

Preliminary note on geophysical work near the hospital at Currie, King Island

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The King Island Council plans an independent water supply for the new hospital, which has extensive lawns which require watering.

A seismic spread of 325 feet length, with a geophone spacing of 25 feet, was fired from both ends along the eastern boundary of the hospital property. The spread extended in a north-south direction with the southern end near the road to Grassy. A resistivity probe, using the Schlumberger configuration for the electrode spacing, was carried out along the seismic spread.

Different materials transmit waves at different velocities and a seismic spread such as the above can be used to determine these velocities and the approximate thicknesses of the material concerned, provided the velocities increase with depth. Using knowledge of the geology, these velocities can be assigned to the various materials that are likely to occur.

As with seismic properties, different materials also have a different resistance to passing an electric current and a resistivity probe measures the apparent resistivity of various layers. Sand saturated with water (particularly if the water has moderate quantities of dissolved solids) has a much lower resistivity than dry sand.

Results

Seismic

From the seismic spread results at least three layers, and probably four layers, with different velocities are indicated.

1. A layer with a seismic velocity of about 1250 ft/sec is about 8-17 feet thick and probably consists of soil and loose sand.
2. The second layer has a seismic velocity of about 2100 ft/sec and is about 25-40 feet thick and is probably damp sand or slightly compacted or cemented sand.
3. A layer with a seismic velocity of about 5600 ft/sec is probably present. If present it is likely to be 10-15 feet thick and would be about 40 feet below the surface over most of the spread. Such a layer could be sand saturated with water or weathered bedrock or clay.
4. A refractor with a velocity of about 9500 ft/sec is indicated at depths of 50-60 feet from the surface along the spread. This is almost certainly basement rock and could be either mudstone or weathered or jointed granite.

Resistivity probe

A plot of the resistivity shows decreasing values from about 7 feet to about 45 feet; this decline is probably due to moisture. Although this lowering of the resistivity with increasing depth could be caused by other factors, the presence of a water table in this zone is a definite possibility.

Conclusion

The results of the seismic spread and the resistivity probe suggest that a layer of water-saturated sand is a definite possibility, and from the information obtained it would be about 40 feet from the surface. If drilling is undertaken it should be extended to bedrock, which is expected to be of the order of 50-60 feet from the surface.

It should be pointed out that development of individual water schemes could affect the supply to the present town supply. A successful bore at the hospital might not affect town supply to a very great extent but development of other underground supplies south of the hospital could be expected to have a greater effect.

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