



BARONA CREEK GOLF CLUB

Located on sovereign Native American land near Lakeside, California east of San Diego in the Wildcat Mountain Valley, the 250-acre golf course's grounds were used for cattle grazing for nearly 100 years. Because much of California's original oak woodlands have been severely depleted, the Barona Band of Mission Indians worked with Audubon International Signature staff to design a large scale oak restoration project. More than 170 mature native oaks were transplanted from other areas of the reservation. Englemann and coast live oak saplings were planted to help restore oak ecosystems. The terrain is subtly undulating, with prominent rock outcroppings and gentle elevation changes. The design staff of Gary Roger Baird developed the natural drainage areas into the dry creek beds giving a natural look and providing new habitat, with the goal of increasing biodiversity. Twelve acres of lakes and streams were constructed and serve as a source for irrigation, while providing vegetated shorelines for wildlife cover. The number of bird species observed on site since the beginning of construction has increased from 62 to 131 species including black-necked stilt, American widgeon, ringed-neck duck, wrentit, bufflehead, and loggerhead shrike. Two golden eagles are frequently sighted near the fourteenth and fifteenth holes. Barona Creek Golf Club was certified on March 19, 2002 as the first Audubon International Signature Sanctuary on Native American sovereign land in California.

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The routing of Barona Creek Golf Club features native vegetative corridors that extend between golf holes and around the perimeter of the golf course. Raptors hunt the rodents that live and forage within the corridors.

Photo courtesy of Barona Creek

WILDLIFE CONSERVATION AND HABITAT ENHANCEMENT



During golf course construction, 180 coast live oak ranging in size from 72 to 96 inch boxes were planted around the golf course to create a natural look with the existing oak trees. The trees were carefully relocated from an existing grove on another part of the reservation. Since the Oak Tree played such an important role in the heritage of tribal ancestors, relocation of the trees took on a very special meaning. The trees were dug out by hand and slowly boxed over a three month period and allowed to sit in boxes for an extended period before planting construction site and equipped with drip irrigation, allowing a safe acclimation period before planting. The trees were safely planted away from irrigation and have been hand watered for the past two years. Dual rings were constructed around the base of the trees, the inner ring serving as protection against water reaching the trunk and the outer ring designed to be watered by a hose. All weeding around oak planting have been performed strictly by hand. The trees have already provided nesting opportunities for numerous hawks and serve as excellent perches for our wide variety of bird life.

In March of 2001, The Barona Band of Mission Indians received over 100 oak saplings from the estate of Sam Knott, a highly respected resident of San Diego. Mr. Knott wanted to be sure that upon his passing, the trees would be donated to a worthy cause and be well taken care of. The trees were carefully planted in clusters around the golf course, with drip irrigation installed to insure a high survival rate. In a couple of generations, these donated oak Trees will also provide habitat for a number of native creatures of the Barona Valley.

Great care was taken during the construction phase to protect the existing large coast live oaks. Construction fencing was installed around the outside of drip lines to prevent construction or trenching equipment from causing damage to the root zone. All irrigation and drainage was installed in a manner that prevented unwanted water from changing the Oak Tree environment.



The twelve acres of lakes and streams constructed to recirculate water and serve as a source for irrigation, also act as home to numerous migratory and resident birds.

Abundant natural growth along shorelines provides safe haven for several of our nesting birds. Egrets, mallards, buffleheads, numerous ducks, black necked stilts, and herons have increased in population with each winter since course construction began.

The number of bird species observed since construction began has increased from 62 to 131.



Decorative ornamental grasses planted in key areas around the golf course require water only for establishment. Decorative ornamentals such as fescues, pennisetum, carex, miscanthus, muhlengergia, acorus, and calamagrostis species all produce attractive seed heads, providing formal landscape in key areas, while maintaining the natural look of the surrounding fields. The open field, which serve as wildlife corridors, consists of various pasture grasses, oats, and large clump grasses known as Hardings grass. The fields go through beautiful seasonal changes, ranging from green from Spring through early Summer and

dormant straw color the remainder of the year. Landscaped and native grass areas both provide cover and food for the abundant wildlife found at Barona Creek Golf Club.

