

Mansfield's market is back on the map

A new bus station and link bridge connecting the town centre and transport hubs is set to give the local economy a much-needed boost



PROJECT REPORT
PAUL THOMPSON

Bustling Mansfield in north Nottinghamshire has been a trading town since it first gained its charter to hold a weekly market in 1227, just two years after the Magna Carta passed into English law.

The market has been a focal point for the town ever since, but in recent years it and the town centre have found themselves hit by a broadside of a change in shopping habits and the economic downturn. Market managers are trying their best to help turn the decline around and a plan to expand the bus station, linking it to the town centre and train station, should help.

First mooted five years ago, the bus station regeneration project will see the facility that handles more than 16,000 passengers each day completely rebuilt on the site of an old car park.



Planning issues resolved, construction got under way in November 2011

Project New Mansfield Bus Station Development

Client Nottinghamshire County Council

Main contractor Kier Central

Piling subcontractors All Foundations, Van Elle, Screwfast

Contract value £6.5 million

Main contractor Kier Central has taken the £6.5 million deal with client Nottinghamshire County Council to deliver the new station under a framework agreement.

"It was due to be one of the first projects we carried out under the agreement," says Kier Central senior project manager Paul Williamson, "but there were a few planning issues thrown up and we didn't get started on site until November 2011."

During that time the Kier team had worked on a number of projects with the county council, some school improvement schemes and

also the refurbishment of Trent Bridge House, home to the county council and recognised by cricket lovers as the 1970s concrete office block that towers over Radcliffe Road End of Nottingham's test and county cricket venue, Trent Bridge.

But the bus station is a scheme that, in its own way, has proven as much of a test as anything bowled at Trent Bridge.

At first glance it seems fairly innocuous - replace an existing facility that was tired, out of date and had become hazardous, thanks to the poor accessibility for vehicles, with a shiny, fully enclosed, secure new station featuring a seated waiting area, toilets, coffee shops and automatic doors as well as a covered link bridge to the town centre and railway station.

But first looks can be deceiving and the design, layout and location has thrown up a number of challenges for the project team.

"The design uses an old subway and re-establishes it as the station's plant room," explains Mr Williamson, "With the new building sitting on top of that subway we have had to pile around to help strengthen it."

In fact the piling around the subway is not the only section of foundations. Across the whole project there are three separate areas where specialist subcontractors have been brought in. Unusually, each of these was undertaken by separate subcontractors. Pinxton based



The branches of the steel "trees" support the roof

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Separate piling contractors used

firm Van Elle carried out the subway piling work, local outfit All

Foundations installed a contiguous piled wall along the side of the site abutting the Midland Hotel, and St Albans based company Screwfast installed the specialist piles specifically for the link bridge (see box).

"We didn't really anticipate getting three different companies involved," says Mr Williamson, "It just sort of evolved. The subway and contiguous wall are at different ends of the site and so we felt that getting two teams in would speed up the project and not cause any clashes. The piling alongside the railway for the bridge was specialist stuff so we

needed to use another contractor there."

Piles for the contiguous wall and those around the subway were 300 mm in diameter and bored 9-12 m into the underlying Sherwood sandstone bedrock. The contiguous wall was dug out some 3.5 m at its deepest point.

Difficult access for the piles for the link bridge abutment closest to

the railway line meant a specialist solution from Screwfast was required. It used its hybrid grout injection pile system for the abutment, drilling its GRIP micropiles 300 mm into the rock head, then driving a circular hollow section steel casing some 12 m into the rock. A sacrificial drill bit with attached hollow bar was then drilled through the centre of this shear tube and grout injected through the bar to provide a strong 250 mm diameter pile.

"We went with this system because of the difficult access. It can be installed using a standard 23 tonne, 360 excavator with an attachment on its arm. You don't have to worry about getting a standard piling rig into tight confines," he says.

"The trees didn't become self supporting until a complete section of roof was in place"

PAUL WILLIAMSON, KIER CENTRAL



The link bridge was placed on its bearings in two sections

BRIDGING LINKS

As part of the overall scheme, the Kier Central team has installed a bridge stretching 73 m to link bus station to the town centre and railway station.

Pre-painted and manufactured in four separate sections, weighing between 12 and 18 tonnes, by steel fabricator Cauntton Steel, the bridge was delivered to site from Cauntton's plant on lorries and then bolted and welded together to form two halves.

Thanks to the close proximity of the railway line, its installation was carried out during a full night-time Network Rail possession with a 350 tonne mobile crane lifting the bridge in and locating it on its bearings in two sections.

At Pier 1, which is where the specialist piles were installed by Screwfast, the bridge sits on a metal grillage that connects the four central hollow bar reinforcements

together. This grillage provides an element of wriggle room for the site engineers to help keep the bridge installation within its tight tolerances. At the other piers and abutments, the bridge sits onto concrete crossheads.

Installed with the steel section of the composite cambered deck in place, the team is to place a 125 mm thick light aggregate concrete slab along the 73 m bridge length. The roof will be installed separately too.

"It will be a fully glazed bridge and part of the decking was pre-installed, but we couldn't install the roof because of the flexure of the bridge during lifting. The lifting process itself started at about lam and thankfully went very well. We had to reposition some of the lifting gear but it all went smoothly despite the tight tolerance," says Mr Williamson.

Elsewhere on the project though the 1 m deep and 5 m long strip foundations that support the steel framed bus station's main structure are cast directly onto the sandstone bedrock.

The steel frame itself - comprising, primarily, 305 x 305 x 137 universal columns - supports the glazed curtain wall cladding of the bus station. This frame features steel "trees", the branches of which support the copper coloured, powder coated standing seam roof, which canopies the structure.

There are six branches on each tree on the project, none of which are identical. Coupled with the pinned fixings on the "trunk" and just below the branches, the roof structure itself was difficult for the site team to fit.

"The trees didn't become self-supporting until a complete section of roof was in place. That meant we had to install a strongback as a temporary measure to support the structure until the roof was in position. It was one of the earliest things we identified as a potential issue," says Mr Williamson.

Another key point was the project's unmissable completion date. Thanks to the local council elections and the imposed purdah period, which doesn't allow any major announcements that can be used as a tool by any political party, the final date for the Kier Central team to finish the bus station is 4 March 2013. And a revamped bus station for Mansfield could be a real vote-winner.