Annexure-III

Date 10/01
Computer Diary No. 3670497 4

**REGISTERED**

No. Ind. Bhu (Geo-7)Engg.-Tribal-KNR-Land Slide-233/2011
Government of Himachal Pradesh,
Department of Industries,
"Geological Wing"

Dated; Shimla - 171001, the 2024

Tribal Development Authority
Dy. No 1306
Dated 16/7/24

To,

The Deputy Commissioner,
Lahaul & Spiti at Kelong,
Distt. Lahaul & Spiti, H. P.

**Subject: -** **Request for Geological report of proposed EMRS Construction Site as per Ministry of Environment, Forest & Climate Change (MoEF &CC) requirements.**

Sir,

Kindly refer to your letter No. KLG-ITDP-EMRS/2018-1-2197-2198 dated 19.03.2024 on the subject cited above.

Please find enclosed herewith a Geological Report for the construction of the proposed Eklavya Model Residential School (EMRS) Building in Kukumseri, Tehsil Udaipur, Disict Lahaul & Spiti, H.P. for information and further necessary action.

Enclosed:- As above.

Yours faithfully,

Geologist (Zone-IV)
Geological Wing
Department of Industries,
Himachal Pradesh
Dated 26-7- 2024

Ends. No. As above. - 2866
Copy to:- The Addl. Commr.-cum-Joint Secretary (TD) to the Government of Himachal Pradesh, Shimla-2 w.r.t. their letter No. TBD(MRS)(F)10-4/2024-Deptt. dated 25.6.2024 for information please.

11/7/24
J.S.(TD)
SO(TD)
11/7/
JD/TD

Geologist (Zone-IV)
Geological Wing
Department of Industries,
Himachal Pradesh

Divisional Forest Officer
Lahaul Forest Division
Keylong (H.P.)

Project Officer,
ITDP Lahaul at Keylong.

# GEOLOGICAL REPORT FOR THE CONSTRUCTION OF THE PROPOSED EKLAVYA MODEL RESIDENTIAL SCHOOL(EMRS) BUILDING IN KUKUMSERI TEHSIL UDAIPUR, DISTRICT LAHUL-SPITI H.P

The Addl. Commr.-Cum-Joint Secy(TD) to the Govt. of Himachal Pradesh, Shimla-02, vide letter no. TBD(EMRS)(F)-10-4-2024-Deptt., dated 20.03.2024 requested The Director, Department of Industries, Majitha House, Shimla(H.P)-171002 to for the submission of ***Geological report*** for a case of a land transfer under FCA-1980 for the construction of Eklavya Model Residential School(EMRS) building in Kukumseri, Tehsil Udaipur, District Lahul-Spiti H.P. Accordingly the undersigned visited the site along with the officers/officials of the concerned department for the preparation for the said report.

The proposed site for the construction of the EMRS building is located near Village Kukumseri, Tehsil Udaipur, District Lahaul-Spiti (HP) just adjacent to the Tandi-Udaipur-Killar road. The site is around 2-3 kilometres from the tehsil headquarters in Udaipur, Himachal Pradesh. The proposed EMRS building comprising of measuring approximately 75-00-00 Bighas(Approximately 6.00 Hectares) area is located in Mouza/Mohal Haduka, Tehsil Udaipur which is sufficient for the construction of the said construction activity/purpose.

Due to the scarcity of flat ground, building construction in hilly regions requires comprehensive planning, site selection and design for slopes and sustainable concrete construction practices. The steep slopes are a common type of structural configuration that is found on hilly terrains where the foundations are provided at variable levels. A building on a hill slope notably differs from a building resting on a flat topography as they are irregular and unsymmetrical in horizontal as well as vertical configuration.

The proposed site under investigation falls under the Survey of India Toposheet No. I43W10 and is situated approximately near latitude 32°42'17.32" N longitude 76°40'56.40" and latitude 32°42'4.41" N longitude 76°41'16.25"E. The altitude of the site ranges from 2680 mtrs to 2780 mtrs.

Project Officer,
ITDP Lahaul at Keylong.

