



**Project: PORT KEMBLA COKE OVENS SETTLEMENT BASINS**  
**Hydrogeological Assessment**

**Location: Illawarra, NSW**  
**Client: BHP and Transfield Construction**

### **Highlights**

- Drilling investigations and permeability testing
- Development of a conceptual model of groundwater flow dynamics
- Modelling of groundwater inflows and dewatering requirements during construction.

### **Background**

The need to plan and design settlement basins for sludge retention necessitated an assessment of hydrogeological conditions at the site. The intention was to line the settlement basin with geomembrane to preclude leakage or ingress of groundwater.

C. M. Jewell & Associates Pty Ltd was engaged to undertake an investigation and make the assessment. The project entailed drilling, logging piezometer construction, permeability testing, water level surveying and sampling of three shallow boreholes. The derived data was subsequently interpreted using both analytical and numerical modelling.

### **Hydrogeological Environment**

The basement rock of the area is weathered latite (a volcanic rock). It is overlain by either estuarine sediments or residual soil. A thick layer of fill material, comprising slag and coal wash, covers the site. A water table is perched within the fill material. The underlying estuarine sediments have low permeability, of the order of  $1 \times 10^{-6}$  to  $1 \times 10^{-7}$  metres per second. The principal source of groundwater inflow to the settlement basin is the perched, unconfined aquifer of the fill materials. The conceptual model and parameters derived in field investigations were integrated into a two-dimensional model of a section perpendicular to the settling basin. This allowed the simulation of the groundwater inflow rates during the basin's excavation and construction.