

An aerial photograph of a large, multi-gabled roof covered in dark grey slate tiles. Several rectangular skylights are installed across the roof surface. In the background, a prominent brick church with two tall spires is visible, along with other residential buildings and green hills under a cloudy sky.

VELUX®

JUST LIKE IT USED TO BE

Refurbishment of the roof at the Silk Museum in
Macclesfield, England



PARADISE MILL

Macclesfield, a medieval town in Cheshire, became famous for silk button production starting in the 17th century. A hundred years later, it became known as the silk capital of the UK, with the silk and cotton industries growing steadily until the late 19th century. In the 1820s, 71 silk mills operated in Macclesfield, and new ones were still being constructed. One was called the Upper Mill, and the other was the Lower Mill, built in 1834 and 1864, respectively, and together known as Paradise Mill.

The floors were densely packed with looms belonging to various companies. On the lower floors of the silk mills, large windows were designed to let in daylight, which was crucial for throwing and weaving. The dense wooden structures of the looms prevented daylight from penetrating deep into the rooms. As gas lighting posed a fire hazard, architects had to come up with creative solutions to enable efficient work before the invention of the electric light bulb in the late Victorian period.

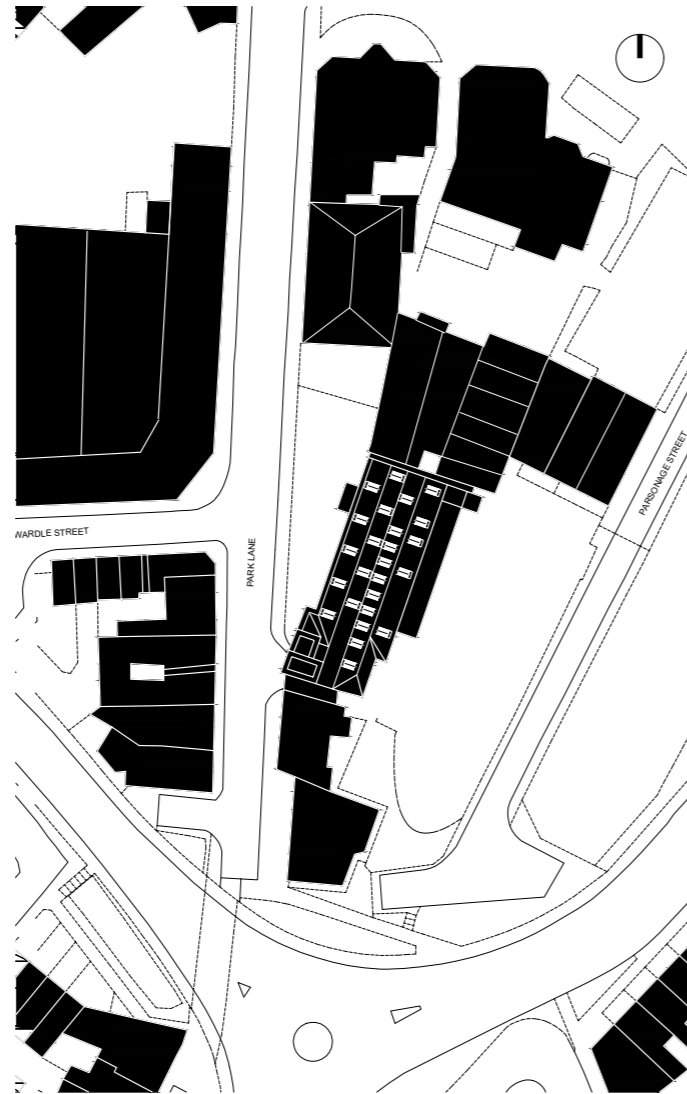
The attic level benefitted from extra natural light filtering through the roof, which improved the working environment for the operators of the 70 looms used in jacquard handweaving. The original roof windows in the Paradise Mill attic were fixed and constructed with lead-lined timber glazing bars.

Handweaving on jacquard looms continued in Paradise Mill until 1981, after which the attic space became part of the adjacent museum, celebrating Macclesfield's industrial and creative past.

Both the main Silk Museum building (in a former School of Art) and Paradise Mill are Grade II listed buildings on account of their 'special architectural and historical interest'. This means they warrant every effort to conserve them, and the repair works were planned with great attention to detail.

