Green Projects Entry
The Animal Foundation (o)

Section 1 - Project Overview Information Part 1

Project name:	The Animal Foundation (o)
Project owner:	The Animal Foundation
Project address:	655 North Mojave Rd. Las Vegas, NV 89101

Section 2 - Project Overview Information Part 2

Project completion date:	8/2005 *(m/y) format*
Project Site:	Previously Developed
Project type:	kennel
Project site context/setting:	Urban
Other Building description:	New (100% new)
Lot size:	3.26 acres
Building gross floor area:	18678 ft2
BOMA floor area method used?:	yes
Number of permanent occupants:	18
Number of visitors:	2500
Occupants (hours/week/occupant):	40
Visitors (hours/week/visitor):	2
Total project cost:	$7,900,000

Section 3 - Project Overview General Description

General description: The Regional Animal Campus for the Las Vegas Valley is intended to serve the animal sheltering and adoption needs for the cities of Las Vegas, North Las Vegas, and surrounding Clark County, Nevada. The Lied Animal Shelter currently houses the sheltering functions of the City of Las Vegas as well as the adoption functions for the Animal Foundation. Driven by a need to expand its operations, The Animal Foundation is developing plans to create a regional animal campus.

The goals for the project's first phase, the dog adoption park, are to create a memorable and dignified way of presenting animals to the adopting public and to use sustainable strategies in the design of this complex, with the intention of achieving LEED platinum certification.

The dog adoption park consists of individual "dog bungalows" containing 12 kennels each, outdoor runs, and a visitation room. The bungalows are arranged in a xeriscaped park-like setting shaded with freestanding canopies supporting photovoltaic panels. The residential scaled environment is intended to strike a familiar tone with visitors and to personalize the prospective adoptive animal during the selection process.

This projected is funded almost entirely from the fund-raising efforts of the non-profit Animal Foundation.

Section 4 - Top Ten Measures

Top Ten Measure 1: Sustainable Design Intent & Innovation

Key environmental aspects: A healthy, pleasant and comfortable environment is important to visitor attitudes about adoption and the mood and health of sheltered animals. The costs of maintaining this environment, however, are exceptionally high and directly impact the scale of the Animal Foundation's operations. The goal of the design team was to minimize facility costs without affecting the quality of the adoption experience. Given southern Nevada's climate, reducing the dog bungalows' cooling load and water use were identified as the two major areas of focus for facility efficiency.

The demands of proper canine husbandry led to unexpected synergies between the health needs of the dog and solutions to the dog adoption park's energy and water use. Canines thrive in environments high in natural daylight and fresh air, however, dogs are major waste producers. Consequently, the bungalow's form and orientation are governed by the incorporation of day lighting and wind powered ventilation. The last has significantly reduces building cooling loads while, importantly for the dog, providing 100% fresh air. The greatest water use for canines is associated with waste removal. Minimizing campus water use is an onsite treatment plant recycling all campus waste water for onsite reuse.

Top Ten Measure 2: Regional/Community Design & Connectivity

Regional/Community Design: The Regional Animal Campus is located in a nondescript urban setting adjacent to an abandoned water treatment plant that was donated to the Foundation as the site of the adoption center. As the major pet adoption center and free pet clinic in Clark County, the Regional Animal Campus is one of the most heavily visited public facilities in the region. The campus plan reduced the number of existing visitor parking spaces and added carpool parking for full time staff. Although the Animal Campus is located adjacent to multiple bus lines most visitors arrive by automobile.

The iconic character of the adoption bungalows and the center's campus design has transformed the former water treatment plant's urban void and established a local identity unique to the facility and the neighborhood. The campus approach as well, enables the facility to handle large volumes of visitors in a comfortable and un-crowded manner with exterior public circulation and kennel viewing walks shaded by a combination of roof overhangs and freestanding photovoltaic canopies bringing life to the previous void of the treatment plant. Further enlivening the campus, visitors are encouraged to bond with prospective pets on familiarization walks on campus grounds.

Use other transport options:	5%
Parking spaces per person:	0.50

Top Ten Measure 3: Land Use & Site Ecology

Site ecology: The design of the dog adoption park restores much of the local ecology of the site.

Located in a mixed use portion of Las Vegas, the site included an abandoned water treatment plant. While the plant's above ground structures had been removed, concrete treatment tanks remained. As part of the project, these concrete remains were

pulverized for onsite reuse as structural fill. The removal of the abandoned structures and subsequent fill restored much of the site's natural percolation rates.

The dog adoption park's landscape design is xeriscaped to be appropriate to Las Vegas annual rainfall. Ground cover is a mix of locally harvested crushed rock and restored native soils. Plant selections are primarily native to southern Nevada. All plant selections are tolerant of the severe drought conditions currently found in the southwest. The landscape is developed without an irrigation system and will reach maturity in ten years.

Every effort was made to minimize heat islands through the use of high albedo hardscape. In southern Nevada urban heat buildup affects outdoor comfort and safety during summer months. In lieu of non-native water consuming large plants, shade is created by the bungalows overhangs and the parasol like photovoltaic canopies.

