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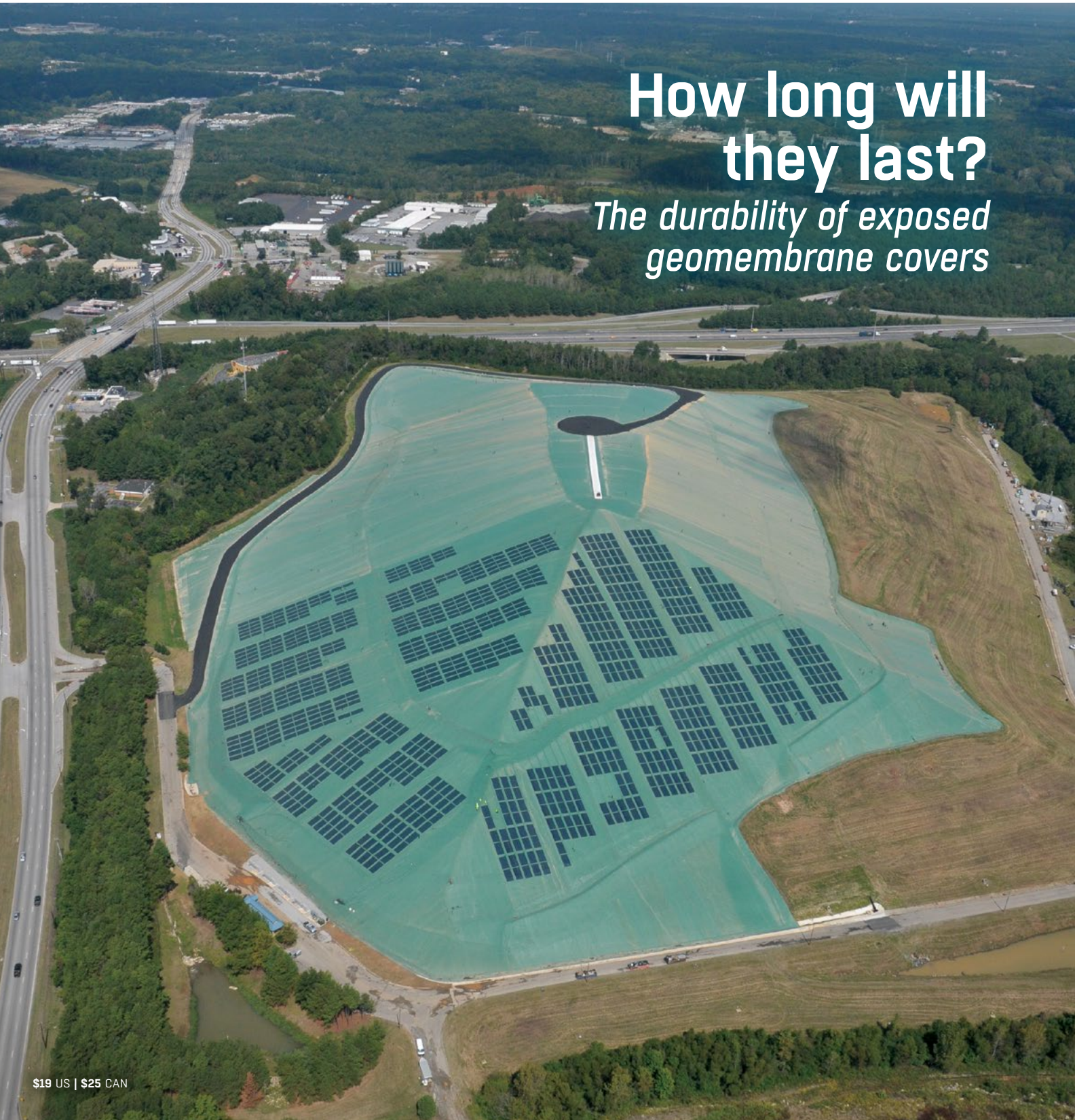
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Installing geofabric at The Summit. Photograph courtesy of ACH Foam Technologies

## Geofoam at The Summit

By Terry Meier

All projects have challenges, purpose and meaning, yet some projects mean a lot more to owners than others. It takes a visionary to leave a legacy, and Richard Bass, founder of Snowbird Ski and Summer Resort in Utah, was such a man. For starters, Bass is acknowledged as the first person in the world to climb to the highest point on each of the seven continents, which he completed in 1985 at the age of 55. He also spent nearly 45 years building Snowbird into a world-renowned, year-round destination mountain resort, literally from the ground up. It is no wonder that after a lifetime of overseeing the development of approximately 2,500 acres of steep mountainsides just 25 miles from downtown Salt Lake City that Bass would want to build his legacy on a summit.