The much-needed re-roofing of Paradise Mill, which included installing VELUX Heritage conservation roof windows, was completed as part of the 'Saving Macclesfield's Heritage' project, funded by the National Heritage Memorial Fund. Kate Dickson of Creative Heritage Consultants Ltd was the Project Manager, responsible for coordinating the funding and project organisation. Simon Revill of Cymes Conservation was the Conservation Architect, ensuring the works were completed whilst protecting the building's significance. Allmand-Smith Limited, the building's owner, carried out the work.

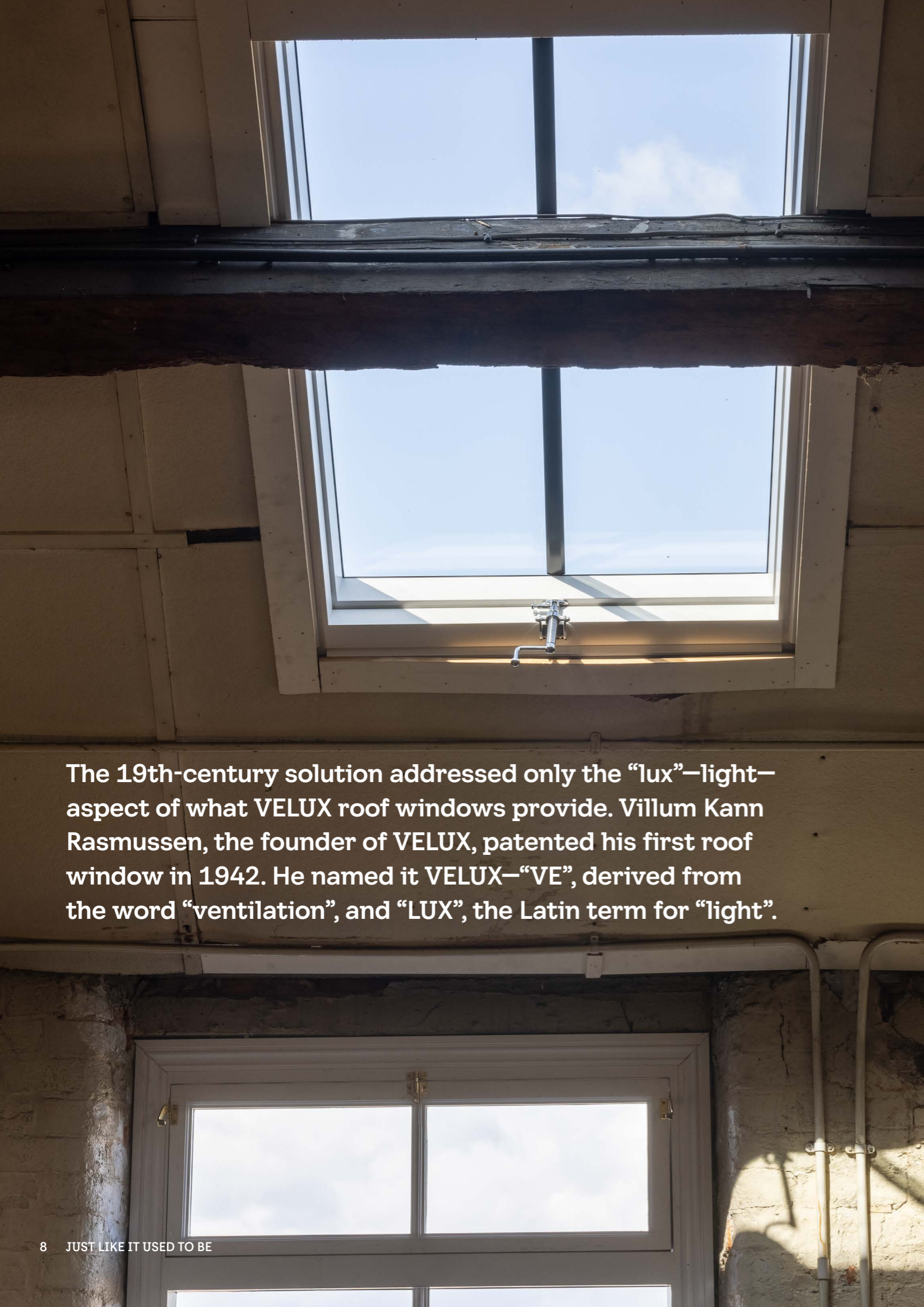
The company manufactures aluminium rainwater goods under the Stormguard brand and runs building maintenance teams, so they used their products and executed the work in-house under the supervision of Mark Newbigging. The team successfully navigated the project's challenges, which led Simon Revill and Kate Dickson to another commission from the Silk Museum.



