RECONNAISSANCE GEOLOGICAL REPORT OF PROPOSED SITE OF SHRI PRATAP SINGH S/O SHRI RAGHUBIR SINGH FOR THE CONSTRUCTION OF OWNER DRIVEN CONSTRUCTION HOUSING (ODCH) VILLAGE- NAGANGAON, TOK- GHARBADA, TEHSIL- BARKOT, DISTT.- UTTARKASHI
KHASARA NO – 4953(a) & AREA – 0.030 ha

Date of Inspection: 19-12-2013

1. INTRODUCTION:

In a 'World Bank' funded programme, Government of Uttarakhand has provided teams of Consultant Geologists and Consultant Associate Geologists to Director, Geology and Mining Unit, Uttarakhand for geological studies in proposed sites for Owner Driven Construction House (ODCH) in disaster affected districts of Uttarakhand. Director, Geology and Mining Unit, Directorate of Industries, Uttarakhand has issued an Office Order No.1612 Aa. Pra./Bhu.Ni./Bhu.Khani.E./2013-14 dated 10th December 2013 regarding geological studies in disaster affected five districts of Uttarakhand. Uttarkashi is one of them. Thus undersigned traversed and collected field geological observations under the management of cosignatory departmental 'Assistant Geologist'.

In the above mentioned questioned area, the reconnaissance geological investigation was carried out in the presence and co-operation of Shri Bharat Singh Rawat, Revenue Sub-Inspector, Nagangaon, for proposed site of Shri Pratap Singh S/o Shri Raghubir Singh, Village Nagangaon, Tehsil- Barkot, Khasara No- 4953(a) and Area- 0.030 ha. The site is 12km approximately from Tehsil Barkot, District Uttarkashi, Uttarakhand and is approachable 9km by NH-123 and then 3km via Nagangaon-Masalgaon Motor road. The site is 100m approximately from the road in West direction. It falls on coordinates –N 30˚50.713' E 78˚15.330' and elevation 1437m. The site is on the right bank of river Yamuna and is about 400-500m approximate distance from the Yamuna river bank, in South direction. The site is densely populated.

2. GEOMORPHOLOGY OF THE PROPOSED AREA:

The proposed site is situated on a hill slope about 25-30m downhill from the Nagangaon-Masalgaon Motor road. The uphill slope in East direction from the site is 60˚-70˚ towards West direction and the uphill slope of the site in Northeast direction is 35˚-40˚ towards Southwest direction. The downhill slope of the site is approximately 15˚-20˚ towards Southwest direction. The overburden thickness in the proposed site is about 5-10m approximately with quartzite, phyllite and metabasic fragments of varying sizes 5-10cm. The boulders of approximately 20-30cm size are also found around the site. There is Badiyar

River flowing in South direction about 100-150 m in Northwest direction from the site. On the hills around the proposed site mix vegetation is found.

3. REGIONAL GEOLOGY AND GEOLOGICAL OBSERVATION AROUND THE CONSTRUCTION SITE:

Uttarkashi valley exhibits characteristic rugged topography of the Lesser Himalayan terrain. The ground elevations generally vary between 1150m to 2000m above msl. The hill slopes in the area are generally observed to comprise of rocky outcrops, rocky cliffs and mantle of colluviums. The hill slopes in the area is generally moderately steep (25°- 35°) to steep (36°- 45°) while few escarpments or cliffs (> 50°) are also present. Uttarkashi town is located in the Lesser Himalayan geotectonic block and it is bound by two major Thrust fault i.e. Main Central Thrust (MCT) and Srinagar Thrust (ST). The MCT can be traced to the northeast of Uttarkashi while the Srinagar Thrust lies in the southwest. Phyllite, metabasic and quartzite of Garhwal Group are exposed around the area.

Geologically, the area falls in the region of rocks of Bhatwari-Barkot Formation (= Chail) of Ramgarh Group of Lesser Himalayan terrain, the rocks are mainly phyllites, quartzites with intrusion. It should be emphasized that the quartzites, phyllites and metabasics (= Chail) directly underlying the crystalline are a typical phenomenon for all the Himalayas.

An outcrop about 3m x 5m size of phyllite is found in East direction uphill from the site. These rocks are green in color, fine grained, and thinly foliated with smooth foliation surfaces. The beds are dipping towards North direction with a dip of 30˚ and strike E-W direction. The most prominent joint plane is dipping 65˚ towards N80˚ with strike N170˚ and the joint spacing is approximately 10-20cm with 2-5mm openings. Along the foliation plane of the phyllite two to three quartz veins of about 5-10cm wide are intruding. The rocks are weak and moderately to highly weathered. There are also interbedding of phyllite and metabasic rocks found along the Nagangaon-Masalgaon Motor road within 100-200m of the proposed site.

