ORANGUTAN CANOPY
AT KANSAS CITY ZOO
A.L. Huber General Contractor Builds a Naturalistic Habitat for Bornean Orangutans at the Kansas City Zoo

INCLUDES TREETOP PAVILION, OUTDOOR EXHIBIT AREA & INDOOR DAY ROOM

A. L. Huber General Contractor has completed the Orangutan Canopy, a $6.2 million habitat that is now home to the Kansas City Zoo’s six Bornean orangutans.

Keith Dorrian, Senior Project Manager for the Orangutan Canopy, traced A.L. Huber’s involvement in the project to their work on two earlier projects at Kansas City’s Crown Center.

“Once we finished Legoland® and Sea Life® Aquarium in 2012, we felt we had created a niche in the exhibit world,” said Keith. “We contacted the Owner’s Representative for the Zoo to let them know we were interested in any new projects that came up.”

In December 2013, A.L. Huber was one of a select group of contractors invited to submit their qualifications and a proposal for fee-based services to Friends of the Zoo, Inc. of Kansas City, Missouri (FOTZ), the Owner. They were awarded the project in January 2014 and served as Construction Manager for the Orangutan Canopy. “This was our first project for them and it was a great one out of the gate,” said Keith.

“During the schematic design phase, we laid out a preliminary schedule and budget based on what we understood the project to be at the time, including its general components and scale,” he said. As the design was being completed in January 2014, A.L. Huber finalized the guaranteed maximum price (GMP) and submitted plans for the issuance of building permits to the City of Kansas City, Missouri. From January through May 2014, they assisted the design team with pricing and scheduling.

There were two bid packages. The initial package consisted of demolition, rough grading, and foundations for the outdoor exhibit area. The second package consisted of the holding facility renovation, the Day Room renovation, the Day Ground -

Room viewing addition, and construction of the outdoor exhibit (including the Rainforest Walk and Treetop Pavilion).

Ground-breaking was held on August 27, 2014. Substantial completion was achieved on May 20, 2015. The orangutans were introduced into the outdoor exhibit on May 21, and the ribbon cutting ceremony was held on May 22. A.L. Huber completed the project on time and on budget, with zero lost-time accidents.

PROJECT TEAM

The A.L. Huber team included Keith Dorrian; Zack Stokes, Project Superintendent; and Jenny Morrison, Project Administrator.

BBN Architects, Inc. was the Design Architect, Architect of Record, and Landscape Designer. The Portico Group was the Exhibit Designer. The engineering team included SK Design Group, Inc. (civil); Smith & Boucher, Inc. (MEP); and Leigh & O’Kane L.L.C. (structural). Water’s Edge engineered the water feature. Newmark Grubb Zimmer was the Owners’ Representative.

A total of $5 million of the $6.2 million project was funded by the Zoological Tax District supported by taxpayers in Clay and Jackson counties. (Residents of the two counties approved the creation of the district in 2011.) The exhibit also received $1.2 million in private donations.

The City of Kansas City, Missouri, requires 22% MBE (Minority Business Enterprise), 8% WBE (Women’s Business Enterprise), and 15% LBE (Local Business Enterprise) subcontractor participation goals for public projects. A.L. Huber exceeded each of these goals.

A.L. Huber’s jobsite trailer was located on the south side of the exhibit. A webcam atop the trailer allowed the construction and design teams to view the jobsite during conference calls.

BBN created 3-D Revit models of the existing holding building, the new Treetop Pavilion, and the new lower viewing area. They also modeled how the rock formations tie into the existing holding facility, and how the newly-constructed tunnels lead from the holding facility into the outdoor exhibit.

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MANAGING THE SITE

“One of the main challenges with this project was the logistics,” said Keith. “The Zoo is a unique site to work on because of the limited drivable access for dump trucks, ready-mix trucks, cranes, and concrete pumps. The project also had tight site constraints. About 85% of the total site was under construction, so we had very little room near the exhibit to lay down materials. Zach Stokes did a great job managing the laydown yard for materials, scheduling material deliveries, and coordinating the arrival of equipment. The process of bringing in all the heavy equipment required constant coordination and communication.”

A temporary construction entrance was located off Starlight Road just north of the Zoo’s Business Operations Center. The site access route was one-way and wound south to the Polar Bear Passage before winding northeast to the project site.

