

# The hills are alive!

Sheppard Robson use the rolling hills of the Lake District as a model for the new car park currently being built in Penrith

Where do architects find the inspiration for their projects? If it is to be a central, iconic feature of a town's major redevelopment within the Lake District National park, they need look no further than the surrounding hills.

That was the solution that Sheppard Robson found when asked to design a new multi-storey car park for developers Lowther Manelli, part of a larger master plan that will revitalise the centre of Penrith, and scheduled for completion at the end of this year! Their response was to create an exact scale reproduction of a linear strip of the local topography right across the façade of the building, providing variety, interest and intrigue to what might otherwise be seen as an expansive and rather dull building façade.

The result is an unusual and visually complex structure, wrapped around the central concrete structure, and comprising over 2,500 unique façade panels.

Car parks rarely feature in the pantheon of iconic architectural structures, but, as Sheppard Robson put it, "car parks are less restrictive than other building typologies - they are not required to be watertight or insulated and don't require views in or out. This freedom creates an opportunity to develop concepts at the forefront of architectural debate - the disassociation of the external appearance from function."

## USING DTMS IN MICROSTATION

The main problem that Sheppard Robson had was in importing the selected terrain data into Bentley Microstation, so that so that it could be used to design the façade panels. Once that had been achieved and demonstrated with the development of a 3D model of the project, it could be used to accurately produce the production data for the individually shaped component parts. The same model could also be used to produce reasonably accurate cost estimations.

The DTM, a wide swath taken from a central part of the Lake District, was sourced from NASA/NOAA publicly available data, and was first of all imported into SketchUp before being transferred to Microstation. There, a set of bespoke VBA scripts, produced by Sheppard Robson's CAD partners, Cadventure, was used to explore design options for the façade fins, and to translate and export the cutting data to a spreadsheet directly from the 3D model. Those of you familiar with Generative Components may ask why it wasn't used for this part of the design, as it is a typical application for the software. Simple answer - when the design study was carried out, GC was not commercially available!

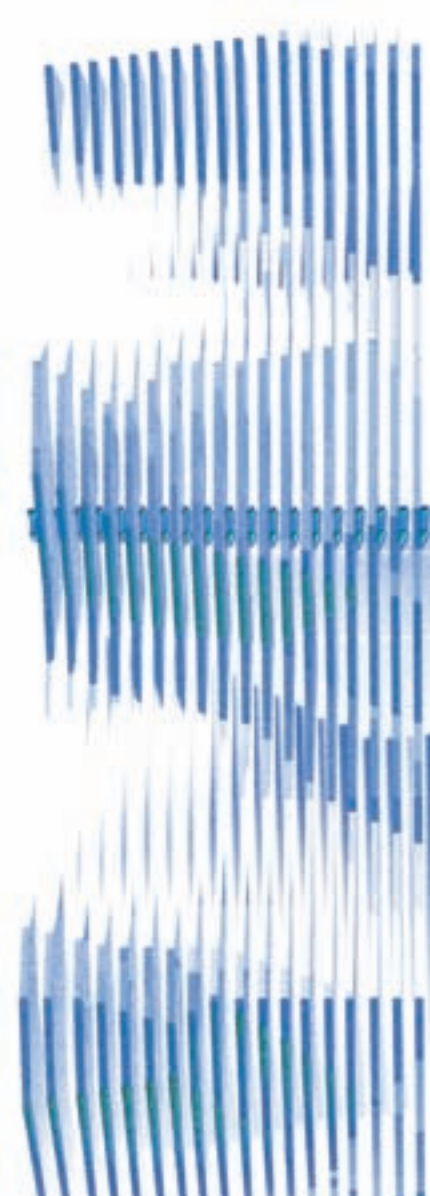
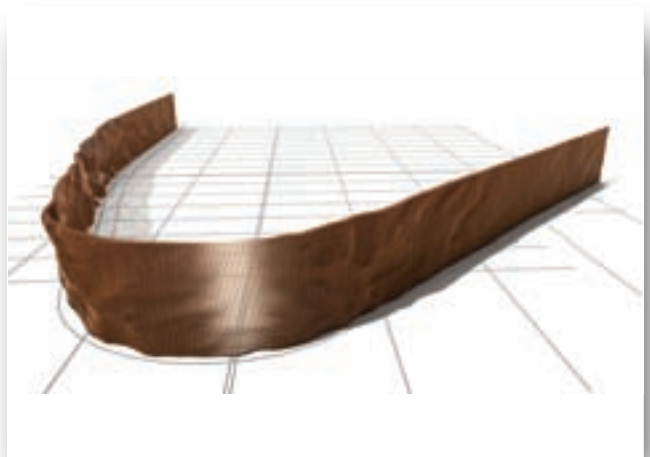
The façade, which consists of a dense series of vertical timber fins specially cut



The swath taken from the Lake District...



...and wrapped around the façade of the car park



to recreate the shape of the topography, is being constructed from LVL (laminated veneered timber) with individual fin profiles CNC cut from large LVL sheets.

The timber planks are 51mm wide by 300mm deep, and are set at a pitch of approximately 150mm. They are pre-assembled in 1500mm wide panels using horizontal bearers to form independent self-bearing units, ready to be installed onto the main structure. The panels are supported at the bottom and restrained at the top. A slight slope will be given to each fin top and bottom and also to the horizontal transom to facilitate rain water run-off.

As each panel was unique, being able to produce manufacturing data direct from the model reduced the need for drawings dramatically. Again, what drawings were required were able to be produced directly from the 3D model. Months of drawing work were therefore saved, enabling Sheppard Robson to manage the project with a reduced number of staff members.

**BENTLEY SOFTWARE**

Bentley V8 XM, and Bentley Architecture V8 XM were used for the design of the car park, with the help of SketchUp, of course, and with the addition of bespoke V8 scripts developed by Cadventure. Image rendering, producing presentation models to put the unique ideas across to the client and the local population, was handled by Microstation V8 XM together with 3ds Max.

Sheppard Robson believes that the combination of software used allowed them to deploy a smaller team than they would normally have done to design a very complex façade and supply that information directly into the manufacturing process, saving months of drawing work.

**PENRITH NEW SQUARES PROJECT**

Penrith only has a population of about 15,000. The developers estimate that the New Squares Project will benefit the town enormously, generating an estimated 4,000,000 visitors per annum - almost doubling the population every day of the year! Such an estimate would raise a considerable amount of derision anywhere else, but as the number one tourist destination for many people, the Lake District can, and does, attract large numbers of tourists throughout the year.

Penrith, because of its unique position - close to a motorway (M6) and right on the edge of the National Park - has become an important focal point for visitors. The developers, Lowther Manelli, showed considerable foresight in giving Sheppard Robson such an interesting brief, and they have risen to the challenge magnificently! I trust that visitors will be made aware of the reason for the unique style of the façade, when they visit the complex.

Perhaps it's time that I visited a favourite aunt of mine who lives in Penrith, in order to ask her what she thinks of the scheme!

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