

To,
The Executive Engineer
(Construction Division)
PWD Baijro

Subject: Submission of Geological Site assessment report of widening (0.0 to 1.0 Km) & construction (1.0 to 6.0 Km) of 6.0 Km long Moro Bend-Dhobhighat Motor Road.

Dear Sir,

In response to your request of making a site visit for the assessment of widening (0.0 to 1.0 Km) & construction (1.0 to 6.0 Km) of 6.0 Km long Moro Bend-Dhobhighat Motor Road till village Nawasu, in Baijro division, district Pauri (Garhwal), a site visit was made on 17/08/2017 of which a report has been prepared. Therefore it is requested to please find report of the above mentioned site attached with this letter.

Date: 11/09/2017

Yours Faithfully



Tushar Sharma
(Assistant Geologist)
Office of the Chief Engineer
PWD (Pauri Zone)

Photo copy Attached



सहायक अभियन्ता

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बैजरो (गढ़वाल)

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Geological Assessment of 6.0 Km long Moro Bend-Dhobhighat Motor Road
Alignment corridor between Chainage 0.0 to 1.0 Km (for widening) and
1.0 to 6.0 Km (for new construction),

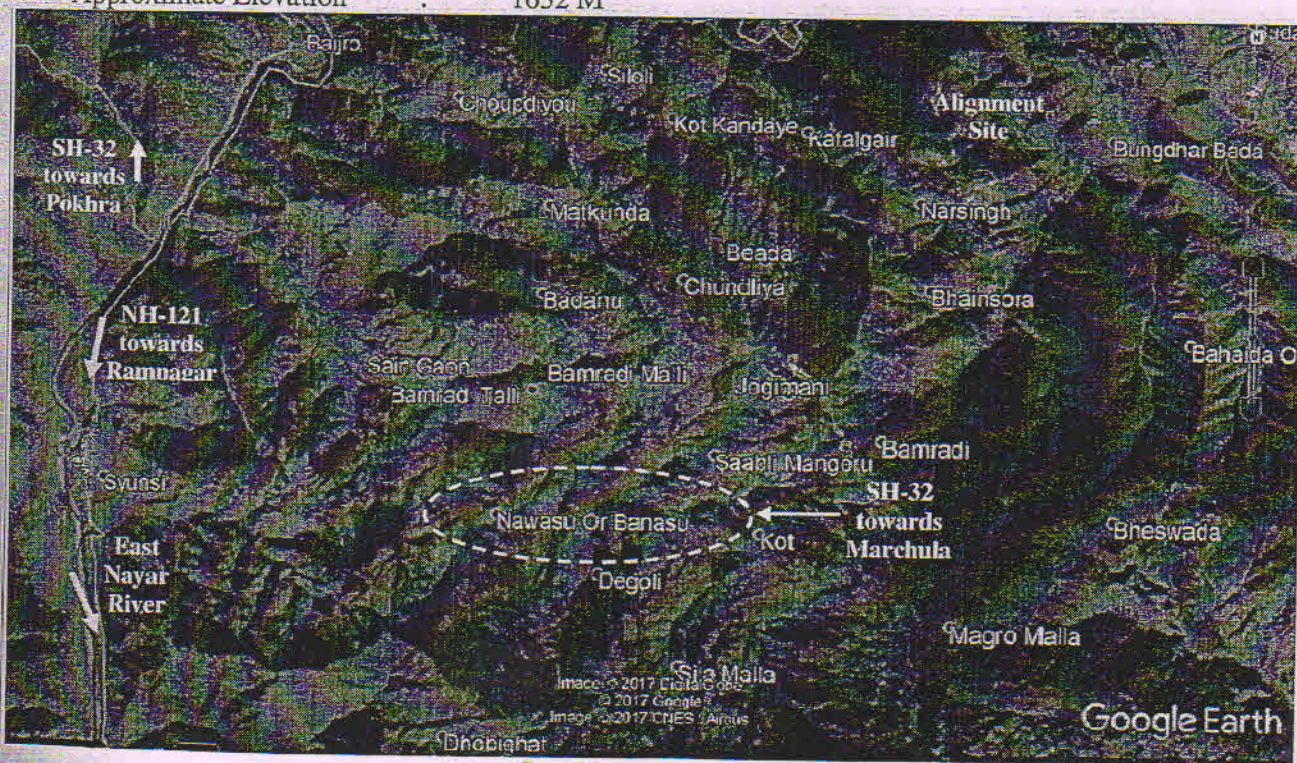
District Pauri (Garhwal)

