



Case Study 6 Sand and Gravel Resource Mapping: Use of Earth Resistivity Imaging

THE PURPOSE in this assignment was to map the sand and gravel layer because of its value as aggregate. The owner needed to determine the volume of the resource present. Trenching and sampling would be done simultaneously to determine the size gradation of the materials to qualify their use for concrete aggregate needed nearby.

The *HydroImage* profile shows a 5- to 10-meter thick non-water-bearing (dry) unit of higher resistivity (yellow-orange) reasoned to be the sand and gravel layer overlying a moist bedrock of lower resistivity (blue color). Vertical and horizontal scale is in meters, so depth of the profile is 87 m (283 ft) and horizontal distance is 375 m (1,222 ft).

The *HydroImage* profile revealed an unexpected feature. There is dune sand cover along the horizontal distance from 0-80 m on the left and 240 m-360 m on the right along the location of this profile. Sand and gravel was only expected where visible at surface between 80 m and 240. The profile revealed that the quantity of the previous resource could doubled by this result, an amount not anticipated. Also unexpected was a thinning of the resource in the area of the active channel where the owner had expected an increased thickness.

Success with this technology established its value for resource mapping purposes. The owner was convinced that several additional profile lines would better define the varying thickness and volume of the sand and gravel over a broader area. To determine a resource, additional parallel profile lines were later completed at a spacing varying from 100 ft to 200 ft between lines and integrated with gradation data obtained from boreholes scattered about the site.

