

Better water efficiency by design

Interest in, and use of, new technology associated with precision agriculture and water use efficiency have placed increased attention on the design and operation of irrigation and dryland development. Of particular note are:

- 'Beeline' type data conversion;
- Multiplane design for Geostar land levelling; and,
- EM-31 ground conductivity surveys.

'Beeline' data conversion can be used to produce reverse grade maps and cut/fill land levelling maps for use in improving irrigation field performance and productivity. They may also be used to produce contour maps suitable for incorporation into other data sets collected by the landholder — such as farm plans, irrigation mapping and crop plans.

These maps can help growers to concentrate their resources on those areas needing attention, while leaving the better performing parts of the fields intact and ready for the next season. Of great interest, are the levels collected along tail-drains — areas which often have watering problems.

These levels may be processed and recommendations made to rectify problems without touching the field/s. Acquisition of Beeline data can be carried out as part of the normal day-to-day farming operations, with no time or cost implication.

REDUCED EARTHWORKS

Depending on the application, earthwork volumes can be substantially reduced due to the compatibility of the

design with natural drainage patterns. Multiplane software is particularly useful in this regard, for designing both irrigation or dryland areas. This program incorporates survey information to produce designs utilising natural topography on a number of planes, and can include drains and roads.

Once processed, the information is downloaded into Geostar-equipped laser buckets for construction. Drains or roads can be built as part of the same operation without the need for additional survey, design or setout.

This system is particularly suited to levelling under lateral move and centre pivot systems, as well as dryland areas where crop inundation during rain events causes crop losses or yield reductions.

Electromagnetic ground conductivity surveys (EM surveys) are rapidly becoming an essential part of improving farm performance and future development. The EM-31 can be used to measure soil conductivity to a depth of up to four metres, which in turn provides information such as:

- Suitability of area for development;
- Detecting soil salinity;
- Location of groundwater monitoring devices;
- Location of sites for soil sampling;
- Suitability of sites for water storages;
- Detection of seepage areas in drains, channels and storages;
- Survey of embankments to assess compaction properties;
- Collection of soil data for property and catchment planning;
- Locating buried services; and,
- Groundwater contamination and landfill studies as well as groundwater resource evaluations.

The EM-31 is mounted on a four-wheel motorbike and is equipped with GPS to enable accurate plotting of the machine position. The data is downloaded onto a computer and is used in conjunction with other data to produce an apparent conductivity map (subsoil salinity map).

Property boundaries and infrastructure details are added and the image can be overlaid onto a topographic map or aerial photograph to allow easier identification of problem areas. Using GPS co-ordinates from the map, particular problem areas or those requiring further investigation can be accurately located and monitored.

SMK Irrigation Consultants, along with their associated companies of MFG Shaw and Associates and North West Environmental Services, are able to advise in many aspects of irrigation design and environmental services, including those mentioned here.

For more information, contact SMK at Moree (02 6752 1640) or Goondiwindi (07 4671 2445) offices to discuss your requirements.



Beeline data can be used to improve irrigation field performance.