Wildlife is abundant in the Barona Valley. One hundred thirty-one birds have been identified, including uncommon visitors such as the Aplomado Falcon and a Rough Legged Hawk. Two large and very impressive Golden Eagles are frequently seen flying above the fourteenth and fifteenth holes. The six-foot wing span make other raptors look small in comparison. Coyotes, deer, bobcats, mountain lions, and a recently identified weasel all call the Barona Valley home. Reptiles are numerous in the grasslands and around the boulder outcroppings. Three distinct types of rattlesnakes (Southern Pacific, Western Diamondback, and Red Diamond) are also found around the Barona property. Colorful and abundant, these snakes along with numerous non-poisonous snakes help provide a natural balance to ground squirrel and gopher populations. Rattlesnakes are caught and relocated when they come into close contact with golfers. The relocation provides protection for the snake as well as the paying public.



Bird boxes have been installed throughout the golf course and perimeter of the property to further encourage nesting. A Bluebird trail has been developed around the golf course, with the hope of increasing populations. Wren and Kestrel boxes have also been installed. Spring of 2002 begins our first season of monitoring and recording nesting activity in the boxes.

INTEGRATED PEST MANAGEMENT

Barona Creek Golf Course is located in an inland valley in San Diego County. Temperatures can be extreme by San Diego standards, with Summer highs frequently over 100 degrees and Fall and Winter nights and mornings routinely falling into the mid 20's and even the teens. The Integrated Pest Management Program began with selecting the proper plant materials that tolerate the extreme swings in temperatures. 419-hybrid Bermuda was selected for tees, fairways, and greens surrounds while Bullseye Bermuda was utilized in the rough. Overfeeding with perennial ryegrass takes place in early Fall to provide desirable color and golfing conditions during the cool months. After careful research, A-4 Bentgrass was selected for use on putting surfaces. The selection has proven successful with the A-4 proving to be nearly disease free. The daily temperature swings of 40 to 50 degrees, aided by consistent prevailing winds and an environment of low humidity provides ideal growing conditions for the Bentgrass.



West Coast Turf leading west coast sod grower was contracted to grow over 90 acres of sod for Barona Creek which made it the second course in San Diego to sod all eighteen fairways.

A fertilizer injection system was also installed to aid in the IPM program. Carefully selected nutrients are applied lightly during irrigation to provide consistent color without excessive growth. Granular applications are reduced to twice per season, greatly reducing the risk of impacting groundwater. Wetting agents and supplemental calcium area also injected on a regular basis to enhance water penetration and control sodium

levels. A combination of deep infrequent irrigation along with managing the turf root zone has resulted in healthy, deep rooted turf that is more tolerant of traffic and extreme fluctuations in weather. The best known weed control is healthy dense turf!

The state-of-the-art irrigation, pumping, and weather station were also designed to be a major part of our IMP. Temperatures and water usage are recorded daily along with information from four moisture sensors installed throughout the golf course. Individual sprinkler head control allows for detailed daily adjustments based on the data retrieved. The architect designed the course to require multiple types of golf shot during the round. To achieve the desired condition requires the course to be firm and fast. Proper water techniques and professional turf management work hand in hand with the intent of the golf course. This combination provides healthy turf and ideal playing conditions.

Frequent water and seasonal soil testing is performed, recorded, and compared to ensure that our turf management program remains accurate. Nutrient modifications are made in an attempt to provide optimum soil and plant needs. Testing of water further provides data to ensure we are not impacting the local well water. The entire reservation shares the same water source, requiring that we be vigilant at all times.

Minimal pest control activity has been required since the installation of the golf course. In the event an application of a control product is required, a number of staff members are trained and licensed to apply plant-protecting materials. Seven members of the staff are licensed and received ongoing training to remain current on laws, equipment, chemicals, and spray techniques. With one Pest Control Advisory and seven Qualified Applicators on staff, Barona Creek Golf Club is well prepared if pest applications become necessary.

Integrated Pest Management is a major portion of our Natural Resource Management Plan. The intent from the earliest planning stage was to avoid problems before they develop. If and when a problem may develop, the lowest toxicity control product will be utilized. Degree-day modeling is basically performed daily throughout the year. All temperatures are recorded to determine trends and assist in developing an accurate water budget.

WATER QUALITY

Fourteen wells are located throughout the Barona Valley and are all connected by a loop pipeline system. Maintaining good water quality is mandatory since residents, the casino, and the golf course all share this valuable resource. Testing is performed regularly by both the tribe and the golf course. Test required by the Environmental Protection Agency are performed by the tribes consultant to monitor drinking water quality throughout the community, and quarterly testing is undertaken by the golf course to verify that nitrate levels remain at current low levels. Testing for pesticides is part of the EPA test performed by the tribe and is available to the golf course to review.

Barona Casino has constructed a sophisticated Wastewater Treatment Plant that provides high quality tertiary water for landscape and golf course use. Currently the plant only produces 65,000 gallons per day, but is designed to produce 750,000 gallons per day upon completion of the 400-room hotel and new casino. Estimated completion of the new facility is January 2003. A higher percentage of reclaimed water will be utilized by the golf course at that point.

