SOIL REQUIREMENTS FOR EARTHZYME

EarthZyme has proven successful as a clay modifier in soils that have greater than 20% by weight passing the 75 micron, (75 micron = 0.075 mm; 1 mm = 1,000 microns) and where the plasticity index is greater than 8. It is critical that all materials, which are being considered for treatment, are tested to ensure that they fit these parameters. Throughout the years of EarthZyme applications, it has become obvious that there is a much greater need for understanding of the road building process and the general materials engineering testing systems to ensure that the benefits of EarthZyme are optimized. While coming to grips with all the aspects of engineering can take a considerable amount of time and practical experience, it is imperative that a solid working understanding is acquired to ensure that all personnel involved in the promotion of EarthZyme can do the job successfully. The integration of EarthZyme into the road building process is relatively simple and has been designed for ease of integration.

Soil Identification - Suitability for Treatment with EarthZyme

As EarthZyme is effective on the clay fraction of a soil it is important that the quantity and quality of clay present be assessed. This is achieved using standard engineering tests.

Tests Needed:
A) Dry Density/Moisture Content Relation Proctor Test ASTM_D698
B) Liquid Limit, Plastic Limit and Plastic Index Test (Atterberg Limits) ASTM D4318-10
C) Particle Size Analysis ASTM D422
D) Hydrometer Analysis ASTM D1140

Preliminary Testing

The particle size distribution and the Atterberg limits are determined. Soils with 20% or greater by weight passing the 75 micron sieve and Atterberg limits plotting above the ‘A’ line in the Plasticity Chart are deemed suitable. A hydrometer analysis is also required to determine the silt to clay ratio of the material as a sieve analysis cannot grade such fine grains. A high silt to clay ratio may deem the soil unsuitable. Engineering the in-situ or available materials to these parameters is invariably more cost effective than importing for a complete resheet. Varying degrees of success have been achieved with soils having less than 20 % passing the 75-micron (No. 200) sieve, but these soils will generally have a high P.I. It can be economical to experiment with these parameters and situations where other options are costly.

Determine the maximum density/moisture relationship.

If a soil is deemed suitable for treatment with EarthZyme then the maximum dry density is determined by the standard proctor test. The information ascertained from this test is invaluable in ensuring that the engineering performance of the soil is optimized on the day of construction. Each soil has its own optimum moisture content. Maximum dry density is achieved at this point. If insufficient water is used during the water-binding phase, significant reductions in densities and consequently the load bearing capacity of the road will be evident. Also, if too much water is applied material’s become unworkable, the same reduction in densities are evident. Compaction values are also determined at this stage and used for comparison in the field at the time of construction.

Cypher Environmental Ltd.
1149 St. Matthews Avenue
Winnipeg, MB R3G 0J8 Canada

(204) 489-1214
info@cypherenvironmental.com
www.cypherenvironmental.com