ASCE Orange County Branch 2009 Annual Awards Nomination

1) Nomination for **Land Development Project of the Year**

2) **Irvine Ranch Outdoor Education Center**

3) Mike Harrison (Nominator and Contact)
(on behalf of all of the firms and engineers listed under #4 below)
Trico Realty, Inc. & Orange County Council, Boy Scouts of America
3100 A Pullman Street
Costa Mesa Ca 92626
714-325-8800
mike@tricorealty.com

4) RBF Consulting (Onsite Water Systems – Domestic, Irrigation, Fire)
14725 Alton Parkway
Irvine, CA 92618
Cindy Miller
949-855-3616
clmiller@rbf.com

Mark Anderson (formerly with RBF Consulting)
(Conceptual Land Plan, Rough Grading Plan)

Hunsaker & Associates, Irvine, Inc. (Street Improvement Plans)
Three Hughes
Irvine, CA 92618
Mabel Hill Garcia
949-458-5472
mgarcia@hunsaker.com

Fuscoe Engineering (Santiago Creek Crossing)
16795 Von Karman, #100
Irvine, CA 92606
Jeff Davis
949-474-1960
jdavis@fuscoe.com
John Hix
949-474-1960

Penco Engineering, Inc. (Precise Grading Plan)
One Technology Park, Bldg J – 725
Irvine, CA 92618
Brent Chamberlain
949-753-8111
bchamberlain@pencoeng.com

Adams-Streeter Civil Engineers (Field Survey Work)
15 Corporate Park
Irvine, CA 92606
Randy Streeter
949-0474-2330
rstreeter@adams-streeter.com

Stantec Consulting, Inc.(Offsite and Onsite Sewer and Water Plans)
19 Technology Drive
Irvine, CA 92618
Bill Maul
949-923-6000
bmaul@stantec.com

HNTB Corporation (Onsite Bridge Abutments)
200 E. Sandpoint Drive, Suite 200
Santa Ana, CA 92707
Mike Jones
714-460-1600
mjones@hntb.com

Leighton & Associates (Preliminary Geological & Soils Engineering)
17781 Cowan
Irvine, CA 92614
Ed Burrows
949-250-1421
eburrows@leightongeo.com

NMG Geotechnical (Geological & Soils Engineering)
17991 Fitch
Irvine, CA 92614
Ted Miyake
949-442-2442
tmiyaki@nmggeotechnical.com

GMU Geotechnical, Inc. (Field Soils Testing and Reporting)
23241 Arroyo Vista
Rancho Santa Margarita, CA 92688
Dave Atkinson
949-888-6513
datkinson@gmugeo.com

STB Structural Engineers, Inc. (Structural Engineering for Buildings and Mine)
21084 Bake Parkway, Suite 100
Lake Forest, CA 92630
Matt Exley
949-599-0320
matte@stbse.com

Patrell Engineering Group, Inc. (Swimming pool design)
751 Sunny Grove Lane
Glendora, CA 91741
Doug Ferrell
626-335-4362
dferrell@patrell.com

Robinson Associates Consulting Engineers (Waterslide design)
5500 Oakbrook Parkway, Suite 110
Norcross, GA 30093
Sweanum Soo, Ph.D., P.E.
770-840-0282
soo@robinsonengineers.com

Standard Pacific Home
15326 Alton Parkway
Irvine, CA 92618
Michael Battaglia
949-789-1752
mbattaglia@stanpac.com

Project Description

The Irvine Ranch Outdoor Education Center is owned and operated by the Orange County Council, Boy Scouts of America on 210 acres of land donated by The Irvine Company adjacent to Irvine Regional Park. It is a unique project designed to serve the outdoor education and recreational needs of all of the areas youth groups and school groups including, the Girl Scouts, YMCA, Boys and Girls Clubs, Boy Scouts, church youth groups, and both public and private school groups. Design and entitlement work on this site was begun in 2003 under the direction of the Irvine Company and the OCC BSA. The deed gifting the land was recorded in August of 2005 and grading began in the fall of 2005. Construction of $30 million in improvements on 52 acres was completed in October of 2009. This included $12 million in infrastructure and $18 million in building and feature construction.

