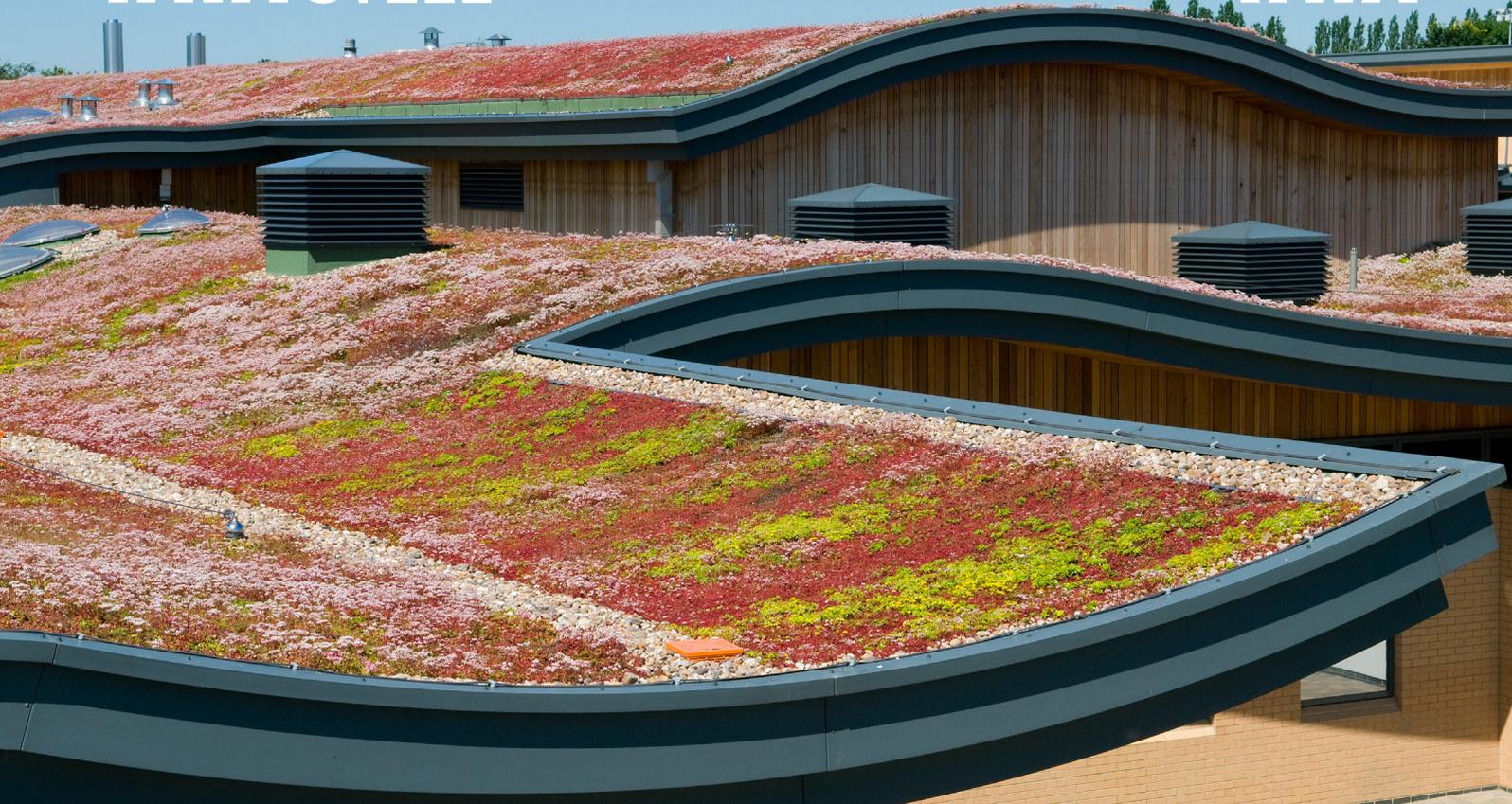


TATA STEEL



RoofDek case study

Maplefields School, Corby

Client: Northamptonshire County Council

Project management: Lend Lease

Architect: GSS Architecture

Main contractor: Graham Construction

Steelwork contractor: Walter Watson

Decking system: RoofDek D100

Tata Steel RoofDek D100 structural roof decking was installed as part of an exciting and innovative green convex and concave curved roof construction at the new Maplefields School in Corby, built by Graham Construction for Northamptonshire County Council.

Designed by GSS Architecture, the new £15 million environmentally-friendly special school caters for pupils with learning and behavioural challenges. It comprises two buildings – the main school building and a sports hall, in addition to external play areas and a full synthetic pitch.



