

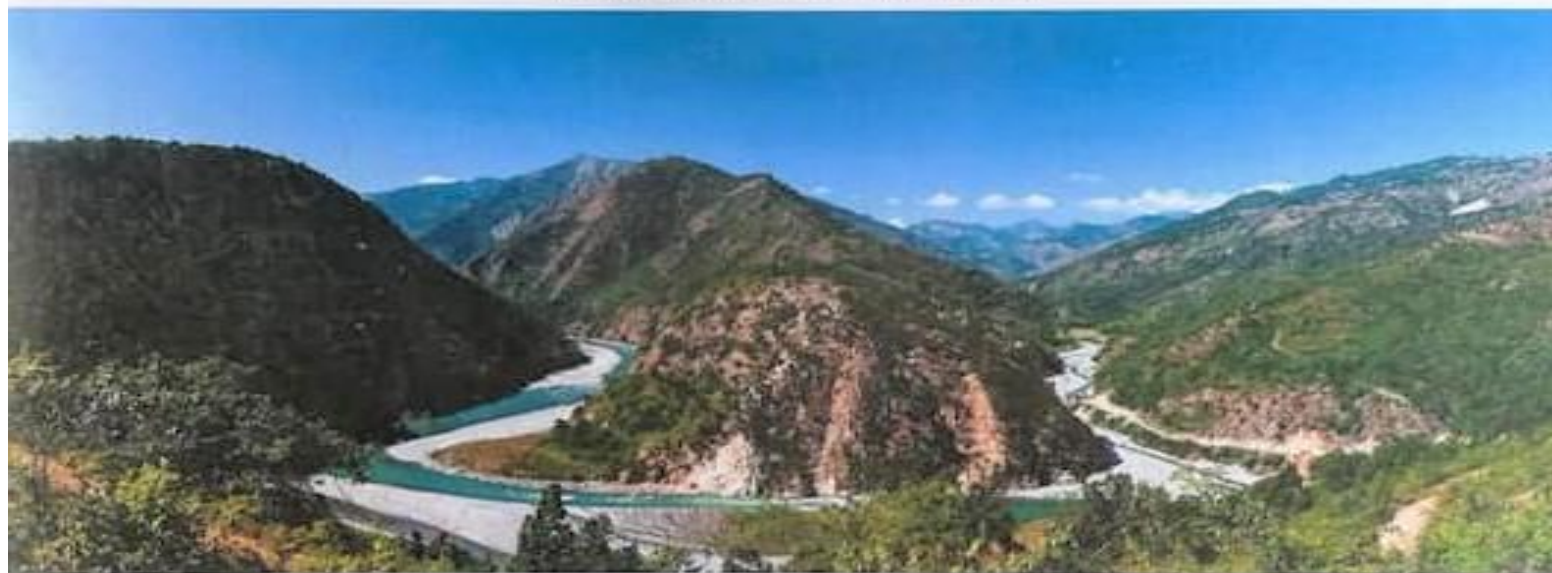


NEPAL ELECTRICITY AUTHORITY

(A Government of Nepal Undertaking)

Updated Feasibility Study and Detailed Design of DUDHKOSHI STORAGE HYDROELECTRIC PROJECT

