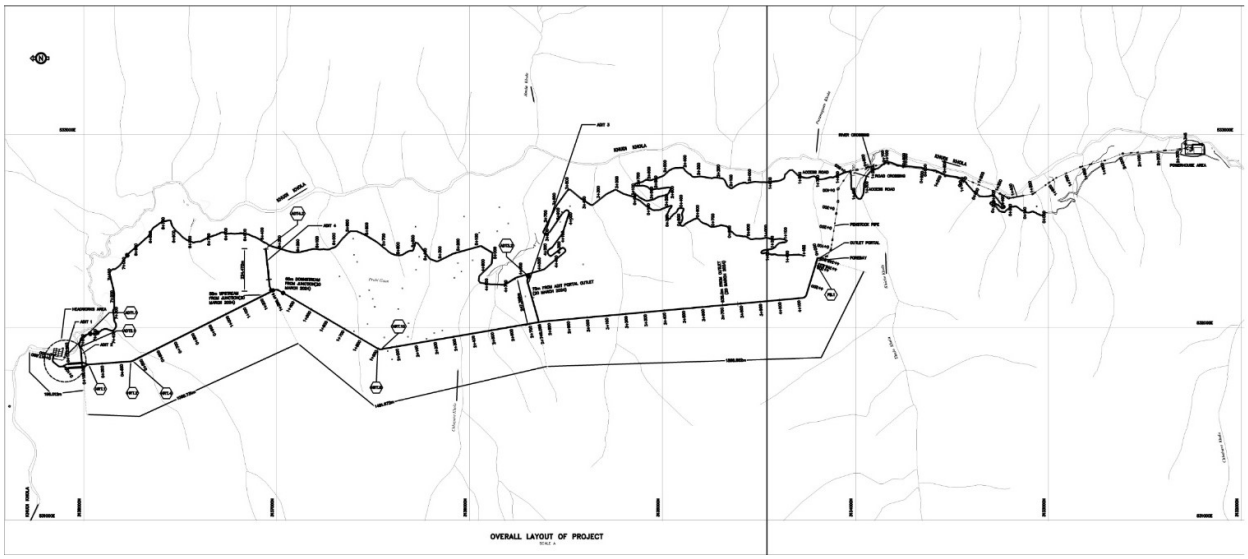

Figure 2: Project Overall Layout

1.4 Salient Features

General

Development Region	:	Western
District	:	Lamjung
Nearest town	:	Beshisahar
Boundary		
East	:	$84^0$20’44”
North	:	$28^0$21’19” to $28^0$21’50”
West	:	$84^0$18’32” to $84^0$19’26”
South	:	$28^0$18’22”
Type of Scheme	:	Run-of-river
Gross Head	:	531.86 m
Net Head @ Full Discharge	:	521.82 m
Installed Capacity	:	21.21 MW
Net Annual Generation	:	129.19 GWh

Hydrology

Catchment Area	:	72.3 sq.km
Average Precipitation	:	5,176 mm
100 years Flood Discharge	:	182 m^3/s
Average Flow	:	6.13 m^3/s
Design Flow (Q_{40})	:	4.69 m^3/s
Minimum Dry Season Flow	:	2.092 m^3/s

Weir

Type	:	Boulder Lined, Overflow Type
Upward Slope	:	1:10
Downward slope	:	1:3.5
Crest Elevation	:	1504.46 m
Normal water level	:	1504.36 m
Crest Length	:	33.63 m

Maximum Height	:	10.28 m

Diversion Facilities

Coffer Dam (First phase)	:	185 m
Coffer Dam (Second phase)	:	100 m
Width (Average)	:	5 m
Diversion Flow	:	8.57 m^3/s

Gravel Trap

No of Units	:	1
Size	:	15 m x 8 m
Normal Flow Depth	:	1.71 m
Particle Size to be settled	:	>2 mm

