INCE PARK BIOMASS ENERGY PLANT

HELSBY, CHESHIRE, UNITED KINGDOM

Ground Improvement

Problem

The proposed structure comprises a Carbonarious Biomass Facility. The main client is MWH Treatment Ltd, based in Heywood, Lancashire.
The designed £100M biomass energy plant replaces the previously consented bioethanol plant.

The biomass energy plant would take up to 175,000 tonnes of fuel per annum and use the latest technology to provide enough renewable electricity to meet the average needs of approximately 37,000 households. It would also have the potential to supply hot water or steam for use in local industries or businesses, increasing the plant's efficiency.
The site is located at Ince (near Helsby) in Cheshire, approximately 2 km north-northeast of Junction 14 of the M56 motorway and about 2 km northwest of Helsby railway station. The site lies on Ince Marshes, which form part of the southern flood plain of the River Mersey. It is located about 500 m south of the Manchester Ship Canal, which runs from west to east along the south bank of the river.

The area of development is characterised by poor ground condition with alluvial clay and peat presence to a depth of about 10m.
The design input has considered a minimum characteristic undrained shear strength cu of 7.5 kPa.

Solution

Maccaferri proposed an innovative method for designing this type of structure. The design method is based on applying the load on a defined rectangular area, considering the load data of the construction plant to be used (e.g. cranes, piling rig machines).

The design methodology is supported by a clear analytical method and has been presented at several international geotechnical and geosynthetics conferences.
The proposed design method enabled the calculation of the tensile forces in each of the reinforcing geogrid layers generated by:
• horizontal thrust due to the self-weight of the different soil layers; • wheel/track load of heavy vehicles; • membrane effect at the base (or subbase) - subgrade interface.
It was then possible to determine the optimum number and the mechanical characteristics of geogrid layers required for absorbing the horizontal forces generated by the above-listed mechanisms.

Client: MHW/Black & Veatch
Designer / Consultant: Geocentrix Limited
Contractor: Ward & Burke
Products used (Qty.)
Date of construction: 10/2015 - 01/2016
Google Maps Google Earth

MacTex W2 laid over the existing ground - Oct 2015

MacGrid WG laying operation using a spreader bar

Placement of granular material (in this case, Class 6F5 GHW)

Junttan PM20 machines during final operation in Jan 2016

Soil stabilisation using MacGrid WG in the compound/parking areas

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