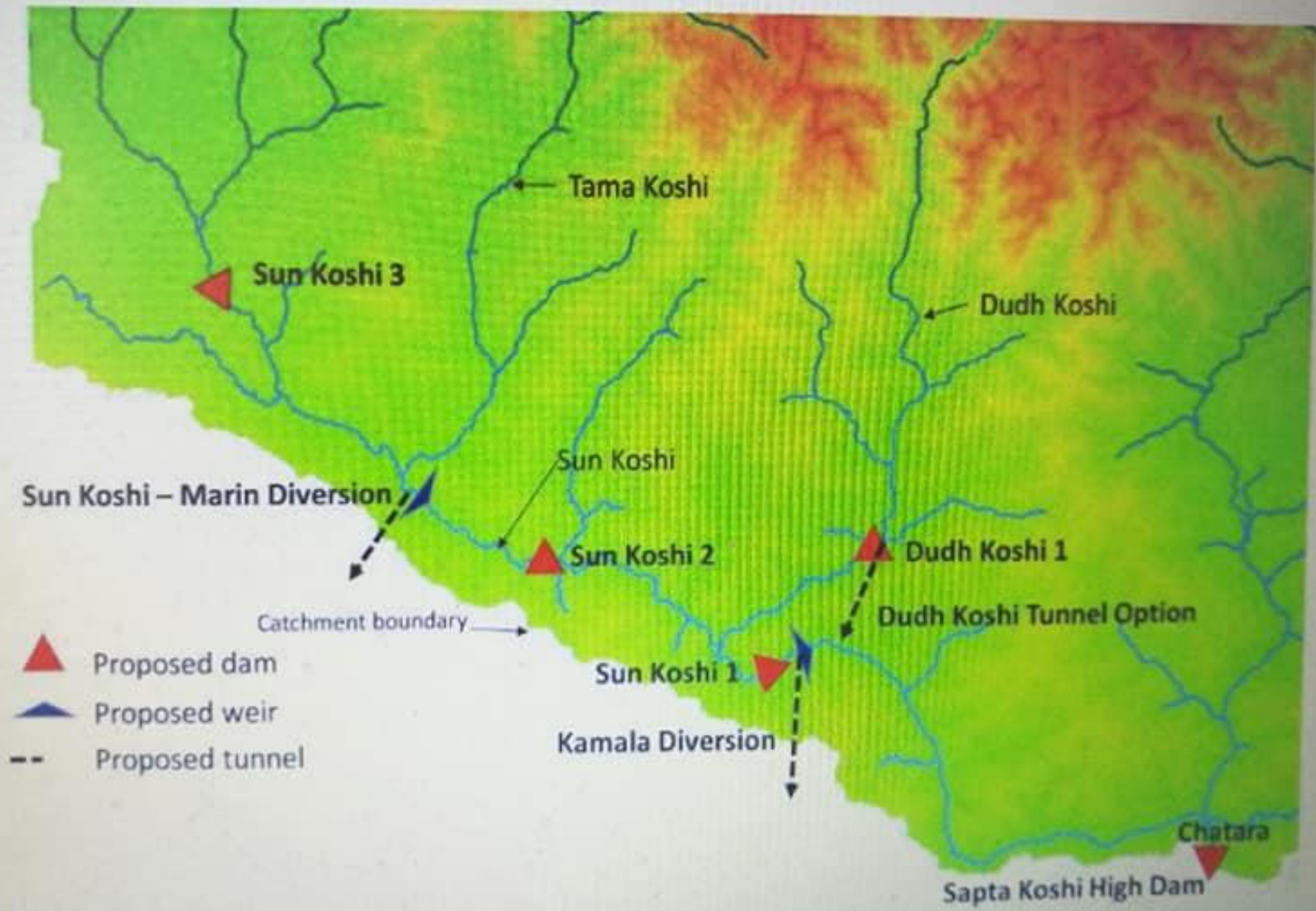
In Khotang and Okhaldhunga Districts



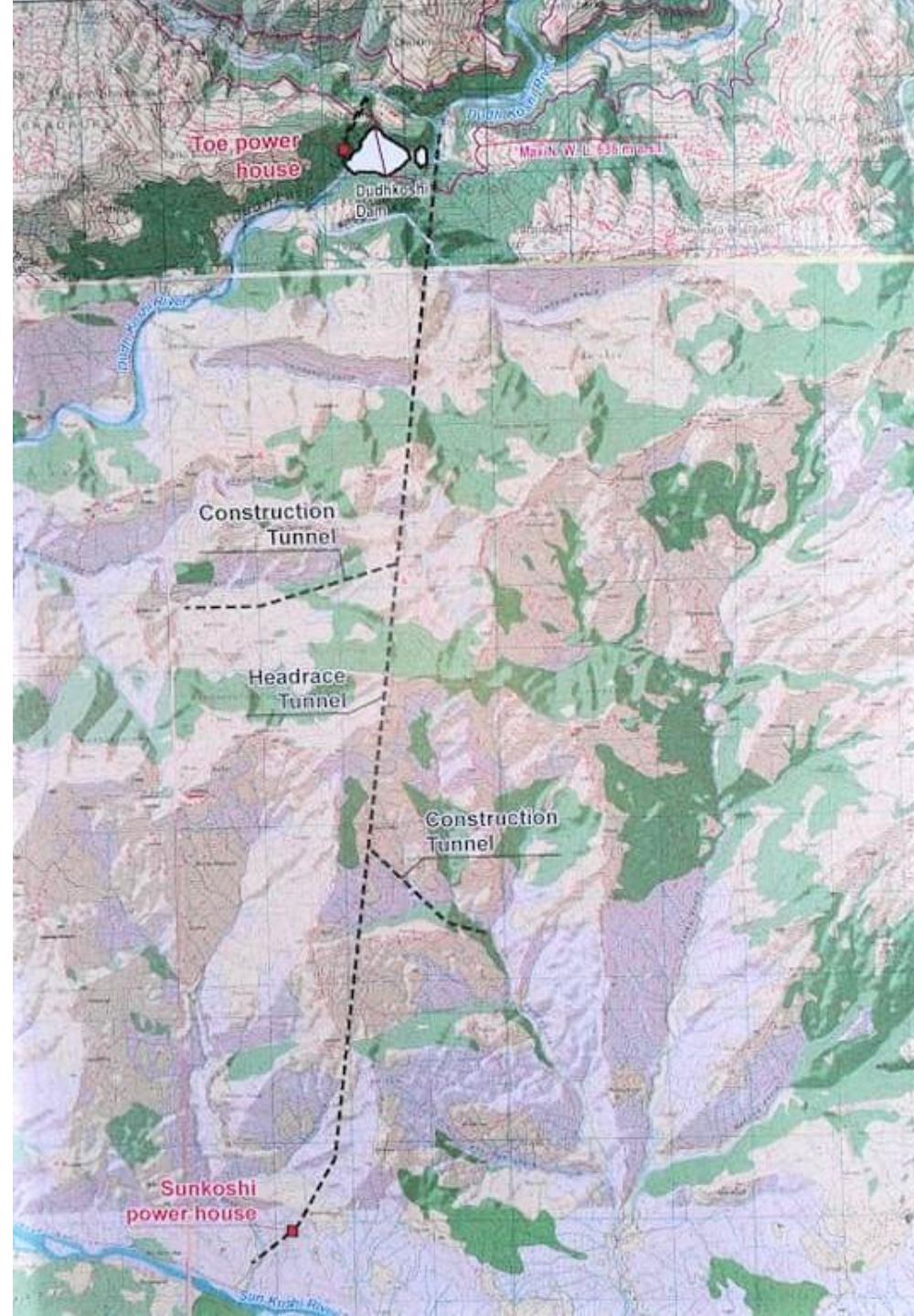
**FINAL UPGRADED FEASIBILITY STUDY
DRAWINGS**

Dudh Koshi Storage Project Location

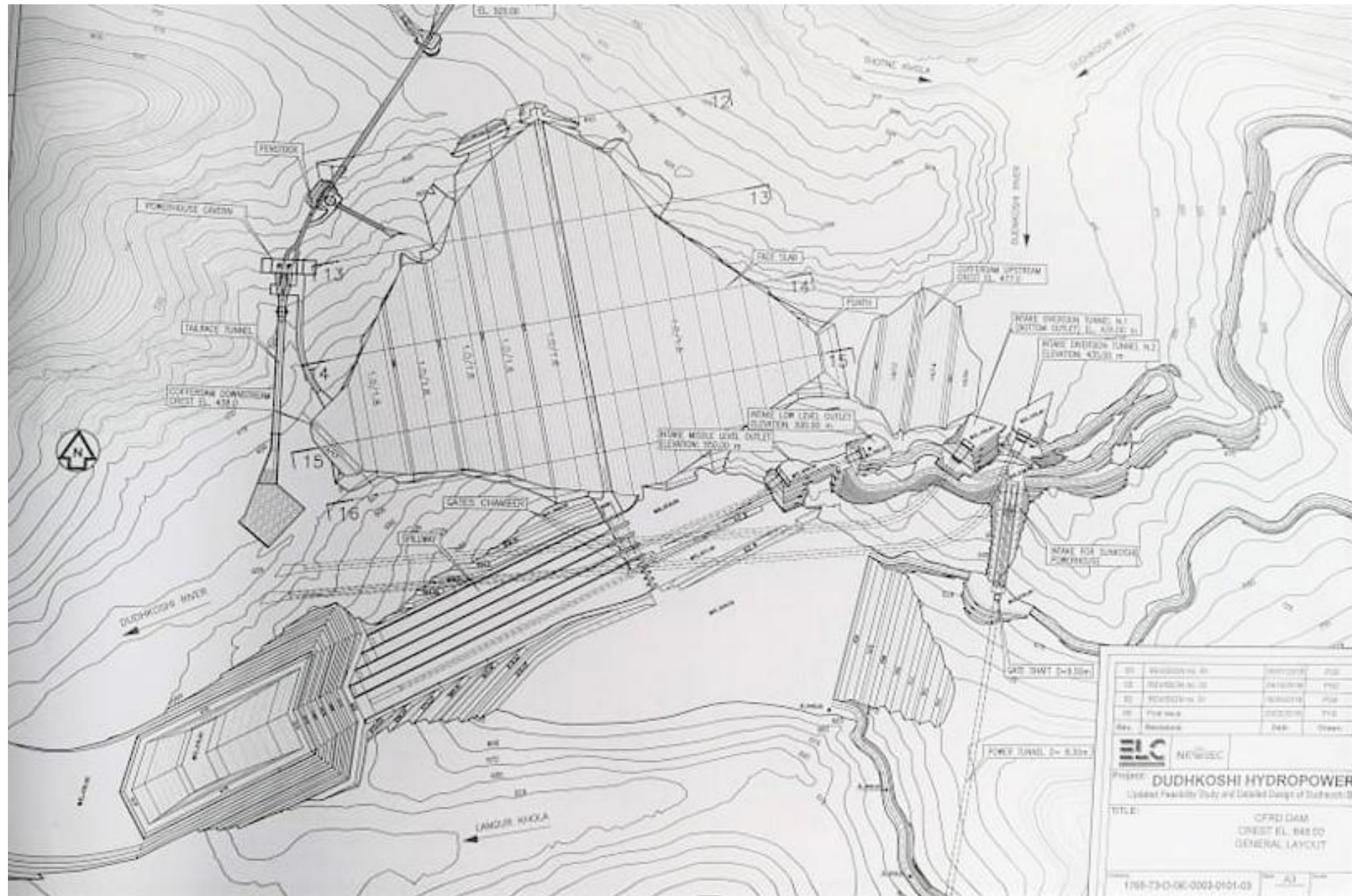
to the Dudh Koshi Dam Options







Headworks Plan



Concrete Faced Rockfill Dam

Dam high: 220 m from river bed, Gross Head 330 m

Dam crest length: 602 m

Dam crest width: 16 m

Dam slopes: u/s 1:1,45, d/s: 1,80

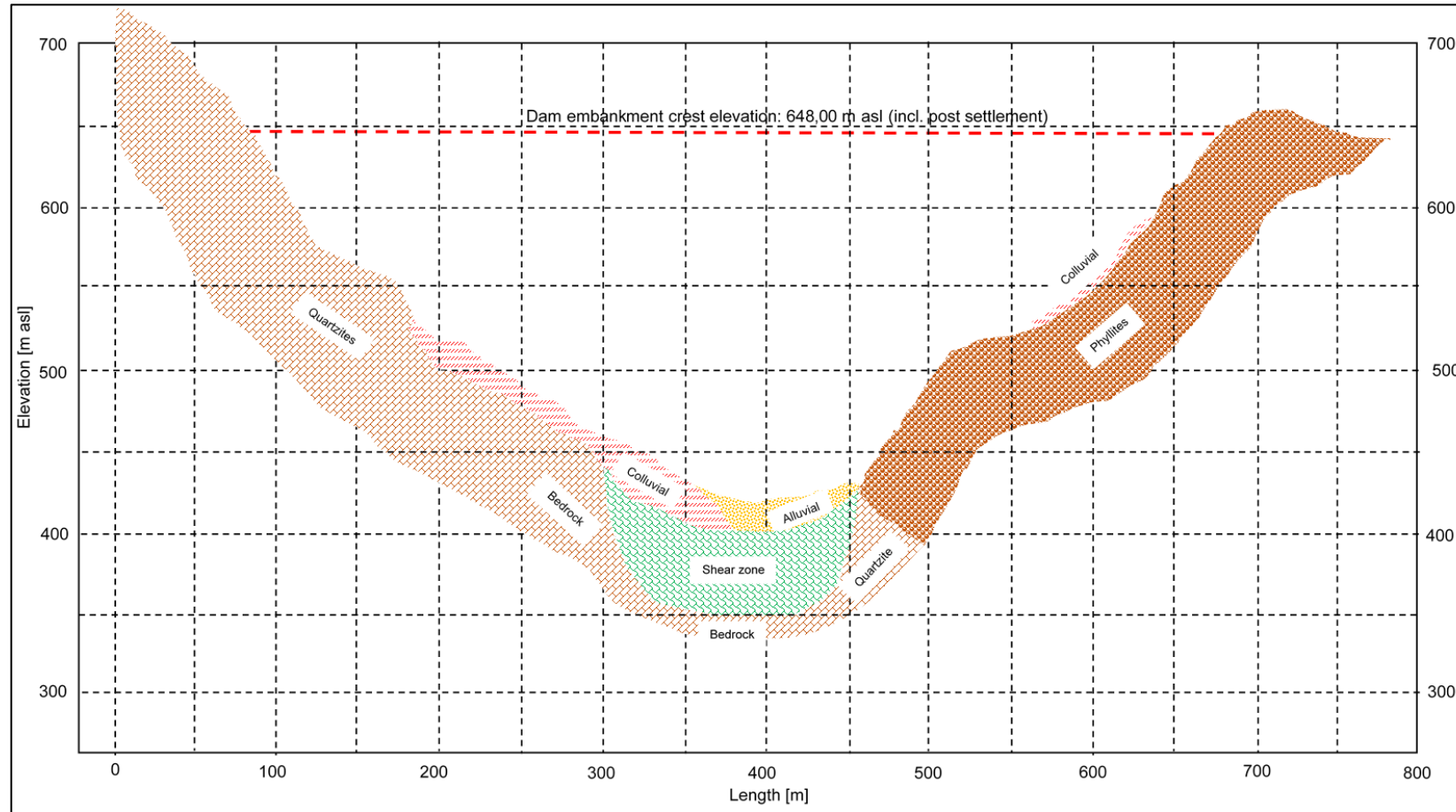
Main rockfill material: quartzite

Storage volume: 1600 Mio. m³

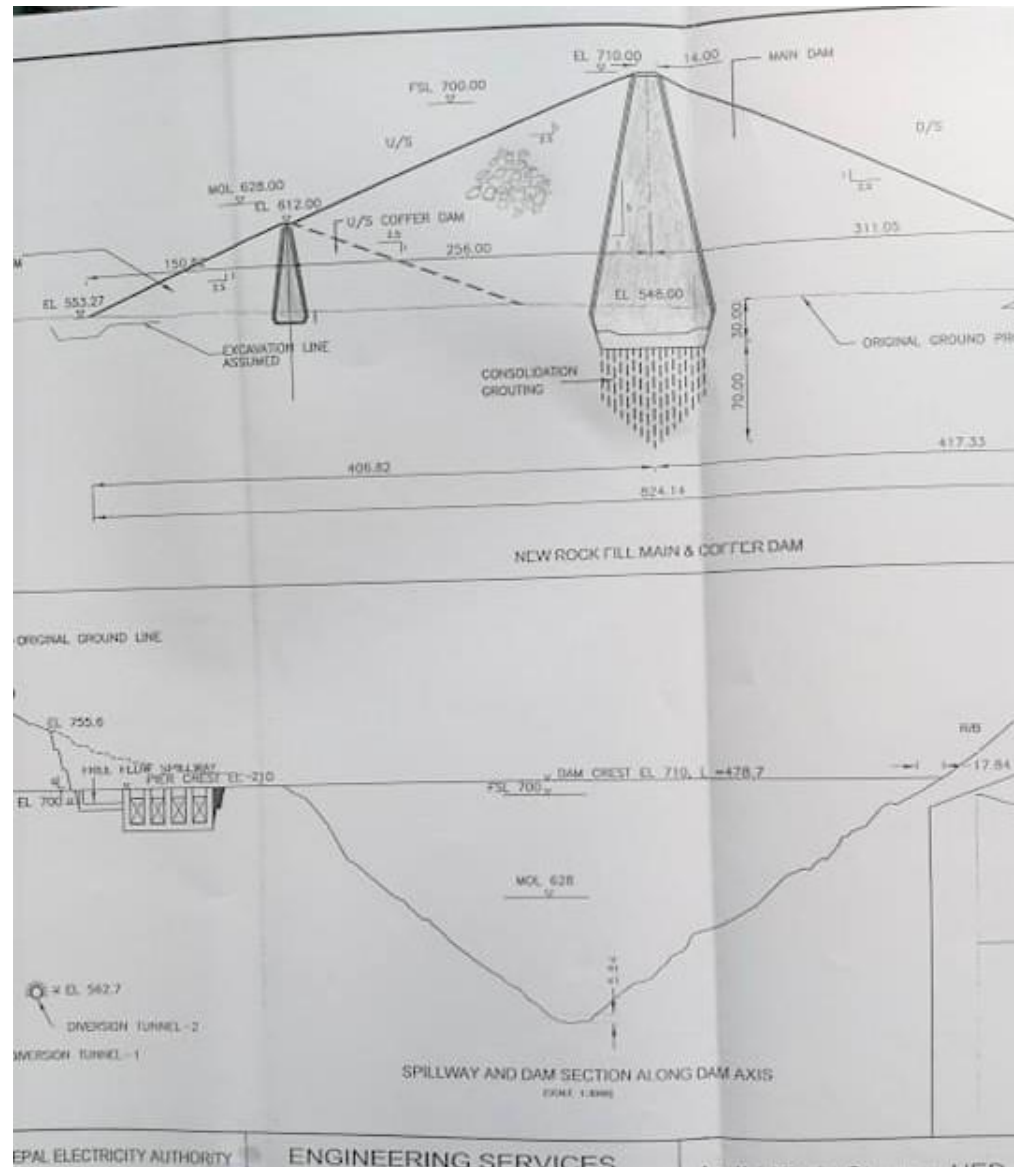
Concrete Faced Rockfill Dam (CFRD) Shuibuya



Cross section at dam site – quartzite /phylite



Rockfill Dam cross section

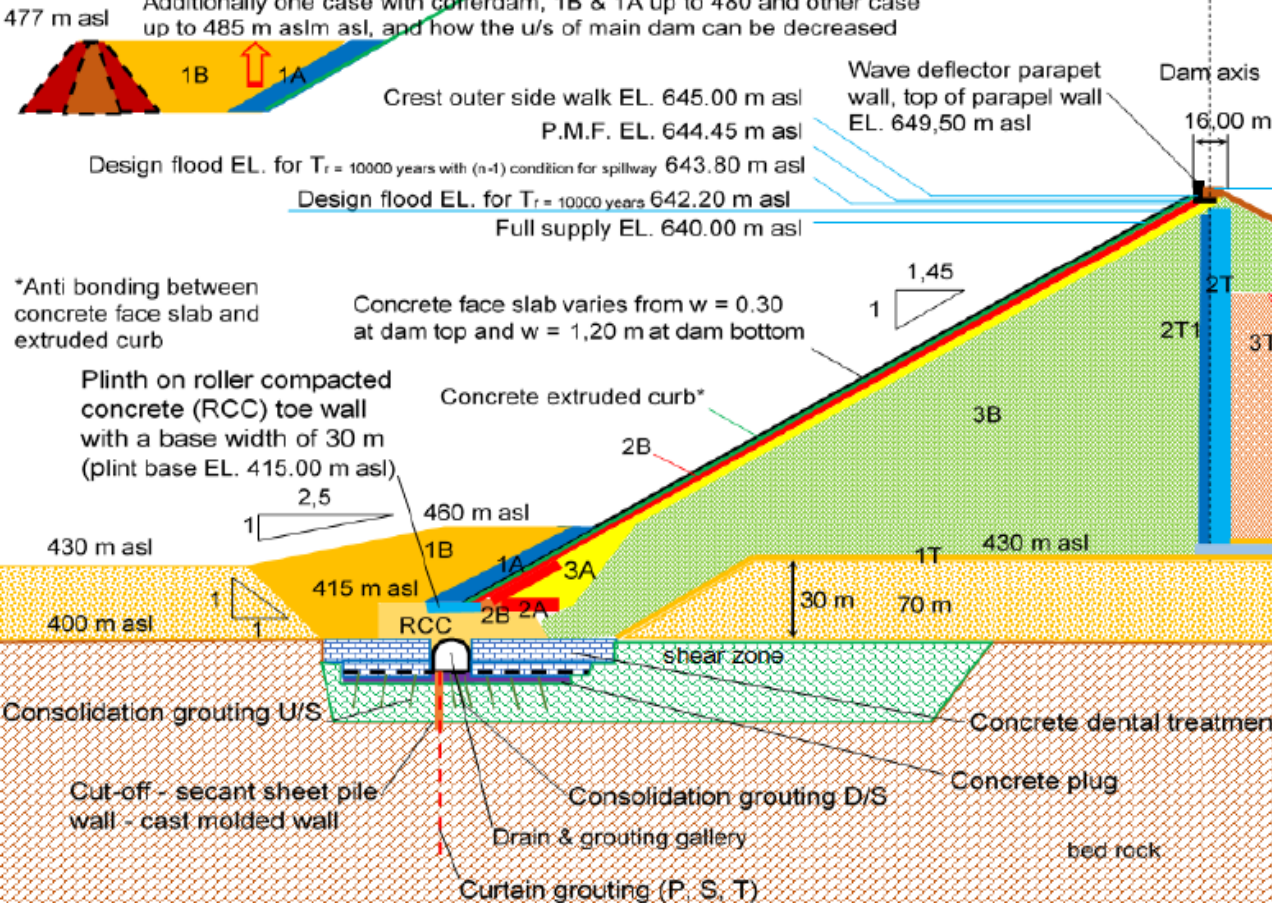


Dudh Koshi - CFRD

Cofferdam upstream (made of impermeable material the core and rockfill the shoulders) so high as required for stability of main dam u/s slope, considering an stabilizer block between main dam u/s slope and the d/s of the cofferdam (EL top cofferdam starts with last stability run computation).

