

# CEMENT & LIME

**GWP Consultants LLP (GWP) has worked extensively over many years both in the UK and overseas on a range of projects relating to cement and lime, and has considerable experience in the industrial and bulk minerals industries.**

## **Mineral deposit evaluation for cement making**

The quality and quantity of raw materials available are fundamental considerations in justifying capital investment in a cement plant. GWP is very experienced in geological evaluation of raw materials deposits, including:

- Exploration for suitable deposits;
- The design and implementation of drilling and sampling programmes;
- Geological, hydrogeological and geotechnical modelling;
- Quality and quantity release scheduling and design of homogenising facilities/raw material sampling programmes;
- Estimation of reserves and resources;
- Preparation of 'bankable' due diligence and feasibility study reports;
- Equipment selection and mine optimisation.



GWP has provided due diligence support to international cement and lime clients in connection with acquisitions in continental Europe, India, the Caribbean and Ethiopia. We have also assisted UK cement producers to secure planning permissions for major quarry extensions. This has included geotechnical, geological (reserve and quality), quarry restoration and after-use design, hydrogeological and economic evaluation inputs.

## **Quarry design and environmental assessment for cement raw materials**

A key constraint in relation to the design of quarries associated with cement making is the delivery of a consistent chemistry to the process. In certain geological situations, this can require the design and implementation of complex selective quarrying and blending/homogenising arrangements to minimise variations in the chemistry of the run-of-mine output.

As with all other types of surface mining and quarrying, minimising environmental impacts is an essential element of design and operational management. GWP has expertise in environmental impact assessment and development of quarry designs that minimise the environmental footprint. Successful design of cement raw material quarries requires a balance to be struck between the needs of the process, economic mining methods and layout, and environmental and health and safety (especially geotechnical) constraints. We have a great deal of experience assisting our clients with the preparation of schemes that aim to strike this balance.



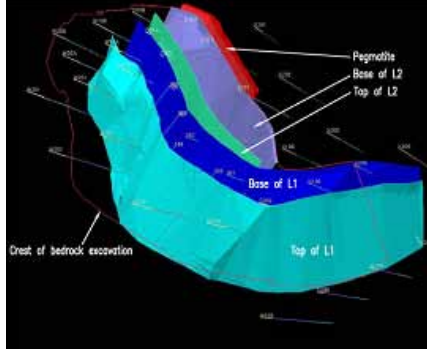
## Selected experience

Within GWP we are able to offer a well balanced range of capabilities from the basic resource identification, through exploration and quarry design, to detailed planning applications and quality predictions for raw material feed to the cement or lime kiln. Combined use of raw materials (e.g. aggregate production alongside cement making materials) and after-uses of workings (for landfill, etc.) are also covered, as are specific environmental matters.

GWP frequently works with other consultancies to bring together specialist teams to meet our clients' needs for the full range of services concerned with security of raw material supply throughout the life cycle of a cement plant (feasibility, planning, operation and closure).

Projects undertaken for the cement and lime industry clients include:

- Exploration and deposit evaluation
- Quarry design and geotechnical assessment
- Environmental impact assessment and monitoring (especially water and blasting)
- Raw material quality programming
- Market evaluation
- Due diligence appraisals



Such assignments have been carried out Worldwide and in the UK, Europe, Africa, Caribbean, India and the Far East. Clients include: Anglo Industrial Minerals (Poland), Cemex (UK, Poland and Croatia), Dyckerhoff (Ukraine), Lafarge (West Africa), Lagan Cement (Ireland), Mughar Cement (Ethiopia), Phoenix Cement (India) and YTL (Malaysia) and Stevin Rock (UAE).

We have also provided advice on raw materials for investors evaluating cement and lime projects in Ukraine, Poland, Russia, Mexico and Jamaica.

## Selected projects

### UK

GWP has worked as consultants for Rugby Cement (now part of Cemex) since 1987 and, during this period we have:

- Re-evaluated all their UK mineral resources
- Designed 2 major quarry extensions as part of planning applications to secure 40-50 years of operation for established or expanded cement plants (both successful)
- Provided operational support in relation to:
  - The safe disposal of CKD
  - Optimum working layouts
  - Costs and benefits of blasting vs ripping
  - Hydrogeological impacts of quarrying
  - Detailed surveying and reserve audits.

### Ethiopia

Provided all raw materials related inputs to a pre-feasibility and feasibility study for a major cement works expansion project at Mughar (for Mughar Cement Enterprises), including:

- Review of local regional exploration mapping and site selection for limestone, clay, sandstone, gypsum and pumice quarries
- Specification of site investigation in all deposits and specification of standards required
- Analysis and modelling of geological and geochemical data from the drilling programmes
- Reporting on the reserves
- Environmental audit, focusing on water and dust
- Design of the mineral operations including detailed quarry layouts.

### India

Designed and managed a drilling and sampling programme at a greenfield site identified with potential for establishment of a new cement plant. Undertook all geological and geotechnical modelling and prepared reserve evaluation reports and conceptual working layouts.

### Nigeria

Hydrogeological investigations were designed and managed in a sub-artesian, semi-karstic, multi-aquifer, dipping limestone sequence, to assess the feasibility and cost of de-watering required to secure 150 Million tonnes of limestone mineral as part of a new kiln line capital investment assessment.

## Key contacts

For details and to discuss your requirements, please contact:

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