



Germany's largest
open-air museum in
Detmold.
© AVP Becker GmbH,
Düsseldorf

Allplan in Practice

OPEN-AIR MUSEUM IN DETMOLD

CO₂ neutral with loam, wood, straw and much more: The new gateway to Germany's largest open-air Museum in Detmold is a beacon project for sustainable building.

The combination of centuries-old cultural history, architecture, and building history – gathered in one central location – characterizes the Detmold Open-Air Museum of the Landschaftsverband Westfalen-Lippe (LWL). Over 120 historic buildings from the region have been collected on an area of about 90 hectares, attracting over 200,000 visitors to Detmold each year. ACMS Architects GmbH is planning and realizing the construction of a new entrance and exhibition building for the LWL. For the holistic and integral planning of this project, the architects rely on Allplan BIM software.

Historic buildings and even complete farm complexes with outbuildings and surrounding walls are increasingly disappearing from the image of rural regions in Germany. Often neglected and frequently uninhabited, they are giving way to new construction projects for residential or commercial use – even though they have an undisputedly high cultural value for the community and the region. Therefore, generously designed open-air museums like the one in Detmold are all the more important, gathering together such disappearing structures on their many hectares of land and making them accessible for both current and future generations.



Site plan: On an area of about 90 hectares there are more than 120 historical buildings from the region.

Grafic: © studio grüngrau Landscape architecture GmbH, Düsseldorf

PRESERVING ARCHITECTURAL HISTORY AND INTERPRETING IT IN A CONTEMPORARY WAY

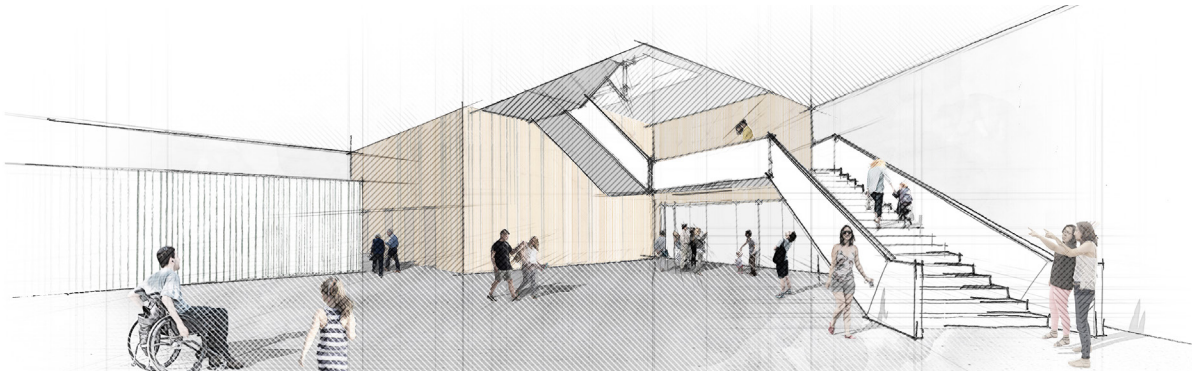
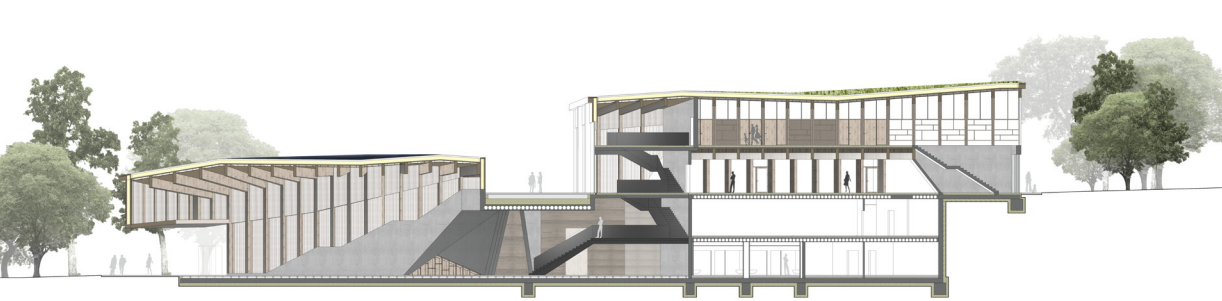
The open-air museum in Detmold is undoubtedly a magnet for visitors, as the 200,000 guests per year impressively demonstrates. Visitors are not only shown the buildings, but also their historical context, functions, and structural as well as regional peculiarities. Comprehensive knowledge transfer plays a central role here. This is an aspiration that will also be reflected in the new entrance and exhibition building designed by ACMS Architects from Wuppertal. In addition, the differentiated selection of the "relocated" buildings, their careful, meticulously documented deconstruction, their conservation, and their faithful reconstruction on site alone represent an extraordinary process. The journey from the original site to the museum environment thus becomes an important part of the often centuries-old history of these houses, barns, and farms.