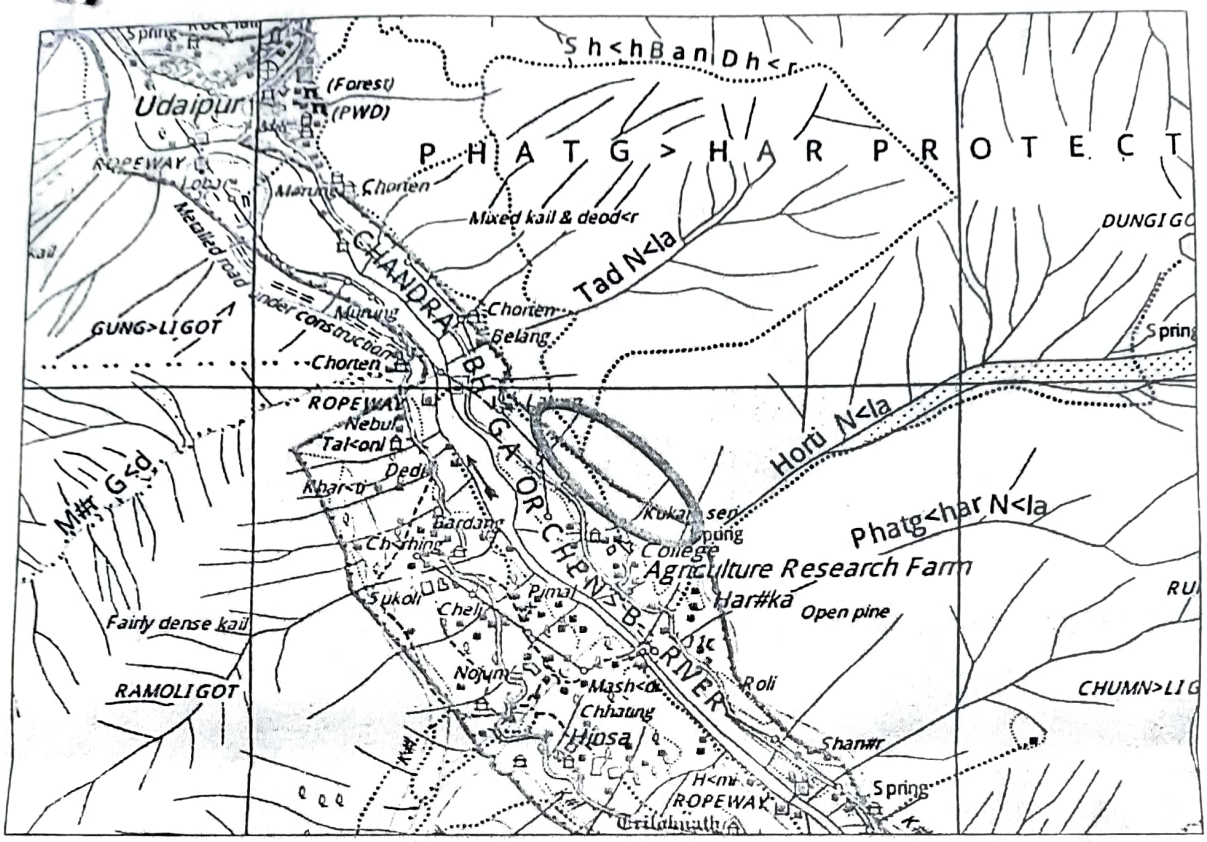


***Image showing the location of the area proposed for the construction of the EMRS Building***

## ***REGIONAL GEOLOGY OF THE AREA***

The area represents a natural cross-section through the southern limb of the High Himalayan crystalline dome defined as the Gianbul dome (Robyr, 2002). In the area, the stratigraphic column is essentially composed of a thick and monotonous series of Upper Proterozoic to Cambrian detrital sediments (Phyllites/slates/graywackes/ siltstone and pelites), generally referred to as Haimantas (Griesbach, 1891) or Phe Formation (Nanda and Singh, 1977). In the lower areas of the valley, this formation is mainly made up of an alternation of a centimetre to meter-thick beds of clastic rocks such as dark grey quartzites, quartzitic phyllite, Phyllitic quartzite, states and pelites. However, despite the presence of more pelitic levels, the sandier lithology dominates in this formation, especially in the Miyar Valley section. The regional strike of

Project Officer,
ITDP Lahaul at Keylong.

these lithological units trend NNW-NW – SSE-SE, dipping 40-85° SW. There are some local variations in litho-orientation, which are consistent with the regional deformation pattern.