Site plan







The 19th-century solution addressed only the “lux”—light—aspect of what VELUX roof windows provide. Villum Kann Rasmussen, the founder of VELUX, patented his first roof window in 1942. He named it VELUX—“VE”, derived from the word “ventilation”, and “LUX”, the Latin term for “light”.

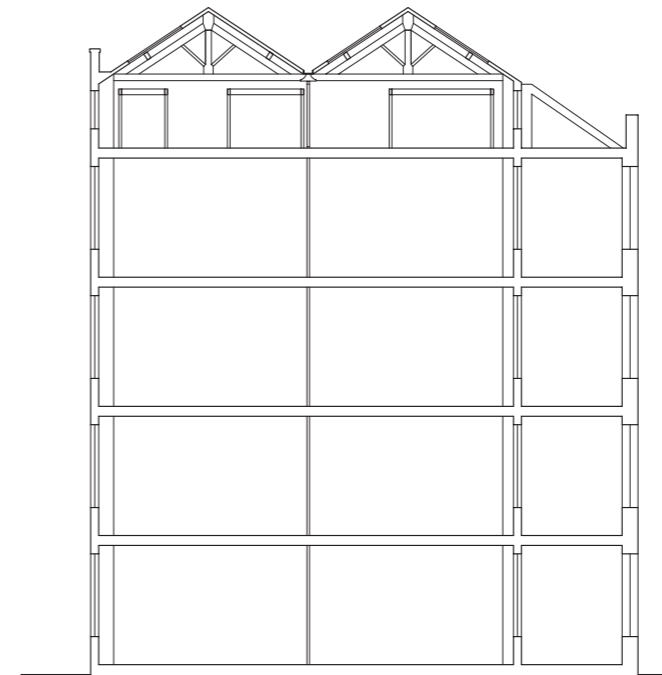
THE OLD, NEW ROOF

The roof renovation had to be carried out with great care to preserve the pattern of roof slates from different periods, including slates of varying widths and diminishing courses. The old roof lights were leaking and needed to be replaced, and their durability could not be guaranteed, so alternative solutions had to be considered. The time and cost required to manufacture and fit replica roof lights were not feasible within the project’s programme and grant funding.

Adding an insulation layer to the roof was impossible, as it would have altered the gable façade. Only a breathable membrane was added as a water protection layer. As a result, the roof remained very thin. Therefore, the new roof windows had to feature a very slim construction height to sit flush with the slates. The new VELUX Heritage conservation roof windows were a perfect choice, as they adhered to all the constraints imposed by the building’s historical structure. Their thin frames and glazing bars resemble the slim, elegant profile of wrought iron, but are more durable and cost-effective. A crucial factor was that the windows were available immediately, allowing the construction to begin.

A temporary roof structure was mounted on rollers and moved along as the works advanced, ensuring the site remained protected. The old roof was documented before being stripped, and the slates were sorted and set aside for reuse.

