SOIL STABILISATION AT LEEDS BRADFORD AIRPORT

PROJECT DETAILS

SOIL STABILISATION WORKS

A small estate of industrial units was to be built on a green-field site adjacent to Leeds Bradford Airport. The site was the two sides of a valley in the bottom of which was a small stream. The job required the re-alignment of the stream; the removal and treatment of the fluvial deposits in the original stream course, for use as acceptable fill; an earthworks cut/fill exercise to produce a plateau on each side of the new stream course; the whole to be topped-off with a cement stabilised capping (CBR 15%). The earthworks cut materials were wet, re-worked, glacial, sandy clays which overlay highly weathered Mudstones with an elevated sulphate content. The embankment slopes to the ‘new’ valley were to be cut at 1:5.

HOW COMBINED SOIL STABILISATION WERE INVOLVED

The Main Contractor engaged CSSL to undertake the earthworks (40,000 cu.m.) and the modification and stabilisation works.

The high Total Potential Sulphate in the mudstone dictated that the ground would need treatment with Lime and Ground Granulated Blast-furnace Slag in order to negate any sulphate reaction. This mixture of soil and binder gives a strong cemented material thus it was decided that it should be used as the surface layer capping material. This had the added benefit of minimising any disruption if swelling occurred resulting from sulphate reaction.

The approximate location of the mudstones was known as a result of the pre-earthworks trial-pitting and sampling exercise. This, plus a well-informed excavator operator, enable CSSL to dig and stockpile the mudstone separately from the other cut materials.

The bulk cut/fill exercise required the clays to be laid 300mm thick layers, lime modified to give an MCV between 9 and 12, then compacted to not less than 95% MDD. The Proctor Curves, established in the lab, design work, showed a range of MDDs which made it difficult to apply the correct value. Air voids content was used as overall control.

At the laboratory design stage the mudstones had been mixed with lime and GGBS in the ratio of 1:3. Soaked CBR tests with swelling check had shown minimal heave even with TPS value between 3 & 4%. This mixture was used to provide the Stabilised Capping. The compliance samples made on-site from the fresh mixture, then lab.cured, soaked and tested, showed similar small heave.