Tensar

geoTALK™

The GlasGrid System reinforces asphalt concrete overlays to reduce reflective cracking.

TET Now Offers Top-to-Bottom Road Pavement Solutions

Tensar Earth Technologies has good reason to celebrate. On January 1, the company became the exclusive distributor of the GlasGrid® Pavement Reinforcement System throughout North and South America.

Developed by Saint-Gobain Technical Fabrics (SGTF), a worldwide leader in reinforcement products, the GlasGrid System reinforces asphalt concrete overlays to reduce reflective cracking caused by traffic loads and temperature fluctuations. Combined with the subgrade improvement and base course reinforcement applications for Tensar® BX Geogrids, the partnership enables TET to offer single-source, top-to-bottom solutions for new and rehabilitated pavements.

"We're pleased to add these capabilities to a market that's extremely important to us," remarked Bob Vevoda, TET president. "By combining the resources of two of the industry's leading pavement solution companies, highway departments, private developers, engineers and contractors now have a sole source for pavement applications that cost less to construct, last longer and require less maintenance."

Introduced in 1989, the GlasGrid System is made of a stiff, environmentally-friendly fiberglass material coated with an elastomeric polymer. The grid is rolled out over a thin leveling course placed before the main asphalt overlay. With its pressure-sensitive adhesive back, GlasGrid is easy to install, with no special equipment required – so easy, it's generally considered the most expedient interlayer system available.

That speed of installation recently impressed engineers and officials at the Rick Husband Amarillo (TX) International Airport. There, a service road battered by years of fuel truck deliveries and freeze/thaw cycles was scheduled for repair. GlasGrid was installed on a 1,600-foot segment of the road in

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Canadian Tire on a Roll With SierraScape®

WIRED-FORMED WALL SAVES $1 MILLION ON PROJECT COSTS

When the owners of the Canadian Tire Store in Tillsonburg, southwestern Ontario, announced they wanted to relocate and expand operations, the news sent chills through the small town's economy. The store had anchored the downtown mall for decades, and a move to the suburbs was likely to have serious consequences for the entire central business district. When the mall owner offered a nearby, but sloping strip of land for the new store, Canadian Tire Store was willing to take it—if site work wouldn't push costs through the roof.

"The land fell away steeply into a ravine with a small stream called Lisgar Creek," said Colin Atkinson, P.Eng., president of Atkinson, Davies, Inc., a geotechnical, environmental and materials engineering firm in London, Ontario. "The general contractor was considering several options, including a concrete soldier pile wall with tie-backs next to the stream to retain the site. But it was a very expensive option."

Atkinson suggested that the general contractor, Ontario-based Traugott Construction, consider a proprietary system for building a mechanically stabilized earth structure (MSE), like the SierraScape® Retaining Wall System from Tensar Earth Technologies, Inc. (TET). Traugott contacted Kent Frame, field specialist for TET distributor Terrafix Geosynthetics, to determine the feasibility of using the system in this application.

LIMITED SETBACKS CREATE UNIQUE CHALLENGES

Frame secured footing loads from the project's structural engineers, Brenik Engineering, Inc. of Concord, Ontario, asked TET engineering to develop a retaining wall design for the site. Although preliminary analysis indicated that the project would require a very tall MSE, he was certain that the SierraScape System could deliver equivalent performance while saving significantly on construction costs.

The design had to address the location of the building's exterior wall footing, which was within 2.5 meters (8 feet) of the wall face, as noted by TET senior construction engineer Gerry Kehler. "Our analysis showed that the footing would be within the structure's active wedge. To avoid this issue and minimize possible movement, we asked Brenik Engineering to change the footing location to put it outside the wedge."

Construction of the 13.5 meters (44 feet) tall stone-faced wall started in June 2004.

"We pushed the building back a bit away from the wall face and put the outside skin on a grade beam," said Peter Kulba, P.Eng., project engineer for Brenik Engineering. "We anticipate the structure can tolerate the maximum long-term settlement amount that was provided by the soils consultant."

RAVINE TRANSFORMED INTO BUILDING SITE

Construction of the 13.5 meters (44 feet) tall stone-faced wall started in June 2004 and was performed by Blue Con Inc., a local retaining wall contractor with no previous SierraScape System experience. The steep terrain, confined site conditions and extensive fill requirements made the project challenging from a logistical standpoint, noted Frame.