The project is unique not only in its features and operating objectives, but also in the degree of support it received from Orange County civil engineers. The eleven firms listed above all contributed their professional expertise on a pro bono or discounted fee basis. By dividing the load each firm was able to make a contribution which in aggregate resulted in significant savings which helped make the project possible. The architecture and engineering design costs for the project were about $3 million of which about $1 million was donated by the firms doing the work. It is an outstanding example of the generous commitment civil engineers make to our community.

I am also very proud to say that the project management team for the facility was lead by civil engineers. Standard Pacific Homes provided project management services and field supervision for most of the infrastructure work and construction of the dinning hall. Johnna Dalby, of Standard Pacific, a USC Civil Engineering graduate, served as Project Manager through much of this work. On the Boy Scout side, I volunteered my

time and experience as a general contractor and real estate developer. Although I have never practiced as a professional civil engineer, I also have a civil engineering degree from USC and am a Life Member of ASCE. I think my civil engineering education contributed greatly to my ability to take a leadership role in working with all members of the design and construction team who contributed so much professional expertise to make this project a success.

The Irvine Ranch Outdoor Education Center also presented some unique engineering challenges and interesting design opportunities.

Although the 52 acres of the developed site began as a gently sloping mesa, the grading plan created a large number of naturally appearing high berms which provided screening of buildings from the Hillsdale housing development (3/4 of a mile away across Santiago creek). It also screened the view of Hillsdale from much of the IROEC site and hid different activity areas on the site from each other creating a number of more intimate and isolated outdoor settings. RBF Consulting did the design under the leadership of Mark Anderson.

Getting adequate water pressure on the site required the installation of pumps for domestic, irrigation and fire systems. After designing and starting construction of a pump house to fit all three pump systems and obtaining OCFA approval of our design for a diesel powered emergency fire pump, the pump manufacturer had a disagreement with AQMD and decided it would no longer provide the specified pump for use in California. The next larger pump had twice the required capacity and would not fit in the pump house. The solution was to use two smaller pumps designed to operate in parallel. This provided added flexibility and a degree of redundancy, but also required a creative piping layout to shoehorn four pumps into space designed for three. RBF provided the creative design under the leadership of Cindy Miller.

One of the most unusual features of the project is the Lucy-Lou Mine which was designed and built with earth-poured concrete tilt-up wall panels and a poured in place concrete roof/ceiling. Dirt was sculpted in the panel forms so that the irregular surfaces at adjacent panels matched at the panel joints. After the wall panels were erected on erection pads, supporting footings and slabs were poured. Then scaffolding was built to support foam blocks and dirt with variations in height to create an uneven ceiling form. After the roof/ceiling was poured, scaffolding was removed and excess dirt chiseled off the surfaces of ceilings and walls to create the appearance of an excavated mine. The Mine was built by Prizio Construction and won a 2009 Concrete Tilt-up Achievement Award from the Concrete Tilt-up Association. Matt Exley of STB Structural Engineers provided the structural design.

Because the road surfaces at the Santiago Creek crossing entering the site from Irvine Regional Park are 10 feet below the 100 year flood plane, an “Arizona crossing” was designed rather than a more expensive bridge across the creek. Water flows through five 42”x29” oval CMP culverts below a concrete road bed during ordinary stream flow. In heavy storms when water is released from Irvine Lake, water flows over the road surface and access is closed. Since the crossing structure reduced the cross sectional area of the creek bed, it was necessary to create a berm along to Park side of the crossing and a high point further along the road from the Park in order reproduce the same cross sectional area. This was done to insure that no more water would escape into the Park from an overflow of the creek than would have escaped before the crossing was built. Fuscoe Engineering completed this design work under the direction of Jeff Davis and Jim Hicks.

In order to provide access across an ecologically sensitive canyon between the main site and the tent camping area, an 8' wide bridge of Core Ten steel was designed with a 130' free span length. The Bridge was built in Minnesota by Contech Bridge and delivered in two 65' sections which were then bolted together on site. This avoided the need to work in the sensitive canyon bottom, but required the largest crane in Southern California (300 ton) to swing the 60 ton bridge onto its abutments from one side of the canyon. The crane provided by Mr. Crane at discounted rates, came with 9 semi truck and trailer loads of weights. Bridge Abutment design was donated by Mike Jones at HNTB.

