

Office of Empanelled Geologist
P.W.D. Uttarakhand

Geological Investigation Report
E.G. – Road / Bridge / Alignment
Sahiya – 1 / 2013

Geological Assessment of the Alignment Corridor Proposed For –
New Construction of Bhaller-Kandoie-Madarsu Motor Road

12 November 2013

Photo copy attached.

[Signature]
सहायक अभियंता
लो०नि०वि०

J.P. Madhwal
Consultant Geologist
Shantikunj, Lane-1,
Nehrugram Road,
Nathanpur, Dehradun
Phone – 0135 – 6448774
Mob – 9412965965
Email –

(57) (314)

**Geological Assessment of the Alignment Corridor Proposed For –
New Construction of Bhaler-Kandoie-Madarsu Motor Road
District – Dehradun.**

J.P. Madhwal
12/11/2013

1. **Introduction :-** The Temporary Division, Public Works Department, Sahiya has proposed the construction of 4.00 Km. long motor road named **Bhaler-Kandoie-Madarsu Motor Road** on the request of the Executive Engineer, T.D. P.W.D. Sahiya, I carried out the geological assessment of the proposed alignment of the road in presence of Er. L.C. Bhatt the concerned A.E. on 9/11/2013.
2. **Location:-** The proposed alignment originates from the Km. 10 of Langha-Madarsu-Matogi Motor Road as a branch road up to Bhadogi connecting the Bhaler-Kandoie village.
3. **Geological Assessment:-** The alignment corridor of the proposed motor road is located in the outer lands of Garhwal Lesser Himalayan Belt, tectonically bounded by the Main Central Thrust (MCT) in the north and the Main Boundary Thrust (MBT) in the south. Which is mostly occupied by the rocks of krol formation. The lower krol formation is exposed along the alignment, lime stone intervened by Red and Calcareous shales are exposed around the area of alignment corridor. These rocks are sheared, shattered tectonized and traversed by four sets of joints (rock – defects). It has been observed at the site that most of the joint sets are tight and sealed by the secondary inclusions. The details of the joints recorded at the site are provided in the following table:-.

Table

| S. No. | Feature | Dip angle | Azimuth |
|----------------|--------------------------------|-----------------|---------|
| 1 | 2 | 3 | 4 |
| J ₁ | (S ₀ Bedding Joint) | 42 ⁰ | N170 |
| J ₂ | Joint | 32 ⁰ | N145 |
| J ₃ | Joint | 70 ⁰ | N115 |
| J ₄ | Joint | 55 ⁰ | N335 |

phd. engg. attender


सहायक अभियंता
लोकनिर्माण

The alignment slopes are inclined at moderate angle and are covered with the overburden material having thickness 1.0 m to 5.0 m order. The over burden material is comprised of rock fragment and chips embedded in clay-silt matrix. The slope forming overburden material (composite soil) is naturally well compacted and dense in nature and it do not contain any soft/ dispersive soil. The "Undrained Shear Strength" of the slope forming soil has been assessed ranging between 300 k Pa to 500 k Pa, which corresponds to "Very Stiff Soil" consistency. The "Uniaxial Compressive Strength" of the lime stone exposed on the alignment corridor has been assessed ranging between 50 k Pa to 100 k Pa which corresponds to the strength "Strong" rock.

By and large the alignment slopes are low to moderately steep and free from any landslide/mass wasting.

Most of the alignment slopes are covered with the envelope of overburden material of 1.0 m to 1.5 m thick.

The slope forming overburden material is comprised of hill wash/ slope wash material of composite soil, embedded in clay matrix and it do not contain / soft / dispersive soil.

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.
- (ii) The hill slope is another factor responsible for geological hazards; the road basically traverses the slope class 36° to 50° special attention needs to be given for stability where it is 42° to 58° in some parts.
- (iii) Form the road by half cut – half fill techniques and ensure the proper compaction of the fill material.
- (iv) Do not dispose the debris in hill side, dispose it in a safe zone.

phd copy attached

[Signature]
- सहायक अभियंता
लोहनादि

- (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.
- (vii) The road must be formed shoulder to shoulder paved, this is so to check the water ingress into the sub surface material.
- (viii) All the construction activity must be carried out as per the standards and norms following the IS 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 4.00 Km. long motor road named **Bhaler-Kandoie-Madarsu Motor Road** in Distt. Dehradun, Uttarakhand.

Photo copy attached

OK

सहायक अभियन्ता
जलसिंचिका

J.P. Madhwal
(J.P. Madhwal)
Consultant Geologist

(J.P. Madhwal)
B.Sc. (Geology)
Consultant Geologist