

BIM Makes It Better

Case Study UK1: Kingsway Primary School





“Quattro’s vision for Kingsway was to design a building that created a sense of place; that reflected the spirit of the former RAF site on which it is built and that created an environment to enhance learning and teaching, delighting children, parents, and staff through its form and colours.”

Joyce Clifford, Associate,
Quattro Design Architects, Ltd., Gloucester, UK

The Mission:

Developing a primary school for children ages four through eleven on the property of Kingsway Estate, formerly home to the Royal Air Force (RAF) at Gloucester, in England’s southwestern quadrant.

The Challenge:

Creating a village format school using sustainable methods that also encourages learning. The building should also stimulate children through the use of varied colors, textures, and geometric shapes. The budget is £4,260,000.

The Solution:

Mixing Quattro Design Architects’ innovative design and Jonathan Reeves Architecture’s Building Information Modeling (BIM) capabilities, and you’ve got sustainability with style. The team designed a building using Vectorworks that relied on environmentally sustainable materials while making color, texture, and form a vibrant part of the everyday curriculum—with some surprising and cost-effective results.

The Story

It was two years and nine months in the making, from feasibility drawings until the doors were flung open to the children. Commissioned by the Gloucestershire County Council, Quattro Design Architects of Gloucester partnered with Jonathan Reeves of Jonathan Reeves Architecture in Bristol to help them actualize their design vision through CAD.

“As well as the final design, I was really pleased with the way the 3D images we produced were so similar to the completed building.”

*Jonathan Reeves,
Jonathan Reeves Architecture, Bristol, UK*



How They Put It All Together: Making BIM Easy

This was the first time that Quattro or Jonathan had used BIM on a project of this scale. They envisioned many different geometric shapes coming together, which when hand-drawn, would have been an arduous and time-consuming task. Yet, it took just three weeks to create the full set of planning drawings and 3D visuals, and the design evolved at the same time.

Vectorworks® Architect software brought the vision quickly to life. Using their BIM capabilities, Jonathan was able to work quickly and enable informed design decisions to be made by the entire team. The entire job was more efficient, since everyone could truly visualize Kingsway Primary in 3D and offer their feedback in real time. Plus, with just a mouse click, Jonathan could verify measurements and their corresponding effects on the rest of the building. Using 3D modeling with freeform drawing, new architectural features, and extensive libraries of objects, the designing was noticeably streamlined.

The team used “Moderate BIM” technology; they employed a 3D model to develop the design, present ideas to the client, and also generate all the elevations and sections up to the planning stage. Then, they exported the 3D model to Cinema 4D to produce high-quality renderings and animations. With a direct export plug in between Vectorworks Architect and Cinema 4D, the modeling, rendering, and animating in the two programs was virtually seamless.

“My favorite features of Vectorworks Architect are the fact that it is such a flexible environment for all stages of design, it offers so many powerful parametric and freeform modeling tools that make developing and presenting the design in 3D simple and compelling, . . .and it’s combined with a wide range of import and export functions.”

*Jonathan Reeves,
Jonathan Reeves Architecture, Bristol, UK*



Levels of BIM

BIM can be complicated. But with Vectorworks, you can employ as little or as much of it as you like. Jonathan looks at BIM as having three levels of adoption: lite, moderate, and advanced BIM.

He defines “lite BIM” as using parametric objects like spaces, walls, doors, windows and stairs in the design phase in a 2D style to speed up drafting and enable automatic scheduling.

“BIM is amazingly efficient in terms of workflow, and also provides a thorough way to evaluate design ideas in three dimensions. . . . I love the way it’s possible to explore design ideas in real time . . . which means you can afford to try more “what if” scenarios.”

*Jonathan Reeves,
Jonathan Reeves Architecture, Bristol, UK*

“Moderate BIM” involves modeling the building accurately enough to extract elevations, plans, and sections from the model. These can then be worked up to enhance the presentation, or converted into working drawings.

“Advanced BIM” is the ultimate ambition, incorporating all aspects of BIM by extracting drawings like plans, sections, and elevations from the model. It also means generating automatic schedules for areas, doors, windows, and even quantities as the design evolves. And it incorporates the necessary input from other consultants.

“As a Head Teacher, it is rare to be given a building where the needs of pupils have been at the very heart of the design. With colour, shape, and texture chosen for interest and stimulation, this is certainly a building that will facilitate pupil learning. . . .”

Paula Needham, Head Teacher

Sustainable Goals

In addition to making it colorful, textural, and full of form and function, Quattro Design Architects and Jonathan Reeves Architecture needed to make Kingsway eco-friendly. Since Gloucestershire County Council ranks sustainability at the top of its priorities, the teams worked together to devise a number of eco-friendly solutions—from climate-controlled classrooms, to solar-heated water, to strict eco-principles for the school’s maintenance. They also designed digital energy-use readouts and wind catchers so that the children could get in on the energy-saving venture.

Then, Kingsway Primary went a step beyond the actual structure with sustainable practices, mandating a car-free environment. The children walk, use scooters, ride bicycles, or take skates and skateboards to school. So they’ve eliminated bus emissions, while also providing great exercise for the children.

“For good architects, green design is now fundamental to the way they think, as integral as drains and wiring. It is no longer an optional extra.”

*Origin unknown,
quote pinned up in Quattro Design’s office*

For these and other efforts in sustainable design, Kingsway Primary was rewarded with a BRE Environmental Assessment Method (BREEAM) rating of very good. It’s the leading environmental assessment method for buildings worldwide.

“As a staff, we still get that ‘wow’ moment every time we enter the front door. I am sure that everyone who is taught here in years to come will share that first impression.”

Paula Needham, Head Teacher

The school welcomed 30 children through its doors in October, 2008. By the same time this year, they expect 100 more. That’s the best measurement of a successful design.

About Quattro Design Architects
www.quattrodesign.co.uk

Quattro Design Architects Ltd. was founded in 1984 and now employs over 40 people. Well known for their focus on collaborative working, Quattro specialises in designing innovative and sustainable buildings in the housing, health, and education sectors. From urban settings, to conservation areas, to rural settings, Quattro designs, remodels, and refurbishes buildings that support sustainability; they subject every building to environmental and access audits. The team is proud to be an Ambassador for the Southwest of England Regional Development Agency's (SWRDA) Future Foundations, has won numerous top awards for their designs, and was recently named in the Building Good Employer's Guide top 50.



About jr architecture
www.jr-architecture.co.uk

Jonathan Reeves Architecture was founded in 2000 after five years of providing in-house design, visualization, and training services for a number of large architectural firms. The creative design consultancy has extensive experience in using computer technology during the architectural process, especially in visualization, CAD training, and digital multimedia. The firm collaborates with architects, developers, and designers to produce high quality photo-realistic images of architectural projects.

Jonathan has been recognized in Australia for helping to design a large residential scheme in the Victoria Park area of Sydney. He also garnered third place in the national design competition to design Lifetime housing, sponsored by Velux.