"It was a challenging site," TET regional manager Daniel Jette said. "We had to take into account the hydraulic effect of the creek, the heavy load on top, the height of the wall and settlement limitations imposed by the future building on top."

Even so, Blue Con's crew was able to quickly master the process of stacking the geogrid-reinforced, welded-wire forms. The workers tied the adjoining facing units together and unrolled precut lengths of Tensar® Uniaxial (UX) Geogrids perpendicular to the wall face on every course. They then used SierraScape loop and connection rods to mechanically join the UX Geogrids to the facing units.

The crew used heavy equipment to spread 225-mm (9-inch) lifts of screened aggregate over the geogrids. Tensar® Biaxial (BX) Geogrids were also installed to provide secondary reinforcement and maintain facing alignment during backfilling. The entire structure was completed by August 2004.

"The wall could have been built with a vertical (90 degree) face," Atkinson said. "But psychologically everyone seemed more comfortable with a slight slope." The finished structure has an approximately 10% batter.

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The newly aquired land fell away steeply into a ravine creating challenges on how to excavate the land for building the new store.

The workers tied the adjoining facing units together and unrolled precut lengths of Tensar Uniaxial (UX) Geogrids perpendicular to the wall face on every course.

The design had to address the location of the building's exterior wall footing; which was within 2.5 meters (8 feet) of the wall face.

Prism® is Just the Ticket for Building New Turnpike Interchange

It may sound idyllic, but northern New Jersey's Meadowlands is more like a marsh than a pasture. Soil conditions consist mainly of water-saturated mud and silt extending up to 250 feet deep. So when the New Jersey Turnpike Authority decided in 2004 to build a $250 million interchange at Secaucus Junction in the Meadowlands, one of the first questions project planners had to address was how to bridge the underlying soft soils.

"The interchange pilings had to go into a sensitive area with classic soft-soil conditions," notes Scott Naiva, P.E., northeast regional manager for Tensar Earth Technologies, Inc. (TET). "That meant the project's general contractor, Conti Enterprises, needed a temporary haul road and construction platforms."

LOCAL DISTRIBUTOR CONTRIBUTES PRISM SYSTEM EXPERTISE

Conti Enterprises, Inc. contacted the Kennedy Companies of Mount Laurel, N.J. for assistance identifying a strategy that could handle heavy loads without excavation or permanent damage to the site's wetland environment. They needed a system that could support a range of heavy construction equipment, possibly including a 200-ton crane with a maximum pick load up to 45 tons.

"We asked about the bearing capacity and bounced ideas back and forth," says Frank Posella, Kennedy Companies regional manager. After considering several alternatives, Posella suggested TET's Prism® Foundation System. "As a Tensar distributor, we had seen it used successfully in similar applications," he says. "It's also the kind of system that can be easily removed after work is completed.

"Prism was the most cost-effective option for us," says Conti Project Engineer Marcelo Fuentes. "We also liked having a whole team of professional engineers to support us. That was a big plus."

GEOTECH EXPERT TACKLES SETTLEMENT AND GLOBAL STABILITY

Those engineering resources included The Collin Group, Ltd. of Bethesda, Md., which developed the geotechnical design and provided technical support throughout construction. "We've specified Prism on numerous soft-soil projects," says firm owner Jim Collin, PhD. "The sites are always challenging, but we understand the strength parameters required for a proper design."

Collin notes that this design had to address two issues. The first was creating a working platform so construction equipment could build the access road. The second issue was global stability under extreme loading conditions. Vane shear tests conducted at the site indicated the foundation soils had undrained shear strengths on the order of 200 psf to 300 psf. "It was stronger than toothpaste but still very soft material," he notes.

CORRIDOR FEATURES EXTENSIVE SOFT SOILS

Collin suggested overlaying the existing vegetation with Tensar® Biaxial (BX) 1200 Geogrids and 20 inches of aggregate. Then following this base course with three layers of Tensar® Uniaxial (UX) 1500 Geogrids for global stability. Each of the Tensar UX layers was to be separated by 8 inches of aggregate.

"With the BX Geogrid at the bottom, we created a stable work platform," he says. "It also gave the contractor something to 'peal up' during the removal process. 'Remove and restore' is becoming a more common project requirement."

