ABB was asked to specify and replace the existing cooling tower to improve performance, reduce energy consumption and noise, and improve ease of maintenance.

Macfarlan Smith is a world leader in the production of specialty pharmaceutical and chemical products. Based in a historic site in Edinburgh, the plant comprises of a number of state-of-the-art production facilities. Cooling Tower 4 is one of a few cooling towers, and feeds cooling water to a number of processing plants with varying demands and frequencies. Due to its age, the existing cooling tower was under performing, structurally less secure, and more prone to biological residue making both the tower and water lines increasingly difficult to maintain.

The customer chose ABB to support them with this project because of ABB’s proven ability to offer the full range of services required during important, complex and time-bound projects. ABB has an established projects group on the site and have successfully implemented many medium to large projects for the client over a number of years including cooling tower, chiller and scrubber replacements.

The cooling tower replacement project provided a number of challenges both in the initial selection and during installation. The replacement cooling tower had to fit within the existing towers footprint and be installed within a relatively short production shutdown.

Not only was the footprint small, but the area was difficult to access and required a lift across a local railway line. Thorough and effective preparation and project management ensured that the cooling tower was delivered and installed successfully and within the required timescale.

Solution
ABB developed a number of recommendations for the cooling water network in addition to several cooling tower options; pre-selecting those which would meet both the performance and spatial constraints. From the list generated, the customer selected their preferred option based on capacity, capital cost, running cost, noise and size. The selected cooling tower offered a balance of significant long terms benefits including increased efficiency, reduced noise and simplified maintenance.

Macfarlan Smith are committed to reducing their energy footprint and boundary noise and this project provided an excellent opportunity to improve both. The existing tower had only one large fixed speed fan which was both loud and inefficient. The new tower comprises of a dual unit with internal silencing and variable speed fans; ABB motors are the current site standard.
Combining the silencing with the variable speed fans ensures that the tower is significantly quieter and more energy efficient, adjusting the fan speed to meet the varying demands. In addition to replacing the tower, the scope of the project also included pump selection, modification of local supply lines, installation of a new control system and electrical supply, and full testing and commissioning.

Using the combined knowledge and experience of the Project Team, ABB had to plan, design and execute the installation of the cooling tower. Due to the limited space and difficulty of the lift, the existing tower was dismantled in position and removed in sections (including lines and pumps) before the new tower could be lifted into position. The ground was then prepared for the new tower, and the tower lifted across the railway line; ABB had agreed line closure with the local transport authority. In addition to the mechanical and civil works, the new local electrical supply and control panel had to be installed in parallel to the other works.

Although challenging, ABB successfully managed all construction, mechanical and electrical works, and installed and commissioned the tower within the agreed timescale.

Benefits
- Increased efficiency
- Increased pumping capacity
- Reduced boundary noise
- Simplified maintenance requirements

“The replacement of cooling tower CT4 was managed very effectively by the ABB Project team. From process design, scope, tender, purchase, installation and then commissioning and setting to work, the team worked efficiently together. It was an interesting project that required multi-discipline activity - process, electrical, instrument, mechanical, civil and project engineering skills were all required. There was a very limited time for installation, but the tower was brought online within the projected programme and authorised cost. The local Environmental Authority should be pleased with the very low noise fans utilised in the tower. Overall, I am delighted with the project and hope to spread the knowledge gained throughout the department to enable others to perform to this standard in future.”

Mike Storey, Head of Engineering