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15. FOUNDATIONS FOR AINSLIE HOUSE, COSGROVE PARK, LAUNCESTON

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INTRODUCTION

A preliminary report outlining the general geological conditions in this area, together with a programme of investigation, has been published previously (Jennings, 1963). Three diamond drill holes were put down on the original site chosen and an analysis of the cores from these holes indicated that the site was unsatisfactory. A further site was selected near Waveney Street and two more drill holes put down. In addition to this, three test pits have been excavated, two of them on the Waveney Street site and one on the original site. An interim report summarizing the investigations on the original site was prepared. (See this volume, p. 88).

The material encountered in the two new holes consists of interbedded plastic clay and sandstone , not significantly different from the sediments encountered in the earlier drilling. Details of the test pits are given below:—

Test Pit No. 1.—(Near Drill Hole No. 1).

0 to 1′ 6″	surface soil, filling, &c.
1′ 6″ to 3′ 6″	yellow, medium to fine grained feldspathic sandstone, dip 10° NNW strike 165°.
3′ 6″ to 9′ 0″	white, fine grained feldspathic sandstone, bedding parallel to above.

Test Pit No. 2.—Waveney Street Site, North.

0 to 0′ 3″	filling, sand, &c.
0′ 3″ to 2′ 2″	pale, fine grained, quartz sand with limonite nodules, irregular interface between sand and underlying clay.
2′ 2″ to 10′ 0″	mottled red, white and brown clay with occasional limonite nodules, no bedding, moist, plastic and showing slip planes.

Test Pit No. 3.—Waveney Street Site, South.

0 to 2′ 6″	sand, loam, filling.
2′ 6″ to 10′ 0″	mottled white, red and yellow clay with broken limonite nodules. Some irregular lenses of sandy clay with irregular boundaries. No bedding discernible. The clay is intersected by several generations of slip planes and the limonite bands are also broken up.

SUMMARY OF GEOLOGY

The investigations indicate that the sites examined are underlain by more than 100 feet of Tertiary sediments. These sediments consist mostly of plastic clays and soft sandstone but some bands and lenses of quartz sand are also present. Nodules, seams and bands of limonite and limonitic sandstone up to six inches thick also occur throughout the sequence. Many of the units are of small lateral extent.

Some of the porous, sandy beds are capable of transmitting significant quantities of water and many of the clay beds have failed by shear several times in the past. Much of the core recovered was soft and water-logged and would have a very low shear strength.

It seems likely that the difficulties in drilling this type of material may have resulted in some of the core obtained being contaminated by water. However, the extreme difficulty in obtaining core at all indicates the generally soft nature of the ground. One driller reported that the material encountered was the same as that obtained during the drilling of the Lawrence Vale landslips.

In the drill core most of the bedding was inclined at angles between 5°-15° except for the bottom of Hole No. 1 where dips up to 35° were present. The only real evidence for the direction of dip is from Test Pit No. 1 where the beds dip 10° to the NNW. This is the most unfavourable direction for the stability of the site as it would favour slipping towards the already unstable ground along Westbury Road.

None of the bores intersected the dolerite basement rocks. Since no dolerite outcrops at the surface between Cosgrove Park and the old clay pits below Westbury Road, it may be inferred that *either*—

(1) The dolerite is more than 200 feet below Cosgrove Park, *or*
(2) The dolerite surface is more than 100 feet below Cosgrove Park and slopes toward Westbury Road.

In the case of (1) the dolerite is too deep to have any effect upon the stability of the hillside whilst in case (2) the dolerite would tend to promote slippage and instability.

The investigations carried out therefore indicate the following:—

(1) The sites are underlain by more than 100 feet of soft clay, sandstone and quartz sand.
(2) These sediments occur as irregular lenses and pockets.
(3) There are beds present capable of carrying sufficient water to promote slippage.

(4) The dolerite basement is either too deep to affect the stability or is inclined so as to promote instability.
(5) The indications are that the sediments are roughly similar to those at Lawrence Vale and the only positive evidence of dip indicates that they are inclined in an equally unfavourable direction.

CONCLUSIONS

In the original report it was noted that the presence of soft clay beds interbedded with waterlogged sand beds is a most important contributing factor toward the formation of landslips. The other important factor is the inclination of the bedding planes. The investigations at Cosgrove Park indicate that both of these factors are present. A major building situated on such a site would therefore entail a very high degree of risk.

It is therefore concluded that the site is not suitable for the proposed building and a more satisfactory site elsewhere should be selected.

Further development of the whole Cosgrove Park area should be restricted to light construction and park areas. Careful attention should be given to surface and sub-surface drainage and excess watering should be avoided.

If the proposal to erect Ainslie House is still contemplated, one of the numerous areas around Launceston where dolerite bedrock conditions occur should be selected. By careful selection of sites there is every reason to expect that a building of almost any dimensions could be erected without the slightest risk of foundation failure. It should therefore be possible to contemplate a building large enough to justify its own service block and operate independently of the Cosgrove Park services.

REFERENCE

JENNINGS, I., 1963.—Geological factors affecting proposed building at Cosgrove Park, Launceston. *Tech. Rep. Dep. Min. Tas.*, 7, 87-89.