

कार्यालय मुख्य अभियन्ता
उत्तराखण्ड लोक निर्माण विभाग
पौड़ी गढ़वाल

भूगर्भ निरीक्षण आख्या जी० पौ० 203 सड़क समरेखण/पुल/गढ़वाल क्षेत्र/उत्तराखण्ड

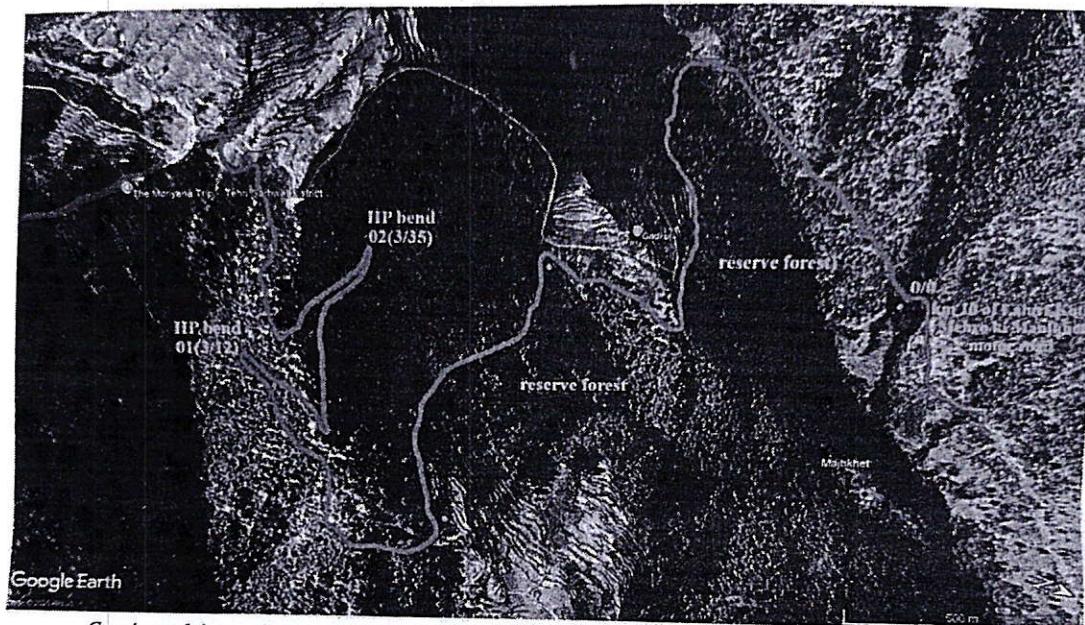
Geological assessment of the alignment corridor proposed for the construction of 4.650 km long motor road joining village Morivana to Manjket lies at km 10 of Laluri-Koti-Mehro ki Manjket motor road, in Thauldhar block, dist. Tehri Garhwal

01 जून 2025

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- 1. Introduction:-** The Construction division, Public Works Department, Chamba with G.O no. 1873/III(2)/16-74(प्र०अण०)/2015 dated 07.06.2016 has been instructed for the construction of 8.00 km long motor road joining village Moriyana to Manjkhet lies at km 10 of Laluri-Koti-Mehro ki Manjkhet motor road, in Thauldhar block, dist. Tehri Garhwal. The work of preliminary site inspection and survey of the alignment has been carried out across the hill slope where two alternative alignment named Alignment 1 and Alignment 2 has been proposed having length of 4.650 km each. The Alignment 1 originates from village Manjkhet lies at km 10 of Laluri-Koti-Mehro ki Manjkhet motor road in the uphill slope direction covering dominantly reserve forest and civil land and scantily the naap land of the local villagers comprising only 2 HP bends in whole along its length of 4.650 km (w.r.t sanctioned length= 8.00 km) which ultimately connects to the population of village Manjkhet and Moriyana, also agreed by the local villagers. The Alignment 2 also originates from the same point as in alignment 1 comprising 6 HP bends in whole along its length of 4.650 km covering dominantly the naap land and scantily the civil and forest land, but not agreed by the local villagers, therefore rejected. Considering above, with reference to the letter no. 1049/10Mg dated 26.05.2025 On the request made by Er. Jagdish Singh Khatri, Executive Engineer, requested to the undersigned for the geological assessment of the above mentioned site in response to which I carried out the same on 28.05.2025 in the presence of Er. Saud Ali Khan, Asstt. Engineer and Er. Ajendra Singh, Jr. Engineer, CD, PWD, Chamba, dist. Tehri Garhwal.
- 2. Location:-** The proposed alignment corridor of the above mentioned motor road originates from village Manjkhet lies at km 10 of Laluri-Koti-Mehro ki Manjkhet motor road in the uphill slope direction comprising only 2 HP bends (x-section= 3/12 and 3/35) in whole along its length of 4.650 km (w.r.t sanctioned length= 8.00 km) which ultimately connects to the population of village Manjkhet and Moriyana, in Thauldhar block, dist. Tehri Garhwal.
- 3. Geology Assessment:-** Geologically, Moriyana gaon and its nearby environs falls in the inner land of the Garhwal Lesser Himalayan belt which is represented by the rocks of Jaunsar Group. The geological set up is very complex due to the repeated tectonic disturbances caused by different orogenic cycles. The rock units exposed in various parts of Tehri Garhwal district are exposed in two broad geotectonic zones viz. Western Himalaya and specially in Lesser Himalaya. The Lesser Himalaya is bounded by two major tectonic lineament named Srinagar Thrust and Main Boundary Thrust (MBT) from its north and south direction respectively. The phyllites of Chandpur formation and the quartzites of Nagthar formation are exposed in and around the area of the proposed road. Mostly the phyllites or quartzitic phyllite which are moderately hard, compact and foliated in nature are exposed on the slopes of the proposed alignment. These quartzites are interveined with the thin partings of phyllites which

