



A Sioux Falls office building
blends with historic neighbors

Courthouse Square

A special project requires special design considerations. In creating the structure that would house the U.S. Attorney's Office for South Dakota, the design team had aspirations of attaining a Leadership in Energy and Environmental Design (LEED) gold rating from the U.S. Green Building Council. The resulting structure, Courthouse Square, is a five-story, 80,000 ft² (7440 m²) office building in downtown Sioux Falls, S.Dak., which uses an abundance of local materials and complements the architecture of the downtown historic district. This article describes the design process of Courthouse Square's outstanding features, which include, among others, a stone veneer, an architectural-precast-concrete-clad exterior, and an underground, all-precast, prestressed concrete parking structure.

George Nasser

The rotunda lobby of Courthouse Square is symbolic of federal architecture. Photo courtesy of Stephen Parezo of Koch Hazard Architects.



Courthouse Square is a stately addition to the downtown historic district, including the original U.S. Courthouse. Photo courtesy of Stephen Parezo of Koch Hazard Architects.

V V A team effort

The programming, planning, and design process included numerous facilitated work sessions engaging all parties involved in the project. Community, neighborhood, and city representatives were also involved in two charrettes, design reviews, and several public hearings concerning the conversion of an adjacent street into a multi-use plaza space. Also, a not-for-profit group conducted a neighborhood workshop to study community linkages to the proposed plaza.

Due to its prominent location adjacent to the downtown historic district and planned public plaza, the proposed building and site design were formally reviewed by the city's planning and zoning departments, Main Street (a not-for-profit downtown organization), and the Mayor's Visual Arts Commission.

Commissioned to facilitate the process of designing and constructing the building were architect of record Bob Winkels of Winkels Group and Jeff Hazard of Koch Hazard Architects, a firm with considerable experience in urban planning and contemporary building design. Joining the architects was engineer of record Innovative Structural Solutions, which was responsible for the gravity- and lateral-load analysis of the building and meeting the structural requirements of the applicable building code.

Stencil Construction, from Sioux Falls, served as contractor, with assistance from the pre-caster, Gage Brothers Concrete Products. During the course of the project, Gage Brothers contributed several labor- and cost-saving ideas.

During construction, regular commissioning and LEED-coordination meetings were held to ensure that the various building components and systems were properly installed and tested and that sustainability goals were being met.

Team members

Owner:

Stencil Development of Sioux Falls, S.Dak.

Design architect:

Koch Hazard Architects of Sioux Falls

Architect of record:

The Winkels Group of Sioux Falls

Engineer of record:

Innovative Structural Solutions of Monticello, Minn.

Contractor:

Stencil Construction of Sioux Falls

Precaster:

Gage Brothers Concrete Products Inc. of Sioux Falls

Precast specialty engineer:

Gage Brothers Concrete Products Inc. of Sioux Falls



Precast concrete meets needs

The base of the building is a two-story arcade of local stone and architectural precast concrete panels that echoes the tall, arched, historic courthouse windows across the street. Above the arcade, the third and fourth stories include wide and tall windows set into a system of architectural precast concrete columns and spandrels. The fifth story is set back from the lower stories behind a mansard-style roof of slate-like roofing punctuated with dormer windows with gently curving tops.

A mechanical equipment screen wall is set back from all sides of the building to ensure that no rooftop equipment will be visible from the courthouse windows across the street. Primary building materials are architectural precast concrete, aluminum windows, and a glazed curtain wall. Local stone is used as a veneer accent material. The roof and framing of the building are structural steel.

The Courthouse Square office building was opened in spring 2006. Photo courtesy of Stephen Parezo of Koch Hazard Architects.



Site considerations

The building and site are designed with respect for the historic courthouse and the downtown historic district that surrounds the site. Rhythm, scale, and proportion of openings all relate to the surrounding architecture. A two-story arched base correlates to the scale of the windows on the courthouse, and the use of local quartzite stone also ties the building to the courthouse.

This 37,576 ft² (3495 m²) site was formerly the home of a one-story furniture store. The project's site included a portion of 12th Street that was vacated to provide a pedestrian plaza.