Approach Tunnel

Shape	:	Invert D Shaped
Length	:	130 m
Size	:	2.5 m x 2.5 m

Settling Basin

No of Units	:	2
Size	:	84 m x 4.25 m
Normal Flow Depth	:	5.38 m
Inlet Transition Length	:	17 m
Outlet Transition Length	:	10.20 m
Settling Criteria	:	90% of >0.15 mm at 15^oC

Water Conveyance System

Shape	:	Invert D shaped tunnel
Length	:	3971.0 m
Size	:	2.5 m x 2.5 m
Discharge	:	4.69 m^3/s

Forebay

Shape	:	Inverted D-shaped
Length	:	17.11 m
Size	:	4.3 m x 5.5 m

Penstock

Length	:	2512 m
Diameter	:	1.4m
Thickness	:	10 mm to 25 mm

Power Facilities

Powerhouse

Type	:	Surface
Dimension	:	17.0 m x 46.7 m x 15.5 m
Installed Capacity	:	21.21 MW

Turbine

Type of Turbine	:	Vertical, Pelton,
Number of Units	:	2
Turbine Axis Level	:	972.5 m
Rated Capacity	:	10.60 MW
Turbine Efficiency	:	92 %

Generator

No	:	2
Rating	:	13.25 MVA
Speed	:	600 rpm
Frequency	:	50 Hz
Rated Voltage	:	11 kV
Efficiency	:	97 %

Transformer

No	:	2
Type	:	3 Phase, Oil Immersed
Rating	:	13.25 MVA
Frequency	:	50 Hz
Transformer Efficiency	:	99 %

Switchyard

Size	:	30.0 m x 44.0 m

Tailrace

Type	:	Rectangular, RCC
Size	:	3.1 m x 1.5 m
Length	:	172.27 m
Longitudinal Slope	:	1 in 500
Tailrace Outlet Invert Level	:	967 m
Tail Water Level (Q1000)	:	965.88 m

Transmission Facilities

Transmission Voltage	:	132 kV
Length	:	5 km
Connection Point	:	Khudi HUB (Tadikuna)

2 Project Implementation

The company obtained the Generation license on May 2018. The RCoD date of the project is Jan 2026. The project has completed IEE and EIA studies of the transmission line and the project. The project is now in the construction phase. The Supervision & Management Consultants, Civil Contractors, Explosives Supplier, Electromechanical supplier, Hydromechanical Supplier and Transmission line contractor have already been mobilized and working at site. The land acquisition for the transmission line has been completed. The electromechanical design has been completed and the manufacturing and supply of equipment is in process. The details of the contractors of the project are as follows.

Description	Contractor's Name	Number of Manpower
Civil Contractor	Baibhav / Adwin JV	Skilled - 85
		Unskilled - 95
Hydromechanical (penstock pipe fabrication) Contractor	Cangzhou Spiral Steel Pipes Group Co. Ltd	
Hydromechanical Erection Contractor	Cream Hydel Pvt. Ltd.	Skilled - 15
		Unskilled - 8
Electromechanical Contractor	Troyer AG-SpA (Italy), Troyer Hydro Pvt. Ltd. (India)	
Transmission Line Contractor	Baibhav / Adwin JV	Skilled - 10
		Unskilled - 40
Explosive Supplier	Synex Power Pvt. Ltd.	

3 Financing Arrangement

The financial arrangement of consortium banks are:

- Global IME Bank as the Lead Bank
- Himalayan Bank
- Kumari Bank
- Agriculture Development Bank

The debt equity ratio has been maintained as 70:30.

4 Present Status of Work:

4.1 Civil Works

4.1.1 Cofferdam

The first phase and second phase of cofferdam construction and river diversion work is completed. The river has also been diverted and passes through undersluice.

4.1.2 Weir and Undersluice

The project has a weir axis of 26m length. The weir construction is divided into first and second phase. The construction first phase (13m) is almost completed. The river has already been diverted through undersluice. The second phase (13m) of weir construction is in progress. As the monsoon season has begun, the first section of the completed weir is safeguarded by a plum wall that stands approximately 3 to 4 meters high, extending from the first cutoff to the last cutoff. The divide wall and guide wall concreting in the left bank is in progress and they are above invert level of undersluice gate.

