

# HISMELT KWINANA PLANT

## STONE COLUMNS



**Owner: Hismelt Operations Pty Ltd**  
**Main Contractor: Thiess**

**Specialist Contractor: GFWA**  
**Geotechnical Engineer: Arup**

### THE PROJECT

Hismelt is an iron making process in which fine iron ores and non-coking coals are injected directly into a molten iron bath, contained within a smelt reduction vessel to produce high quality molten pig iron.

During 2002, an unincorporated joint venture was formed for the purpose of constructing and operating an 800,000 ton per annum plant in Kwinana, Western Australia.

The site was located on the seashore with high groundwater levels and the soil comprised of loose to medium dense sand.

Preliminary calculations suggested that design loads could be safely transferred to the in-situ soil and the site required ground improvement.

### THE ROLE OF GFWA

GFWA was awarded the contract for installing the Stone Columns for the lock hopper, off gas cooler, off gas scrubbing and cooler, scrubber absorber tower, ore preheat, stoves, and coal drying and grading.

Due to the large loads and sensitivity of structures to settlements, Stone Columns with 1 m diameters were installed in staggered lengths of 10 and 20 m. The grid size of each column type was 2 m; with each grid located in the middle of the other grid.

Testing was performed using CPT to verify the soil stiffness in between the Stone Columns after treatment and plate load tests for the columns themselves. Stone Columns were tested up to 600 kPa using 600 mm diameter circular plates and up to 200 kPa using a 2x2 m<sup>2</sup> square pad.