The Aquatics Center includes a state of the art junior Olympic swimming pool, a smaller teaching pool and a waterslide. The pools were designed by Doug Ferrell of Patrell Engineering Group and built by California Commercial Pools. The waterslide engineering was done by Robinson Associates Consulting Engineers to meet the challenge of setting the fiberglass flume into the hillside so it would appear to be a creek. In order to avoid run off from the hillside flowing into the flume, the flume was set into an 8' wide channel lined with visqueen and filled with gravel. The gravel was sloped away from the edges of the flume to create subtle parallel channels for water flow on each side of the flume and hold pressure on the sides of the flume to within design standards. Native rocks from the site were used to enhance the natural stream bed look. A collection drain line was set at the bottom of the channel to collect the run off. This natural stream bed design enabled us to win support for the waterslide from the neighbors who originally opposed it over concerns that they would be able to see it on the hillside from their homes on the other side of Santiago Creek. The design is also consistent with the natural outdoor environment of the property.

The onsite road system designed by Hunsaker and Associates, under the direction of Mabel Hill Garcia, needed to meet the OCFA standards for fire truck access but also needed meet our objectives of minimal run off and as natural and rural an appearance as possible. Through a fire truck test run on a crushed miscellaneous base surface, we were able to demonstrate to OCFA's satisfaction that a CMB section would support the fire truck load and provide sufficient traction. While the main access road has an asphalt surface, all secondary roads, parking areas and OCFA required hammerhead turnarounds were designed and built with a 12" CMB section. Fire lanes are marked by a combination of rustic heavy timber signs along the sides of roads and low profile synthetic Fire Lane – No Parking signs spiked into the CMB in areas where traffic needs to drive over them. Delineation between parking aisles in the main parking lot is with old fire hose spiked into the CMB.

The Irvine Ranch Outdoor Education Operations and Remaining Challenges

Due to the complexity of the project, planning approval, permitting and fundraising challenges, design and construction stretched over a seven year period from 2003 through 2009. However, with cooperation from the County, we were able to bring portions of the project on line as they were finished without waiting for final completion. We began using the tent camping area in 2007 and the dinning hall in the fall of 2008. While the Aquatics Center was just completed in the fall of 2009, over 12,700 youth participated in programs at the IROEC during 2009. As construction was progressing, staff was developing both educational and recreational program elements. All groups having experienced programs at the IROEC have been enthusiastic about both programs and the facility. The principal challenges for 2010 are twofold.

First, we need to complete fundraising to pay for the capital improvements. We have excellent financing; however, we need to raise the final $5 million to complete our capital campaign. Pledges are payable over 5 years.

Second, we need to ramp up to full utilization of the facility. We are working to make sure all potential users are aware of this great resource. A visit to the site is really necessary to fully appreciate what the IROEC has to offer. One part of the plan to fund operations is to offer use of the facility for corporate and other community group use in a way that helps support lower cost usage fees for youth groups. The facility can accommodate this type of use without interfering with its primary purpose of service to youth. Meetings can be held in the training center and main hall. First class overnight accommodations for retreats are available. Recreation, such as the COPE course and zip line, and outdoor education activities can augment meeting schedules. Excellent food service can be arranged in the dinning hall or other venues on the site. By using the IROEC for such events, a company or group will not only have a great venue and experience but also will be helping to provide the programs that IROEC offers youth at lower costs.

For more information on IROEC operations or how you can help support the IROEC please call 714-923-3191 and/or visit the website: **outdooreducationcenter.org**.

Summary

The Irvine Ranch Outdoor Education Center is a land development project in which civil engineers have contributed generously to create a resource which will be of great benefit to the youth of our community for the long run. It is an excellent example of the how cooperation among civil engineers and their companies can produce an end result in which we can all take pride.

Attachments:

Aerial Photo / Topo Map

Photographs