The pedestrian plaza's design was inspired by the flow pattern of the nearby Big Sioux River with 745 ft (227 m) of outdoor seating provided by serpentine retaining walls constructed of local quartzite. Over 800 cobblestones are reused from city stockpiles accumulated from the original streets of the city and placed adjacent to the retaining walls to reduce storm-water runoff.

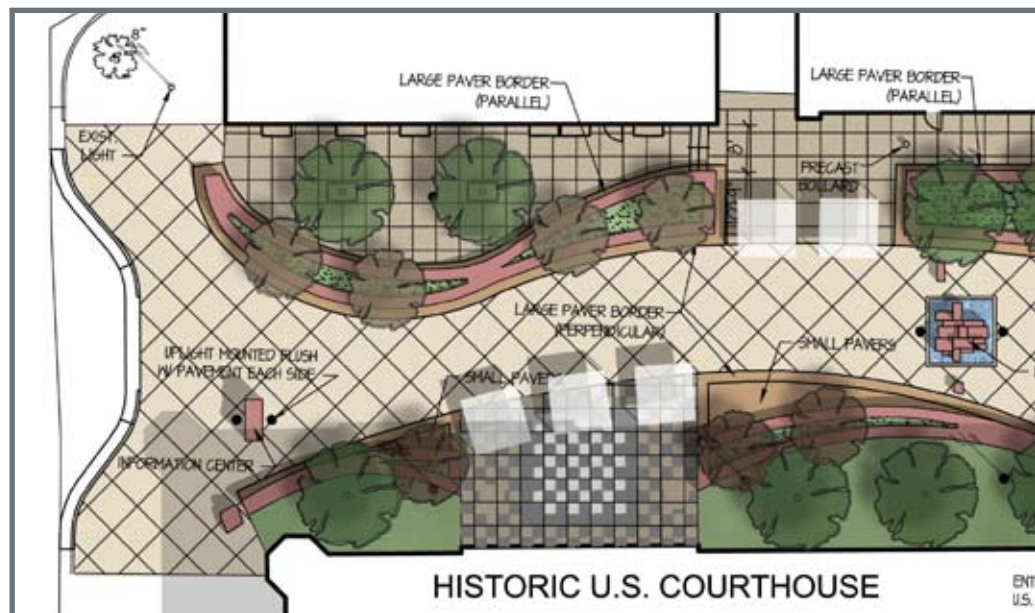
A water feature, constructed of local stone, echoes natural landscape features of the area and is used instead of traditional bollards to help meet vehicular traffic restrictions around the building. Precast concrete bollards around street-facing sides of the building are intermingled with quartzite landscaping features to soften the aesthetics without compromising safety.

Aesthetic appeal

A design goal for the building was to create a welcoming facility that is appropriate for both federal tenants and the local community.

The rotunda lobby is symbolic of federal architecture and extends from the face of the building in a gesture of welcome. Daylight is maximized with nearly full-height glass on the exterior windows. Exterior use of noble local stone and limestone-inspired architectural precast

The pedestrian plaza design incorporates various landscaping and security precautions. Figure courtesy of Stephen Parezo of Koch Hazard Architects.



concrete are also maintained on the building's interior to lend the building a sense of federal permanence.

Inside, the two-story lobby space offers views of the courthouse and plaza, as well as the downtown historic district.

Functionality

Another goal of the building design was to unobtrusively integrate substantial security requirements of the General Services Administration (GSA).

The design team responded with its strategic placement of precast concrete bollards, which maintain a 50 ft (15 m) perimeter as required by the GSA. Dry-laid quartzite walls and boulders of the plaza were well balanced by precast concrete bollards at the street frontages.

In the interior, a security/information desk and metal-detecting area are located inconspicuously in the third-floor lobby of the U.S. Attorney's suite.