***GEOLOGY OF THE SITE***

The site is located in the Batal Formation where, quartzites, quartzitic phyllites, and carbonaceous phyllites of varying thickness are exposed and have been investigated for their rock mass characterization. The area under observation projects a good exposure of quartzitic phyllite and dark grey quartzites in the uphill side area and does not show any major problem with the stability of slopes. The various rock outcrops exposed uphill side of the proposed land are comprised of 3 to 4 sets of joints. The proposed area projects undulating to sloping topography and is occupied/overburdened by the debris of slope wash material which covers the same material in the entire vicinity. Hence it is observed that the bedrock may not be encountered at a shallow depth, however, if the proposed buildings are not very high-rise structures, the properly designed foundations can be laid on this land at a shallow depth without any difficulty.

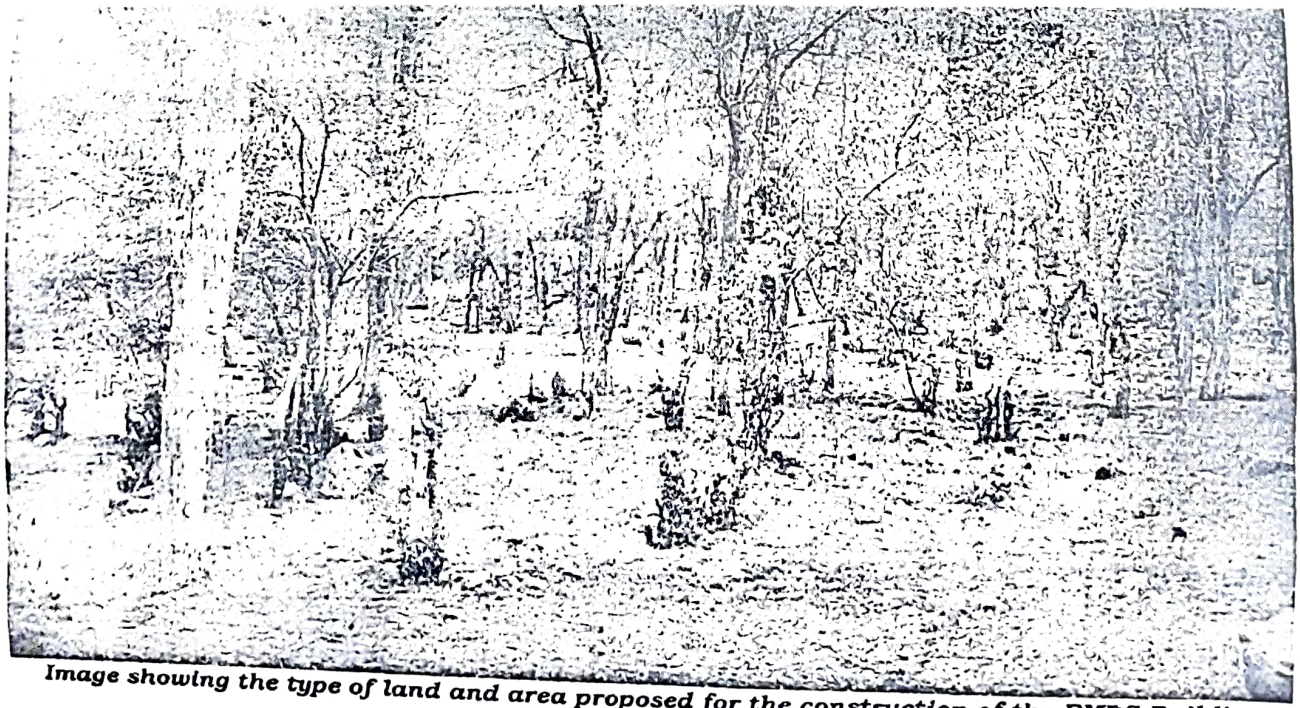

***Image showing the type of land and area proposed for the construction of the EMRS Building***

Project Officer,
ITDP Lahaul at Keylong.

## OBSERVATIONS AND RECOMMENDATIONS:

The area under investigation is covered with slope wash and soil cover accumulation having moderate slopes at major locations. No rock outcrops have been observed in the proposed location. Also, no water seepages, subsidence or creeping movement has been observed. It has been observed that the proposed site is located on the downside of a Natural hillock and may be prone to slope failures or rock fall from the hillside due to either geological failure or continuous weathering or after the rain or snowfall, need to be protected.

Following are the recommendations/suggestions that need to be considered, which include proper foundation, drainage, both surface and sub-surface and the use of restraining structures.