Concreting work of the counterfort wall above the base slab of the undersluice is in progress.

The boulder lining and ARC concreting work in the undersluice in is completed. Similarly, the steel lining work at undersluice and intake orifice has also been completed.

Figure 1: Weir & undersluice construction

4.1.3 Intake and Gravel trap

The intake & gravel trap construction is in progress.

4.1.4 Approach Tunnel

The 420 m long approach tunnel has the excavation of size 3 m × 3 m. The approach tunnel is being excavated from the intake and the outlet at Marta Khola. About, 252.6 m length of approach tunnel has been excavated till date from two faces which is about 60 % of the total length.

Table 1: Approach tunnel construction progress

Total Length (m)	Excavation from Intake (m)	Excavated from Marta (m)	Total Excavation (m)	Completion %
420 m	62 m	190.6 m	252.6 m	60 %

Figure 3: Approach tunnel inlet and outlet portal

4.1.5 Approach Pipe

The site clearance and excavation for the approach pipe is in progress. The fabrication of approach pipe is in progress at the workshop.

4.1.6 Settling Basin

The rock excavation for the settling basin is in progress. Similarly, the slope stabilization works such as rock bolting, wire mesh laying and shotcrete work are also going on simultaneously at the site.

Figure 4: Settling basin construction

4.1.7 Flood Protection Works

The flood protection works such as gabion wall, stone masonry wall, boulder rip rap etc. have been done as per the site condition to protect the structures from flood and landslide in headworks, penstock alignment and access road.

Figure 5: Flood protection work

4.1.8 Headrace Tunnel

The headrace tunnel is 3971 m long and has the excavation size of 3 m × 3 m. The headrace tunnel is being excavated from outlet, adit 3 and adit 4. Till date, about 83.2 % of length of the headrace tunnel has been excavated and the required supports are provided. About, 3304.1 m length of tunnel has been

excavated till date from five faces. The project has two adits with 454 m total length. The excavation of both adits has been already completed. The breakthrough of tunnel section between outlet portal and Adit 3 was done on 16th July 2025.

Table 2: Headrace tunnel construction progress

Description	Total Length (m)	Excavation from Outlet (1 Face) (m)	Excavated from Adit 3 (2 Face) (m)	Excavated from Adit 4 (2 Face) (m)	Total Excavation (m)	Completion %
Headrace Tunnel	3,971 m	1568.75m	917.01 m	818.34 m	3304.1 m	83.2%
Adit 3	238				238	100 %
Adit 4	216				216	100 %

