Design and Construction Supervision of two Landfills for Industrial Hazardous and Non Hazardous Waste

Project Details

Belgium

Client:
Multinational Company, Confidential

Project Budget:
Confidential

Key Staff:
- Piet Wens
- Paul Verkaeren
- Uda Pannizzo
- Luis Hens
- Ciaran Kennedy

Duration:
2011 – on going

Provided services
- Feasibility Study and Conceptual Design
- Engineering Analysis
- Detailed Design and Tendering
- Supervision of the Construction
- End reporting for the authorities
- Training

Introduction

The Client is an European leading company in hazardous waste treatment. The Client operates a class 2 landfill for non hazardous waste and two class 1 landfills for hazardous, primarily inorganic industrial waste.

Extension of the landfill for non hazardous waste

Global description

Pollux Consulting has carried out the design of the extension for two existing landfills:

Extension of the landfill for non hazardous waste. The extension was approximatively 5 ha, on a site characterized by the presence of several layers of soft clay and peat, with a thickness of 4 to 5 m. The extension had to be designed for a total waste thickness of 40 m. The confinement layer and the leachate drainage layer were profiled in function of the foreseen differential settlements due to the consolidation processes in the soft clay and peat layers in the subsoil.

Delivered services

Pollux Consulting staff fullfilled this assignment by using their knowledge and expertise within the fields of design of landfills, earth works, hydrological investigations, soil investigations, stability of embankments and waste bodies and calculation of water balances.

Pollux Consulting delivered the following services:

Feasibility Study and Conceptual Design, Basic Engineering, evaluation of the bidders, supervision of the construction works, conformity report of the construction works.

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Extension of the landfill for hazardous waste in Antwerp

Global description

Extension of the landfill for hazardous waste. The extension concerns the filling of a valley between the existing landfill of the Client and an existing landfill for municipal waste. The valley has a length of 250 m and a hight of 55 m. Approximatively 500.000 m³ of waste can be landfilled in the valley.

A number of design issues linked with the specific geometry of the landfill had to be solved.

A first issue concerned the behaviour of the confinement liner of the landfill under the stress caused by the differential settlements of the subsoil (soft clay layers) and the differential settlements of the waste of the municipal landfill.

A second issue linked with the specific geometry of the landfill concerned the management of the rainfall water and the leachate during the landfill's lifetime.

A third issue concerned the management of the landfilling operations on this specific waste body.

A last issue concerned the stability of the valley landfill, particularly the stability of the capping layers. The design of the capping consisted of the geotechnical calculation of the existing waste body and the top cover system itself. During these calculations different geometries were investigated to obtain a maximum disposal capacity at the lowest investment and operational costs. The minimum requirements for the geotechnical characteristics for each layer were determined.

Delivered Services

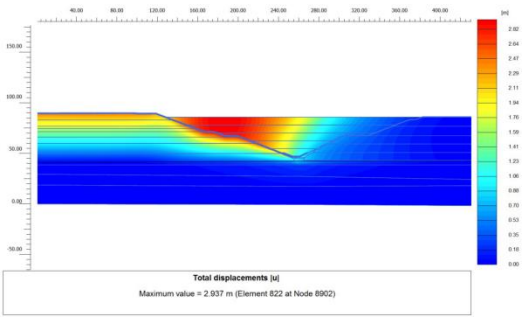
Feasibility Study and Conceptual Design, Engineering Analysis, Basic and Detailed Engineering, Tender Documents, Permit Application.

The Engineering Analysis concerned:

1. the 3D build up of the landfill, using Rhino 3D and the AutoCad Civil 3D Software,
2. the geotechnical studies and stability analysis, using Slide and Plaxis Software,
3. the hydrological analysis and the calculation of the water balance, using Visual Help Software.

The detailed engineering concerned the selection of construction materials, drafting of landfill construction plans, design of the water and leachate drainage and collection systems, design of the water emergency facilities (collection pipes, pumps and buffer pond), design of a new facility (pumps and piping) for the discharge water of the Client's Plant..

Pollux Consulting provided also an intensive training for the Client's Engineers regarding construction and operation of a landfill.



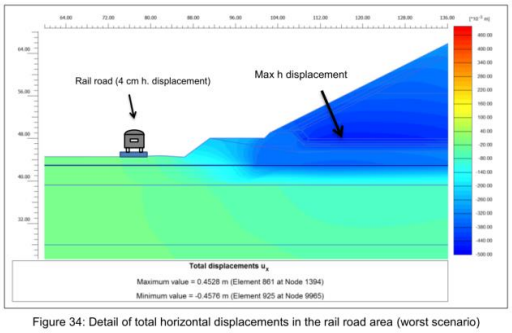


Figure 34: Detail of total horizontal displacements in the rail road area (worst scenario)

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