1B & 1A min. 460 m asl, max. up to 477 m asl.

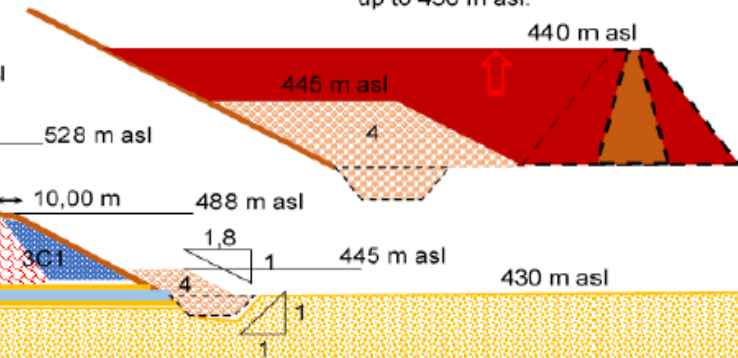
Additionally one case with cofferdam, 1B & 1A up to 480 and other case up to 485 m asl, and how the u/s of main dam can be decreased



All the other layer thickness (1A, 2B, 2A, 3A, T and drain) are similar as in the last run computation called „Model (2) / Modified 3“

All the berms in the d/s slope are 10,00 m wide.

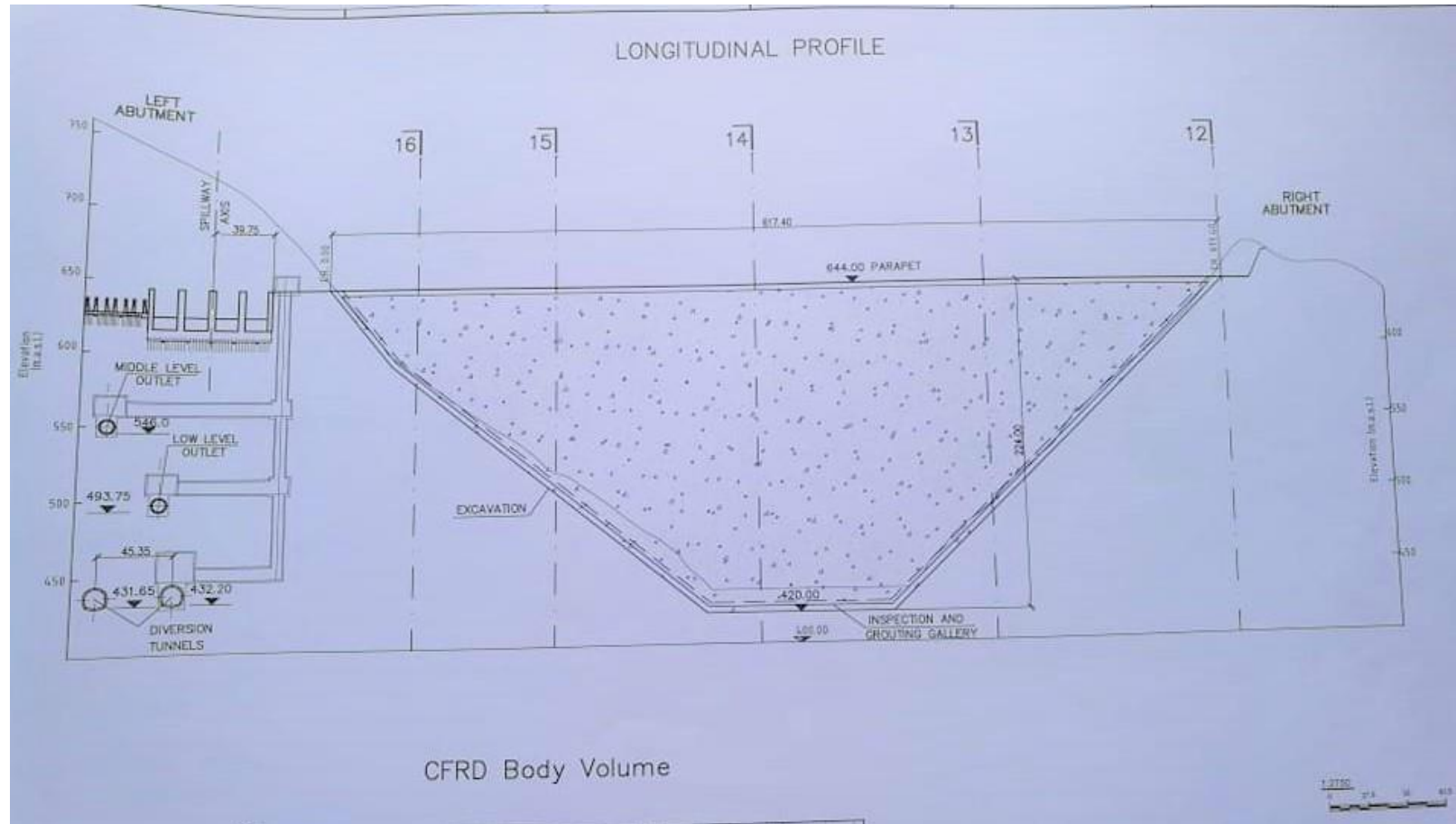
Cofferdam downstream (made of impermeable material the core and rockfill the shoulders) so high as required for stability of main dam d/s slope, considering an stabilizer block between main dam d/s slope and the u/s slope of the cofferdam (EL top cofferdam starts with 440 m asl and increases up to stabilize it selfs and main dam body, probably up to 450 m asl).