FIRST-TIMERS HANDLE CONSTRUCTION WITH EASE

Conti crews, supervised by two workers with previous geogrid experience, constructed the temporary haul road and building platforms. They laid the BX Geogrids rolls parallel to the access road with 36-inch overlaps, cable tied every four feet at the center and then used lightweight equipment to spread and compact the aggregate. Toe berms helped to prevent mud waves during construction. They laid the UX Geogrid rolls perpendicular to the road without overlaps, except where the road curved.

Fuentes says the process went very smoothly, and the road was soon providing complete access for all the equipment and materials that were needed to build the interchange. There was some tension when the 200-ton crane was engaged to make a 90,000-pound lift, however.

"We were concerned about stability, but the lift went off without a hitch," he says. "Everybody was very satisfied with the way the Prism System performed. It was a great solution for this project."

After the interchange was completed in June 2005, Fuentes' crew needed only a week and a half to remove the haul road and platforms. The Meadowlands work area is expected to return to its pre-construction state within a few years.

The New Jersey Turnpike Authority decided to build an interchange at Secaucus junction in the Meadowlands. The challenge was how to bridge the underlying soft soils.

The haul road that was built with the Prism System provided complete access for all the equipment and materials that were needed to build the interchange.

A 200-ton crane was engaged to make a 90,000 pound lift on the haul road.

Tensar® Geogrids and Noodles Bring Summer Ski Jumping to Colorado Town

The summer ski jump at Howelsen Hill Resort in Steamboat Springs, CO.

Laid-back Steamboat Springs, Colo., has been a skiing destination since 1914. Now, the town's Howelsen Hill Resort offers something few other facilities in the world can match: summertime ski jumping.

"The Steamboat Ski Club and Howelsen Hill Resort wanted to offer year-round training," says Joe Kerrigan, Rocky Mountain Regional Manager for Tensar Earth Technologies, Inc. (TET). "The project called for using plastic surfacing elements (commonly referred to as "noodles") that are normally attached geogrids. This technique has been used in Europe but this was the first project in the U.S."

STEEP SLOPE CREATES UNIQUE CHALLENGES

URS Corporation's Denver office developed the ski jump design. It was an extremely challenging project, notes Doug Bradfield, principal-in-charge for Civil Design Consultants, Inc. (CDC), which was responsible for planning and profiling the new ski jump facility.

"The construction was quite complex," he says. "The entire structure had to be anchored to a 34 degree slope where subgrade embankment stability was an ongoing concern."

"We were also working on a tight timeframe," says Gerry Carter, project superintendent for TCD, Inc., the project's general contractor. "After we were on the site, we found out it was impossible to have crews working above each other. There was too much rock-fall danger. We had to approach the project in a much more linear fashion than planned."

STABILITY WAS ESSENTIAL

To establish the required profile, TCD used both heavy and light equipment to cut and fill the slope. To ensure stability, these areas were reinforced by applying a combination of methods and technologies, including Tensar® Biaxial (BX) Geogrids, Tensar® Uniaxial (UX) Geogrids, soil nails and ground anchors with grouted tendons. Tensar BX 1500 geogrid provided reinforcement in the jump landing area as well.

"Structurally, the ski jump is much more complex than you might think," says Carter. "But with wintertime snow and spring melt water, there is a tendency for soil to slide. We had to make sure the jump wouldn't move."

NEW SKI JUMP GENERATES SMILES

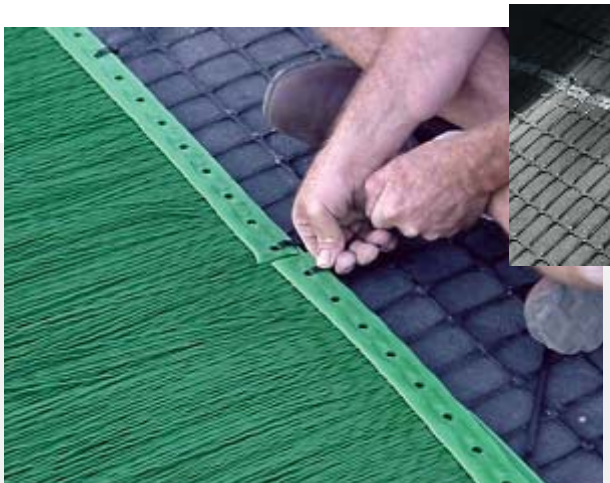
Members of the local ski club were hired to install the jump's plastic "noodles" by tie wrapping the material to an underlying layer of geogrid.