A.L. Huber used the employee parking lot west of the job site as a staging area. They also used a portion of the site access route for staging while making sure any emergency vehicle would have unimpeded access to the animals at all times. The route was continually monitored as construction vehicles came through.

Access to the site was gained through a gate behind the Polar Bear exhibit and a second gate west of the Orangutan Canopy. A.L. Huber monitored the first gate to ensure there was no unauthorized access. “We actually had to watch it close behind every vehicle,” said Keith.

Creating a new habitat within a zoo for exotic animals can be challenging, and especially so when adding on to an existing habitat that is still home to those animals. A.L. Huber and all their subcontractors did a masterful job of working with and around the orangutans. As new challenges cropped up each day, the usual for a zoo project, A.L. Huber identified the issue, developed a plan, and moved on. Orangutan Canopy opened after only nine months of construction and exceeded expectations. Careful precision and meticulous measurements created challenging yet containable indoor and outdoor environments for orangutans that possess incredible dexterity and intelligence. It’s truly ‘ape’-mazing!

– Randy R. Wistoff, Executive Director/CEO, Kansas City Zoo

Subcontractor Members of The Builders’ Association Who Worked on Orangutan Canopy at Kansas City Zoo

- Capitol Painting Company
- Commercial Waterproofing, Inc.
- International Builders & Consultants, Inc.
- A K Lee Construction L.L.C.
- Musselman & Hall Contractors, L.L.C.
- Safeway Services, LLC
- SGH, Inc.
- George J. Shaw Construction Co.
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moat’s east walls continue upward and help
support the Treetop Pavilion’s two end beams.)
The surrounding walls are made of cast-in-place
concrete except for the freestanding rammed-
earth wall on the east side, which serves as a
backdrop to prevent glare from the windows.
The floor is integrally-colored concrete with a
wood pattern and texture.

LOWER VIEWING AREA
The lower viewing area has two 60”-wide by
150”-high windows that provides visitors a
closer view of the orangutans in the lowlands
and along the stream. To the right of the
windows are glass doors that open to a wire
mesh panel through which the Zookeepers can
interact with the orangutans. For example,
Zookeepers can place a toothbrush through a
panel opening to brush an orangutan’s teeth, or
hold out an iPad so an orangutan can put its
finger through a panel opening to press X’s or
O’s during a game of online tick-tack-toe.

The lower viewing area also has glulam beams and columns and a corrugated metal roof.
A concrete wall to the right of the glass doors
has an angled cylindrical opening into which the
Zookeepers can drop fruit.

OUTDOOR EXHIBIT
The outdoor exhibit contains approximately
3,400 square feet and features a grove of
artificial trees, poles, and vines for climbing and
exploring. (Orangutan is Malay for “people
of the forest.” They are the largest arboreal or tree-
dwelling animals in the world.) The trees, poles,
and vines rise above a naturally-planted,
contoured forest floor. Keith noted that for the
younger orangutans, the forest floor provided
their first exposure to grass and plants. (Their
former outdoor habitat, the Primadome, had a
concrete floor.)

On Monday, May 18, during the final week
of construction, hundreds of cubic yards of
special soil were added to the forest floor. The
soil, which is two feet deep, was pulverized and
sifted through multiple times to eliminate any
objects that could be used as projectiles by the
orangutans. On the same day, natural boulders
(which weigh 4,000 pounds or more so the fully-
grown orangutans, which are about seven times
stronger than humans, cannot pick them up) were
“flown in” (set in place) by a 50-ton crane.

The trees and faux logs are structural steel
with an artificial concrete finish. The faux logs
have receptacles into which the trainers can pour
honey, add peanut butter, or stuff leaves and
lettuce for foraging by the orangutans.

HOLDING FACILITY
A new access tunnel for the orangutans now
connects the existing holding facility to the new
outdoor exhibit at two locations. The service area
to the south of the holding facility now provides
the orangutans multiple paths into the outdoor
exhibit. Additionally, a new covered area was
built on the south side of the service area with a
large sliding overhead door for Zookeeper access
into the outdoor exhibit.

There are nine holding cages. The two
outdoor cages were modified. Of the seven indoor
cages, two are on the east side of the Day Room
and were also modified. When
it is less than 45°F, both groups
stay inside, one group on
exhibit in the Day Room and
the other in the holding facility
cages. (Mature male orangutans
do not get along well and are
kept separate.)