**Foundation:-** It has been observed that the in-situ rock mass is not available at shallow depth at this site under consideration for the construction of the building. Laying the foundation of construction on such type of landfills is a challenging task hence it is recommended that in order to bear the load of the proposed building, a suitable foundation structure should be designed. It was also observed that the site is in a very cold cloudy area - with very cold temperatures in winter, hence it is suggested to identify and use materials and technologies, that would satisfy the test of long-term durability; and reduce life cycle maintenance requirements.

**Wire Netting:** Rockfall occurrence always results in loss of public life, and property and a lot of inconvenience for the people residing in the locality. Once a rock block has detached from the steep slope, it will free fall, topple, bounce, roll or slide along the slope surface at a high speed, which can cause significant damage to the facilities at the foot of the slope. There may be a chance of the rockfall from the hill located behind the proposed area at a considerable distance, hence the area should be protected with high-strength wire mesh fencing and wire netting to control or stop the falling of rocks/stones or in case of any type of slope failure.

Project Officer,
ITDP Lahaul at Kaylang

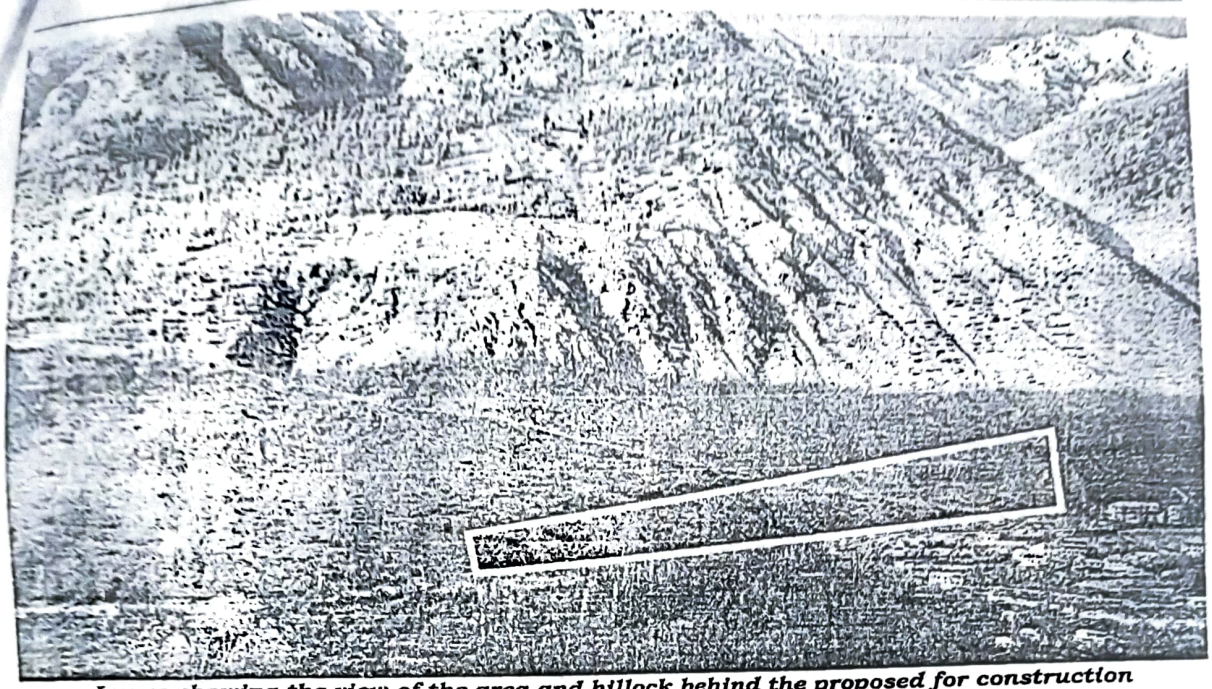

*Image showing the view of the area and hillock behind the proposed for construction of the EMRS Building*

**Earthquake Safety:** The site falls in the High Seismic Zone which implies a high degree of seismic activity and hence a high earthquake threat in the region. Earthquake safety of the structures is a crucial parameter for the selection of the material (lightweight material) and the technology – and design of the buildings. Relevant codes shall be adopted for the structural design of buildings.

On the basis of site inspection and observation made above it is observed that the site under investigation is stable and fit for the construction of the said structure.

Gaurav Sharma
Geologist
Geological Wing, Deptt. Of Industries,
Himachal Pradesh, Shimla – 171001

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Project Officer,
ITDP Lahaul at Keylong.

Divisional Forest Officer
Lahul Forest Division
Keylong (H.P.)