

RETROFIT SUDS SCHEME ALLEVIATES FLOODING ON SITE

Welsh Water Invests in Green Infrastructure System for Stebonheath Primary School Playground

In 2012 Dŵr Cymru (Welsh Water) committed a £15 million investment in Llanelli and Gowerton to help alleviate the risk of flooding in the area through the adoption of retrofit SUDS, or sustainable Urban Drainage Systems, that utilize greenspace and trees to prevent flooding by

The school used to generate 10,000 m³ of storm water annually (enough to fill four Olympic-sized swimming pools). But following this retrofit SUDs scheme, designed by ARUP in collaboration with Welsh Water along with input from the pupils of the school, the trans-



allowing rain to soak into the ground or slowly re-enter local water courses rather than entering the sewer system. One of the first sites for the implementation of this plan is Stebonheath Primary School, the first school in the UK to have a sustainable surface water scheme retrofitted, for which Welsh Water committed a £500,000 investment for the creation of a sustainable playground.

formed playground will attenuate water on-site, thereby preventing 3,000 m³ of water from ever entering the sewer network and instead sending it back into the natural water cycle through the new plants and trees.

As integral components of the retrofit scheme, Silva Cells were specified on the school's playground to act as modular soil storage that helps to drain the catchment

area and reduce surface water, while also providing soil to grow two large central trees. Two areas of Silva Cells were installed in a two layer system for the two new trees planted on the site of the playground, One has a catchment area of approximately 240 square meters, and the other has a catchment area of approximately 130 square meters. Water enters the system via well-defined kerb cuts that gently direct the water into the tree openings.

An impermeable liner was installed around most of the site in order to keep the water within the system. In order to alleviate potential overflow, an emergency un-



derdrain was also installed, resting inside the Silva Cell structure on the frame at base. A 350 m² thrust block/concrete surround was cast in place around the stand-pipe connection to the underdrain.

The site posed very specific requirements regarding the selected tree species, which needed to be able to handle periods of inundation as well as drought. *Betula nigra* "Heritage" trees were selected because of their high soil moisture tolerance and resistance to the bronze birch borer, a wood boring beetle that has killed other trees in the area.

Through this innovative system of water management installed at Stebonheath Primary School, a precedent has been set in the United Kingdom that demonstrates how a retrofit SUDS installation can not only combat cli-

mate change and flooding, but can use trees in order to create a site that is both a welcoming greenspace and playground, as well as a functional workhorse that works with nature to give promise to a sustainable future. As Carmarthenshire County Council Executive Board Member for Technical Services, Cllr Colin Evans told Welsh Water:

"The authority are very pleased to be working with Dwr Cymru Welsh Water and other partners in delivering solutions to problems brought about by climate change; this scheme is innovative and a sustainable solution,



one of a number required to meet challenges brought about by changes in our environment while also accommodating economic growth."

Installation Summary

Average soil volume per tree: 12.5 m³ (440 ft³)
Number of Trees: 2
Total Silva Cells: 88 Frames, 44 decks
Installation Date: August 2013
Installation type: Integrated – Trees and Stormwater
Project Site: Plaza
Project Designer: ARUP - Cardiff
Contractors: Morgan Sindall Group

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