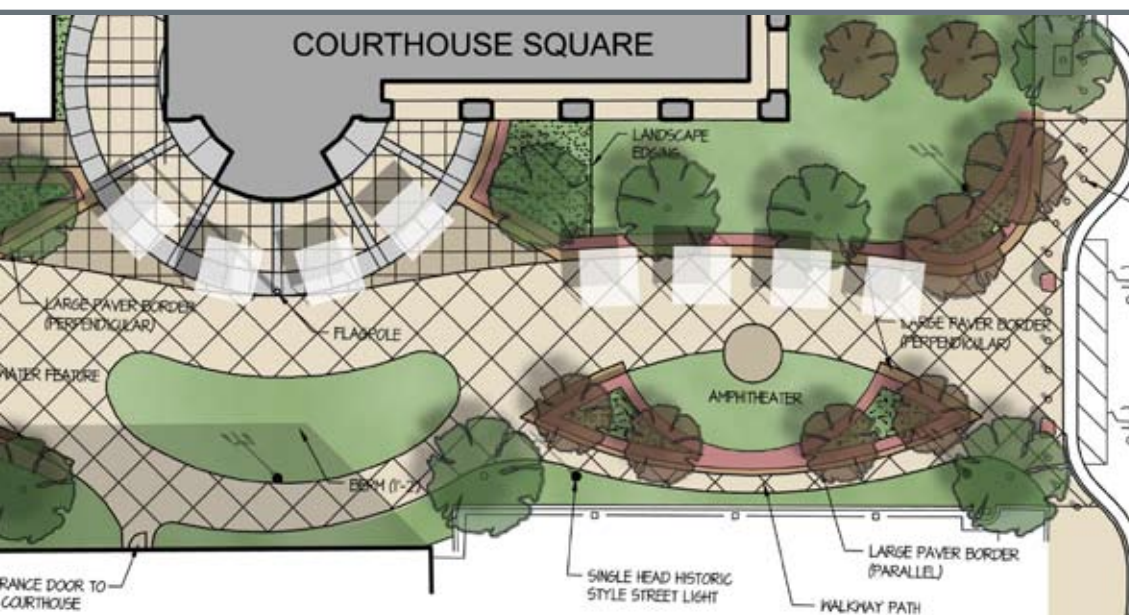
Other sustainable features

Courthouse Square is attempting to be the first LEED-certified building in South Dakota. Many sustainable strategies were incorporated, including the use of renewable energy, local materials, natural daylighting, and underground parking. The building's innovative mechanical system is drawing the attention of area developers and city officials for its energy-saving design, which will help reduce operating costs by 38%.

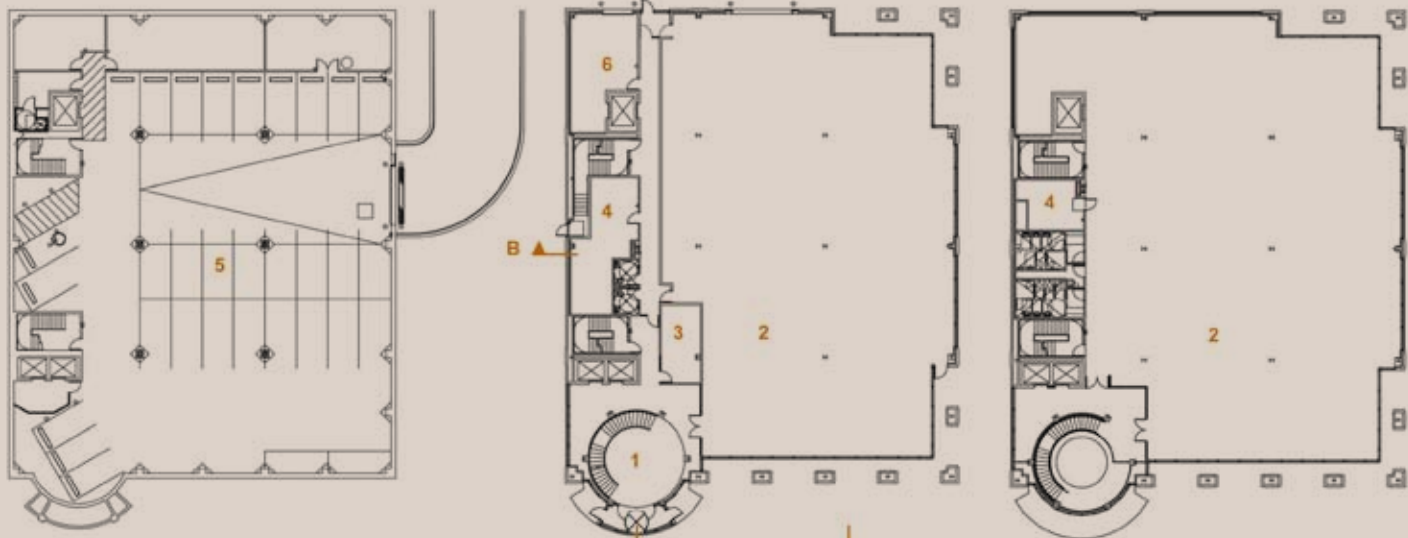
From top The pedestrian plaza is between Courthouse Square and the U.S. Courthouse. Photo courtesy of Stephen Parezo of Koch Hazard Architects.

