

Normandy Landfill, Beirut, Lebanon

Our Services

- Review of Data
- Intrusive Ground Investigation
- Numerical Modelling
- Expert Advice



Assessment of Remediation Design and Gas Generation Potential

The Normandy Landfill occupies an area of 33ha adjoining the northern coastline of the Beirut Central District. Phase II comprises some 22ha that is being reclaimed for prestige development. Offices, hotels and apartments will be built together with associated car parks, roads, footways, services, parkland and landscaping. The requirement was that the reclaimed land will pose no risk to human health, including during the construction phase.

Originally, the landfill site consisted of a small bay that cut 200m into the mainland. Initially mostly municipal waste was dumped. Later, demolition debris was tipped. During the civil war, damage to sewage treatment facilities led to the discharge of untreated waste. The site also received old household appliances, cars, medical and industrial wastes plus unexploded ordnance. This history led to a heterogeneous fill with horizons of inert and organic-rich materials in no clear pattern.

The investigation was required to identify the current and potential future landfill gas regime. To

do this the physical and chemical environment of the landfill materials and the rate of degradation of the organic fraction were evaluated.

CGL's work included a detailed study of existing reports and papers and a site investigation involving the construction of 19 boreholes, together with geotechnical and chemical laboratory testing. Numerical modelling and data analysis were used to predict current and future landfill gas production and to evaluate gas rectification and control measures.

The report gave recommendations on the construction risks and measures required to allow project completion according to the contract requirements and programme. **CGL's** ongoing brief is to advise SOLIDERE on development issues related to the ground conditions and landfill gas issues.

Client: WA Fairhurst International and SOLIDERE