

Green Roof Award Winner Macallan Distillery Extension

Despite poor weather, isolated location, and a large, undulating rooftop, Sky Garden has created Europe's largest wildflower roof.

At a glance

Client: Macallan Distillery

Architect: Rogers Stirk Harbour + Partners

Landscape Architect: Gillespies

Main Contractor: Robertson Construction Group

Roofing Contractors: Blue Sky with Topek Ltd

Building Type: Industrial

Location: Aberlour, Scotland

Completion: 2017

Roof type: Green Roof

Finish: Sky Garden Wildflower Blanket Green Roof System

Underlay: Resitrix

Battens: WIEHAG glulam timber



Set in the heart of the Scottish Highlands, near the River Spey, the Macallan Distillery has been producing whisky since 1824 at the beautiful 18th century Easter Elchies House. The client wanted a modern facility and visitor centre that would not only help them to meet growing demand for their single malt whisky but would complement the setting. The architect Rogers Stirk Harbour + Partners, therefore designed a modular building with an undulating green roof to help the building blend within the surrounding countryside. Composed of a timber grid-structure, the 12,000 m² double-curved roof, which features five mounds to accommodate the distillery's five production cells, is one of the largest wildflower roofs in Europe.



The irregular shape and scale of the roof made this a highly complex project that tested the knowledge and experience of both Sky Garden and Topek Ltd, which installed the expression channels. In order to hold the channels in place and maintain their shape, the Sky Garden installers had to fill the channels progressively with washed river stone pebbles, using 25kg bags rather than bulk bags due to the narrow width of the channels. The roof was broken down into sections so that once the river stone was installed in one area the green roof, components could be installed one square at a time between the channels.

Careful planning was needed to install the green roof system on the five mounds, which covered the production cells, in order to prevent it from sliding. The mounds were broken into squares, based on their pitch, with soil retention layer incorporated into the system for areas between 12 and 19 degrees. This was installed above the drainage and filtration layers and then filled with the substrate. Areas pitched between 20 and 45 degrees had two layers of the soil retention component, with the first layer filled with substrate before the second was placed on top. The retention sheets were secured to the channels, giving excellent stability to the loose substrate and the overall system.

A five-axel crane was required to install the system across the roof efficiently, safely and within the strict timescale. However, because no such cranes were available in Scotland, Sky Garden had to procure one from Ireland and organise the logistics in transporting it to site.



Poor weather presented the biggest challenge for Sky Garden. The installation was scheduled for the end of the year but with Macallan Distillery located in the north-east of Scotland, this meant the team having to work in temperatures as low as -12°C and caused a number of issues.

The heavy frost and icy conditions on the roof, especially on the pitched mounds, were impossible to work on until they thawed out, made worse by large portions of the roof not getting any sunlight until late in the day. Meanwhile, the wildflower blanket rolls and bags of substrate were often frozen solid and so could not be installed for long periods of time. Labour and site management was therefore critical in keeping the project on track in terms of time and budget.

With no permanent installation team in Scotland, and the site located in an isolated part of the country, Sky Garden had to carefully plan how it managed its staff. Following site visits ahead of the installation, the company leased a nearby eight-bedroom house so that that the team of dedicated installers were on-hand for the entire project.

Timing was a challenge throughout, with blanket sowing beginning in April 2016 that gave Sky Garden only a single growing season to get the wildflower blanket sufficiently advanced for delivery to Scotland.



High levels of workmanship were upheld by all project contractors. The latest in 3D modelling technology was used for the entire building design, which was tailored to hold the green roof system. The expression channels across the roof were specifically designed to retain the green roof system at the steepest pitches on the five mounds, while the wildflower blanket was grown specifically for the project by Sky Garden's own experienced growers.

Meetings with the architects and detailed research of the surrounding area, enabled Sky Garden to engineer a bespoke seed mix that would replicate the surrounding landscape. The mix was sown at Sky Garden's nursery and production site in the heart of the Cotswolds and carefully monitored throughout the growing phase, with monthly reports and quality assurance testing. Only the highest quality blanket was delivered to Scotland, with further checks undertaken once the vegetation reached site. Regular

quality checks were carried out throughout the project to ensure the high standards of workmanship. As each layer of the green roof system was installed, checks would be made before the next component was placed. Coverage of fleeces and drainage layers, depth of substrate and quality of wildflower blanket were just some of the criteria checked throughout the project.