"We found the European specification method was different," says CDC project representative Bob Furman. "It was a last minute discovery. But Joe Kerrigan found that Tensar BX 1300 Geogrids were close to the specifications. He got it to us quickly and that kept us on schedule."

Work on the ski jump wrapped up in September 2005—just far enough ahead of the first snowfall to allow for a few test jumps.

"The skiers were anxious to give it a try," says Furman. "When the first jumper reached the landing area, they were all smiles."

The Steamboat Ski Club and Howelsen Hill Resort wanted to offer year-round training, so they created a facility for summertime ski jumping.



Members of the local ski club were hired to install the jump's plastic "noodles" by tie wrapping the material to an underlying layer of geogrid.

Mesa® Systems Behind Preservation Efforts in Savannah

A 2,500 square foot Mesa Wall was built behind-the-scenes of the original wall.

RETAINING WALL SUPPORTS RECONSTRUCTED BRICK FAÇADE IN HISTORIC TRUSTEES' GARDEN DISTRICT

When it comes to historic preservation, few cities equal the diligence of Savannah, GA. So when the time came to restore a historic brick wall built more than 140 years ago, property owners and engineers collaborated on a unique solution – one that includes a Mesa® Wall in a behind-the-scenes role.

The original wall was built to support a gas manufacturing plant that operated from the 1850's to the 1950's but had closed with the introduction of natural gas to the state. Owned by Atlanta Gas Light Company (AGLC), the property had been redeveloped with company offices and other businesses, apartments, a landmark Savannah restaurant and more. Scheduled for removal and reconstruction under an overall site environmental cleanup and restoration plan, the wall was partially dismantled in 2002.

As restoration plans proceeded, AGLC contracted Atlanta-based MACTEC Engineering and Consulting for project work including environmental cleanup, historic reconstruction, road widening, sidewalks, landscaping and more. The project began with environmental remediation.

"Contamination was found in the soil, groundwater and bricks," said MACTEC's Randy Knott, P.Eng., project engineer of record. The company contracted New York-based Sevenson Environmental Services to excavate contaminated materials, beginning in January 2004. A major segment of the brick wall was removed, and portions of the uncontaminated bricks were carefully saved.

"To reconstruct a buttressed, all-brick gravity wall would have been cost prohibitive, so we proposed an MSE (mechanically stabilized earth) wall behind a brick facing and brick buttresses built to resemble the original," Knott continued. MACTEC's design team specified the Mesa Retaining Wall Systems, according to Gary Rhodes, P.Eng., principal design engineer, who also cited the company's long-term relationship with Tensar Earth Technologies. The team began designing the wall in early 2004.

Sevenson Environmental began its environmental remediation work on the wall and adjacent roadway. Designated as general contractor, the company hired two firms known in the region for their restoration skills: Charleston, S.C.-based Superior Surfaces for the Mesa Wall installation, and Savannah-based Scottish Stonecraft for the attached historic brick façade.

"MACTEC specified a National Concrete Masonry Association (NCMA) certification, which we have, so we were referred by Lee Adcock at RMC Metromont Materials (now Cemex)," said Tim Crump, Superior Surfaces president. In July 2004, Crump dispatched a six-man crew to build the 2,500 square foot Mesa Wall (measuring approximately 150 feet in length and from 15 to 30 feet in height). The crew installed standard split-face gray Mesa Units, inserting galvanized tabs every other course to secure the brick facing. Both Mesa Units and Tensar® Geogrid were purchased through RMC Metromont. The Savannah-born Adcock, now Cemex's territory manager for the coastal Carolinas and Georgia, was especially proud that the materials were provided locally.

Construction of the brick façade soon followed. Known for its work on the Cape Hatteras, NC and Tybee Island, GA lighthouses, Scottish Stonecraft's six-man crew rebuilt the brick wall with a combination of salvaged and newly manufactured replica brick. To replicate the original wall, the new bricks were cast in historic "Old Savannah Gray" in accordance with standards set by the city's Historic District Board of Review. Alex Skellon, Stonecraft president, remarked that the wall was built to the depth of two bricks. Once completed, the entire wall bordering the property measured approximately 600 feet in length and up to 30 feet in height.

The property has since been sold to local private developers and renamed Oglethorpe Landing in recognition of Gen. James Oglethorpe, founder of the Georgia colony. As restoration of the site's historic buildings continues, tentative plans include a mixed use featuring residential, office and retail development. But whatever the ultimate plans for the property, it's certain that a Mesa Retaining Wall will provide historic support for years to come.