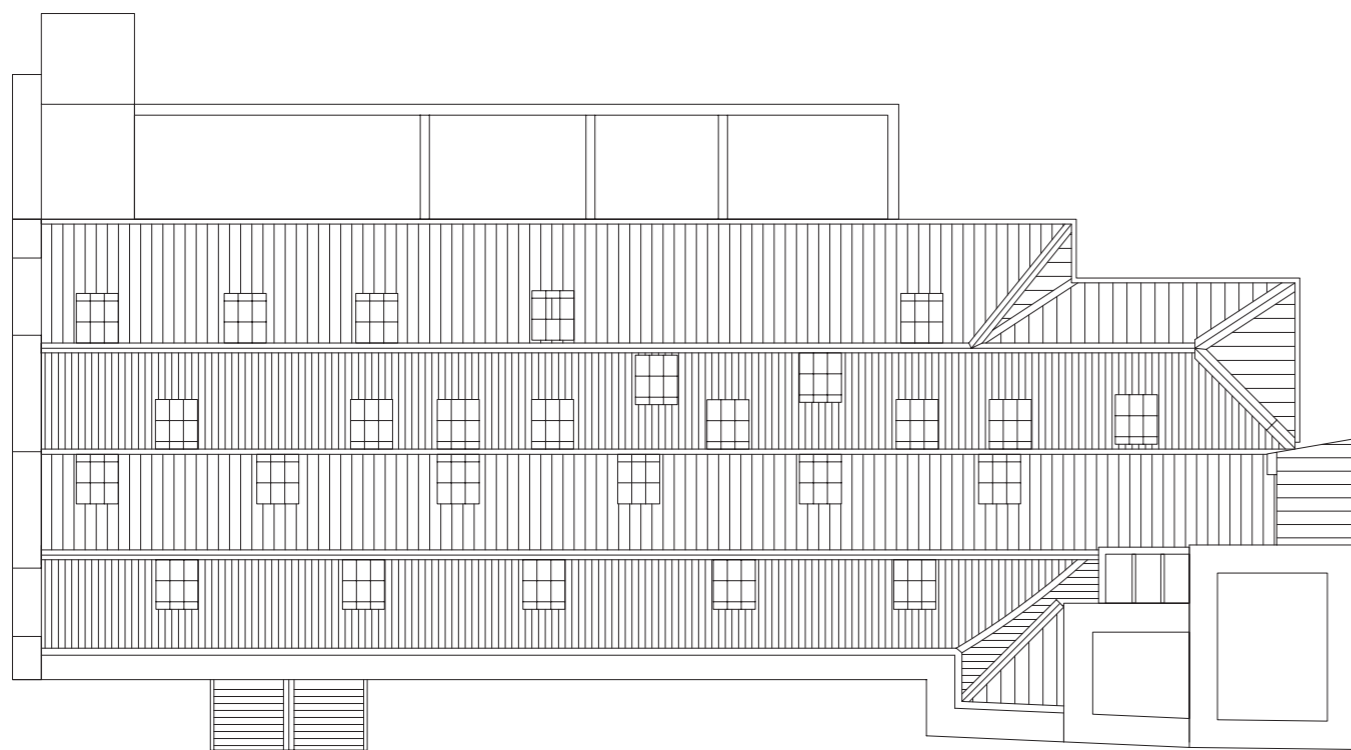
The uncovered roof structure showed signs of moisture-related decay and required repair. There was indications of charring, suggesting that a fire may have occurred at some point.



