

**Geological Investigation Report
E.G. – Road / Bridge / Alignment
Div. P.W.D., Chamba (Tehri Garhwal) – 03 / 2017**

**Geological Assessment of the Alignment Corridor Proposed For –
Construction of Laluri Koti Mehro ki Manjkhet motor road from
Manjkhet to Moryana motor road in Block Thauldhar, Vidhansabha area
Dhanolti, Distt. Tehri Garhwal**

02. March 2017

**Geological Assessment of the alignment proposed for Construction of
Laluri Koti Mehro ki Manjkhet motor road from Manjkhet to Moryana
motor road in Block Thauldhar Vidhansabha area Dhanolti,
Distt. Tehri Garhwal**


Harish Kainthola
22-12-16

1. Introduction: - The Division, Public works Department Chamba, Tehri Garhwal has proposed the construction of 4.650 km Laluri Koti Mehro ki Manjkhet motor road from Manjkhet to Moryana motor road in Block Thauldhar Vidhansabha area Dhanolti, Distt. Tehri Garhwal. I carried out the geological Assessment of the proposed alignment on 22.12.16 in presence of Er. R. S. Rautela, Asstt. Engineer and Er. Sunil Kumar, Junior Engineer, P.W.D Chamba.

2. Location: - The Proposed alignment of Laluri Koti Mehro ki Manjkhet motor road starts from village Manjkhet at km 10 and runs upto village Moryana at km 5.0. Three hair pin bends are proposed in this alignment. All hair pin bends proposed on gentle to moderate slope. This alignment is passing on both civil and forest land.

3. Geological Assessment: - Geologically the alignment of the proposed road is located in the middle lands of Garhwal Lesser Himalayan Belt, bounded by the Main Central Thrust (MCT) in the north and Main Boundary Thrust (MBT) in the south. Another prominent thrust namely Srinagar Thrust (ST) runs in between this belt which separates the rocks of Krol Nappe from the rocks of Garhwal Group. The proposed alignment is located near the Srinagar Thrust and two different lithological units namely Chandpur Phyllites and Nagthat Quartzites are exposed on its southern direction. The effect of Srinagar Thrust is manifested on these rocks hence they are sheared and shattered in nature. Most of these rocks are thinly bedded/foliated, folded, partially to moderately weathered and dissected by four prominent joint sets.

The entire alignment corridor of Laluri Koti Mehro ki Manjkhet motor road passes across the slope inclined at 20° to 35° and the alignment mostly covered with the thick overburden material comprised of angular rock fragments embedded in silty soil. The most common rock found below the overburden and at places along the alignment is phyllitic in nature. It is greenish gray in colour moderately to highly weathered and thinly bedded. Mostly rock is dipping towards northerly or northeasterly direction. The slope forming overburden material is naturally well compacted and dense. Its "Undrained Shear Strength" at the site has been assessed ranging between 350 k Pa to 500 k Pa which corresponds to the consistency "Very Stiff" soils. The slope forming materials do not contain any alkali content or dispersive / soft soil. All the joints planes of the rocks are rough to moderately smooth, tight and sometimes sealed with the secondary inclusion. The rock mass exposed around the alignment corridor is


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mostly moderately hard and its "Uniaxial Compressive Strength" has been estimated ranging between 50 M Pa to 100 M Pa (ISRM 1978 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 50 percent to 80 percent suggests that the slope forming rock masses are less distressed in nature.

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

Set No.	Dip	Dip Direction	Strike
Bedding	20° - 40°	N10° - 35° E	N55° to 80° W- S55° to 80° E
Joint	50° - 70°	S20° - 40° E	N50° to 70° E- S50° to 70° W
Joint	40° - 70°	N10° - 25° E	N65° to 80° W- S65° to 80° E
Joint	30° - 60°	N20° - 35° W	N55° to 70° E- S55° to 70° W

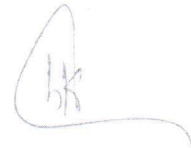
Prima facie; the alignment slopes are stable and free from any active landslides/ mass wasting.

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) Construct suitably designed retaining walls / breast wall all along the road; it is essential for the overall stability of the hill slope.
- (ii) Construct large size lined long drain with the adequate cross drainage arrangements.
- (iii) Dispose the drained water on the safe / stable ground.
- (iv) Preventive measures for debris failures and flows should be mandated where ever necessary.
- (v) The drainage work must be taken up immediately after the excavation of the hill slopes.
- (vi) Special attention should be paid where structural failures can take place.
- (vii) Do not dump/ dispose the excavated waste on the downhill slopes.
- (viii) The excavated bench should not be rendered exposed for long period, the formation of the road must be taken up immediately and it will help to check the erosion of the excavated surface.
- (ix) Plantation works on the either side slopes will enhance the overall stability of the hill slope.
- (x) Do not blast heavily on the rocks and blasting is restricted near the human settlement / public property.
- (xi) The road must be formed shoulder to shoulder paved, this is so to check the water ingress into the sub surface material.
- (xii) 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 out at the site and with the above recommendations, the site was found geologically suitable for the construction of 4.650 km long Laluri Koti Mehro ki Manjkheth motor road from Manjkheth to Moryana motor road in Block Thauldhar Vidhansabha area Dhanolti, Distt. Tehri Garhwal.



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