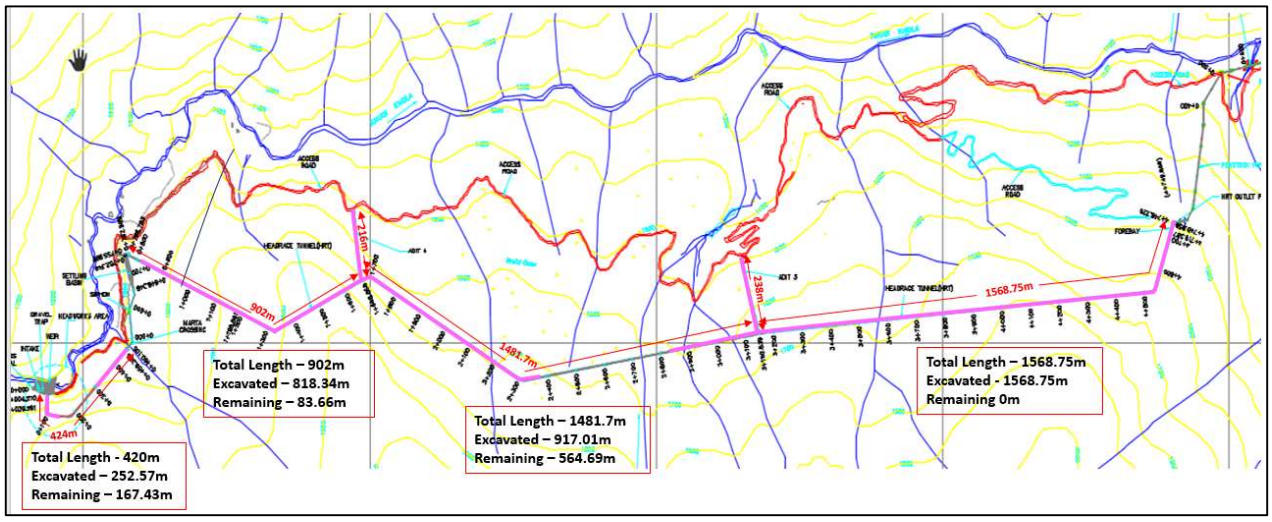

Figure 6: Tunnel construction progress

4.1.9 Underground Forebay

Because of unavailability of the space at the surface, an underground forebay has been proposed at the outlet of the tunnel. The excavation of forebay has already been completed. Similarly, spot bolting, initial shotcrete, wiremesh and rib installation have also been completed.

Figure 7: Forebay construction

4.1.10 Anchor Blocks, Saddle Blocks & Syphon

The project has 2512 m long steel penstock which requires 37 nos of anchor blocks and 318 nos of saddle blocks. Out of 37 anchor blocks and 318 saddles, 25 anchor blocks and 245 saddles have already been completed. The penstock pipe erection work is also going on side by side. Similarly, the excavation, PCC, stone soling, formworks, reinforcement laying and concreting work of remaining anchor blocks are going on side by side.

Table 3: Anchor block construction progress

S.N.	Description	Excavation	Concreting
1	VAB1		
2	CAB2	Completed	ongoing
3	CAB3	Completed	ongoing
4	VAB4	ongoing	
5	VAB5	ongoing	
6	VAB6	ongoing	
7	VAB7	ongoing	
8	VAB8	Ongoing	ongoing
9	CAB9	Complete	Completed
10	CAB10	Complete	ongoing
11	AB11		
12	CAB12		
13	VAB13	Completed	ongoing
14	AB14	Completed	Completed
15	CAB15	Completed	Completed
16	CAB16	Completed	Completed
17	CAB17	Completed	Completed
18	CAB18	Completed	Completed
19	CAB19	Completed	Completed
20	CAB20	Completed	Completed
21	HAB21	Completed	Completed
22	VAB22	Completed	Completed
23	VAB23	Completed	Completed
24	CVAB24	Completed	Completed
25	HAB25	Completed	Completed
26	CAB26	Completed	Completed
27	HAB27	Completed	Completed
28	CAB28	Completed	Completed
29	VAB29	Completed	Completed
30	CAB30	Completed	Completed
31	VAB31	Completed	Completed
32	HAB32	Completed	Completed
33	CAB33	Completed	Completed
34	VAB34	Completed	Completed
35	VAB35	Completed	Completed
36	VAB36	Completed	Completed
37	CAB37	Completed	Completed

Figure 8: Anchor block construction

4.1.11 Powerhouse and Tailrace

The concreting work up the maintenance bay level has been completed. The super structure construction work is in progress. The excavation of tailrace is also completed and concreting works is in progress.

Figure 9: Power house construction

4.2 Hydromechanical Works

The project has 2,512 m long penstock pipe. The penstock pipes have already been delivered at the site and the erection work is going on at site. About 1800 m length of penstock has already been erected till date. The design of gates, expansion joints, bifurcation, man hole etc. has been completed and fabrication is in process. The frames of bypass gate, undersluice gate and intake gate are also delivered at site. The steel lining work at the orifice intake is also completed. The frame installation of bypass gate and undersluice gate is completed. Similarly, trash rack frame installation of bypass canal is also completed.

Figure 10: Pipe erection work

4.3 Electromechanical Works

The design of electromechanical components is almost completed and now in the process of manufacturing and supply.

4.4 Transmission Line

The transmission line survey and detailed design has already been completed. The land required for the transmission line has been acquired. The detail design of transmission line including structural tower drawings has been already completed and approved. The contractor has already been mobilized and the tower foundation work is in going on at site. Out of 20 towers, the foundations of 10 towers are completed. Status of transmission line foundation works are summarized below.