A recirculating wash station was installed at the Natural Resource Management Center to eliminate water used in cleaning of equipment from leaving the site. All equipment is initially blown clean with air pressure prior to being washed. All solid matter is collected (grass clippings) prior to washing. The wash station is serviced on a regular basis to keep it performing at maximum efficiency.

WATER CONSERVATION

The irrigation system for the golf course is state-of-the-art providing maximum efficiency and flexibility. The system selected is a Toro system utilizing valve-in-head technology with computer and radio control that is connected to a Campbell Industries weather station. The control is the new site Pro E-OSMAC series with wireless paging. The control system provides central control with 64 stations managed per satellite.

Southern California in general falls under the category of a desert-like climate. Rainfall generally occurs only from November through March with an occasional storm in October or April. Water is a precious commodity due to the limited rainy season and less than ten inches of average rainfall in the overall San Diego areas. With only 90 acres of carefully selected turf, Barona Creek's water requirements are less than many courses of comparable size. To further maximize our irrigation efficiency, individual sprinkler head control was designed into the system. Our weather station and moisture sensors allow for daily adjustments to match the fluctuating temperatures. Irrigation maintenance is an everyday occurrence to guarantee sprinklers



remain properly arced. Decorative landscape grasses around tees and fairway cutout areas were irrigated during grow-in and are now able to be self-sustaining. The 140 plus acres of native grasses remain completely natural.

Barona has made an extra effort to capture all rain and runoff water, with the intent of recycling it for golf course and landscape irrigation. All parking lot and building watershed is captured and delivered to a central point. Water is then pumped into a new ten million gallon holding pond and eventually re-blended with reclaimed water for future use. Containment basins have been built in the flood control channel to assist in recharging the aquifer.

Prior to the installation of a complex well monitoring system, all wells were inspected with cameras to verify their condition. Proper pump sizing took place and a well metering system referred to as the SCADA system was installed. Like our irrigation system, the wells are monitored with sensors and the data is radioed back to a central computer system. Each well is monitored for speed of recharge throughout the season. This allows for a rotation to be established shutting each well down at specified times, allowing for maximum recharge. This system protects the health of the Barona water system. This system will prove increasingly beneficial during seasons of drought. Without adequate recharge, a well could easily be over pumped if the proper information were not available. The SCADA system is a major tool in our water conservation efforts.

ENERGY CONSERVATION

Barona Casino has been very energy conscious since its inception, winning several awards from the City of San Diego and San Diego Gas and Electric for overall energy efficiency. The golf course facilities have been designed with the same considerations. The irrigation pump house contains a state-of-the-art pumping station, equipped with numerous sensors and alarms to maintain high efficiency. All pumps are variable frequency drive to maximize efficiency. A heat sensor and fans are installed in the building to maintain consistent temperature during the heat of the summer. A skylight provides excellent lighting, reducing the need to operate the lights during the working day.

The Golf Shop was designed with large windows to maximize lighting during the workday. Outside restroom facilities have no power and function perfectly with well placed skylights providing lights.

The Natural Resource Management Center is a nearly 12,000 square foot Sprung Structure building made from a vinyl fabric. This light colored fabric provides a bright interior that is further enhanced by the positioning of the building within the yard. Facing north to south, the building receives morning and afternoon sun as well as constant airflow through the four side service doors. Ceiling fans provide further air circulation, creating comfortable conditions, even on the hottest days. Office spaces are equipped with central heating and air conditioning, but is only operated during periods of extreme heat or cold. Electric golf carts are stored in a separate facility, with all battery charging taking place in off-peak hours.



An important aspect of our energy efficiency program is the preventive maintenance program established for every piece of equipment. The In-Circuit management information system program assists us in maintaining every piece of equipment at factory recommended intervals. Properly operating equipment is more energy efficient and reduces long-term fuel costs.

WASTE MANAGEMENT

The Barona Valley Ranch project (the entire development) has been under construction for nearly three years. Upon completion of the hotel and new casino, the Landscape Manager and Golf Course Superintendent will be working toward the development of an in house composting operation. In general, the golf course produces minimal waste. All fairway and rough mowing allow clipping to remain and eventually be incorporated back into the soil. The newly planted and existing oak trees require no pruning, thus minimal debris removal is required. Overfeeding each Fall generates the largest amount of waste from the golf course. Well over half of the debris generated is spread in an open field and consumed by cattle. This serves as an efficient method of recycling, as well as reducing refuse green-waste truck trips into the valley.

