



Reproducing Historical HARDSCAPES



By Alex Leeson, marketing and business manager, Milestone Imports

Based on the historic Chartres Labyrinth outside Paris, an expert mason, a sacred space garden designer and a stone importer collaborate to create a sacred hardscape for the Saint Francis of Assisi Cathedral in Santa Fe, New Mexico.

The porphyry labyrinth, completed in 2003 for the celebration of the 150th anniversary of the Saint Francis of Assisi Cathedral in Santa Fe, New Mexico, has a history dating back 800 years. The project research, performed by AvantGardens' landscape contractor Kevin Avants and

William Campbell of Sadhu Stone, reads much like the popular novel *The Da Vinci Code*. Like the characters in Dan Brown's fictional novel, both Avants, a sacred space garden design specialist, and Campbell, an expert mason, studied the historic, mathematic and astrological history of the Chartres Cathedral labyrinth outside Paris on which the Saint Francis labyrinth was based.

Opposite Top: The subsurface of the labyrinth started with a six-inch concrete base. Normally this type of hardscape plan would call to dig down two feet and compact a subbase. But because of historical artifacts that remain buried on the site, the area could not be excavated to that depth. Instead, a six-inch engineered-fill (similar to a department of transportation fill for street traffic) subbase was installed underneath the concrete for endurance and stability. "We poured one quarter of the slab and then poured the opposing quarter the same day," says landscape contractor Kevin Avants. "If we had poured the entire slab at one time, we would have gotten more cracking—we wanted this project to last 400 years."

Opposite Left: The rebar layout was designed in a seven-pointed star pattern encased by a typical rebar grid. The seven-pointed star honors the directions of north, south, east and west, and echoes the sacred history of archeological ruins, including an ancient unmarked cemetery that remains buried underneath the site.

This page: Completed in 2003, the Saint Francis of Assisi Cathedral in Santa Fe, New Mexico is a faithful, while slightly smaller, reproduction of the famous Chartres Cathedral labyrinth outside Paris.

PROJECT TEAM

CLIENT: Archdiocese of Santa Fe, Saint Francis Cathedral

LANDSCAPE CONTRACTOR: Kevin Avants of AvantGardens, Inc., Santa Fe, NM

STONE MASON: William Campbell of Sadhu Stone, Santa Fe, NM

LANDSCAPE ARCHITECT: Ken Romig of Morrow-Reardon-Wilkinson

STONE SUPPLIER: Milestone Imports, www.milestoneimports.com



Avants was well suited to undertake this highly complex paving project. As a board member of the Labyrinth Research Group, frequent visitor to the cathedral in Chartres and veteran builder of numerous public labyrinth projects, Avants had the relevant background and personal interest that was required.

Originally slated for concrete pavers, Avants felt it was inappropriate to use such material, and that the nature of the project called for the use

of natural stone. But not just any stone would do—the Saint Francis of Assisi Cathedral called for a “noble” type of stone. Consulting with Miles Chaffee of Milestone Imports, Avants selected porphyry from Mexico. During the Roman occupation of Egypt, the Romans considered porphyry from the imperial quarries to be priceless and spared no expense in quarrying it. Porphyry was used only in artistic creations of great importance, mainly those commissioned by royalty. The historic significance, along with the durability of porphyry, deemed it the ultimate choice for this sacred project and was subsequently approved by the Archdiocese of Santa Fe.



A worker uses a hand grinder to smooth cuts on a piece of porphyry stone. One of the most difficult parts of the project was creating the templates (background) and accurately cutting the porphyry to match the exact mathematical geometry of the original labyrinth at the Chartres Cathedral outside Paris. Bucking technology, the 262 custom templates—used as guides to cut over 1,600 stones—were not created with computer aided programs like AutoCAD, but instead were hand-drawn in actual size using a compass and a string.

The goal was this—the labyrinth at Saint Francis would be a faithful reproduction of the labyrinth at Chartres Cathedral, though it would need to be scaled down slightly to a 6-7 ratio in order to fit within the existing 36-foot-diameter circular void that had been left in the paving. The requirements were that the reproduction remain as true as possible to the original, which meant not only recreating the many interrelated proportions of the labyrinth at Chartres Cathedral, but also maintained that the reproduction would capture the paradox that lies in the heart of the original.

According to Avants, this paradox is the hidden meaning that we as a society are no longer aware of. It's our relationship to the numerical symbolism in our day-to-day happenings. For example, the labyrinth is split up into four quadrants that represent the four seasons. Each quadrant has 28 "lunations" (exterior circles) that represent the 28 days of the lunar cycle. The paradox is that the symbolism is so

straightforward—it's only when we have the time to slow down to observe or study, that it becomes quite profound and beautiful.

Although the ideas symbolized in the proportions of the labyrinth at Chartres Cathedral allude to mathematical perfection, there is a noteworthy lack of perfection in the actual labyrinth itself, despite the obviously superior caliber of the mason who did the work. The implication, to the designers of the St. Francis Labyrinth, is that the beauty of the Chartres Labyrinth lies not in the perfection of the thing so much as it does in the perfection of the idea behind the thing. The key then was to strive for perfection built by hand.