Table 4: Transmission tower foundation work progress

S, N.	Tower Description	Excavation	Foundation Concreting
1	AP1	Completed	Completed
2	AP2	Completed	Completed
3	AP3	Completed	Completed
4	AP5	Completed	Completed
5	AP5/1	Completed	Completed
6	AP7	Completed	Completed
7	AP8	Completed	Completed
8	AP9	Completed	Completed
9	AP10	Completed	Completed
10	AP11	Completed	Completed

Figure 11: Transmission tower foundation construction

4.5 Land Acquisition

The project has already acquired 52 ropani land required for the project components, office, staff quarters, store, army camp, bunker and other facilities.

4.6 Camps and other facilities

The project has already constructed the office, staff quarter, store and other facilities required for the site staffs of the project. Similarly, the labor camps at headworks, adits and power house have also been constructed.

Figure 12: Camp & housing

4.7 Army Camp and Bunker House

The camps, bunker and other facilities required for the army are already completed. The army is stationed in the army camp.

Figure 13: Army camp

4.8 Environmental & Social Mitigation

The total budget allocated in the EIA report has already been released to the Sarokar Samiti. The project has also contributed to the CSR activities which include hume pipe laying, gabion works, river training works, upgrading community road, truss bridge, supply of electrical poles etc.

Figure 14: CSR activities

4.9 Access Road and Bridge

The construction of access road upto headworks has been completed. A hume pipe culvert has been constructed at the Kichhe Khola to cross the vehicle easily even in the monsoon season.

Figure 15: Access road

5 Work Progress

The realistic measurement of work progress in the construction is a key element for successful project management which provides as-built information for project planning, estimate, cost control etc. It helps determine the earned value of a project and forecasts the cost at completion and estimated completion date. The present work progress at the site has been monitored, evaluated and the corresponding individual work progress is presented in the table below.

Table 5: Individual physical progress achieved

S.N.	Description	Total Work	Progress till date	Progress % till date	Remarks
1	**Civil Works**				
A	**Underground Structure**				
i	Approach pipe	200 m	20 m	10%	Partially excavated
ii	Approach Tunnel	420 m	252.6 m	60%	Excavation in progress
iii	Portals, Adits, Headrace Tunnel and Forebay	3971 m	3304.1 m	83.2%	Excavation in progress
B	**Surface Structure**				
i	Coffer dam			100%	Completed
ii	Weir & Undersluice			65%	Cut off walls are 80 % completed & undersluice, divide walls & guide walls are 80 % completed.
iii	Intake & Gravel trap			30%	Excavation work in progress
iv	Settling Basin			50%	1st and 2nd benching excavation completed remaining last benching excavation work in progress & slope stabilization work (rock bolt, wiremesh, shotcrete) in progress

v	Flood Protection Work			55%	Flood protection works as per requirement at different locations.
vi	Penstock and Anchor Blocks (surface)			89%	Out of 37 nos. of anchor blocks and 318 nos. of saddle blocks, 25 nos. of anchor blocks & 260 nos. of saddle blocks are completed and remaining works are ongoing.
vii	Power House & Tailrace			75%	Foundation works, shear walls and concreting upto maintenance bay level is completed and superstructure concreting work is in progress Tailrace excavation is completed and concreting work is ongoing.
viii	Switchyard			20%	Site clearance & excavation work is in progress.
ix	Spillway canal			20%	Excavation work in progress.
2	**Hydromechanical Works**			85%	Out of 2512 m, 1800 m length penstock has been erected and testing completed. Steel lining in intake & undersluice are completed and steel frame installation is in progress.
3	**Transmission Line**			35%	Procurement of Land completed. Out of 20 towers, the foundations of 10 towers are completed. LC has been open for tower materials.
4	**Electromechanical Works**			45 %	Design completed and manufacturing and delivery is in progress.
5	**Access Road**			100%	Completed.

Based on the progress presented in table 5, the physical progress was calculated and it is 66.09% till date.