New £150m children's hospital gets the Polypipe treatment

More than 300,000 Permavoid and Polystorm-R modular cells for water attenuation have been installed across the new £150m site of the Royal Hospital for Children and Young People in Edinburgh.

Permavoid used to combat high water table

The hospital complex at Little France will provide the Royal Hospital for Sick Children, the department of clinical neurosciences and the child and adolescent mental health services with a purpose-built location that consolidates three key departments on one central site in the city. Polypipe, working with primary contractor Multiplex, supplied 11 shallow geocellular attenuation tanks that hold a combined volume of up to 2020m³.

"There were a number of challenges on this project, including the need to keep the site open to hospital traffic and the high water table on-site. The on-site teams were able to coordinate deliveries to meet strict installation schedules, ensuring disruption on-site was kept to a minimum and the geocellular tanks, positioned above the high water table, will be able to endure all levels of traffic for years to come."

Rosie Cheetham, marketing manager at Polypipe Civils

The tanks were installed under parking bays and beneath crucial entrances, including the hospital's Accident and Emergency. An intelligent sub-base replacement design was needed to store the appropriate level of water, above the high water table, that gathers on the site during heavy rainfall. Following discussions with Polypipe's technical team, the Permavoid geocellular system was chosen by the project consultant engineer as the primary engineered solution.

In addition, Polypipe supplied the additional attenuation tank using components from its Polystorm range, which included Polystorm R, Polystorm Inspect and Polystorm Access.

CASE STUDY

Project
Royal Hospital for Children and Young People

Client
Multiplex

Consulting Engineer
Robert Bird

Application
Stormwater attenuation

Product
Permavoid, Polystorm

Polypipe

Jonathon Mays, procurement manager at Multiplex, said:

"Polypipe was a clear choice for this project as its technical experts were able to assess on-site requirements and define the right products and quantities needed. By working with merchant partner PDM the easy to install Permavoid and Polystorm-R systems could be delivered to site on a timely basis and quickly put into position. Using a geocellular system also reduced the amount of land that needed to be excavated from the site."

The Permavoid tanks were placed beneath permeable and non-permeable paving, wrapped in geomembrane to make them watertight for attenuation. Permatex, a polypropylene geotextile, was installed between the Permavoid layers to ensure passive water infiltration into the tanks. Demonstrating how the breadth of Polypipe's range can provide a solution for any challenge, 10 of the tanks installed used Permavoid 150mm to hold a volume of up to 1780m³, with one tank using a combination of Polystorm-R with Polystorm Access, and Polystorm Inspect, supplying a further 240m³ volume tank.

With adjoining hospital departments needing to remain open and accessible during construction, a carefully co-ordinated delivery schedule for the products on-site needed to be devised between Polypipe, the selected merchant PDM and the on-site project managers to minimise disruption to patients and medical staff.

Glynn Irvine, Senior Civil Engineer, Robert Bird, said:

"Planning conditions set by SEPA, due to the proposed finished flood level of the building below site wide flood levels, required Greenfield discharge rates for the proposed development. This resulted in a maximum discharge rate of 12.1l/s during the 1:200 year return period, with controlled flooding controlled during the 1:1000 year return period. An integrated SuDS strategy was proposed at the site which required a significant amount of below ground attenuation within external spaces.

"Overall, the attenuation system designed by Robert Bird enabled the stringent planning conditions to be met while utilising the many benefits of the versatile product. Robert Bird Group specified Permavoid throughout the site, within both permeable car parking areas and impermeable hardstanding areas as sub base replacements due to the very shallow site-wide outfall which was required to be retained.

"The Permavoid was also specified under areas trafficked by 40 tonne cranes due to its ability to withstand the anticipated strenuous loading. Polypipe undertook structural checks to ensure that the Permavoid met the site loading conditions throughout both construction and final design which was a great assistance to the design and construction team."

Polypipe Civils Head Office, Charnwood Business Park, North Road, Loughborough, LE11 1LE
Tel: +44 (0)1509 615100 Fax: +44 (0)1509 610215 Email: civils@polypipe.com
www.polypipe.com/civils

Polypipe