A sidewalk goes alongside the pedestrian plaza between Courthouse Square and the U.S. Courthouse. Photo courtesy of Stephen Parezo of Koch Hazard Architects.

Precast concrete bollards around the perimeter of the building address federal security requirements. Photo courtesy of Stephen Parezo of Koch Hazard Architects.



A typical architectural precast concrete panel is being readied for installation. Photo courtesy of Stephen Parezo of Koch Hazard Architects.



Floor plans are shown for the Courthouse Square office building. Figure courtesy of Stephen Parezo of Koch Hazard Architects.



Precast concrete panels are being erected at Courthouse Square. Photo courtesy of Stephen Parezo of Koch Hazard Architects.

The building has plenty of other sustainable features as well:

- Waste management diverted more than 80% of the construction waste material from landfills.
- Materials from the demolished one-story furniture store on site were largely recycled or reused—the bricks were given to a local restoration mason, concrete was crushed for aggregate and base material, steel was recycled, windows were reused by a friend of the previous owner, and bed frames found in the building were donated to a local charity.
- Water-saving plumbing fixtures reduce potable water use by over 40%.
- Over 78% of project materials were manufactured within 500 miles (800 km) of the city, and many were obtained locally, including quartzite veneer for the architectural precast concrete panels.
- Building materials have a recycled content of more than 40%.
- Regularly occupied spaces are arranged to take advantage of the abundant natural light, with over 90% of these spaces having views to the exterior.

Geothermal system

The innovative mechanical system takes advantage of the project's proximity to the Big Sioux Aquifer lying 200 ft (60 m) below the main-floor level. The geothermal system meets most of the building's heating and cooling needs by borrowing the aquifer's cooling in the summer and heat in the winter.

Note that no water is consumed in the geothermal system and it returns in the summer the heat that it borrows in the winter through two open-loop wells circulating 150 gal. (600,000 L) of water per minute, which is naturally maintained at a temperature of 52 °F (11 °C).

This water runs over a heat exchanger and is then pumped through a panel system to provide radiant heating and cooling to each space. A displacement ventilation approach is used, delivering air efficiently and effectively via an under-floor supply plenum and collecting it at the ceiling.

Sustainable = savings

Dramatic cost savings are realized every time the gas and electricity bills are paid. The building's operating systems perform about 50% more efficiently than a building of the same size designed to meet current ASHRAE 90.1 standards and provide savings of about \$60,000 or more per year. This conserved energy would power and heat about 40 average households for an entire year.

Other savings will be realized through the use of low- and no-flow plumbing fixtures, such as low-flow toilets and waterless urinals. Every year, 150,000 gal. (600,000 L) of potable water—enough to fill three public swimming pools—are conserved. In addition, landscaping consists of native grasses and plants that require little irrigation.

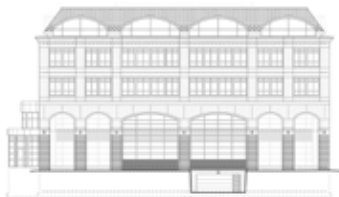
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Community involvement

As part of the LEED initiative, an education and outreach program is planned to explain the sustainable features of the project and the importance of sustainability to the visitors and everyday users of the building. Signs are being added to explain special features of the project. Brochures explaining sustainable building features will be available to the public. A wall display in the lobby will show the LEED gold rating plaque and will highlight sustainable features of the building.