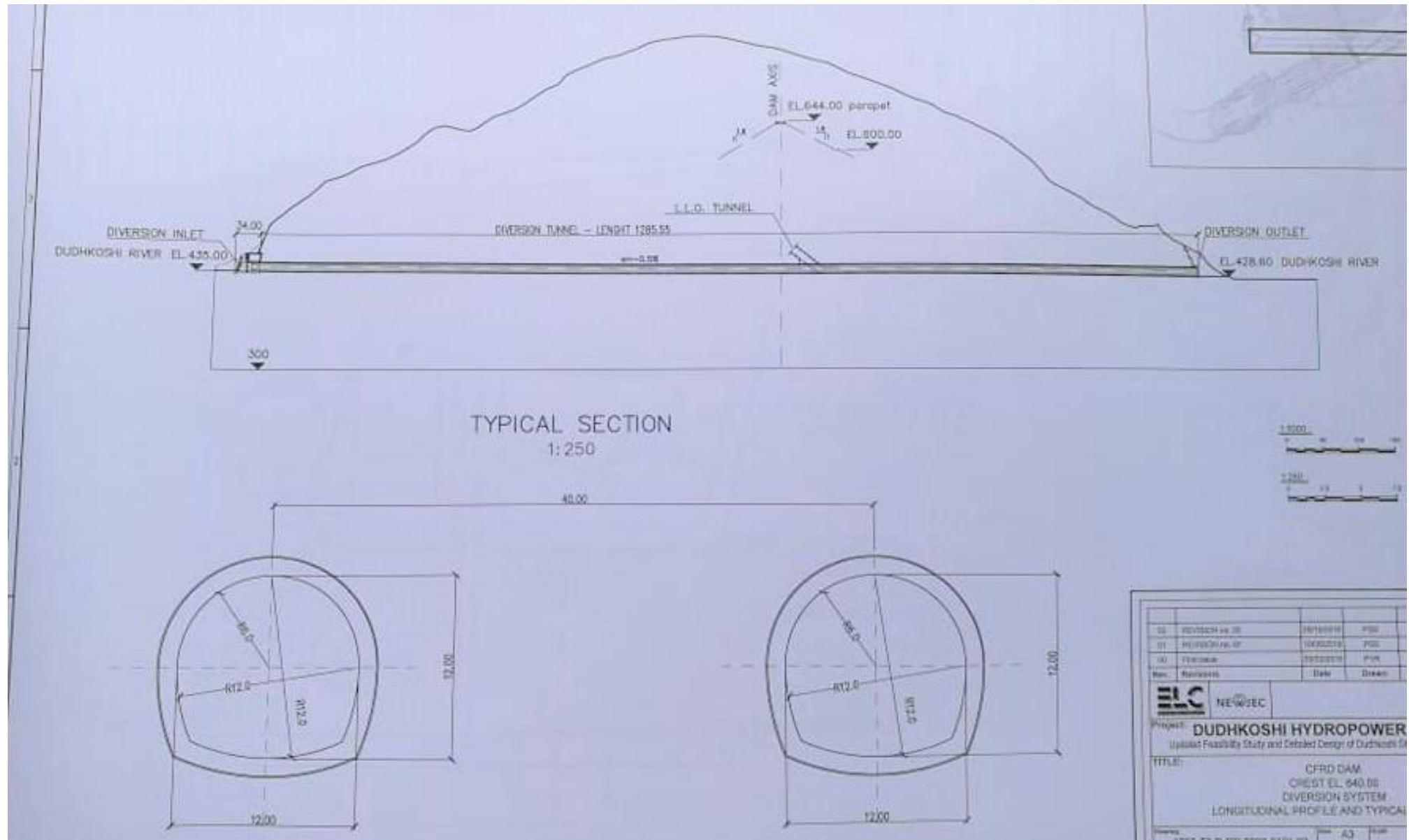
CFRD design features

- Material characteristics are stress dependent
- Stability analysis with different rockfill parameter
- Estimation of rockfill settlement needed for face slab design
- 3D model analysis for arching effect and stress
- Tension/ compression joints along the vertical

