

## Helping to work out where to build

The planners of the Albury-Wodonga growth centre expect its population to increase from 50 000 to 300 000 by the end of the century. Their task is to work out the best way to cope with the influx.

One of the things they have to do is decide what areas to allocate for housing, industries, parks, roads, and so on. Many factors have to be considered, but a basic one is the suitability of different parts of the planning area for construction activities.

To help them work out what should go where, the planners invited a team from the CSIRO Division of Applied Geomechanics at Syndal, Melbourne, to evaluate the growth area's terrain. The CSIRO team, led by Mr Keith Grant, has developed an evaluation system now being used in many parts of Australia.

Rather than giving the detailed site information needed when construction begins somewhere, their system points to areas that are likely to be most suitable, from an engineering viewpoint, for particular develop-

ments. In this way it guides planners in their choice of sites.

The system, based on aerial-photo interpretation and on-site tests, can be used for broad surveys over large areas; one application has been to help pick the best route for a re-made Birds-ville Track in outback South Australia. It can also be used for much more local and detailed surveys, such as the Albury-Wodonga evaluation.

The scientists call it the PUCE program—PUCE standing for pattern-unit-component-evaluation. Terrain patterns, units, and components are sections into which areas being evaluated are divided. In broad-scale surveys, the scientists map and describe in their reports only the largest sections, terrain patterns. When more detail is wanted, the features of each unit, or even each component, may be described.

In the Albury-Wodonga survey, Mr Grant and his colleagues, working with people from the Albury-Wodonga Development Corporation, began by divi-

ding the 9000 sq km into 34 terrain patterns. The boundaries of terrain patterns mark major changes in the hilliness of land, in the numbers of streams crossing it, and in soil and vegetation.

The team also marked out terrain units—250 of them in the 9000 sq km. These, too, are defined in terms of topography, drainage, soil, and vegetation, but as the definitions are more precise the number of units is greater than the number of patterns.

At this stage, the scientists produced a map showing the terrain patterns and units on a scale of 1:125 000. Then, with the planners, they gave areas ratings in terms of their suitability for various uses—for example residential, large-scale industrial, transport corridors, rural, and nature conservation.

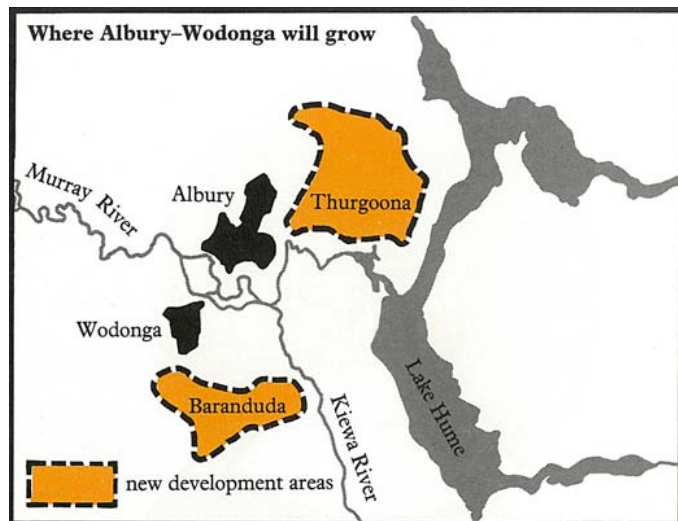
In the residential evaluation, land was categorized as choice, good to above average, average to below average, poor to unsuitable, and unsuitable. The categories in some of the other evaluations were not so obvious. For example, under the heading 'aesthetic evaluation, unique scenery, evocative qualities',

land was rated as dramatic landscape, rich fertile land, meditative, vistas, high-quality landscape, pleasant countryside, not attractive, and no notable features.

The Albury-Wodonga planning area takes in many types of country, including scenic granite country with spectacular cliffs, historic settlements like Beechworth and Chiltern, forests, pastures, and wheat lands. Running through the middle of it, of course, is the Murray River and its flood plains. No new development will take place on the flood plains. Lake Hume, held back by the Hume Weir on the Murray just east of Albury-Wodonga, is both an important area for recreation and the city's main water supply.

In 1973, the Development Corporation chose two areas as the sites for expansion up to the year 2000 after these had been assessed in the survey as suitable for suburb-building (see the map). One of them—Baranduda, south-east of Wodonga—will contain a major business centre as well as suburbs. The survey showed that the site first proposed for this centre





was swampy; the location was changed accordingly.

The other area chosen for suburbs is Thurgoona, just east of Albury. Both areas were farmland without any urban development, so they can be planned from scratch.

After Baranduda and Thurgoona were chosen for development, the CSIRO team went back and surveyed these areas in much more detail. Their on-site work included drilling for deep soil samples, and the maps they produced are on a much larger scale than the earlier one—1:10 000 compared with 1:125 000.

These surveys helped the planners begin laying out the suburbs—siting main roads, open areas, shopping centres, housing, and so on. To assist with even more-detailed planning, the scientists went back last February for a survey at terrain component level.

This was virtually a block by block survey in sections that earlier work suggested were best for various developments. Maps will be drawn on a scale of 1:1000.

No two areas of land are exactly the same, and to describe any area completely would be an impossible task. What PUCE does is enable land to be described, at specified levels of detail, in terms of features important for decisions on land use.

It also provides a method of easily storing information about any piece of land.

Mr Grant and his team began their terrain evaluations in 1965, with broad-scale surveys in northern Queensland for beef road construction. In 1967 they did the Birdsville Track survey; work on the new track has begun along a route following the old one as closely as possible but on land that won't flood whenever rain comes to the area. In 1968 they were back in northern Queensland, helping choose a route for transport from the Lady Annie phosphate deposits to the Gulf of Carpentaria more than 300 km away.

Since then, they have begun a series of evaluations of urban areas with the Victorian Town and Country Planning Board—in Melbourne, Queenscliff, Sale, and Warragul. They plan to do similar surveys in Warburton, Colac, and Ballarat. Other PUCE surveys are also under way in Canberra, around Brisbane, and at Shoalwater Bay near Rockhampton, Qld.

The PUCE program for terrain evaluation for engineering purposes. I. Principles. K. Grant. *CSIRO Division of Applied Geomechanics Technical Paper No. 15, 1975.*