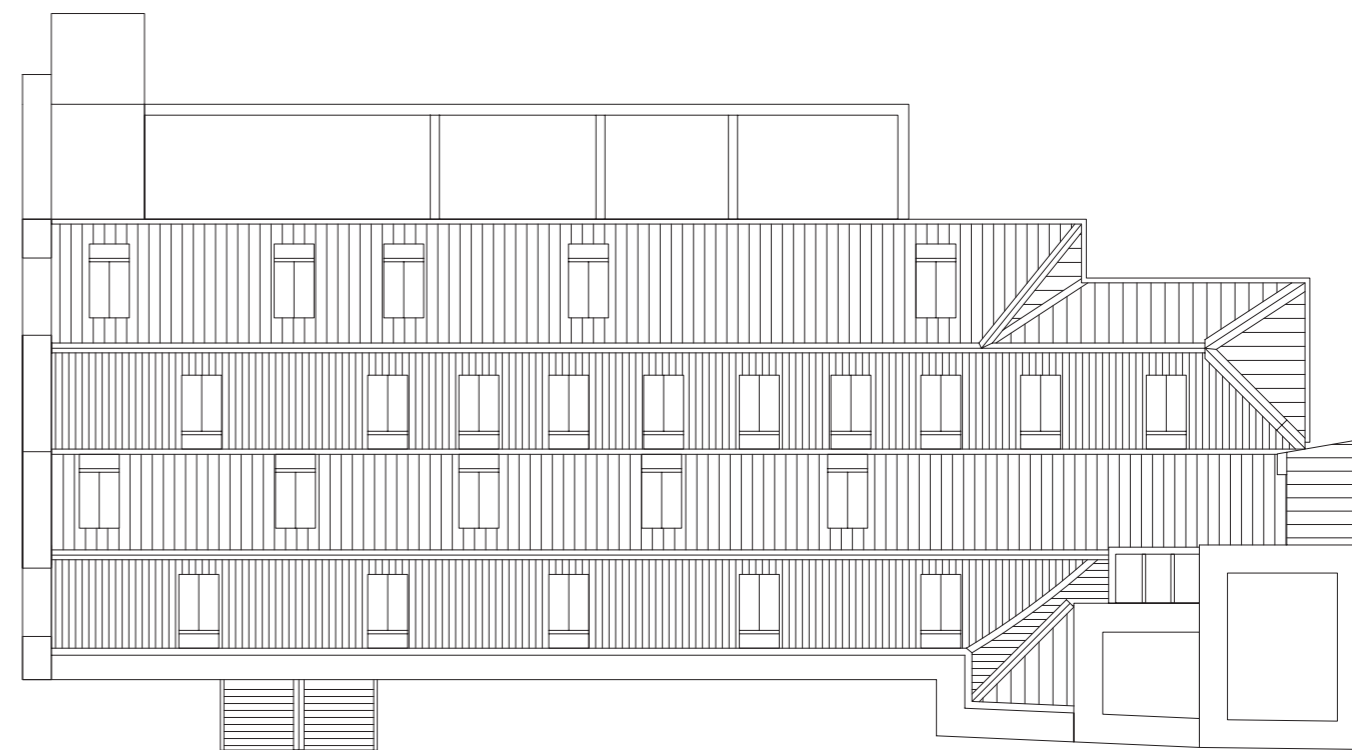
The original ceiling boarding was made of tongue and groove softwood, but it was eventually replaced with a modern hardboard in the past years. Ideally, the renovation would have included replacing this boarding, but financial constraints and the complexity of working around the looms made it unfeasible. Hence, the project focused on renewing the covering and installing new roof windows. The original roof windows were too close to the valley gutter, making them prone to leaks during heavy rain, so their position was altered for better drainage.

The original construction featured slates laid directly onto the wooden battens without any secondary protection, so a breathable membrane was added.

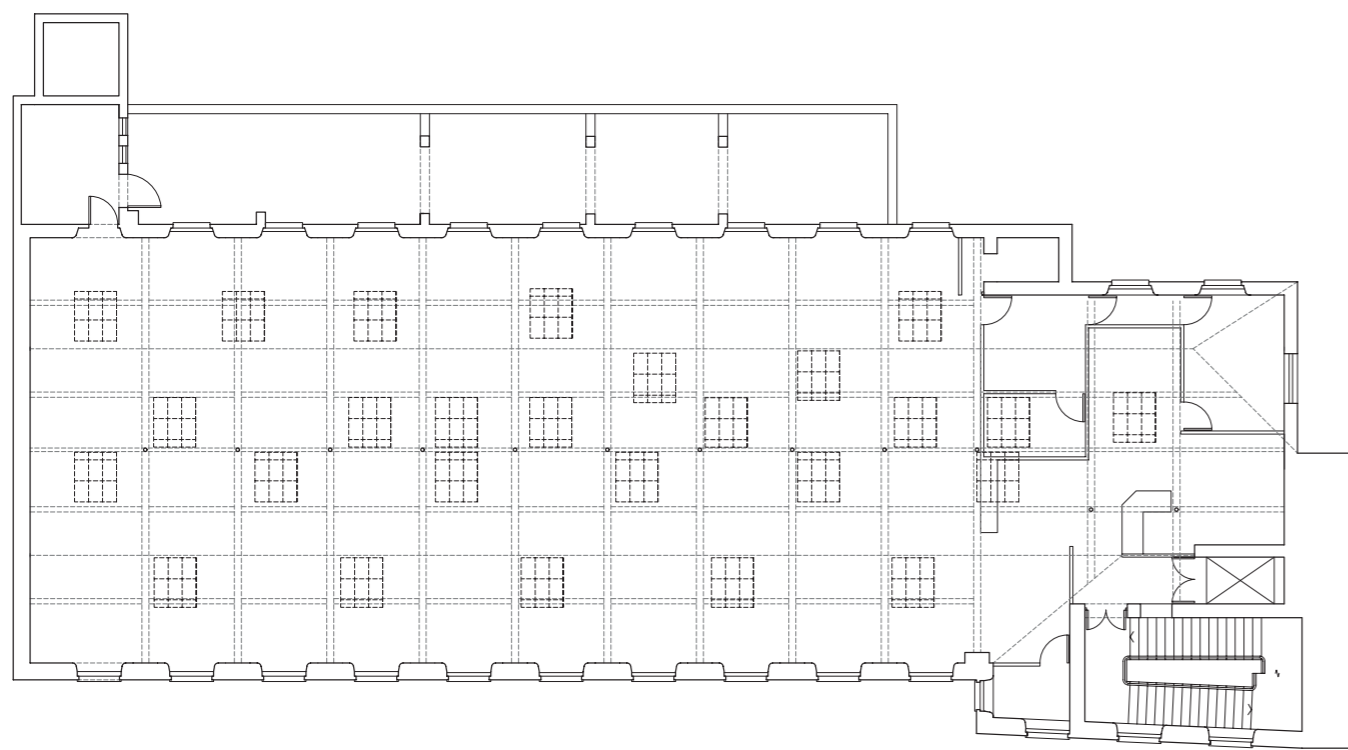
Cross-section through the building. The double-pitched roof was placed symmetrically on the original building, with cast-iron gutter and columns supporting the middle. The extension towards the courtyard was added in the 20th century.