DAY ROOM & ORANGUTAN UNIVERSITY
Visitors take the Rainforest Walk from the
Treetop Pavilion to both the lower exhibit area
and the Day Room 16 feet below. Along the
Rainforest Walk are interactive activities and
play features for the children as well as
interpretive signs. At the lower plaza area are
bronze sculptures of an orangutan and a Komodo
dragon, as well as shade sails and play surfaces
around the play equipment.

A.L. Huber completed the Day Room
renovations early so that the orangutans could
have an indoor habitat while the Primadome was
removed and the outdoor exhibit was completed.

The existing Day Room had just three small
punch windows through which visitors could see
the orangutans. It was relatively dark inside, with
a white interior and galvanized metal transfer
doors. A.L. Huber removed the front of the
building and replaced it with six new windows
from 58” to 59” wide and 121” high. Eleven new
skylights now capture the sun’s rays and transfer
the light indoors through highly reflective tubing.

The project team transformed the Day Room
interior into “Orangutan University,” a themed
space with the walls painted shades of green
and the ceiling painted blue. The old fire hoses
that served as vines and that hung from anchors
in the ceiling have been replaced with crisscrossing
climbing poles and three large nesting disks in
the “canopy” above the floor. Grips were added
to the walls to facilitate climbing. The concrete
floor in the Day Room was stained an earth tone
to give it a more natural feel.

A canopy with glulam beams, wood decking,
and freestanding rammed earth walls was added
to create a Day Room viewing area on the front
(north) side. The canopy keeps the sunlight from
reflecting off the glass while protecting visitors
from the elements. While sitting comfortably on
large concrete bleachers, visitors can watch the
orangutans or two flat screens above the viewing
windows to learn more about their history,

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habitat, and behavior.

Each group of orangutans is headed by a mature male and includes two females. One group is headed by Rufus (who will be 27 on October 8, 2015) and includes Jill (39) and Kalijon (6). The other group is headed by Berani (16) and includes T.K. (30) and Josie (13).

Orangutans are among the most intelligent of all primates. In their natural habitat, they use a variety of sophisticated tools and construct elaborate sleeping nests each night from branches and foliage. In the rain, they hold large leaves over themselves like ponchos or umbrellas, according to the exhibit’s interpretive signage. They can also be mischievous. “Kali gave everyone a hard time during construction, but particularly one of our laborers who spent a lot of time at the Zoo,” recalled Keith. “She had a fondness for getting a drink of water and spitting it at him. I think it was just a game to her. She would also run behind Jill and pull her hair—and Jill would give her a whack.

“When I was with a group of people I’d try to be the first into the holding building, because if you were first in line, she didn’t have time to get a quick drink to spit at you. Sometimes she’d hide around a corner and wait for you to come out of the Day Room and then spit,” he continued. (The public, of course, is separated from the orangutans by the special viewing glass.)

During preconstruction, recalled Travis Hachmeister, he and two members of the George J. Shaw team were standing outside the old Primadome. “When one of my colleagues turned away from Kali, she climbed up the rails inside the cage, sat on the ledge, and spit a stream of water at him. She looked at me and my other colleague and just smiled as if to say, ‘Did you see what I just did?’ ”

“You also had to make sure you didn’t leave tools around,” added Keith. “The orangutans are so intelligent that if they see you use a tool even one time, they may try to mimic you.”

On May 12, with the Orangutan Canopy’s opening fast approaching, Zoo officials called in specialists from the Kansas City Climbing Club to determine if the orangutans could climb their way out of the outdoor exhibit. “Orangutans are known to be masters at escaping, so fortunately none of the climbers even came close to scaling the rock walls,” said Keith. “The other walls are made of slick concrete, and since an orangutan can climb up a 90-degree corner, there are no 90-degree corners anywhere,” he added.

STAYING ON SCHEDULE
The project team was faced with rain during all but two of the last 22 days on a project that was mostly outdoors. During the final month, crews worked multiple shifts around the clock to overcome the weather days and stay on schedule.

“It was very important for the Zoo that the exhibit be open prior to Memorial Day [Monday, May 25] in order to kick-start their summer,” said Keith. “Down the stretch we ramped up to the point where all the subcontractors were onsite. Artificial rockwork was being installed, cranes were setting in big boulders and glass, the holding cages were being modified and reconfigured, and concrete was being poured in the lower viewing area.