Tushar Sharma

11/08/2017

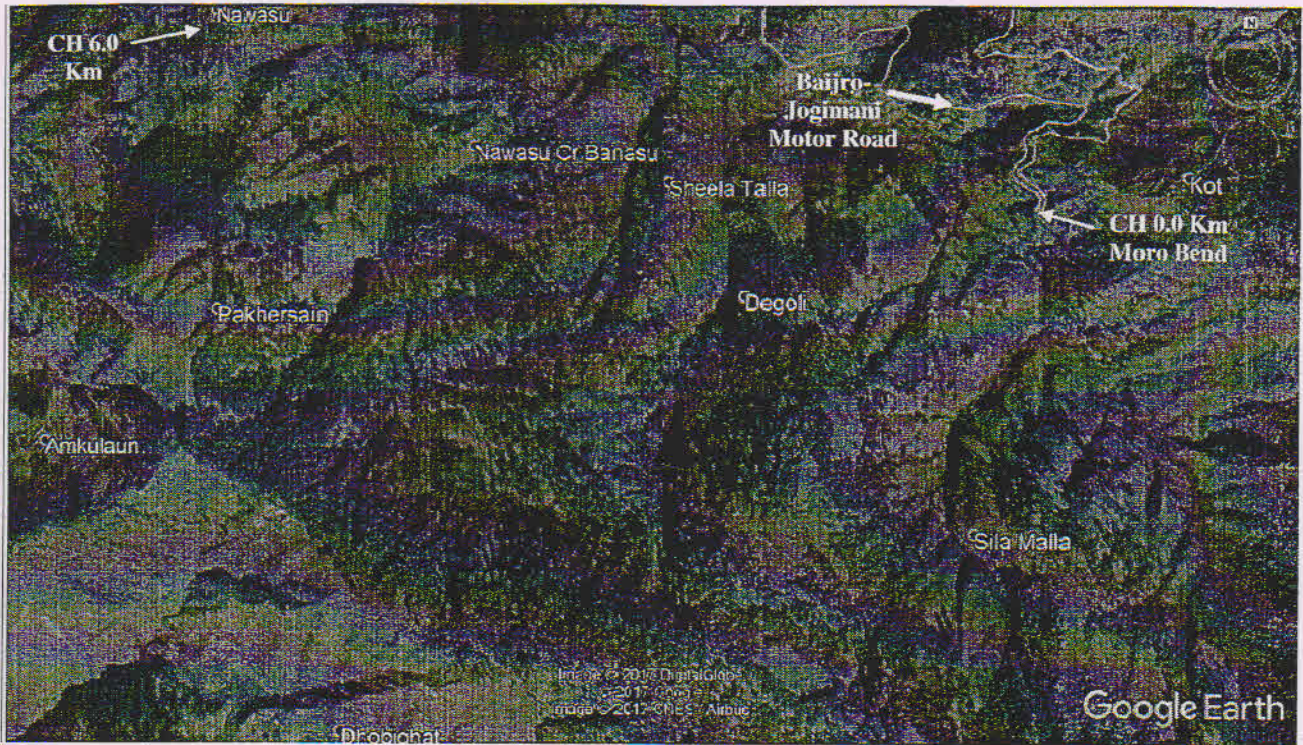
- 1- **Introduction:** The Construction Division, Baijro, has been entrusted for widening (0.0 to 1.0 Km) & construction (1.0 to 6.0 Km) of 6.0 Km long Moro Bend-Dhobhighat Motor Road. In order to assess the geological conditions of the road alignment site for its feasibility, Er. R.P. Singh (Executive Engineer) Construction Division, PWD, Baijro asked for a geologist to make a site visit. Consequent to their request a visit to the proposed bridge site was made on 17/08/2017; Er. Upendra Kumar (Junior Engineer) and Mr. Devi Ram (Work Agent) CD, PWD, Baijro were present during the site visit.
- 2- **Topographical Information/Location:** The initial 1 Km of the proposed alignment site is previously constructed LVR which is to be widened and further from CH 1.0 to 6.0 Km new construction is to be done. The proposed Moro Bend-Dhobhighat Motor Road which diverts from CH 7.0 Km of Baijro-Jogimani Motor Road connecting Sila Malla, Sila Talla-Divoli and Nawasu villages and ends near village Nawasu, Baijro Division in district Pauri (Garhwal). The co-ordinates along with elevation, masl of the site at CH 0.0 Km are as follows-

Latitude	:	29° 53' 23.25"
Longitude	:	79° 03' 54.55"
Approximate Elevation	:	1632 M



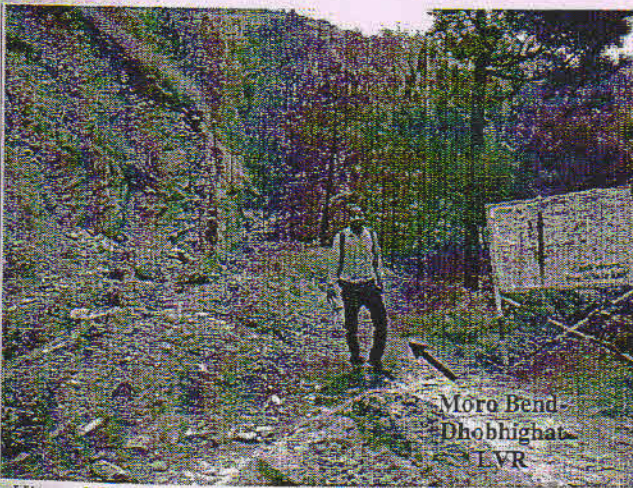
Broader Satellite View of the Site

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Closer Satellite View of the Road Alignment Site

