



Braywick Court School /  
Maidenhead

**Allplan Engineering in practice**

## BRAYWICK COURT SCHOOL

**Braywick Court School in Maidenhead, UK is extending its classroom capacity with a new, £5 million state-of-the-art primary school.**

Due to be completed in July 2019, the new school features a mix of one- and two-story construction, comprising a steel frame and in-situ concrete first floor on composite steel decking. With a floor area of 1,154m<sup>2</sup>, the new school will feature classrooms with glazed elevations that let in natural light combined with overhanging, cantilevered roofs to blend indoor and outdoor learning areas.

### THE CHALLENGES OF THE PROJECT

The site for the new school presented challenges in terms of optimizing the space available. The building needed to be adequately sized for the projected student numbers while also making space for

play areas. In the limited site area available, this meant trying several different siting options for the building that would permit the maximum available play area.

In addition, the site was located next to a nature center and reserve. The trees located close to the eastern site boundary, including their roots, needed to be protected throughout construction, and the roots could not be excessively loaded. Ensuring the building and its foundations were located outside of the root protection zone was a condition of the planning application and needed a bespoke engineering solution to satisfy this restriction.



Allplan Engineering provides us with the versatility to be able to work in either 2D or 3D.

The architect wanted the projecting cantilevered roof to appear as thin as possible, which meant that the design needed to be designed and modeled accurately to achieve the architect's vision.

The new building would require connections to the existing services, such as sewage, which needed to be carefully considered due to the amount of existing services on site. This created uncertainties around the cost of installing the required pipework as well as the need for possible service diversions, which could prove costly as well as dangerous.

## THE BENEFITS OF TECHNOLOGY

Allplan Engineering was used to combine the architectural, structural, and building services (MEP) models, as well as the existing site conditions. This enabled better coordination between all aspects of the design and removed possible clashes between building elements. The updated drawings and models that were received almost daily could be easily imported into Allplan thanks to the data exchange interfaces, which made working and sharing information with other consultants effortless. It was also useful for more than one person to access the same model at the same time, allowing the entire team to use a single, up-to-date source of data for decision-making. As a result, issues and conflicts were resolved before they were detected on site, resulting in fewer queries from the contractor and less time wasted during construction.

The software provided the versatility to be able to work in either 2D or 3D, allowing the 2D outputs – such as drawings – to be created as a by-product of the 3D modeling process. For example, by having all the important elements – such as structures, roads, and drainage – in one model, the 2D sections created from the model contained all the required information. This eliminated the need to duplicate work while also providing the flexibility to tailor the 3D design offer to suit the project or client's needs.

The ability to create a model of the existing services was key to finding a design solution for the sewer connection, allowing various options to be proposed and compared. Without the model, it would have been more difficult to fully appreciate the amount of service crossings required and may have led to costly issues on site and an increased risk of injury for the operatives. Similarly, the model was critical to developing a foundation design near the tree root protection zones, which could be modeled accurately and allowed a bespoke solution to be developed.

Allplan Bimplus provided the perfect platform from which to share models and collaborate throughout the project. Being able to have real-time access to the most current project model for analysis and information made the design more efficient and enabled better coordination between the team. Having multiple people working on the model at the same time in Allplan Bimplus facilitated team working rather than working in separately in silos, allowing the best design to be created for the client.



Allplan Bimplus offers the perfect digital platform to share models and collaborate with project partners in real-time.

Another powerful feature was the ability to quickly and easily generate material schedules and quantity take-offs directly from the model. With 2D design methods, quantity take-offs are a time-consuming process usually reserved for when the design is nearly completed. However, using Allplan Engineering to generate the quantities from the model allowed the team to provide the developer and contractors access to quantity and cost information at an earlier stage of the project. Better informed decisions and confident solutions could be made with the data created using the 3D model, reducing the impact of uncertainties on the project.

### THE COMPLETED MODEL

The final design sited the new school building against the eastern boundary to maximize the available space for the students' play areas to the front and west of the building. This bordered the nature reserve, requiring innovative solutions in order to protect the existing trees.

As a result, the foundations along the eastern boundary had to be designed in a way that did not damage or excessively load the tree roots. The root protection zones were modeled, which allowed the structural engineers to visualize the space available and develop a suitable foundation. The final solution was to cantilever reinforced concrete ground beams over the root protection zones.

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### FACTS ABOUT THE CONSTRUCTION

- > **Structural & Civil Engineers:** Solid Structures
  - > **Architect:** ADP Architects
  - > **MEP Engineers:** Couch Perry Wilkes / IES
  - > **Contractor:** Interserve
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The school was completely modeled in Allplan Engineering, including the superstructure, foundations, and underground drainage. In the design office, multiple engineers worked in the same model simultaneously to develop the design. This model was then integrated into the architect's and MEP models, which were imported into Allplan Engineering and Allplan Bimplus using the included data exchange interfaces. This ensured there were no conflicts between the design models.

The existing services within the site were also modeled in order to determine the best option for connecting to the existing sewer. When this was complete, it became clear that connecting to the sewer would be extremely difficult due to the amount of buried services that would need to be crossed. To mitigate the risks and provide cost certainty, the design was changed to an alternative option of pumping to a nearby manhole.



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Sean Daly  
Managing Director, Solid Structures

With Allplan Bimplus, the combined models could be reviewed during meetings between the design team as well as with the clients, allowing the entire team to visualize and understand the building. It was also used to coordinate works between different team members, which could be assigned and tracked in the model. The model was also used to create the material schedules for the substructure concrete works and underground drainage, which was then provided to the contractor.

## THE CUSTOMER

Solid Structures is a young, friendly structural engineering business based in Chipping Norton, Oxfordshire. It was started in 2005 by Sean Daly, responding to a need for a bespoke engineering service with hands-on director involvement. In 2012, Mark Harris became a director and joined Sean as owner.

Trust and transparency were key values upon which the company was founded. As the business has grown, these values have remained at the heart of everything we do, enabling us to build open and lasting client relationships.

## ABOUT THE COMPANY

ALLPLAN is a global developer of open solutions for Building Information Modeling (BIM). For more than 50 years ALLPLAN has pioneered the digitalization of the construction industry. Always focused on our clients we provide innovative tools to design and construct projects - inspiring users

to realise their visions. Headquartered in Munich, Germany, ALLPLAN is part of the Nemetschek Group. Around the world over 400 dedicated employees continue to write the ALLPLAN success story.

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