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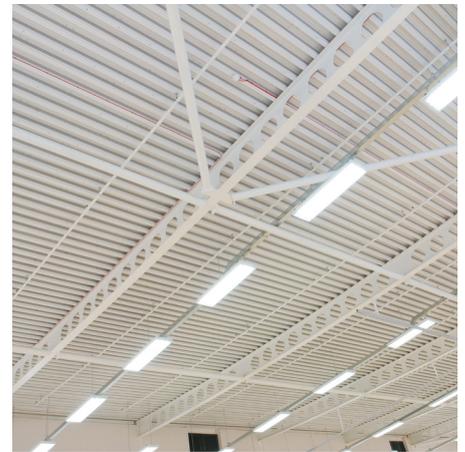


“The school’s roofs feature rainwater harvesting, high levels of thermal insulation, natural ventilation, green sedum roofs and solar thermal panels. A biofuel boiler supports an underfloor heating system. The project has also benefitted from extensive hard and soft landscaping and a habitat area.”



Maplefields has been built on the former Beanfields Secondary School site. It includes a primary and secondary school and a post-16 and diploma centre, providing vocational and sports facilities. The school can accommodate 65 staff and 110 pupils, aged 5-18.

The school’s roofs feature rainwater harvesting, high levels of thermal insulation, natural ventilation, green sedum roofs and solar thermal panels. A biofuel boiler supports an underfloor heating system. The project has also benefitted from extensive hard and soft landscaping and a habitat area.



The architecturally eye-catching curved roofs at Maplefields School, Corby, presented a number of challenges.

The project is best described as three interlaced extensive sedum roofs, approximately 6000m² in total, featuring broad curved sections, convex and concave, interspersed with aluminium standing seam roofs.

Approximately 3000m of curved fascias follow the waveform rooflines. A single-ply system, with tapered insulation and elliptical upstands, is installed on two atriums.

The school's buildings comprise a main building with a central plant room, plus a sports hall.

The extensive curved sedum roofs and four of the standing seam roofs are located on the main building.

The sports hall has two standing seam roofs; a gentle concave/convex profile (S-shape on elevation) forms the main roof and the second roof is a convex profile.

Designed by GSS Architecture, the decking on all buildings was specified as Tata Steel RoofDek D100 structural decking, in lengths from 8m to 15m.

Approximately 8,000m² of RoofDek D100 was used on the project, in 1.2mm galvanised steel (5983m²), 1.2mm Bright White perforated liner (1663m²) and 1.2mm Bright White liner (83m²).

Structural engineering calculations required that decking lengths accepted the 75kg/m² loads generated by the sedum roofs.

Designed to accommodate the additional loadings imposed by green roof construction, RoofDek D100 features a 700mm cover width and a 233.3mm pitch. This provides a very strong deck and offers excellent insulation support. Its lightweight construction also minimises the load on the building structure.



A glass reinforced polyester solution was selected, to match the architect's requirement for smooth fascias on the rooflines, where these were curved in elevation.

Proprietary GRP design and fabrication could achieve this without faceting, or shortened fascias, creating a radiused profile.

The roof build-up initially comprised the three variations of RoofDek D100, 'tek'-screwed to the primary steelwork, installed by Walter Watson.

Tata Steel RoofDek D100 perforated liner was installed where an acoustic performance was required on the sports hall and plant room roofs.

This product includes perforated strips and is overlaid with an acoustic batt.

Sound is absorbed when it passes through the perforations and is dissipated in the tissue faced insulation batt.

Standard RoofDek D100 1.2mm galvanised steel deck was installed on all other roofs. This product lends itself to the requirements of a design curved in elevation.

The trapezoidal detail allows a degree of flexibility and is uncomplicated in its installation.

Where green roofs were installed, the build-up comprised of Tata Steel RoofDek D100, a vapour control layer, followed by 160mm PU insulation, then Bauder membranes, overlaid with an extensive green roof.

An upstand detail for the windcatchers and circular roof lights was also installed.

The project's six standing seam roofs were built up from the RoofDek D100, overlaid with a vapour control layer, over which halters were installed. Insulation is packed around these and the aluminium standing seam roof is then fixed to the halters.

The GRP rooflines ('wave-form' in elevation) were manufactured in two 'arches', concave and convex. These accommodated eight different radii. Jointing was effected utilising a specially developed lap jointing system.

The resulting construction achieved a lower cost than a metal alternative and offered superior detailing. There were only two small straight bullnose runs on the roofs in total, also manufactured in GRP.

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