3- Geological Assessment: Geologically, the road alignment site area falls under the Meta-Sedimentaries of Lesser Himalaya. The area is in the close vicinity of thrust-junction (Ramgarh Thrust) between Nagthat Formation and Betalghat & Bhatwari-Barkot units of Ramgarh Group. The rocks exposed in the area consist of jointed and weathered Phyllite, Quartzitic Phyllite, Quartzite to occasional Chlorite Schist bands. But on the hill slope of the road alignment site rock outcrop is covered under thin to thick veneers of overburden and slope wash material having vegetation/cultivation land (Naap Khet) over them with a few exposures of bed rock. The hill slope is traversed by many rain cuts and streams/nallas some of which are perennial these can damage the road constructed especially during the rainy season.



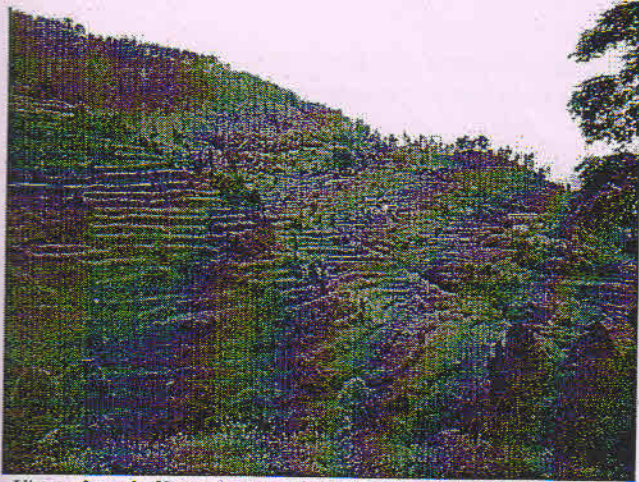
View of CH 0.0 Km road alignment at Jogimani Village



View of LVR passing through gentle hill slope

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The hill slope of the road alignment site is gentle to moderately steep $\sim 20^{\circ}$ - 30° . The approximate strength of exposed rock mass ranges between 50-150 MPa and has undergone W_0 to W_3 weathering grade. There are no Hair Pin Bends on the road alignment.



View of road alignment passing through gentle hill slope



View of road alignment passing through village Silli Talla

- 4- **Seismicity of the area:** According to Indian Standard code the site falls in seismic zone V of seismic zoning Map of India (IS 1893, part 1, 2002) which corresponds to intensity IX or above on MM scale.

On the basis of the geological inspection of the site studies carried and the facts given above, the following recommendations are being made for the construction of the proposed road failing to these recommendations this report will be automatically treated as cancelled.

5- Recommendations:

1. Blasting by explosives for the road construction is to be avoided as far as it is possible. Use of explosives will render the slope highly unstable as the slope consists of both rock and slope wash material.
2. Rock excavation must be carried out by the skilled manual workers as the rock slopes are prone to slide down in case of rapid.
3. The slopes on either sides of entire road must be protected by the construction of suitably designed retaining wall/ breast wall with proper weep holes, this work shall be carried out simultaneously with the advancement of the road cutting. This is very important for the stability of the hill side slopes.
3. Construction of large U-shaped longitudinal concrete lined drain all along the hill side of the road with adequate provision of cross drains is necessary.
4. Construct the road by half cut and half fill techniques and compact the fill material properly by dynamic compaction.

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5. Disposal of muck and excavated waste on the lower slopes of this road is to be strictly avoided; failing to which will increase the weight of the lower slope resulting in the increase in driving forces. It is advised to dispose the muck on the identified site for muck disposal.
 6. It advise to construct scuppers/causeways/puliyas on raincuts, streams or nallas which would be encountered on the road alignment.
 7. All the construction activities ought to be carried out as per the standard codes of practice laid by the BIS and MORTH.
- 6- **Conclusion:** On the basis of the geological / geotechnical studies carried at the site and with the above recommendations, the alignment site proposed for widening (0.0 to 1.0 Km) & construction (1.0 to 6.0 Km) of 6.0 Km long Moro Bend-Dhobhighat Motor Road was found geologically suitable for road construction.

Letter No: 1870 /भू० वै०-12-पौड़ी /2017

Date: 11/09/2017

Tushar Sharma

(Tushar Sharma)
Assistant Geologist
Chief Engineer Office
PWD, Pauri

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