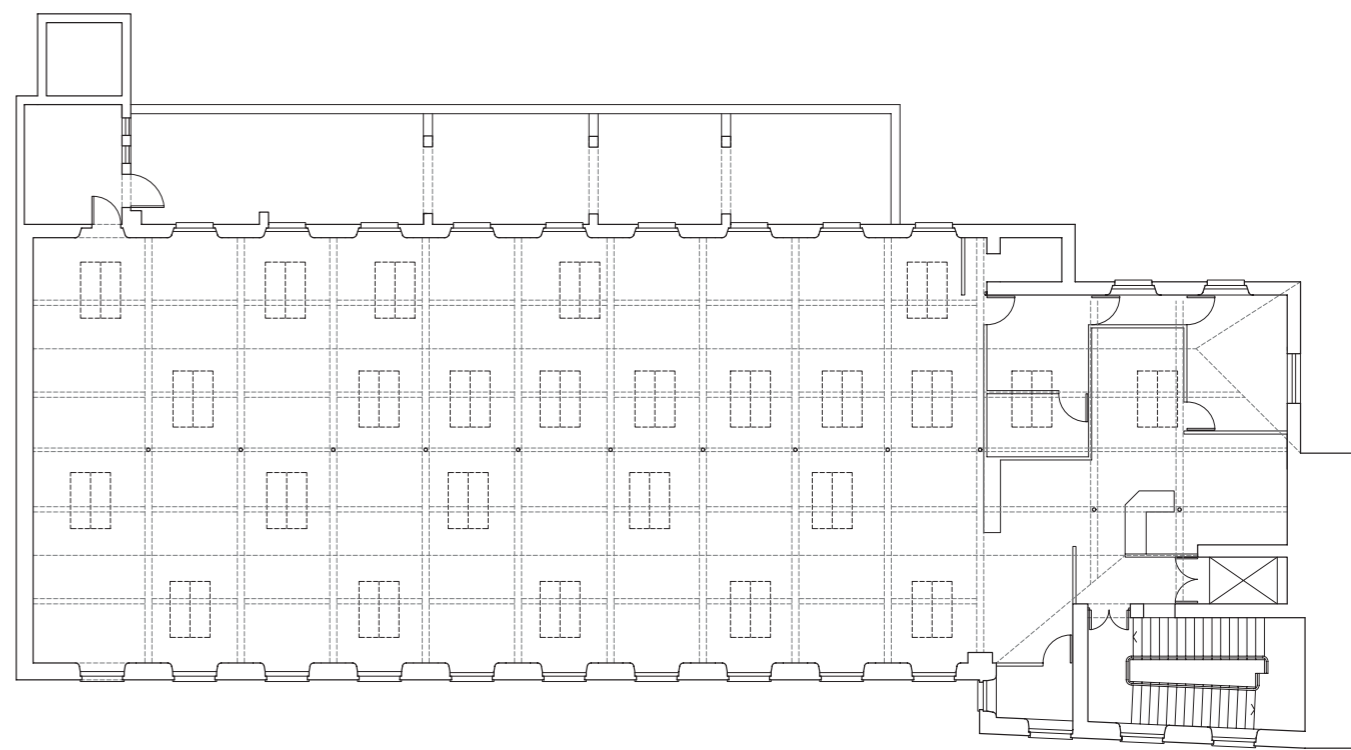
The roof before the renovation.