SUSTAINABILITY AS A UNIFYING ELEMENT

In Detmold, sustainability is the overarching principle behind all house relocations, explanations of historical building and agricultural techniques, and insights into the life and work of past generations. Old, often hidden things are preserved and displayed, put to new use, and made permanently

accessible to the general public. It is therefore not surprising that the new exhibition and visitor center is also intended to be a beacon project for sustainable construction – and an example of how public buildings can contribute to a holistic and ecological building culture today and in the future. This will be underlined not least by the highest DGNB platinum rating for the new CO₂-neutral building, which the client and architectural office are striving to achieve.

But the road to CO₂ neutrality during planning and realization will not be easy. The architectural firm ACMS developed a new type of museum building for the LWL-Freilichtmuseum. Museums are often problematic in terms of energy – which is a result of their function, the complex building technology used, and a building fabric that is often subject to strict regulations regarding historical preservation. In the case of the entrance and exhibition building in Detmold, however, the focus is on saving energy, which manifests itself in a holistic sustainable concept. ACMS has developed a building structure from the interplay of renewable or already recycled raw materials such as wood, straw, or clay, which will also offer conservation benefits. Energy-intensive building technology is thus minimized, and the energy required for operation can be covered entirely by renewable energy sources.



Entrance area of the Detmold Museum.
© ACMS Architects GmbH, Wuppertal

THE "GENIUS LOCI" CAN BE EXPERIENCED

The Wuppertal architects emerged as the winners from a preliminary competition. ACMS impressively demonstrated that they could meet the energy, structural, and design requirements for the building envelope and the tight delivery program. Another special feature lies in the unusual topography of the site: a 20-meter height difference has to be overcome in such a way that it can be negotiated smoothly, with as few steps as possible along the exhibition path in and around the building. To make this possible, there are three "stepping stones": the reception building, the exhibition building, and the service building. Michael Müller, managing partner of ACMS and deeply involved in the project, explains: "We divided the building mass to take away its solidity. The division in turn resulted from the three functional areas. In the rear area, we combine the structures with a common foyer. It lies below the terrain and is accessed via a large flight of steps and the adventure path, leading from the street to the entrance."

PROJECT INFORMATION AT A GLANCE

- > **Focus:** Museum/exhibition building
- > **Software used:** Allplan 2023
- > **Architect:** ACMS Architects GmbH
- > **Client:** Landschaftsverband Westfalen-Lippe (LWL)
- > **Work phase:** 1-9
- > **Object size:** 5,000m² gross floor area
- > **Construction costs:** €58m (total costs)
- > **Start of construction:** 06/2022
- > **Completion of construction:** 03/2025
- > **Special features:** DBU research project
- > **Contents:** Load-bearing rammed earth construction, steel- and glue-free timber construction, CO₂-reduced concrete

DIGITAL TOOLS IN ALL PROJECT PHASES

The holistic project approach pursued by the architects is already shaping the early planning phases of the new museum building. The use of digital planning tools is the basis for this, emphasizes Michael Müller. His office works with Allplan as the central BIM planning tool. The entire project is modeled in the software, including the topography in which the three building sections are embedded. The polygonal shape, the level changes, and the



View of the construction site.

© ACMS Architects GmbH, Wuppertal

complex roof and façade development would not have been possible with 2D-based planning. Digital tools are used in all phases of the project and are also used, for example, for the timber framing on the CNC milling machines. In addition to the design quality they ensure for the museum building, which is by no means trivial, they are used for energy calculations and comprehensive CO₂ accounting.