“Between Monday and the ribbon-cutting on Thursday, what happened on the job site was nothing short of miraculous. We put the dirt in the outdoor exhibit area and flew in the heavy boulders on May 18. We had to get up high and stain all the glulam members and roof decking in both the Treetop Pavilion and the Day Room viewing area. We continued to monitor the noise level and communicate with the Zookeepers during the final days.”

THE HIGH POINT
On the evening of May 28, FOTZ’s board and staff held a Contractors Appreciation Night for A.L. Huber, the design partners, and the subcontractors. “We had our own personal tour. Everyone got to see the Orangutan Canopy in its final state and the orangutans enjoying it. After all the rainy weather at the end we were in an all-out mode to meet the deadline, so it was great to sit back and have a fun evening taking everything our team had accomplished,” said Zach.

“I am very fortunate to have been part of two great projects, Sea Life at Crown Center and now the Orangutan Canopy,” he continued. “The day before the opening, the orangutans were kind of slow to come out of the holding area and into the new outdoor exhibit the first time, but they were soon climbing into the treetops and enjoying their new environment. They now have a quality of life they didn’t have in the Primadome and the old Day Room. That was the high point of this project for me, along with seeing the kids smiling and laughing as they interacted with the orangutans on opening day.”

A.L. Huber Travels to Michigan to Complete Their Second Sea Life® Aquarium
A.L. Huber was the general contractor for the Sea Life® Michigan Aquarium. The new aquarium is located in renovated space at Great Lakes Crossing Outlets – a 1.3 million square foot regional shopping center and entertainment venue in the Detroit suburb of Auburn Hills, Michigan.

Construction began in May 2014 on the mall’s northeast. The formal groundbreaking ceremony was held on September 23, 2014. The aquarium opened to the public on January 29, 2015.

The A.L. Huber team included Phillip W. Thomas, Project Executive; Randy Huber, Project Manager; and Jay Dooley, Project Superintendent. Zack Stokes was the original Project Superintendent before going to the Orangutan Canopy project.

Sea Life Michigan was A.L. Huber’s third project for Merlin Entertainments PLC, a British company headquartered in Poole, Dorset. A.L. Huber completed Sea Life and Legoland® in Kansas City in 2012.

“Zack Stokes was superintendent at Sea Life in Crown Center and Jay Dooley was superintendent at Crown Center Legoland®. I really think their performance on the two Kansas City projects is one of the big reasons we were chosen for Sea Life Michigan,” said Randy Huber.

Sea Life Michigan Aquarium contains a total of 35,000 square feet over two floors. A.L. Huber coordinated with hundreds of artisans and laborers from around the world to create a variety of themed aquatic spaces on the first floor. The mezzanine consists primarily of support space centered around the Ocean Tank. There are 21 tanks (including the Ocean Tank) containing 150,000 gallons of water.

RESERVOIR TANK
A major challenge was to excavate a 12-foot hole around the existing columns inside the mall for the 28,000 gallon Reservoir Tank. Five footings were underpinned so the earth could be excavated right up to the columns. Sheet piling and lagging were employed to support the exterior wall while excavation next to the wall was underway. The Reservoir Tank and Ocean Tank were cast in place with self-consolidating concrete. The Ocean Tank required precise measurements in order to fit the 4”-thick acrylic viewing panels in place.

OCEAN TUNNEL
A mini-crane was driven through one of the viewing window openings in order to set the acrylic panels for: 1) the 11’-long, 7-high quarter-cylinder window that provides views of the shipwreck and Mayan statue features inside the Ocean Tank; and 2) the 30’-long underwater tunnel (painted at right) that takes visitors inside the Ocean Tank. The window and tunnel were designed and shipped from Japan and set in place without a scratch.

A.L. Huber’s mechanical subcontractor routed miles of piping for the Life Support System, a critical component for the life of the sea creatures.

The project was completed on time and with zero accidents. All of the subcontractors participated in weekly “Toolbox Talk” safety meetings. They also received confined space safety training.

The 30’-long underwater tunnel that takes visitors into the Ocean Tank has three separate sections of 4”-thick acrylic and offers views of the blacktip reef and hammerhead sharks.