are chloritic in nature. These rocks are traversed by four prominent joint sets and at places they are weathered, oxidized and tectonized in nature. At along the alignment corridor bends of phyllites were also encountered. The Lesser Himalaya occupies major part of the district and comprises of different groups like Jaunsar Group with Chandpur formation, Blaini-Krol Group and Tal Group.



Google earth image showing proposed alignment joining village Moriyana to Manikhet lies at km 10 of Laluri-Koti-Mehro ki Manikhet motor road, in Thauldhar block, dist. Tehri Garhwal.

The groups are subdivided into various formations like Bhilangana Formation, Rautgara Formation, Bijni Formation. Generally, the rocks of the Lesser Himalayan Zone show signs of multiple phases of deformation and metamorphism. The area of Chamba-Tehri motor road falls in the Garhwal Lesser Himalayan Belt and it is mostly occupied by the Phyllite rock of Chandpur Formation. Most of the rock masses exposed in and around village belongs to Grade-IV which is thinly foliated, sheared, shattered and tectonized in nature and have attained higher weathering grade. The rock mass exposed on the either side slopes is intensely folded and jointed having planner failure dominantly and wedge failure contains clay minerals in abundance which has generated thick cover of overburden material over them in form of residual clays. Four-five prominent linear discontinuities traversing these rocks has been recorded at the sites and most of these are opened and in filled by the soils or crust rock material. A prominent tectonic feature namely Srinagar Thrust (ST) runs parallel to the Bhagirathi river at a close distance in its NE direction and its affect is clearly manifested on these rocks in the form of shearing, crushing and deformation.

The proposed alignment connects the population of village Moriyana where the arms are falling one above the another with thick overburden across the gentle

hill slope. The hill slope have scattered large boulders signifying chronic landslide which attains its dormant stage. Dominant stretch passes across the reserve forest and the civil land nearby the villages. The phyllite rock is argillaceous in nature which is highly porous and low/no permeability. The phyllites with subordinate slates is slightly weathered and oxidized (W_2 to W_3 weathering Grade) in nature. These are thinly foliated, hard and compact in nature and exhibitors fair values of physical competence. According to the estimation made at the site the "Uniaxial Comprasive Strength" of the bed rocks were found ranging between 30 M Pa to 50 M Pa. The Rock Quality Designation (RQD) values of the phyllites exposed along this alignment corridor determined manually at the site was calculated ranging between 20% to 30%, hence these the phyllites falls in the Rock Class-III (Fair) as per Rock Mass Rating. It has been observed that the soils forming the slopes contain clay minerals in abundance with thick pine vegetation therefore these may exhibit contrast values of strength under the dry and wet conditions. According to the assessment made at the site the "Undrained Shear Strength" of the soils exposed along this corridor was found ranging between 300k Pa to 400k Pa and the "Uniaxial Compressive Strength" of the rock masses was found ranging between 30 M Pa to 60 M Pa. It has been observed that most of these soils are generated by the decomposition of terrain rock, therefore these are residual soils and contains plastic clay minerals in abundance.

By and large, the alignment slopes are stable and presently free from any landslide/ mass wasting activities but due to the massive dolomitic terrain where the probability of sink holes/pot holes/caves formed due to dissolution action of carbonate rock.

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 failing to which, this report will be automatically treated as cancelled.

4.Recommendations:-

- a. The work of road cutting can be carried out by bench like cutting full excavation method.
- b. Blasting is strictly prohibited considering loose rock mass along the alignment and dense population close to the proposed alignment.
- c. Do not throw the excavated waste on the lower hill slope otherwise which may damage the cultivated land of the local villagers. Dumping should be only be carried out at dumping yard proposed before cutting of road.
- d. In order to maintain the overall stability of the hill slopes and the road, construct suitably designed retaining walls/ breast walls along the road, wherever required.
- e. Construct large hill side lined/concrete drain all along the road and make adequate cross drainage arrangements.
- f. Make adequate arrangements to dispose the waste water on the safe/ stable ground.
- g. All the construction activity must be carried out as per the Indian standards codes of practice and norms prescribed by the BIS.

5.Conclusion:- On the basis of the geological/geotechnical studies carried at the site and with the above recommendations, the proposed alignment 1 corridor was found geologically suitable for the construction of motor road joining village Moriyana to Manjkhet lies at km 10 of Laluri-Koti-Mehro ki Manjkhet motor road comprising only 2

HP bends(x-section= $3/12$ and $3/35$) in whole along its length of 4.650 km(w.r.t sanctioned length= 8.00 km) which ultimately connects to the population of village Manjkhet and Moriyana, in Thauldhar block, dist. Tehri Garhwal.

Date: 01.06.2025


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