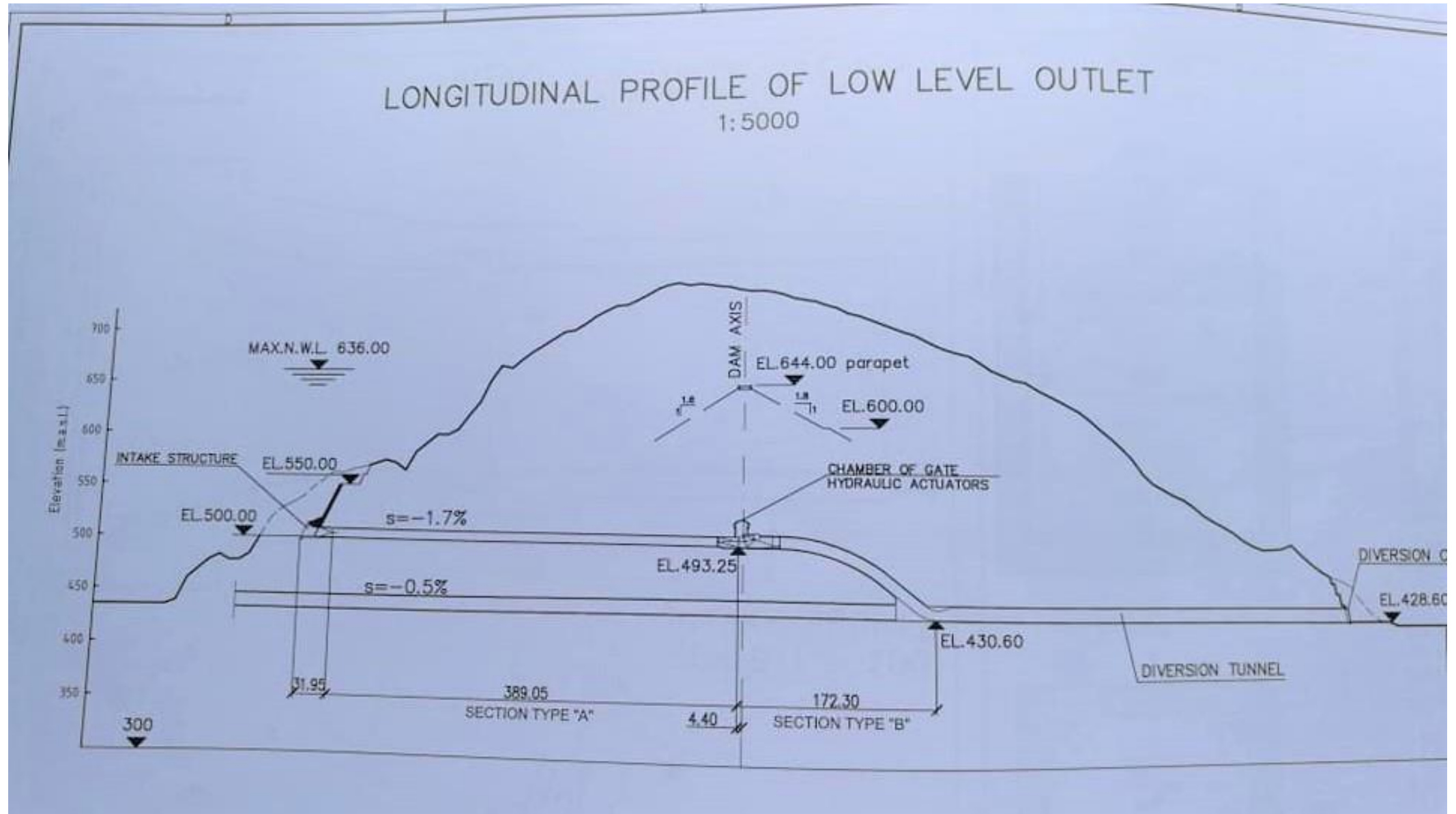
Dam Elevation with spillway and outlets



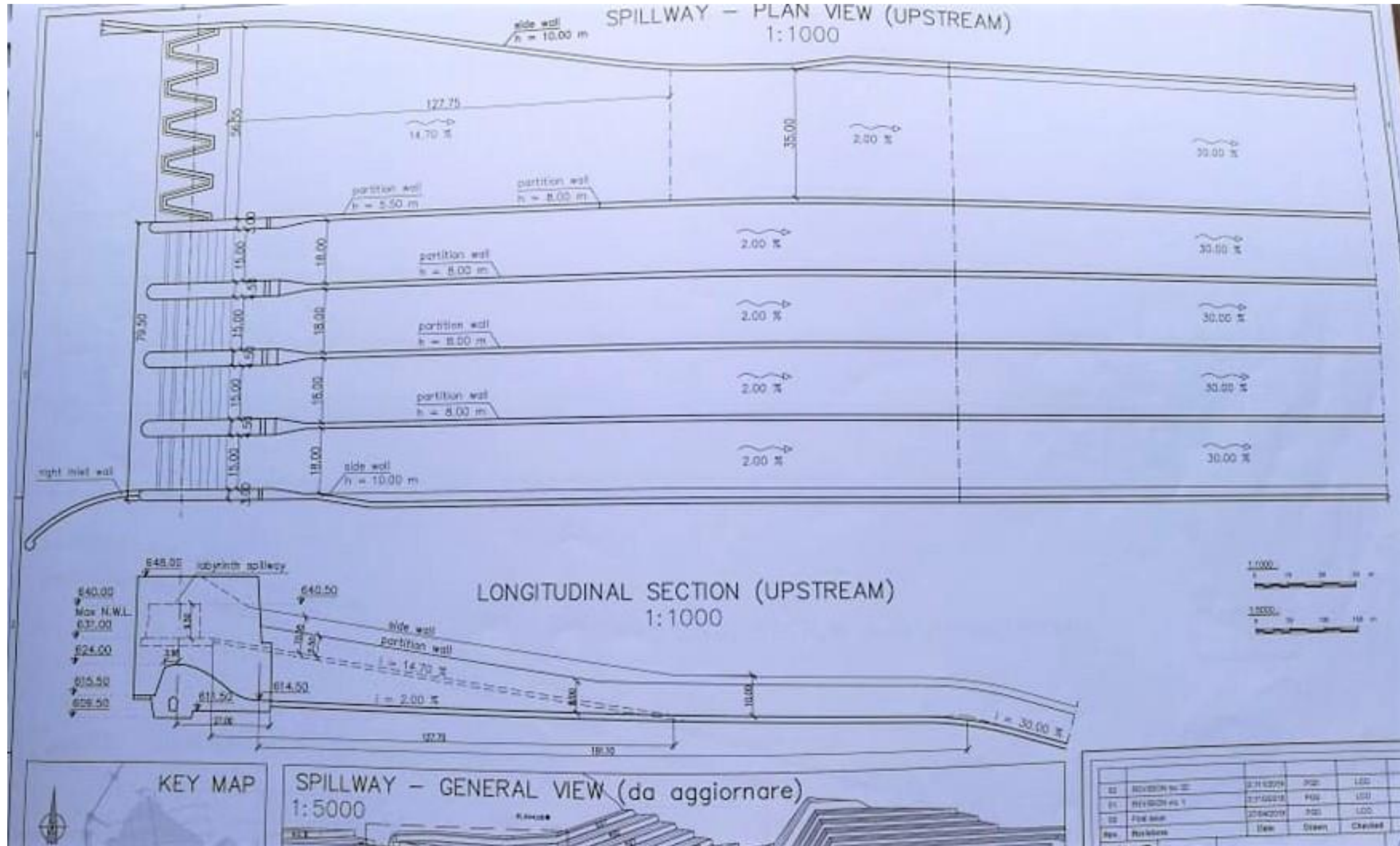
Diversion Tunnel 2 no.s of 12 m. dia.



