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Office of Empanelled Geologist
पत्रांक 622 / 148वांक - सी0 / 13 दि0वांक 15 / 05 / 2013
P.W.D. Uttrakhand

Geological Investigation Report
E.G. – Road / Bridge / Alignment
PMGSY Champawat – 2 / 2018

Geological Assessment of the Alignment of the Proposed Road named From Km. 2 of Laluwapani – Balekh M/R to Naghan Motor Road in Distt. Champawat

27 April 2018

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Geological Assessment of the Alignment of the Proposed Road named From Km. 2 of Laluwapani – Balekh M/R to Naghan Motor Road in Distt. Champawat

J.P. Madhwal
27/04/2018

1. **Introduction :-** The ID, PMGSY, Champawat has proposed the construction of 13.300 Km. long motor road named From Km. 02 of Laluwapani – Balekh M/R to Naghan Motor Road on the request of the Executive Engineer, ID, PMGSY, Champawat I carried out the geological assessment of the proposed alignment of the road in presence of the person of Himalayan Engineers, Dehradun on 17/04/2018

2. **Location:-** The proposed alignment is **Starting from Km. 02 of Laluwapani – Balekh Motor Road.**

3. **Geological Assessment:-** Geologically the area of the proposed road is located in the Kumoan lesser Himalayan belt which is mostly occupied by the rocks of Almora Group. The Mica schist of Saryu formation and Champawat granite & augen Gneiss are exposed along the alignment. These rocks are massive to thinly bedded, soft to very hard, compact and partially weathered in nature.

   Four prominent and one random joints set in addition to minor shear zone traverse these rocks and control the stability of the various slope facets. The alignment passes in inclined to moderate angle slope and are partially covered with the overburden material of varying thickness ranging from 0.5 m to 1.5 m thick. The rock mass exposed along the alignment corridor is mostly hard and its "Uniaxial Compressive Strength" has been estimated ranging between 50 M Pa to 90 M Pa (ISRM Manual Index). By and large the joints traversing the rock masses are widely spaced through except at places where the rocks is sheared and shattered. The values of the Rock Quality Designation (RQD) calculated at the site ranging between 71 percent to 80 percent suggests that the slope forming rock masses are less distressed in nature and decrease the risks of instability. All the joints planes of the rocks are rough to moderately smooth, tight and sometimes sealed with the secondary inclusion.

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The overburden exhibits distinct properties of strength parameters depending upon the surface and subsurface hydrological conditions and it ranges from 50 k Pa to 350 k Pa according to the water content and grain size distribution.

The details of the joints recorded at the site are given in the following table:-

Table

S. No.	Feature	Dip angle	Dip direction
1	2	3	4
J_1	(S_0 Bedding Joint)	25^0	N170
J_2	(S_1 Foliation Joint)	22^0	N210
J_3	(Random Joint Set)	32^0	N235
J_4	(Sealed with Quartzites)	40^0	N310

On the basis of the geological / geotechnical studies carried at the site and the facts mentioned above the following recommendations are being made for the construction of the proposed road.

4. Recommendation:-

(i) The alignment some time traverses along/across minor fault zone which is geologically fragile and special attention needs to be given for stability of road where alignment crossing the Nalas or Gads or Local streams and soft rock zone.

(ii) The hill slope is another factor responsible for geological hazards, the road basically traverses the slope class 35^0 to 48^0 special attention needs to be given for stability where it is 60^0 to 65^0 in some parts.

(iii) Special attention should be pay for the protection of H.P. Bends.

(iv) Do not dispose the debris in hill side, dispose it in a safe zone.

(v) Do not blast heavily on the rocks and blasting is restricted near the human settlement/ public property.

(vi) The road must have extra wide lined long drain with adequate cross drainage arrangement.

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(vii) The road must be formed shoulder to shoulder paved, this is so to check the water ingress into the sub surface material.

(viii) Construct suitably designed retaining walls / brest wall all along the road, it is essential for the overall stability of the hill slope.

(ix) All the construction activity must be carried out as per the standards and norms following the BIS codes prescribed for the similar civil construction in Himalayan Zone.

5. Conclusion:- On the basis of the geological / geotechnical studies carried at the site and with the above recommendations, the site was found geologically suitable for the construction of 13.300 Km. long motor road named From Km. 02 of Laluwapani – Balekh M/R to Naghan Motor Road, Distt. Champawat, Uttrakhand.

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