NATURAL RESOURCE MANAGEMENT CENTER (NRMC)



The nearly 12,000 square foot facility was designed by the Golf Course Superintendent and his management staff. The building was de-signed to allow 360-degree access for large trucks delivering sand, compost, and other materials stored in the outside bins. The building was divided into three parts. The business end of the building consists of four offices, one of which also functions as a conference room. Equipment storage is large enough to keep all equipment under cover, with each unit parked in assigned locations. The equipment

repair portion provides for comfortable and safe conditions for three mechanics to work on preventive maintenance. The Equipment Manager's office, located in the working end of the building, is large and provides the mechanical staff with room to efficiently manage a large fleet of equipment. The wall space is utilized to show scheduling of repair and employee training status on each piece of equipment storage areas are clearly marked, identifying each part stored in inventory. The clean, safe, and efficient layout of the shop allows for professionalism and quality in all phases of Barona Creek's operation.



Clean and comfortable lunchroom, restroom, and training facilities are located in the far end of the building. The entire facility is kept spotless at all times due to efforts of the crew and the Barona Casino Housekeeping staff.

The fertilizer, chemical, tool, and accessory buildings are all separate and located outside the shop. An above-ground fuel bay storing 1000 gallons of gas and 1000 gallons of diesel is safely located away from all other facilities. Employee parking is also provided on the opposite side of the building, away from all storage areas.

OUTREACH AND EDUCATION

Outreach and education begins with keeping the Barona Creek Golf Course management team fully up to date with current education. As a Certified Golf Course Superintendent and one who has completed all of the GCSAA Environmental Management Certifications, I have a major responsibility to share the knowledge gained from seminars and the Audubon Signature Program process with my peers and the community. An existing opportunity has developed with the tribal newsletter. Beginning immediately, I will be writing a Turf Tip column for the monthly publication.

Discussing water conservation and healthy turf will provide a positive impact within the community. As a Golf Course and Sports Turf Management instructor for Cuyamaca College, I have included the important relationship of golf and the environment into the lesson plan. I am excited to provide this management approach to future superintendents. Recently, Barona Creek Golf Club in conjunction with the United States Golf Association, Southern California Golf Association, and the San Diego Golf Course Superintendents Association hosted the first Golf Course Environmental Workshop in the San Diego area. The purpose of the seminar and workshop was to assist existing courses with the steps necessary to become Audubon Sanctuary facilities. Encouraged by the turnout, we plan to make this an annual event. Thanks to the position press coverage Barona has received from Audubon Signature Certification and rankings in several golf magazines, I have been asked to be a guest speaker for numerous educational events. This will provide an opportunity to share the Barona Audubon Signature experience with local turf and landscape professionals.



Barona is blessed with a diverse plant and wildlife population. An ongoing project that will assist our efforts to respect nature, will be the development of a book showcasing the plant material and wildlife of the Barona Valley. Upon completion, this information will be displayed at the Barona Museum and in the Barona Creek golf shop and event center. Our primary goal is to educate golfers on respect of nature and protection of wildlife and plant material. Barona is also requesting permission to turn the current elementary school into a charter school. If granted, this will provide educational outreach opportunities with the tribal youth.



“Pursuing the Audubon International Signature Program certification has been a rewarding experience. I was able to complete the entire GCSAA Environmental Management Certification Program over several years and this was a great opportunity to utilize what was learned. Our staff has taken a great deal of pride in not only providing a quality golf course, but doing so in harmony with nature. Pursuing certification was something we chose to do. We worked with a beautiful piece of land and felt was important to honor the spirit of the tribal heritage by showing respect for the environment. I would highly recommend the experience to any golf course superintendent. It is a tremendous opportunity to learn and accomplish a very positive result in the process. We have all experienced a special satisfaction by achieving Signature certification.”

Sandy C. Clark, CGCS
Golf Course Superintendent

“Living in tune with nature has been an important part of our culture for hundreds of years. While planning the Barona Creek Golf Club, preserving and protecting the environment was our top priority. Having the opportunity to form a partnership with Audubon International has been an honor. We have both learned from each other. We feel we are fortunate to have the ability to learn state of the art conservation techniques from Audubon International and become one of the nation’s most respected groups on the cutting edge of this technology. The result of the relationship between Barona and Audubon is a championship golf course that has been rewarded for environmental sensitivity and which successfully conveys our tradition of living in harmony with nature.”

Clifford M. LaChappa
Chairman, Barona Band of Mission Indians

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