Although there was no obligation to use the BIM method at the time of commissioning by LWL in 2019, ACMS undertook the planning in a component-oriented and model-based manner. A BIM execution plan did not exist at that time. The modeling quality and depth as well as the exchange parameters for the IFC data exchange with the involved specialized planners were coordinated by the project management team at ACMS together with the offices. In terms of the Level of Information Need (LOIN) that has been introduced in the meantime, there was no uniform modeling depth and attribution of the components. The requirements – and thus the component information assigned to each component in the architectural model – are too specific within the various disciplines (such as MEP or structural design) to always work with the same Level of Geometry (LOG) or Level of Detail (LOD) across all planning phases. Or, to put it another way: not everyone involved in the project needs all the information on all components, design, and structure at the same depth of information. Modern BIM planning already takes this into account.

“Digitalization is a technical necessity for what we do. Without digital tools or the use of BIM, we would find it difficult to manage many tasks in our projects.”

Michael Müller, Managing Partner,
ACMS Architects GmbH

CREATING PLANNING RELIABILITY – MINIMIZING SOURCES OF ERROR

Allplan is the central BIM software that ACMS has been using for many years. Via the integrated IFC interface, the office exchanges its architectural model with the specialist planning offices and receives the specialist models back for coordination with its own design planning. Quality assurance and quality management of the BIM planning is carried out after the bidirectional exchange via the Solibri model coordination software. Here, in the coordination model of the architectural office, the specialist planning is merged with the architectural planning and checked for component collisions and other potential errors (conformity to standards, wall and ceiling clashes, etc.). In addition, the Allplan model is used in the design phase for the cost calculation. Thanks to component-based modeling, masses and quantities can be determined very accurately and costs can be assigned early in the project. This advantage provides important cost certainty. And



Michael Müller,
Managing Partner,
ACMS Architects GmbH

Laura Heidelauf,
Associate Partner,
ACMS Architects GmbH

Pictures: © Chris Rausch
Fotografie

this happens months before the construction of the entrance and exhibition building for the LWL Detmold Open-air Museum.

INTEGRALLY PLANNED AND REALIZED IN DIALOG

All those involved are certain that the new museum building will have a major impact and serve as a model for many other public buildings. The project is designed as an OPEN BIM planning project to ensure that the interplay between the specialist planning departments and architects works as well as possible in an integral and interdisciplinary dialog. In OPEN BIM, each partner uses the digital tools and programs that they know and that work best for them. This ensures that ACMS achieves an optimum result in the tight timeframe of the extensive planning and coordination process and that the quality of its own and third-party services remains consistently high. Michael Müller sees this as a central key for future projects from ACMS: "With BIM, integral planning has become even more important. We have to bring specialist planners and architects into an open dialog. If we succeed in this, we will have taken a big step forward!"

"Our central CAD and modeling tool is Allplan. We also use the BIM software for our quantity takeoff and cost calculation. This way, we create important planning and cost certainty – early on in the project."

Laura Heidelauf, Associate Partner,
ACMS Architects GmbH



Another showcase project by ACMS: the CampusRO, Rosenheim.
© Photographer: Sigurd Steinprinz, Düsseldorf

ABOUT THE CLIENT

ACMS Architects has made Wuppertal their home for the last 20 years. Their core competence is the holistic supervision of construction projects in all phases, from concept and design to tendering and site supervision. Their focus is on sustainable use of the buildings they design. They specialize in resource efficiency, refurbishment and upgrading, prefabrication and timber construction as well as supporting both teaching and research. Internal

and external training courses as well as our own knowledge management system ensure the continuous professional development (CPD) of the team. The tasks in interdisciplinary project groups form an important basis and requirement for successful project execution. ACMS Architects also act as a general planner, taking responsibility for all the planning services required for the success of the project.

ABOUT ALLPLAN

ALLPLAN is a global provider of BIM design software for the AEC industry. True to our "Design to Build" claim, we cover the entire process from the first concept to final detailed design for the construction site and for prefabrication. Allplan users create deliverables of the highest quality and level of detail thanks to lean workflows. ALLPLAN offers powerful integrated cloud technology to support

interdisciplinary collaboration on building and civil engineering projects. Around the world over 600 dedicated employees continue to write the ALLPLAN success story. Headquartered in Munich, Germany, ALLPLAN is part of the Nemetschek Group which is a pioneer for digital transformation in the construction sector.

ALLPLAN GmbH

Konrad-Zuse-Platz 1
81829 Munich
Germany
info@allplan.com
allplan.com

©2023 ALLPLAN GmbH, Munich, Germany

ALLPLAN
A NEMETSCHKE COMPANY