Mid & Low level outlets for dewatering



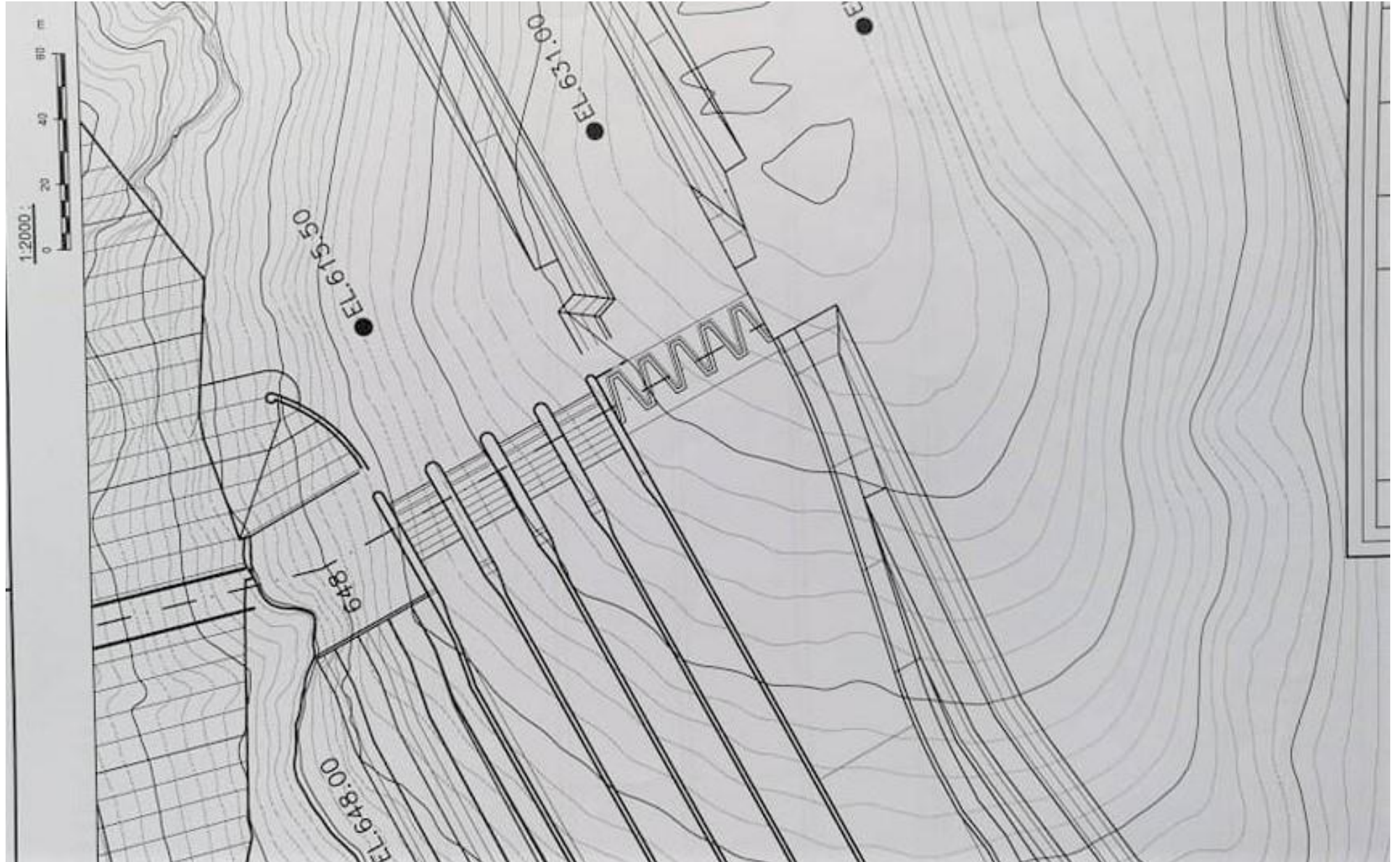
Gated spillway and Labyrinth section



Labyrinth Spillway



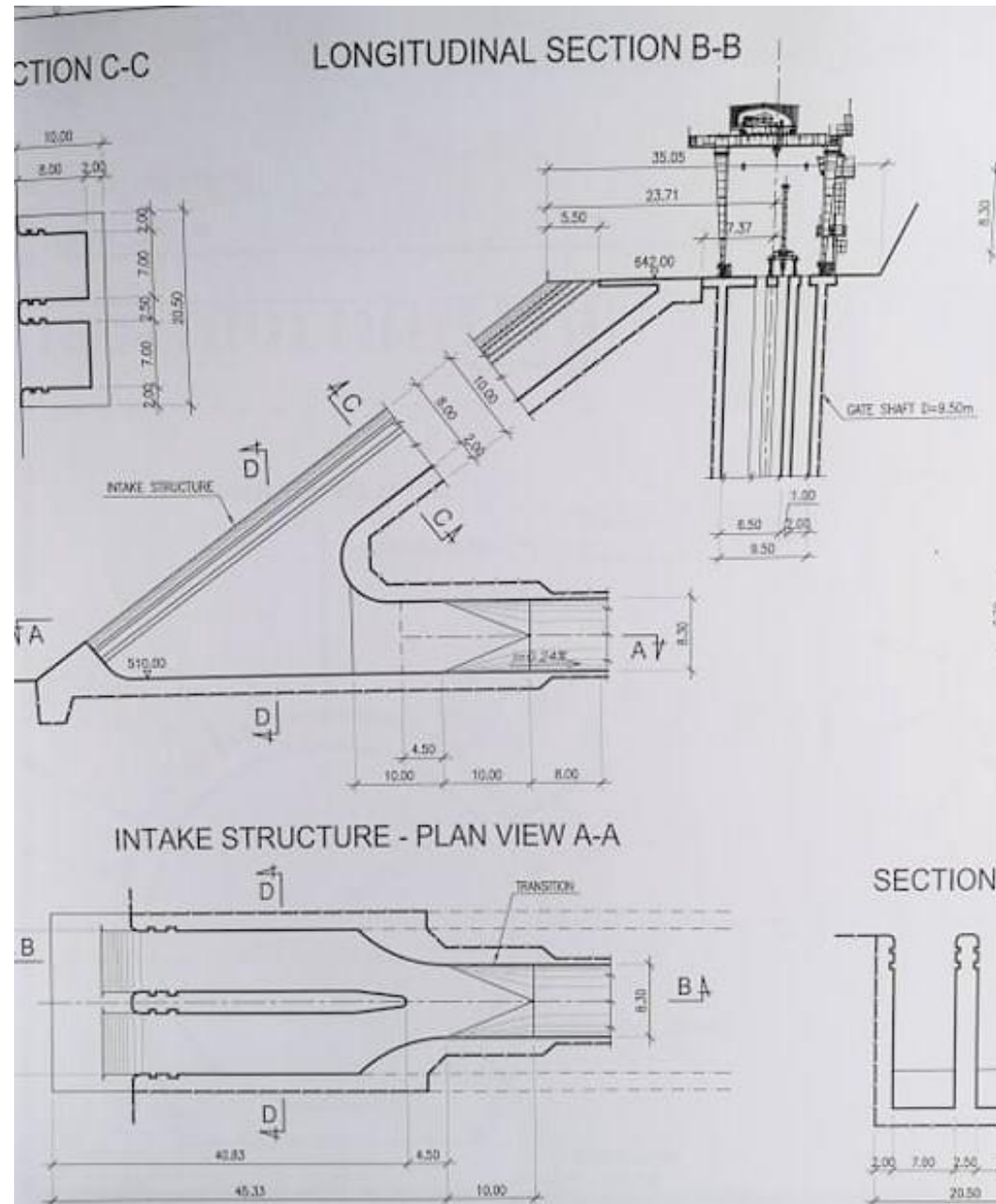
Spillways – Gated & Labyrinth



Sloping Intake



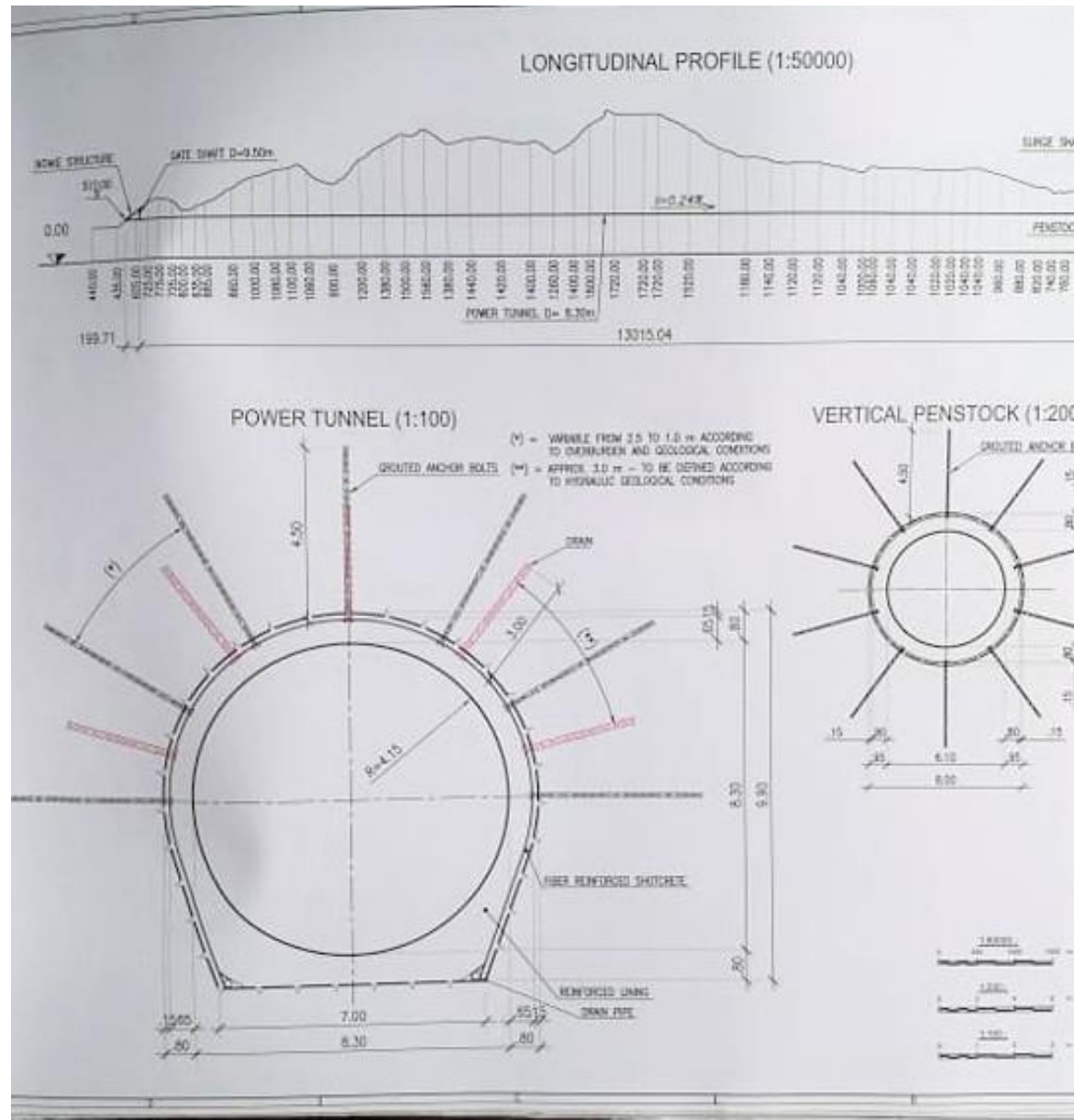
Sloping intake cross section



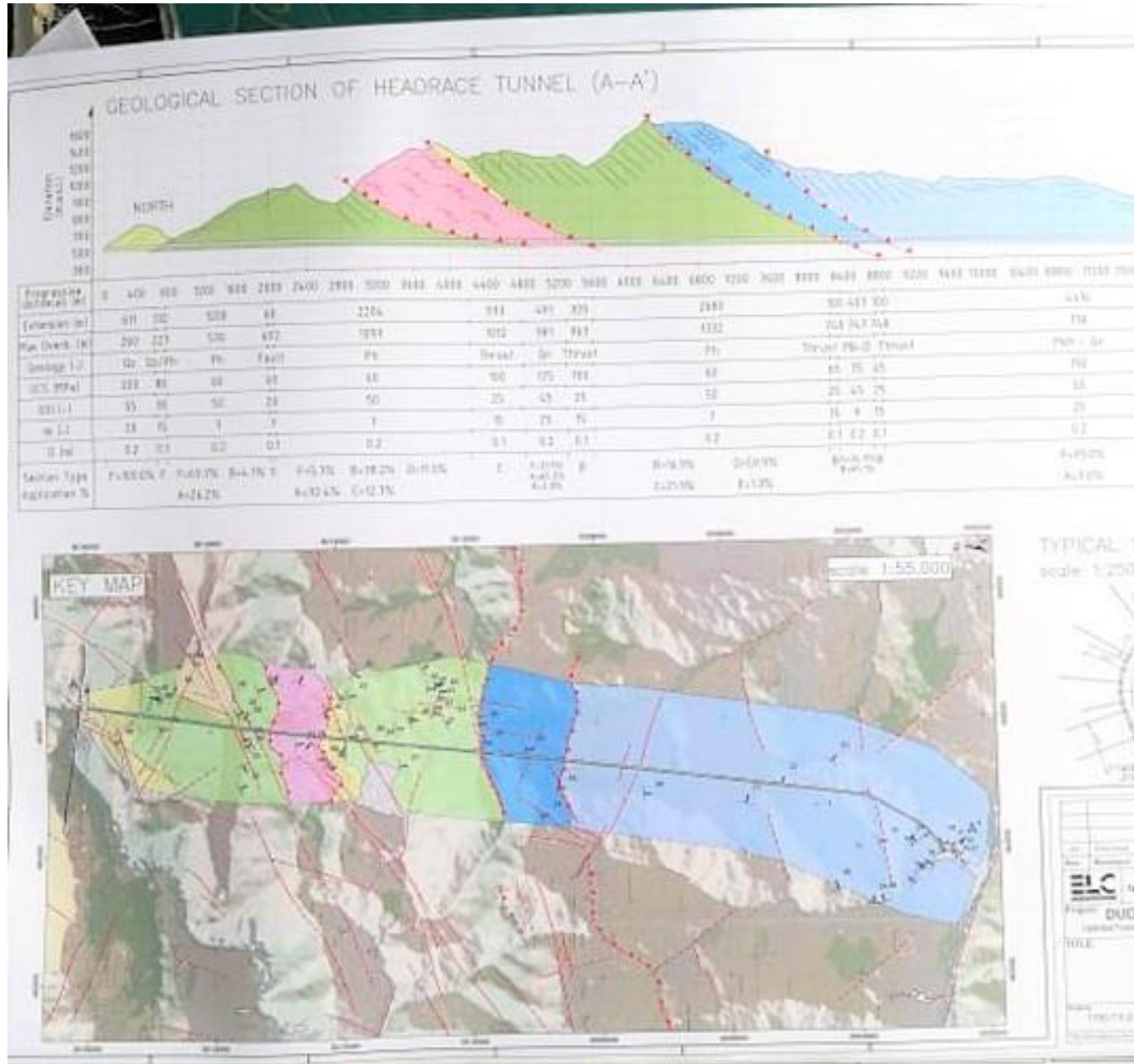
Headrace Tunnel 13.3 km long 8.3 m dia.



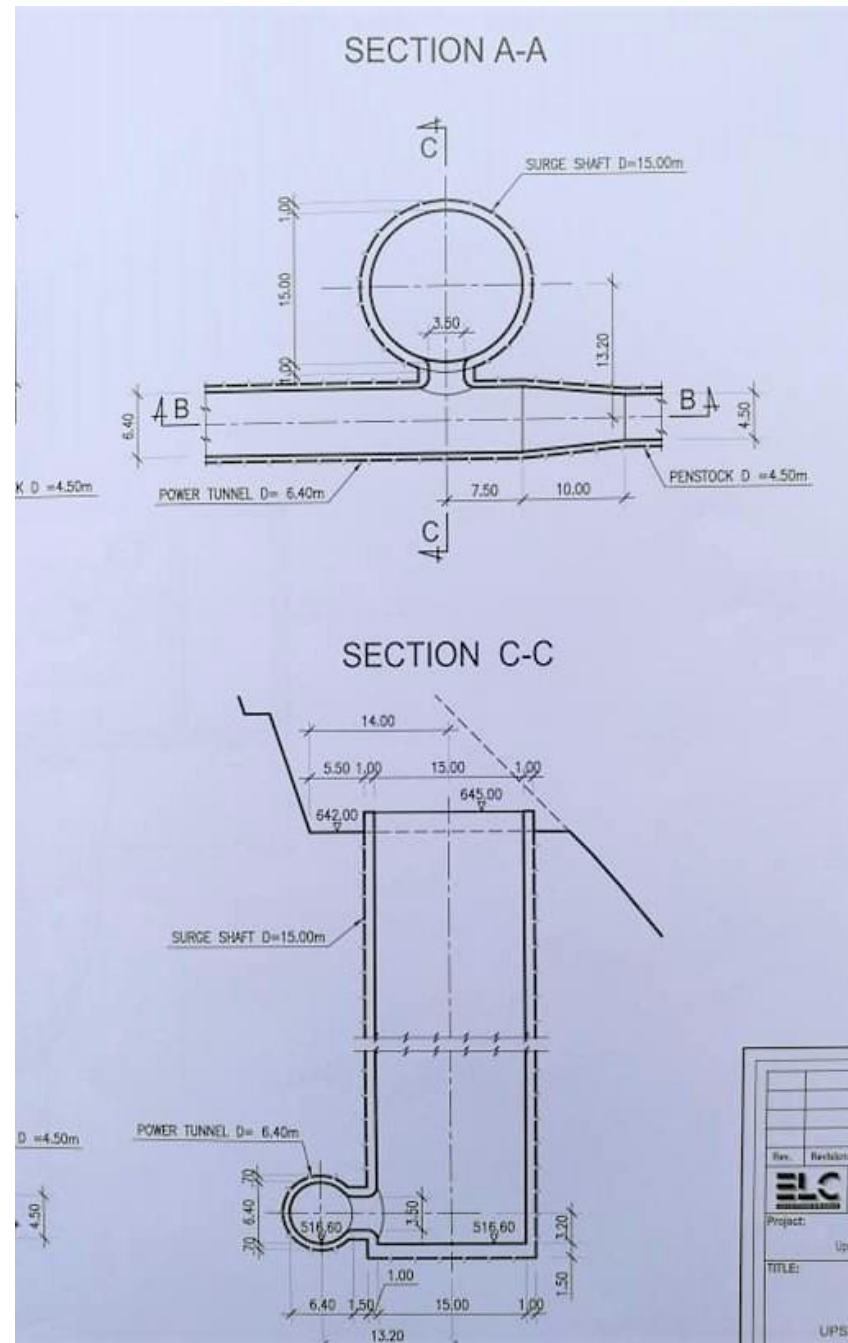
Headrace tunnel profile and cross section



