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15 GEEVESTON WATER SUPPLY: STABILITY OF PIPELINE ROUTES AND RESERVOIR SITES

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ABSTRACT

Alternative pipeline routes for a proposed water supply for Geeveston have been examined. The first route descends a steep unstable slope and is regarded as unsuitable. The alternative route is across stable ground but further investigation of the proposed reservoir site is recommended.

PROPOSAL "A"

In this proposal the pipeline is fed from a 500,000 gallon reservoir situated on a steep-sided spur east of Geeveston. The pipeline will descend the west-facing slope of the ridge to the vicinity of the swimming pool.

The ridge is composed of coarse grained dolerite which is deeply, but irregularly, weathered in situ. Overlying the bedrock is a variable layer of clay and dolerite boulders up to 6 feet thick. Small earth flows resulting in failure of the road cuttings have occurred at the base of the slope quite recently and the weathered

bedrock and overlying clay are saturated in the vicinity. The side of the spur has probably been originally oversteepened by a meander belt of the Kermandie Rivulet and the present failure has resulted from recent road widening. Although no other evidence of recent movement could be detected it seems clear that the slope stability is delicately balanced and that further works in the vicinity could lead to progressive failure of a larger area. For this reason it is recommended that an alternative route be sought.

A route from the proposed reservoir to the north along the crest of the ridge would avoid the steeper, potentially unstable slope.

The reservoir would be situated on the side of the ridge and would be founded on a mixture of weathered dolerite and clay with perhaps some kernels of unweathered rock. It may be noted that the clays resulting from the weathering in situ of dolerite are characteristically permeable and sensitive. Evans (1958) recommended, for a strip footing 2 feet wide at a depth of 2 feet, a maximum loading in *undisturbed* soil of 4.7 tons/foot run with a safety factor of 3.7 and a loading of 0.7 tons/foot run with a safety factor of 3 for the *remoulded* soil. If any movement occurs or has occurred, the soil along the surface of shearing will have the shearing resistance of the remoulded soil. Since these soils are relatively permeable, leakage from the pipeline resulting from small scale movements is likely to have a severe effect upon the stability of the hill slopes.

PROPOSAL "B"

This proposal envisages a longer pipeline from a hill west of Geeveston. The slopes involved are very much flatter and should not constitute any danger to stability. The reservoir is situated near the top of a spur composed of Permian mudstone which is irregularly intruded by dolerite. Outcrops are poor but it appears that the intrusion boundary is close to the reservoir site as indicated by Ford (1954).

About 50 feet below the reservoir site a series of springs emerge which appear to be perennial and are possibly connected with the shape of the dolerite intrusion. Without further subsurface investigation it is not possible to express a firm opinion as to the effect these may have in the stability of the reservoir site but they are a disturbing factor which should be investigated before the proposal is proceeded with.

REFERENCES

EVANS, J. W., 1958.—Engineering properties of dolerite soils; *in* Dolerite Symposium. *Univ. Tas.*

FORD, R. J., 1954.—Geology of the Franklin-Glendevie area. *Pap. Roy. Soc. Tas.*, 88, 153-159.