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Examination of land near Grindelwald, West Tamar

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A brief examination was made of land on the corner of Upper Craythorne Road (Waldhorn Drive) and the West Tamar Highway. The land is at the foot of steep slopes leading up to the Grindelwald development. The steep slopes and the flatter area above are underlain by coarse-grained Tertiary basalt. The land at the base of the steep slopes to the River Tamar is underlain by Tertiary sediments made up of clay, sandy clay and sand. Basalt talus from the steep slopes behind occurs on the surface over most of the land inspected.

The area in question is in class 4 on the landslip zone map of the Tamar Valley. It has two rather large rounded mounds which have been selected as possible house sites. These mounds have probably formed as a result of landslip in ancient times. As there is some doubt about the future stability, investigations were recommended to examine the subsurface material and groundwater conditions; two or three test pits dug with a backhoe to about 3 to 3.5 m depth at each site should be adequate to make this examination.

Test pits

Three test pits were dug and examined on the land. A description of the material encountered in the pits is included as Appendix 1 and the approximate locations of the pits are shown on Figure 1.

Over most of their depth, the pits encountered basalt boulders with varying amounts of clay derived from the weathering of the basalt. Much of the clay retains an igneous texture although a thin zone of massive clay was struck at shallow depth in hole 3. The absence of any free water in the pits indicates that the material is well drained.

X-ray diffraction analysis on the plastic clay sample from pit 3 shows that it contains mainly montmorillonite, an expansive clay mineral.

The area selected for test pit investigation appears to have a thicker accumulation of basalt boulders than the eastern end. Tertiary sediments can be seen in road cuttings below the lot on the eastern end while in cuttings below the western end, there only appears to be basalt boulders in clay.

The whole lot is in an area of old landslips and extreme care should be taken in developing the land. The western end, where the test pits were dug, is the more favourable part of the lot. Disturbance or clearing of the steep slopes up towards Grindelwald should be avoided and excavation on the slope between the house site and the road should not be undertaken. The house site should be on the flat area at least 10 m from the beginning of the slope to the road. Drainage around the site should be maintained in excellent condition and large quantities of water should not be stored near the house site (e.g. in swimming pools) because of the possibility of leakage. Stormwater, sullage and septic tank water should be piped away from the house site (along the ridge either to the east or west) for at least 40 m and discharged. Trees planted in the discharge area will aid in maintaining stability. It should be ensured that the area at the foot of the steep slopes to Grindelwald is well drained and grassed to encourage rapid runoff. Although it cannot be said there is no risk of future landslips affecting the property, with

these precautions, the risk should be small.

It is likely that the foundations of part of the house at least will be on the plastic clay containing abundant montmorillonite. With differential drying of this clay, movements in foundations can take place unless they are specially designed. A reinforced slab is often used in these conditions.

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APPENDIX 1
Logs of test pits

Pit 1

0 – 0.3 m	Brown silty clay soil, a few basalt boulders, grass roots.
0.3 – 2.1 m	Basalt boulders varying in size from 20 mm to 300 mm with clay between, some shiny surfaces on clay in places. Moist from about 0.6 m to base of pit but no free water. About 80% boulders and 20% clay.

Pit 2

0 – 0.4 m	Brownish grey silty clay soil, tree roots, grass roots.
0.4 – 2.5 m	Brown and brownish fawn clay with basalt texture remaining and basalt boulders. Boulders usually only up to 100 mm across but occasionally larger. Moist but no free water, some shiny surfaces on clay. Boulders about 30% and clay about 70%.

Pit 3

0 – 0.3 m	Brown silty soil.
0.3 – 0.9 m	Brown plastic moist clay, occasional small basalt boulders.
0.9 – 2.5 m	Brown fragmental clay with basalt boulders up to about 150 mm across. Some of clay has shiny surfaces, is moist with no free water, and often has remnant basalt texture. About 30% boulders.


ROAD
CRAYTHORNE
TAMAR
HIGHWAY
N
WEST
Test pit (position approximate)
DRIVE
WALDHORN
1
2
3

Figure 1