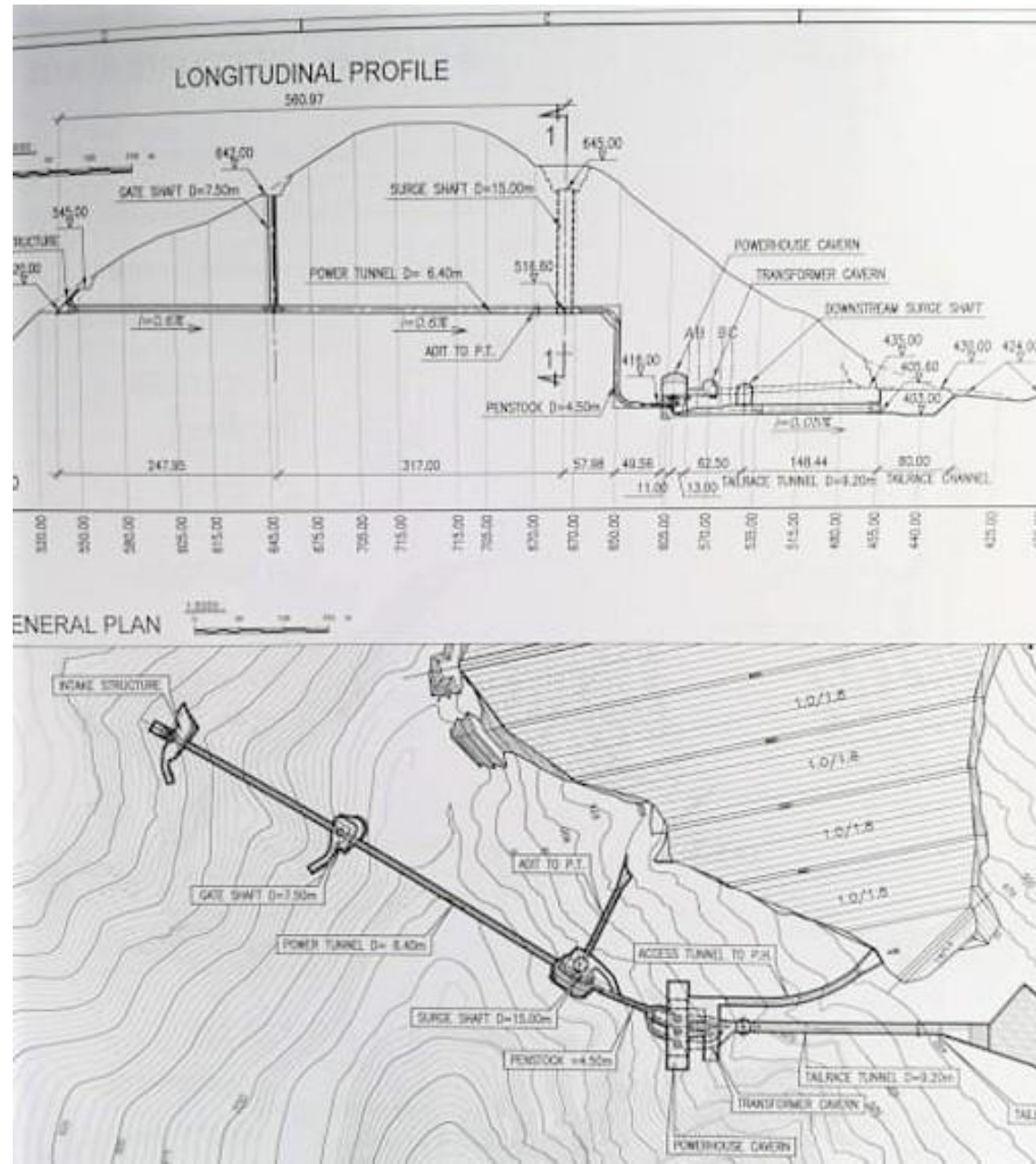
Headrace tunnel profile and plan



Surge Shaft

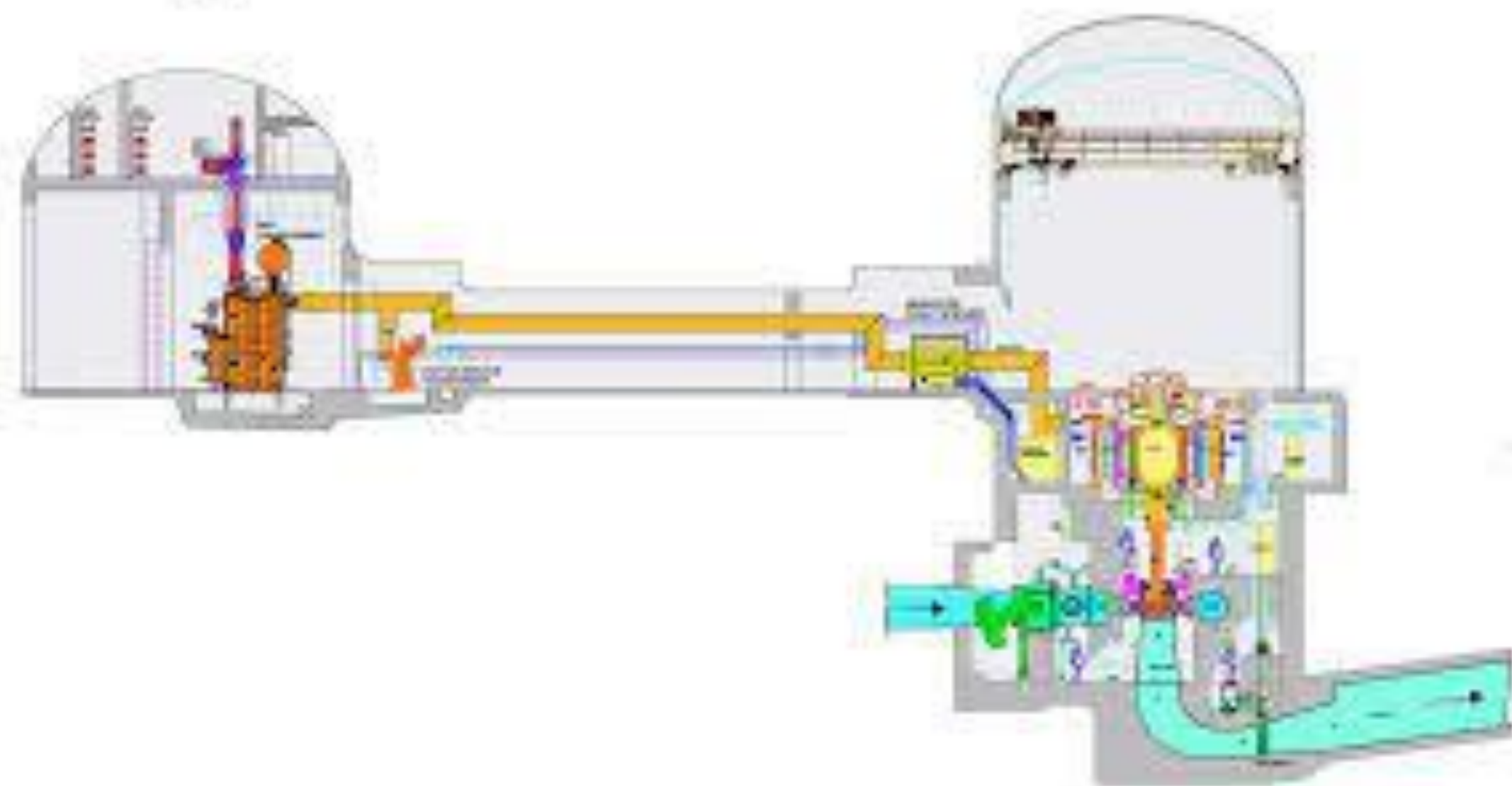


Profile & Plan of Toe powerhouse 36 MW

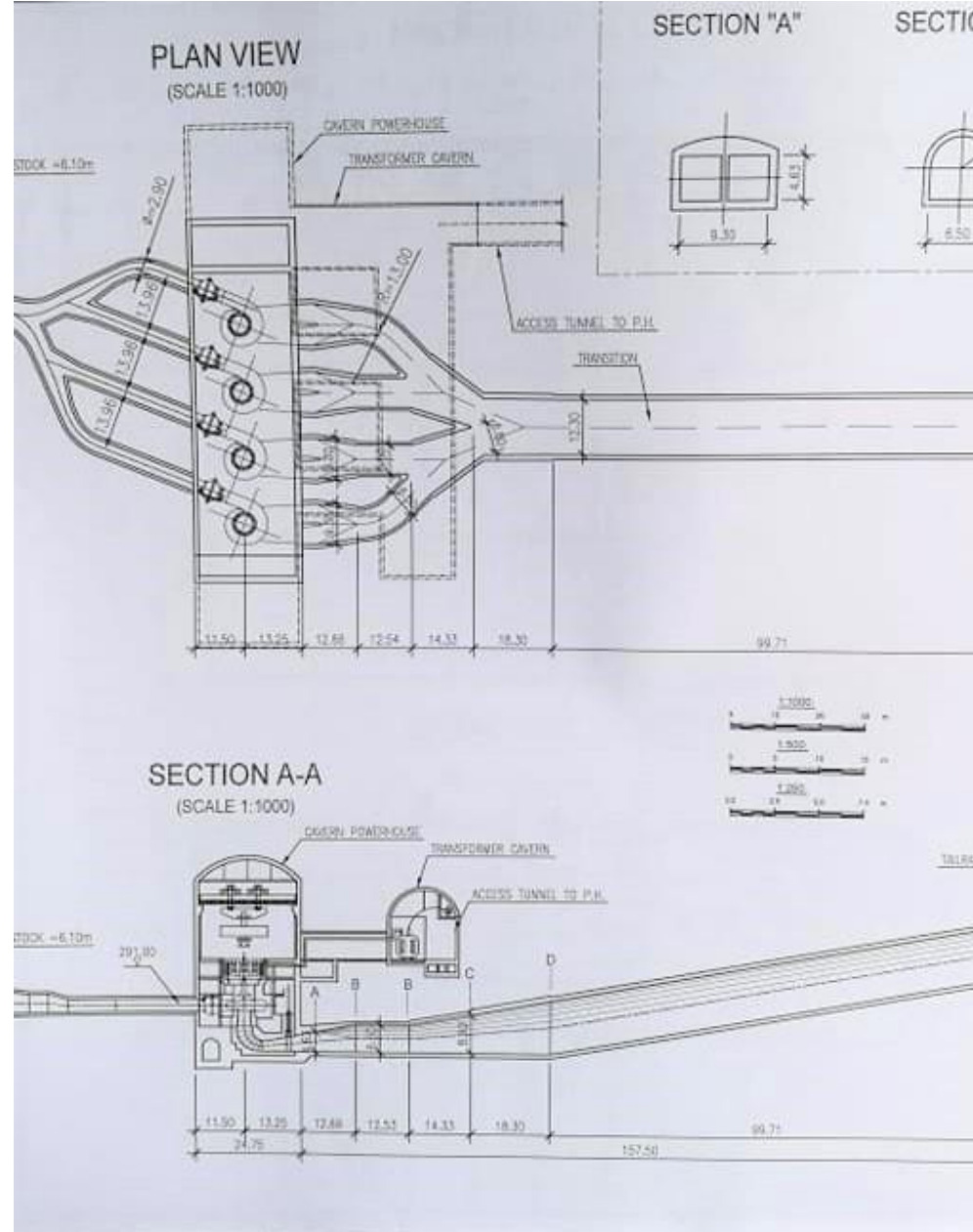


Transformer
Hall

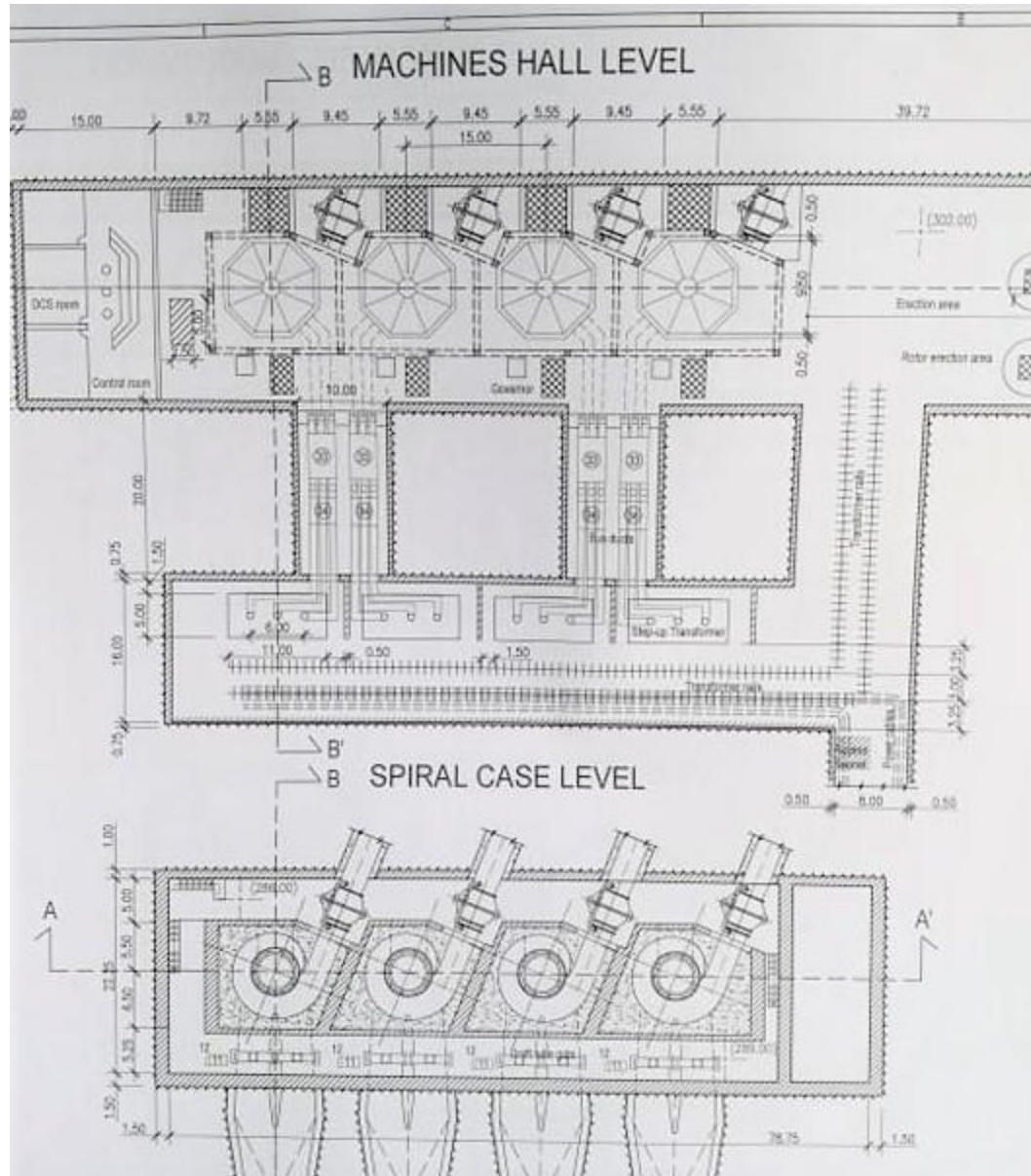
Powerhouse



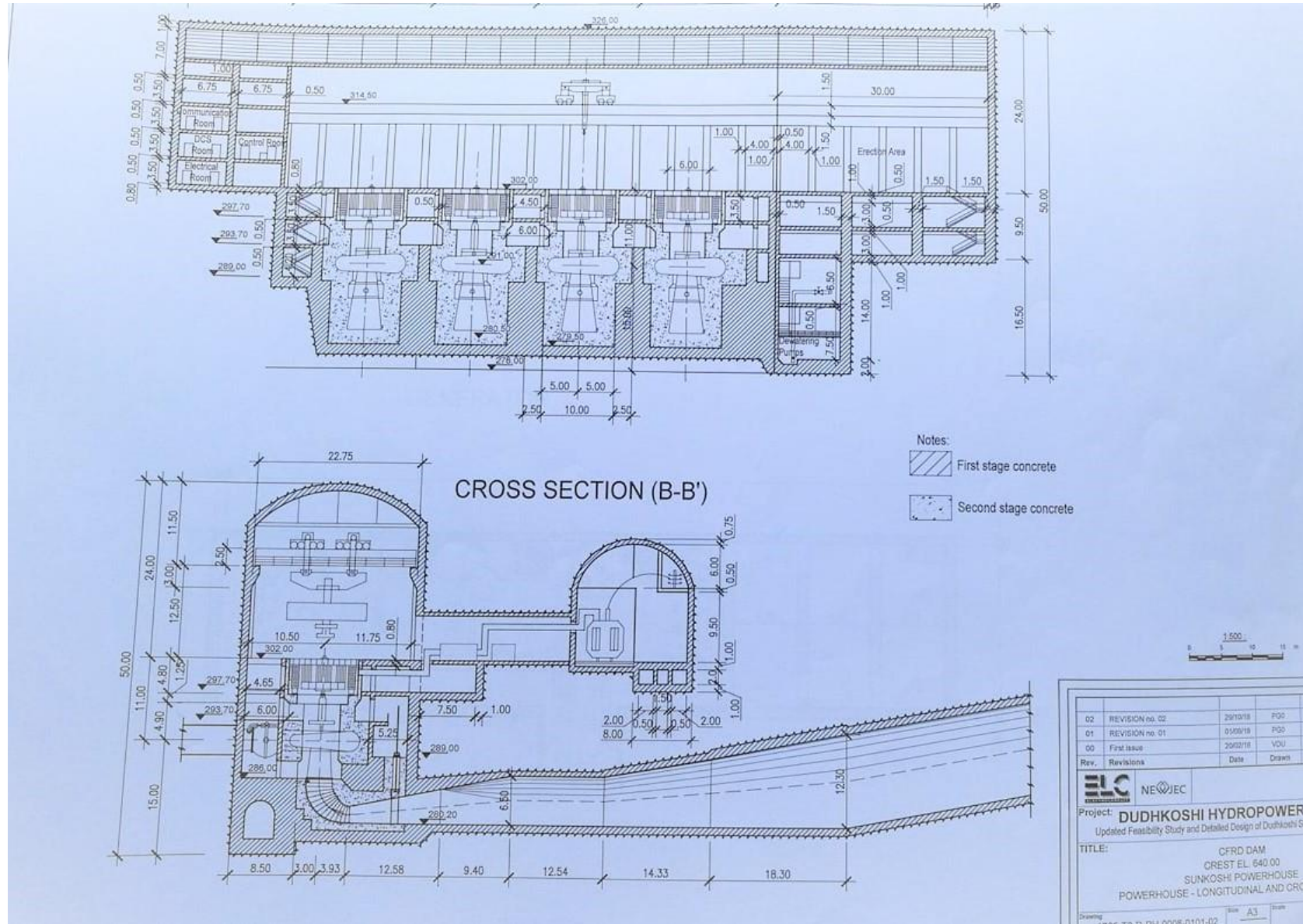
Plan and Profile of underground Powerhouse



Powerhouse Plans (Generator & turbine floors)



Underground Powerhouse 150 MW x 4 units



Underground Powerhouse



Dudh Koshi Storage - Summary

- CFRD dam ht. 220 m Capacity 635 MW
- Headrace tunnel 13.3 km length, 8.3 m dia.
- Total annual energy 3443 GWh , Dry season energy 40%
- Transmission Line 400 KV , 85 km length to Dhalkebar
- Estimated basic cost 1531 Million \$
- Financial rate of return 9.6%
- No. of household for relocation 200
- Construction period 6 years
- Funding commitment by ADB