The roof after the renovation. The position of the openings was adjusted for more efficient construction, leak-proof details and improved drainage



Floor plan before the renovation.



Floor plan after the renovation.



“The VELUX Heritage conservation roof window fits historic buildings perfectly; it is brilliant, well-designed and of great quality.”

Simon Revill, Conservation Architect AABC, Cymes Conservation Limited



TECHNICAL CHALLENGES

The historic valley gutter, made of cast iron, served as structural support for the double gables and is intrinsic to the special interest of the building. To improve durability against leaks, the cast iron gutter was relined with aluminium, fabricated and installed in-house by Allmand-Smith Limited, the building owner. The team developed an innovative solution by adding aluminium aprons to a standard gutter and positioning them beneath the slates. Small cleats were used to secure the material while allowing for thermal expansion. These cleats were screwed into the rafters and hooked under the single welt.

“I genuinely enjoy working with builders on-site to solve problems. Conservation projects often bring unexpected challenges, and experiences teaches you to anticipate the unknowns. This adaptability makes the work engaging—designing repairs and planning projects with a deep understanding of the craft and the unpredictable nature of historic buildings.”

Simon Revill, Conservation Architect AABC, Cymes Conservation Limited





BUILT TO REPAIR

The rising interest of the building industry in mitigating CO₂ emissions has led to increased popularity of refurbishments, where houses that have previously been demolished are repaired and upgraded. The know-how of specialist conservation architects such as breathability and use of natural materials is also a valuable asset for non-heritage buildings.

With guaranteed performance and durability a key need in today's construction industry, the VELUX Heritage conservation window is a reliable product for conservation projects, bringing the advantages of modern technology of buildings at traditional construction and in sensitive locations.

The building techniques used in historic structures, characterised by solid walls and their breathability, differ significantly from modern construction methods. Modern approaches often prioritise combatting nature by creating barriers and preventing moisture ingress. In contrast, historic buildings are designed to work harmoniously with their environment.

Understanding breathability, particularly in relation to mortars like lime mortar, which offers greater permeability, has become increasingly important when retrofitting older buildings with insulation. There is growing interest in using breathable insulation materials, such as wood fibre board, cork, and wool insulation. These materials are gaining popularity due to their breathability, especially when paired with lime plasters.

“The VELUX Heritage roof window is an excellent product, and I can envision it being widely used. Conservation officers in England appreciate this style of roof light for historic buildings, and I am confident that this product will quickly gain popularity.”

Simon Reville, Conservation Architect AABC, Cymes Conservation Limited

“After the opening was formed, it took about an hour to install each roof window. Fitting them was a delight—it’s a great product!”

Mark Newbigging, Allmand-Smith Ltd

**“A sustainable way to build is
to reuse an existing building.”**

Simon Revill, Conservation Architect AABC,
Cymes Conservation Limited





The attic floor of Paradise Mill is now flooded with natural light and protected, thanks to the new VELUX roof windows and a secure, water-tight roof.





PROJECT DATA

Client: Macclesfield Silk Heritage Trust
Location: Macclesfield, UK
Architecture: Simon Revill, Cymes Conservation
Project Management: Kate Dickson, Creative Heritage Consultants Ltd
Construction: Allmand-Smith Ltd
Year: 1862 (construction);
Principal grant funder: The National Heritage Memorial Fund
April 2023 – February 2024 (refurbishment)
Photography: Nick Osborne.; Simon Revill (construction site)

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