Let in the Sunshine

BY TERRANCE J. BROWN, FAIA

Kirk Gittings Photography

Structural steel helped make this modern Native American health center a reality.

WITH A STUNNING 360-DEGREE VIEW OF THE SURROUNDING MOUNTAINS, THE NEW DULCE HEALTH CARE CENTER REPLACES AN OLD, CROWDED CLINIC. The facility provides health care for the members of the Jicarilla Apache Tribe in northern New Mexico. The 58,038 sq. ft., two-story building sits on the side of a gentle hill, offering tremendous views of the surrounding mountains.

Having received funding from the Indian Health Service for a new health center, the Jicarilla tribe hired the largest Native American-owned architectural/engineering firm in the nation, ASCG Inc. of Albuquerque, NM, to design the building and price the structure. At nearly the same time, the health board also hired a project manager and a construction manager-at-risk (CMAR) to complete this project on a fast track.

The CMAR and the steel fabricator and detailer were brought in early as a part of the design team. To facilitate fabrication while minimizing fabrication time and potential fabrication errors, the steel fabricator developed three-dimensional models of each area, in which he modeled each structural member and connection in the virtual world using RAM Structural System prior to fabrication. This resulted in a building completed on schedule and in time for the scheduled blessing ceremony. Structural steel made this modern Native American health center a reality, a place where the people of this remote tribe can receive quality health care.

The architectural design of the facility presented a series of unique challenges for the structural system. The initial concept of a two-story building in the shape of a "Y" provided a building structure which offered maximum window exposure for the occupants. The "Y" form also provided a focal point at the intersection of the wings for the circular entry rotunda. The geometry of this unique structure provided important health separations which locates healthy and sick patients in separate wings. Patients who enter the building for dental work, for example, do not have to sit in the same waiting room as sick patients. The building size was

dictated by the size of the property, the number of offices and exam rooms requiring natural light.

The clinic includes the following service units: urgent care, primary care, radiology, pharmacy, physical therapy, audiology, optometry, dentistry, mental health, environmental health, community and public health, and social services along with associated facility support services.

In contrast to the design, bid, and build method of construction, the CMAR process enabled the contractor to positively impact the design process at the early stages by bringing a structural steel fabricator and detailer on board during structural design. The CMAR worked closely with the A/E firm to develop building systems, select materials, determine methodologies and constantly evaluate construction costs early in the process. This streamlined the processes for both the A/E and the CMAR, and provided the owner with a guaranteed maximum price at the 70 percent phase of construction documents. This process provided a cost-effective project and enabled the owner to take occupancy of the health center six months early. This system also helped create a cost-effective steel structure that began construction earlier than normally expected.

Additional design, fabrication and erection challenges arose as the facility had vertically curved entry canopies intersecting the gable roofs over the facility and framing into the circular rotunda. Marrying the arching roof beams with the sloping flat surfaces proved a challenge to the designers and steel fabricators. The complicated angles and dimensions had to be exact, and the fabricated steel sections had to fit together on-site. The roof framing for the facility utilized open web bar joists with the lower ends extending 4 ft beyond the support point to shelter the windows from the snow melting from the roof and reduce the impact from the summer sun on the mechanical system.

Due to the remote location of the site, and, with the onset of winter, the team quickly determined that a tubular braced steel frame building with masonry veneer would be cost effective. The bracing member sizes included HSS4×4×¼ and HSS5×5×¼ members. The use of structural steel framing system would reduce the time from fabrication to erection and allow for the construction to proceed during the harsh winters in northern New Mexico. The second-level floor framing system was designed utilizing a composite floor framing system, which provided a stiff floor, and 6 ft nominal member spacing, reducing the conflicts between the structural system and the utilities typically involved in a medical facility

The clinic is fully equipped with sprinklers and is designed to provide rapid egress from all areas of the building. The second floor is also served by two pneumatic elevators. Because basket-making and beadwork are traditional crafts of the Jicarilla people, many of their designs are integrated in the natural-colored CMU masonry walls and flooring patterns. The exterior CMU designs represent the towering mountains surrounding the clinic.

The principal entry to the clinic is on the east face of the rotunda. A sliver of sunlight slices thru the narrow aperture of rotunda wall greeting the public as they enter the rotunda. This 48-ft-diameter circular entry is constructed of split-face concrete masonry units and extends above the highest part of the building's roof. The rotunda is capped with a sloping roof and is punctuated by a central skylight allowing the natural sunlight to filter into the building in a soft glow.

Curving monumental steel stairs with stainless steel handrails and tile treads provides access to the second floor of the rotunda and access to all areas. The stair is a 3-D, curved steel structure

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with tube stringer members, embracing the entire lobby. Embossed in the floor pattern of the rotunda is a depiction of a traditional Jicarilla basket design and the cardinal directions of the Jicarilla culture.

Circling the second floor rotunda balcony are twelve painted, extra-strong steel columns measuring 6 in. in diameter, with stainless steel cables extending from the tops. These "poles," common to the Jicarilla tradition, circle the balcony and extend up to the circular skylight to form a structure reminiscent of a teepee, featuring inclined upper walls. The Kalwall skylight reaches up, emulating the colorful design of a basket. The stair and balcony handrail is accentuated by etched glass panels with silhouettes of men and women and symbolizes the people of the Jicarilla Nation and designs indicative of this tribe.

Steel erection challenges were notable with the installation of the conical roof over the two-story-high rotunda. The circular rotunda roof, using HSS8×4×¼ joist members framing into HSS10×4×¼ tension and compression rings, was assembled on the ground and installed as a unit with a crane, similar to placing a lid on a pot. The arching W12×22 roof beams, interfacing with sloping planes of a standard gable roof structure at the service and emergency entries, offered unusual challenges to the design and construction teams. These beams were shop rolled around the strong axis of the member to provide curved roof support members. To meet the architectural requirements of the design, the curved canopies extended into the sloped portions of the gable roofs creating unique challenges with the intersection of curved and angled roof planes over critical medical spaces.

The lateral load-resistive system chosen was a K-braced steel frame. The K bracing system provided the opportunity for the installation of door openings in the bracing lines, and was integrated in the building fabric and glazing systems, thus allowing for attractive architectural detailing where windows pass in front of them.

A traditional meditation room is located in the heart of the clinic, and provides a beautiful wooden slat ceiling and recessed lighting, which terminates with a disc of blue recessed light at the apex suggesting the sky. The carpeted concrete floor has four circular openings located in the cardinal directions allowing the presence of the natural elements into the clinic. These openings in the floor are covered with plate glass discs and are illuminated by recessed lighting. A medicine man has provided traditional sand paintings of the earth in each disc. On the West wall of the meditation room is a mural painted by a Jicarilla artist, depicting the tribe's life and culture.

The design approach for the site of the new Dulce Health Clinic provides a safe and fully functional design, while incorporating the area's natural terrain and cultural architecture. MSC

Terrance Brown, FAIA, is a Project Manager for ASCG Inc. and is a former National Vice President of the AIA. He is the recipient of the AIA Whitney Young Jr. Medal.

Owner
Jicarilla Apache Nation

Architect and Structural Engineer
ASCG Incorporated, Albuquerque, NM

Engineering software
Enercalc and RAM Advanse

Steel Detailer and Fabricator
Amfab, Bernalillio, NM, AISC member

General Contractor
Jaynes Corporation, Farmington, NM