Phyllite outcrop in the uphill of the proposed site.

4. GEOTECHNICAL OBSERVATION OF THE PROPOSED CONSTRUCTION SITE:

The proposed area is on old colluvial deposit man made terrace. There is a slide in East direction of about 30m long and 15m wide on the uphill slope dipping 60˚-70˚ towards West direction below the Nagangaon-Masalgaon Motor road near the proposed site. The slide has caused the most damage to the house in question. There are many factors responsible for the landslide here including the road cutting, creeping, and oversaturation due to seepage, steep slope and weak phyllitic rocks dipping along the slope direction. The landslide debris is composed of angular and sub-angular fragments of quartzite, phyllite and metabasic rocks varying from 5-10cm (60 %), 10-20 cm (30%) and > 20cm (10%) size. A drainage channel of 1ft x 1ft size is present flowing N to S direction in the back side of the site. The soil type here is colluvial, brown in color of silty clay material.

A far view of the proposed site from West direction.

A view of the damaged house due to the slide in East direction.

5. RECOMMENDATIONS:

Based on above surface geological observations of the proposed area the following remedial measures for construction of a geologically suitable house are recommended:

1. As the site is affected by an active slide, so it is highly recommended to construct the new house at a minimum of 10-15m distance away from the slide in Northwest direction for the safety of the house.
2. A retaining wall must be constructed in two levels of 5m each in East direction of the proposed site to retain the landslide. A retaining wall in Northeast direction of about 4m and another wall in Southwest direction of 3-4m height must be constructed.
3. The foundation depth of the houses must be as per the compactness of the overburden material in the proposed site.
4. A minimum gap of about 2-3ft must be kept between the backside retaining wall and the proposed house to prevent seepage into the house.

5. The back, sides and premises of the houses must be made cemented to prevent subsurface seepage and a drainage channel must be constructed at the back of the house with a slope towards North to South direction for discharge of rain water and surface water.
6. As the area falls in Lesser Himalayan earthquake zone IV, light weight and slanting roof, framed structure, and single or double storied house construction is preferable.

6. CONCLUSION:

Prima-facie, the proposed site of Shri Pratap Singh S/o Shri Raghubir Singh is geologically feasible for the proposed construction, only if, the above mentioned recommendations will be followed strictly, otherwise, in their contravention; geological suitability will be deemed annulled.

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Consultant Associate Geologist

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Consultant Geologist

Date: 25th Dec 2013

Place: Camp Uttarkashi

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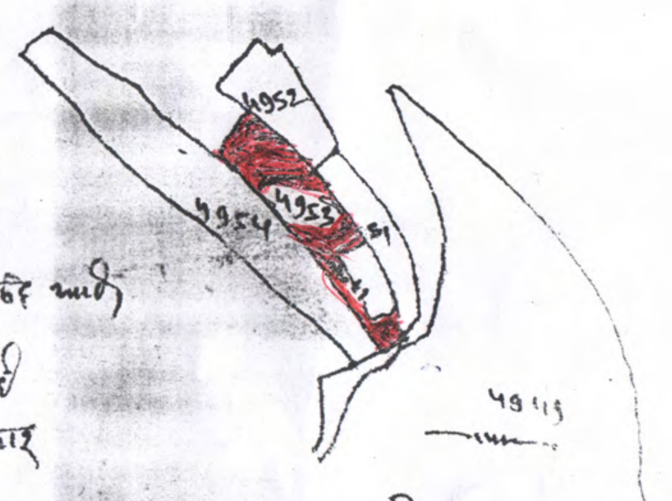
R.S. No. - 50, 51, 52

नक्शा मौजा नागांगाव महाल खरवाड़ा नाम लाके स्वामी जो देवीभाल के प्रभाकर पारेखादी हेतु श्री फेब्रिकेट भवन निर्माण करना चाहते है

पैमाना 64" = 1 मील



चौहद्दी

(1) उत्तर दिशा खसरा नं 4952 [illegible] आदि
(2) दक्षिण दिशा में 4954 [illegible] आदि
(3) पूर्व दिशा में 49 [illegible] रास्ता
(4) [illegible]

नक्शा लेखा किया
26-11-013

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(1) [illegible]
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प्रमाणित स्थल O.D.C.

19-12-013

नकल खसरा मौजा .....मध्ये तोक ,पट्टी .....

तहसील बडकोट, जिला उत्तरकाशी जहां पर दैवी आपदा प्रभावित परिवार हेतु प्रीफेब्रिकेट भवन निर्माण हेतु भूमि प्रस्तावित की जा रही है।

खसरा नम्बर	क्षेत्रफल हे0 में	खतौनी खाता संख्या	भूमिधर का नाम/पिता/पति का नाम	विवरण
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