The original wall was built more than 140 years ago. At the time, it was built to support a gas manufacturing plant.

The MSE wall behind a brick facing and brick buttresses was built to resemble the original.

The finished wall bordering the property measured approximately 600 feet in length and up to 30 feet in height.

A New Partnership Adds Pavement Reinforcement to Tensar's Product Lineup

Tensar Earth Technologies (TET) has inked a new partnership agreement with Saint-Gobain Technical Fabrics (SGTF), a world leader in manufacturing reinforcement products for a wide range of industries. This deal took effect January 1, 2006, and specifically gives TET the exclusive rights to market and sell the GlasGrid® product line throughout North and South America.

It's a deal that has both parties excited about potential sales. For TET, the GlasGrid product neatly fills a gap in their extensive range of reinforcement products. GlasGrid is a patented fiberglass grid used to reinforce asphalt; this significantly extends the life of a pavement by helping to prevent reflective cracking.

From SGTF's point of view, Jon Woolstencroft, Global Business Development Manager says, "We expect that TET will be able to leverage its marketing strength and distribution ties with local suppliers in order to take GlasGrid to the next level. Not only will it increase our sales and penetration in North America, it will open up new markets for our products in South America."

The GlasGrid product has demonstrated its efficacy since it was introduced in the 1980s. As a subsidiary of Saint-Gobain, one of the top 100 industrial companies in the world with annual revenue of $40 billion, SGTF has significant assets and expertise in R&D and manufacturing. In addition to producing reinforcement products for industries and engineered applications, SGTF is a leading producer of flat glass, high-performance plastics, packaging, insulation, building materials, iron pipe, abrasives and industrial ceramics.

CASE STUDY: GLASGRID'S STRENGTH IN ACTION

In 2005, Rick Husband Amarillo Airport, owned by the City of Amarillo, was facing complaints from its largest customer, Bell Helicopter Textron, about the dire state of the airport service road. As a result, the worst section of the road was scheduled for reconstruction in the winter of 2006. For airport manager Richard McConnell, this presented an ideal opportunity to try something new.

When city engineers started to design the roadway, McConnell advanced the idea to incorporate GlasGrid into the specifications, and build a road that could better withstand the punishment of heavily loaded fuel trucks, and frequent freeze/thaw cycles.

One step installation – The tractor unrolls the grid, and places it, while the roller on the back activates the adhesive on the grid.

McConnell said, "We had recently rebuilt another section of the airport service road, using the same design, but minus the GlasGrid. I convinced the engineers to use GlasGrid in this new project so we could compare and see how well it worked."

The road specification called for kiln dust-fly ash reinforced base material, a 1 in. thick level–up course of asphalt, and then the placement of GlasGrid 8511, followed by a 2 in. course of Type D asphalt. Following the Texas Department of Transportation's recommendation, the project used GlasGrid 8511 with a mesh aperture size of 1 in. by 1 in. The sister product GlasGrid 8501 features a smaller aperture size of 0.5 in. by 0.5 in. for use with finer asphalt mixes.

The installation of the GlasGrid mesh took place in one day along a section of road 1,600 feet long. To cover the full width of the road, five strips (each strip was 5 feet wide) were lapped together. Industrial Fabrics, Inc. installed the GlasGrid in less than four hours, while the paving contractor, Advanced Pavement Systems of Amarillo, Texas, placed the asphalt immediately after, with no disruption or delay to paving operations.

The comparison has begun. The airport will continue to monitor long-term performance of the new GlasGrid section, but meanwhile McConnell intends to push for its installation on other sections of the service road as rehabilitation systematically rolls on.

For more information about the GlasGrid system visit www.tensarcorp.com or call 888-828-5140. "

No wait time – The tractor installs the grid, while the paver follows close behind.

It sticks! The paver and trucks drive on the grid and it won't lift or tear.

Tensar® BX Geogrids on the Road to New Energy Sources

SPECTRA® ROADWAY IMPROVEMENT SYSTEM INSTALLED THROUGHOUT NEW YORK WIND FARM

Talk about a story with a positive spin: the largest wind farm east of the Mississippi River includes 23 miles of wind tower access roads built in large part with Tensar® Biaxial (BX) Geogrids.