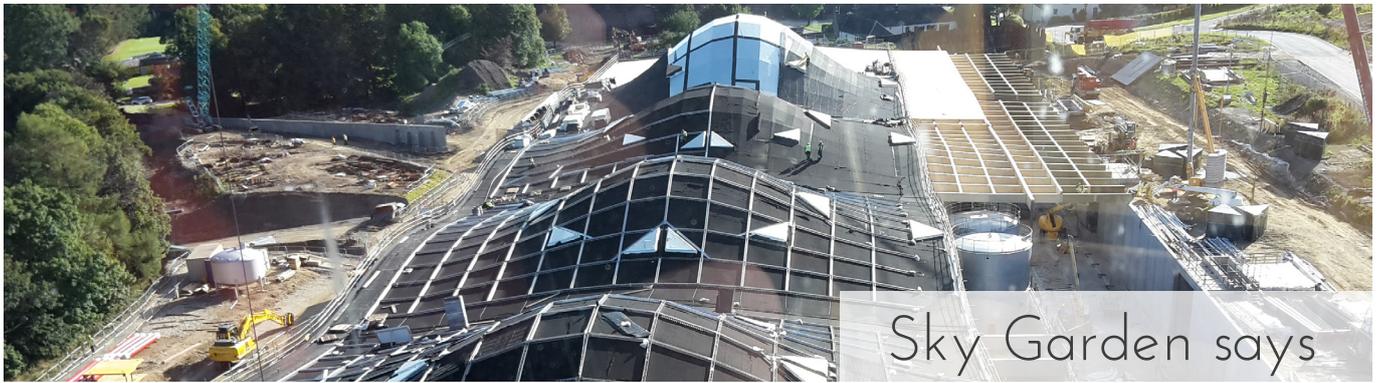


The size, complexity and location of the project required a high level of management, which needed to be integrated with the architect, landscape architect and contractors. Two Sky Garden managers were deployed on-site to overlook the whole project in order to guarantee a smooth process, including planning, operations and health & safety. Regular director visits were organised in to carry out health and safety audits as well as quality assurance of the products and overall installation. A procurement manager also worked exclusively on the project, overlooking logistics planning and sequencing with the on-site manager to ensure the green roof components arrived at the right time, in the right order and in the correct amount.



The safety of Sky Garden's staff, as well as all other trades on site was paramount. The roof was accessed by a Haki tower managed by Topek, with a roof permit register required to be signed daily and boot cleaners available at the top and bottom of the tower for clear and tidy access. The site also had an edge protection system installed around the full roof perimeter, as well as a temporary A-Frame handrail system as the edge protection was removed for fascia installation to the gutters.

A mansafe post was also installed on top of each of the five mounds to assist with installation of waterproofing, expression channels and the green roof, with Sky Garden using four rope-trained staff to work on the higher areas of each mound. Installer working in these areas were given sufficient rest periods to prevent injury, and together with daily inductions, health & safety and quality checks by all contractors, this resulted in no reported incidents nor accidents being reported.



“We are proud to be part of this outstanding project which has succeeded in integrating a substantial and unique building into the sensitive Scottish topography. The green roof is the essence of this project. By some margin this is the largest known wildflower roof in Europe and given the roof design, it is certainly the most innovative and challenging green roof we have ever installed. The Macallan has stood for nearly two centuries. Sky Garden are honoured to now be part of their history”.



Sky Garden is the UK's leading independent supplier and installer of green roof products. Its expertise encompasses consultation, development, installation and maintenance of all styles of green roofs and surfaces. As well as being committed to protecting and enhancing the environment Sky Garden is dedicated to providing great service and innovation in all areas of its business. With many years of experience and tens of thousands of installations across the UK and Europe Sky Garden understand all aspects of green roofing and urban greening, water run-off, imposed loads, plant varieties, substrates, pitch stabilisation and drainage.

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