Since the inception of the project, the building and plaza have been highlighted numerous times, educating people about the pedestrian mall aimed at eliminating vehicular traffic and stimulating downtown activity, the advantages of building green, and even future plans for sustainable design projects in the area. Already, this building has initiated a significant amount of public interest and awareness.

Local materials



The building cladding includes 3515 ft² (327 m²) of quartzite veneer, the local bedrock used to construct many original and historic downtown buildings. The balance of nonglazed cladding consists of architectural precast concrete panels that are designed to complement the stone.

The stone base firmly roots the building in its site. Along with precast concrete and stone, all materials used on the project are highly durable and require minimal maintenance. From the outset, precast concrete was used as a sustainable design solution.



The precast concrete components were produced by Gage Brothers Concrete Products at its plant in Sioux Falls. The following is a breakdown of the types of components used in the project:

- 15 precast concrete columns, 185 linear ft (56 m)
- 19 precast concrete beams, 392 linear ft (120 m)
- 72 precast concrete double tees, 23,270 ft² (2164 m²)
- 234 architectural precast concrete panels, 31,783 ft² (2956 m²)



Gage Brothers engineered all of the precast concrete and also produced the shop drawings. The precast concrete components were transported by tractor-trailer the short distance to the project site. The precaster was also responsible for the erection of the precast concrete components.



Various elevations are shown for the Courthouse Square office building. Figure courtesy of Stephen Parezo of Koch Hazard Architects.

The rotunda has a view of the U.S. Courthouse.

Photo courtesy of Stephen Parezo of Koch Hazard Architects.

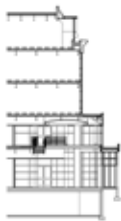
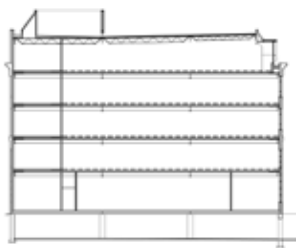
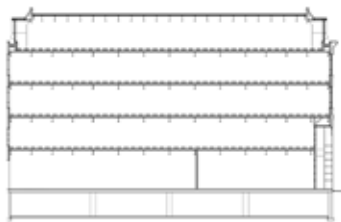
✓ ✓ Sustainable goals set in concrete

The owner, architect, structural engineer, contractor, and precaster involved with the Courthouse Square project are pleased with the outcome of the building. Also, the U.S. Attorney's office, staff, and local community have embraced the new facility.

During the past year, the facility has been operating with total satisfaction. Indeed, in a short period of time, the structure has become a city landmark. Added to this are the advanced environmental and sustainability features, which have set a benchmark for the community to follow.

The aesthetics of the building are particularly striking. Much of this is due to the high quality and attractiveness of the architectural precast concrete, which have given the structure a sense of long-lasting elegance. 





Typical cross sections are shown for the Courthouse Square office building. Figure courtesy of Stephen Parezo of Koch Hazard Architects.

About the author



George Nasser is editor emeritus of the *PCI Journal*. Nasser has written multiple articles and technical papers for the precast, prestressed concrete industry. A well-respected expert in the precast concrete industry, he was formally editor of the *PCI Journal* for over 30 years. He is a PCI fellow and was named a Titan of the industry in 2004.

Synopsis

In creating the structure that would house the U.S. Attorney's Office for South Dakota, the design team had aspirations of attaining a Leadership in Energy and Environmental Design gold rating from the U.S. Green Building Council. The resulting structure, Courthouse Square, is a five-story, 80,000 ft² (7440 m²) office building in downtown Sioux Falls, S.Dak., which uses an abundance of local materials and complements the architecture of the downtown historic district. This article describes the design process of Courthouse Square's outstanding features, which include, among others, a stone veneer, an architectural-precast-concrete-clad exterior, and an underground, all-precast, prestressed concrete parking structure.

Keywords

Architectural precast, GSA, LEED, office building, parking structure, underground parking.

Reader comments

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