Onsite work started first with a six-inch concrete base. Avants and Campbell decided against a compact base because of the unstable soil in which the labyrinth would lay, as well as the fact that there would be high traffic and a need for it to last for at least another 150 years. *(Continued on page 32)*

PORPHYRY STONE

Porphry is a natural, granite-like stone that has been used for over 3,000 years. It's beautiful—it comes in rich colors like red,

grey and green—and is practically maintenance free. The durability of porphyry as a natural stone is unmatched. "Some of the roads the Romans built with porphyry are still being used today," assures Alex Leeson, of Milestone Imports, the exclusive North American distributor of porphyry for Mexico

Porphyry stones. This endurance is the reason porphyry is chosen by homeowners, contractors and landscape architects to create unique, long-lasting hardscapes on driveway, walkway and street projects. To find out more, contact Milestone Imports at (866) 641-1999 or log onto their website at www.milestoneimports.com.



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The layout of the rebar may be one of the most unique ever. The two men designed a seven-pointed star to be encased by the typical grid to uphold the historic nature of this project. The entire slab circle was poured quarter by quarter, at a slight angle to allow for proper water runoff.

Campbell began drawing the labyrinth on the concrete by starting with the paths and borders. Although the measuring began in the center using a chain, the center was the last portion to be drawn. Proper creation of the templates, along with the accurate cutting and the laying of the porphyry, proved to be one of the most difficult parts of the project due to the exact mathematics needed. Avants and Campbell spent endless hours perfecting the necessary "sacred geometry" in order to keep with the dimensional accuracy of the original. For example, the center had to be equivalent to one-quarter of the entire labyrinth.

There were no AutoCAD programs and no water jets on this project.

Templates, all drawn to actual size using a compass and a string and then transferred to a board, were made for the paths, borderlines, labryses, lunations and rosettes. The templates—262 were created for over 1,600 stones—were transferred to the stones, which were cut by hand. Each stone was rough-cut with a 14-inch Imer Combitcut 100 saw and finished with four-and-a-half-inch grinders. Although pavers are typically used in a rectangular form, each stone was cut with the exact arc of the circuit in which it would lay in order to achieve one-eighth-inch joints. Within the 36-foot diameter of the labyrinth there are 12 circuits (rings) of stone that lead inward to an eight-foot center rosette.

Porphyry pavers are the perfect complement to the design. The natural variation in color and irregular surfaces provide balance and counterpoint to the overall precision for the labyrinth design. A total of seven pallets of gray/red porphyry, 12-inch by random length by two inches, and six pallets of green porphyry, 10-inch by random length by two feet were used. The porphyry, quarried in Mexico and imported by Milestone Imports, includes a very seldom-used green color (utilized in the border and chalice pieces), (Continued on page 34)



According to precise drawings made by hand on the concrete base, the porphyry stones were carefully laid out in the north quadrant of the labyrinth. A total of 13 pallets of red, grey and green porphyry, quarried in Mexico, were used to create the labyrinth's rich colors.



Above, Inset: Within the 36-foot diameter of the labyrinth there are 12 circuits surrounding an eight-foot center rosette. Below: A worker places stones in a mud bed according to precise circuit drawings hand-drawn on the concrete base. Special attention was given to level the stones and make sure they relate smoothly to the center point. "Whether it's this decade or in 50 years, pilgrims or peregrinos (foreign visitors) will walk these stones on their knees (a local tradition), and we want to have the porphyry as level as possible to avoid scrapes to their knees," landscape contractor Kevin Avants says.

HISTORICAL HARDSCAPES

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which, combined with the gray and red, is innovative and makes for an exceptionally rich color spectrum.

Once 80 percent of the stone was cut, the pieces were laid out in their proper circuits and set on the slab using mud and cement-based thinset. Special attention was given to lock the pieces into their spots while keeping the one-eighth-inch joint between stones. The old, Italian grout method was used consisting of three parts silica sand and two parts concrete. The grout mixture was swept in carefully and water was added. A sponge was then used over the stone and grout to clean the stone and seal the grout.



To protect themselves and the grouting process from the strong New Mexican sun, Avants and Campbell erected a tent over their specific work area each day and covered the entire project with tarps each night. Every morning they checked the grout and continued to add water and sponge off the newly set areas.

After all of the setting and grouting was done, the entire labyrinth was cleaned using a vacuum and then power washed.

Once the area was dry, Campbell used his floor-cleaning machine with muriatic acid to give the labyrinth a final cleaning. As a sealer, Avants and Campbell mixed linseed oil and mineral spirits and applied the sealer two times.

Giving life to the labyrinth, Kevin Avants' and William Campbell's journey never rivaled that of the characters in *The Da Vinci Code*. But, their commitment to reproducing such a historic hardscape enabled them to continue in the tradition of great 11th century masons and their benefactors.

Porphyry was used in ancient times, before modern quarrying, transportation and setting techniques, because of the availability of the stone, the ease of its setting and its durability in resisting the climatic changes that occur in Europe. These wonderful aspects of porphyry allow it to provide an old-world look, while meeting modern standards for paving. For example, with a strength of 22,000 psi, porphyry pavers with a thickness of 1.25 to 2.25 inches can be set in sand on a driveway project while withstanding the daily use of contemporary cars and SUVs.

Typically, porphyry paving jobs do not require anything near the tremendous planning, preparation and labor needed to complete the labyrinth at Saint Francis of Assisi Cathedral.

A small, experienced crew, equipped with a snap cutter, can finish a porphyry installation as fast or faster than most other stone installations. It's a true blend of beauty, brawn and ease of installation. **L C N**