Located in upstate New York, approximately 25 miles from Lake Ontario, the Maple Ridge Wind Farm is the city's source of power. Privately developed, the project results from a 2003 state initiative to secure alternative forms of energy. The farm's first phase, completed last year, includes 120 wind turbines capable of producing enough energy for nearly 60,000 homes. Following a break over the past winter, work resumed on an additional 75 turbines to be completed this year.

Development required the installation of access roads that could support construction equipment needed for tower foundations and assembly. However, an original 16-foot wide test road, built with a ten-inch undercut, geotextile layer and ten inches of limestone aggregate, failed under heavy traffic. Silt and clay surfaced where the geotextile had ruptured, and portions of the geotextile were exposed to the surface as well. To compound the problem, some of the aggregate had shifted out of position.

Responding to those events, general contractor D.H. Blattner & Sons Inc., along with Gloversville, New York-based Delaney Construction, called in local representatives of CONTECH Construction Products to assess the situation.

"Those were challenging soils that needed to be reinforced," remarked CONTECH's Martin Derby, P.E. (now with environmental specialists Malcolm Pirnie, Inc.). Using Tensar Earth Technologies' SpectraPave2™ Software, Derby determined that the roadwork would require 14 to 22 inches (depending upon soil conditions) of a Type 2 aggregate combined with BX1200 Geogrid. Separate recommendations were made for the previously installed roads that had failed. The design also called for portions of the roads to be temporarily widened from 16 to 32 feet to accommodate the 300-ton construction cranes. Derby presented his recommendations within 24 hours of his site visit.

Following a successful road test, two six-man crews from Delaney Construction installed 453,000 square yards of BX1200 Geogrid, a key component of the Spectra Roadway Improvement System, from May through September. Installation included not only the network of roads throughout the farm, but underneath the crane platforms at each tower site as well. Mike Delaney, site project superintendent, noted that the combination of geogrid and aggregate "bridged in and worked very well for us."

Altogether, the BX1200 Geogrids improved the bearing capacity of the soils, reduced the amount of required aggregate, provided ease of construction and kept the project on track. The installation also demonstrated "a very good display of teamwork," commented Pat O'Rourke. The CONTECH District Manager cited the company's local distributor, Ramsco Inc., along with representatives from D.H. Blattner and Delaney Construction. "Blattner & Sons is very experienced, and it was fulfilling to know how much the road installation impressed them," he said.

"This was really an exciting and important project for us," added Scott Naiva, P.E., Tensar Earth Technologies' North Atlantic Regional Manager.

"And it was a once-in-a-lifetime project that will help generations to come," Martin Derby concluded.

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TET Now Offers Top-to-Bottom Road Pavement Solutions

(continued from cover)

less than four hours! Local distributor Industrial Fabrics, Inc. provided both the product and installation services. (See the complete story on page 6.)

"We were looking for a product that would complement our Spectra® Roadway Improvement System. The GlasGrid System completes our suite of roadway design solutions and enables us to move in a new direction in the roadway rehabilitation market," said Jim Penman, TET's product director for roadway systems. "It's the leading system of its kind in the industry, one that will now benefit from our technical marketing expertise."

The grid is rolled out over a thin leveling course placed before the main asphalt overlay.

Adding to that expertise is Nicholas Reck, former SGTF global sales and marketing manager, who joined TET in April. In his new role as Application Technology Manager, Reck will oversee road pavement research activities and assist in the company's marketing efforts. Familiar with a number of interlayer pavement systems, Reck claims that the GlasGrid System is "clearly the leading product based on its unique structure, strength characteristics and installation."

Canadian Tire on a Roll With SierraScape®

(continued from page 2)

PROJECT DELIVERS BIG SAVINGS

Post-construction monitoring indicates the building's foot has settled between 9 and 21 millimeters. "There has to be some movement as expected," Atkinson said. "Anything less than 25 millimeters is considered reasonable."

"Most of the settlement that will occur takes place during construction," Frame noted. "All settlement should occur within 3 to 6 months."

With construction complete, all parties agree that the site presented less than ideal conditions for a traditional big-box store, but the results have been very satisfactory — both from a performance and cost perspective. Final assessments indicate the owners were able to build the store they wanted – where they wanted – and still save more than $1 million (CDN) by selecting the SierraScape System.

"This really was a landmark project," Frames concluded. "It showed that a near-vertical SierraScape Wall can support a large structure and do it for a lot less than traditional solutions."

Owner realized savings of more than $1 million (CDN) by selecting the SierraScape System.

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