### The mountaintop

Snowbird's acreage is covered by an average of 500 inches of low-density "dry" Utah powder annually and accessed by a collection of ten chairlifts and one aerial tram. The tram first opened in 1971 and takes passengers along a 1.6-mile cable up 2,900 vertical feet to the resort's highest point, Hidden Peak, at 11,000 feet. It was here at the peak of a mountain that Bass envisioned The Summit, a high-altitude guest services center and mountain restaurant with limitless views of spectacular surroundings. For the designers and builders working on an owner's legacy, everything is elevated and

rightfully compels them to push the envelope on their own craft and capacities.

"Designs for The Summit have been under consideration for roughly twenty years," shares Tang Yang, principal with GSBS Architects. "We partnered with Luis Ulrich of Lu'na Design Studio to conceive what is now a 23,000-square-foot, glass-enclosed lookout capsule perched high above the resort sprawling below."

The Summit accommodates cafeteria-style dining totaling 400 seats, along with service areas and ski patrol offices on levels one and two, while staff space and mechanical equipment occupy the basement. A large outdoor patio on level one and a wraparound deck on level two allow visitors to peer over the Wasatch Range and Mineral Basin below—an on-top-of-the-world feeling only a mountain's summit can provide.

"The vision was to provide non-skiers with panoramic mountaintop views in a comfortable, secure space yet . . . in an environment that faces winds of up to 135 miles an hour and temperatures in the low negatives," says Yang. "These are not everyday design challenges and that really speaks to what it takes to build on such a site."

Building Bass's legacy fell to Layton Construction, a general contractor that has been building large commercial projects in Utah since 1953. When Layton joined Snowbird and GSBS on the project in 2013, the construction schedule was phased over two summer seasons. In 2014, crews raced from the earliest spring thaw to clear the site and put in most of the structure's concrete footings, foundation, steel structure, floor decking and concrete work. In 2015, roofing, glazing, mechanical, electrical, plumbing, drywall, interior finishes and concrete finish work, including the unique snowmelt

Terry Meier is a geofabric specialist with ACH Foam Technologies in Westminster, Colo.

system integrated into the upper decks, was completed.

“On the construction side, the biggest challenge was simply getting men, materials and equipment to and from the site,” says Layton Construction assistant project manager Cooper Darling, who had experience working on mountain projects but never at such steep access. “The site is only accessible by either the aerial tram or an unpaved mountain road and that made things a lot more complicated.”

As an example, Darling notes that a concrete hauling truck making the round-trip took six hours, mainly due to the sharp switchbacks and icy conditions. Throughout both building seasons, snow and ice were continually cleared from the road to avoid slide-offs and many of the switchbacks required drivers to back up sections where there wasn't sufficient turning radius.

A key to solving the logistical challenges for material hauling came during the preconstruction phase, when Layton took the unusual step of hiring its client as a subcontractor on the project.

“Snowbird's drivers know the road and the mountain far better than commercial drivers ever could,” says Darling. “It made a lot of sense to use their people and equipment to get things to the top.”

Simultaneously, the tram carried most laborers to and from the summit each day and was used on a more limited basis to transport construction materials. On a few rare occasions, the mountain road was impassable with snow, and a helicopter was used to get materials to the top.

### The geofoam solution

While the complexities of the site and situation made both design and construction more complicated than normal on The Summit, there was one component of the project that was surprisingly uncomplicated. During the first season

of construction, excavation for the new foundations stretched across the site to the tram structure's existing foundation wall on the edge of the mountain. Yang and the designers at GSBS Architects knew the tram's foundation, built some 43 years earlier with concrete masonry unit block, represented a possible vulnerability. Backfilling with the excavated soil could potentially expose the foundation's walls to lateral pressures caused by natural soil resettling after construction.

“We didn't want any additional loading in the form of settlement to be added to the tram's foundation walls as the result of the new building,” says Yang. “We developed a structural barrier between the foundation and the mountain by filling the void with [geofoam blocks]. . . . Geofoam is a lightweight material with high compressive strengths and predictable performance.”

While architects and engineers take comfort in the geofoam's performance, builders often find it to be particularly well suited to difficult circumstances where a lightweight structural fill is needed.

“[The geofoam manufacturer] developed shop drawings for configuration of the geofoam blocks,” says Darling, who then worked with the vendor to develop a just-in-time delivery schedule to be accommodated in a single trip up the mountain. “Once the geofoam was on the top, it was surprisingly easy to work with.”

Darling adds that the large, dense blocks were moved into place by hand with just two laborers. His team also used a hot wire cutter to customize blocks as needed. Once the geofoam was set in place, it was covered with 4 inches of free-draining gravel and a concrete patio slab.

“Special considerations require special products,” says Yang. “This was a special project for all of us for many reasons and we're all proud to have played a part in realizing Mr. Bass's dream.”

“Once the geofoam was on the top, it was surprisingly easy to work with.”

## PROJECT HIGHLIGHTS

### OWNER

Snowbird Ski & Summer Resort

### ARCHITECT

GSBS Architecture

### DESIGN

Lu'na Design Studio

### CONSTRUCTION

Layton Construction

### GEOFOAM

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