Top Ten Measure 4: Bioclimatic Design

Bioclimatic design:

The dog adoption park bungalows' massing and orientation were derived from strategies to harvest the site's annual light and wind conditions. With an excess of 300 sunny days per year, natural light is abundant in the region and provided that measures are taken to minimize solar heat gain day lighting is a reliable resource. Annual wind patterns primarily have two seasonal variations: winter, with intermittent winds predominantly from the NW, and summer, with frequent hot/dry winds predominantly from the SW.

Individual bungalows are organized in narrow blocks oriented east/west. Large windows on the north and south facades in combination with the narrow section allow for day lighting of the entire bungalow. Deep overhangs shade south facing windows throughout the year preventing glare and excess heat buildup. The bungalows' orientation prevents early morning and late afternoon summer light penetration while allowing direct winter morning and evening light for additional warming of the minimally heated structure.

The bungalows' form, distinctive towers and airfoil result from the site's wind conditions. The bungalows' angled roofs shelter the dog runs and viewing walks while the uplift added to the wind immediately above the bungalows increases the efficiency of the chimneys.

Top Ten Measure 5: Light & Air

Light & Air:

The bungalows are naturally lit with make-up lighting by high efficiency fluorescent fixtures. Light levels are controlled by photocells to maintain minimum light levels set by the local health department code.

The bungalows' narrow section and large windows create a visual connection between the interior and exterior allowing prospective adopters to view animals from the outside with minimal disruption to the animals themselves.

The bungalows are cooled/ventilated in the summer with 100% outside air via indirect evaporative coolers. Air is distributed at 24" above the floor and then drawn out of the building at roof level through the wind tower. No air is recirculated to other portions of the building.

The bungalows are passively ventilated during temperate periods with sensor controlled operable louvers installed at floor level. There are permanent openings at each dog

kennel and permanent openings in the wind tower.

The bungalows are minimally heated. The concrete slab in the kennels is heated with electric cables to provide a 80F slab temperature for the dogs' comfort.

During the cooling season when indirect evaporative cooling is in effect it is anticipated that indoor CO2 levels will match outdoor levels. During temperate seasons CO2 levels will not exceed 500ppm.

Percent of building area that is daylit:	100%
Percent of building that can be ventilated or cooled with operable windows :	90%

Top Ten Measure 6: Water Cycle

Water Cycle:	Of the animals served by the Foundation, canines are the most significant species in terms of water demands and waste production. In support of the Foundation's mandate to minimize the environmental impact of the project, an on-site water reclamation system (The Living Machine) that recycles and provides the water source for the non-potable water system reclaims up to 22,000 gallons of water per day. Each kennel building is served by 4 potable and 6 non-potable hose bibs. The kennel drains and effluent tracks feed back to the reclamation system. The potable water hose bibs are used to provide drinking water for animals. The non-potable bibs are used to provide all kennel wash down. The landscape is appropriate to the region's annual precipitation and incorporates no irrigation system. The plants that comprise this xeriscape are regionally adapted and severe drought tolerant. Pervious ground cover is used on all non-hardscape areas and any on-site and roof runoff is filtered and directed to the treatment system.

Precipitation managed on site:	100%
Total water used indoors:	10252400 gal/yr
Total water used outdoors:	0 gal/yr
Percent of total water from reclaimed sources:	78%
Percent wastewater reused on-site:	100%
Calculated annual potable water use:	549 gal/sf/yr

Top Ten Measure 7: Energy Flows & Energy Future

Energy description:

The green strategies incorporated in the design of the bungalows allow the dog adoption park to operate at a 81% reduction from baseline energy models. This reduction is the result of the incorporation of passive cooling, day lighting, use of photovoltaics, and sensor control of artificial lighting and ventilation systems.

The efficiency of the passive cooling system made it possible to construct the project without a mechanical chiller based HVAC system. This single design decision has had the greatest impact on the project's energy use reduction and ensures that the bungalows will operate at minimal energy loads during peak demand hours. In the event of a blackout, the cooling system which is driven by the wind, will continue to operate without interruption. Building sensors monitor both temperature and CO2 buildup. These sensors control the intake and exhaust louvers to maintain a healthy and

comfortable environment within the bungalow.

The bungalows are day lit and immune to power blackouts. Artificial lighting, used to maintain minimal health district standards, is controlled by photocells to govern that indoor lighting is not on at inappropriate times. Fixtures incorporate high efficiency fluorescent lamps for low energy consumption.

In conjunction with energy efficiency strategies the dog adoption park incorporates a photovoltaic system that provides 28% of the Animal Foundation's energy load. This will work in conjunction with a planned wind turbine farm to be completed in 2006 that will provide a further 30% of the Foundation's energy demands.

Performance Rating

EPA	
HERS	
Percent total energy savings	81

	Base Case	Design Case
Total energy (Btu/sf/yr)	192286	35999
Electricity (Btu/sf/yr)	77140	35999
Natural gas (Btu/sf/yr)	115165	0
Other: (Btu/sf/yr)	0	0
Heating (Btu/sf/yr)	106637	3334
Cooling (Btu/sf/yr)	24623	0
Cooling capacity (sf/ton)	129	
Lighting load connected (W/sf)	19814	19814
Lighting load after controls (W/sf)		0
Plug load (W/sf)		0
Peak electricity demand (W/sf)		
Percent on-site renewable energy (%)		28
Percent grid-supplied renewable energy (%)		0

Supplemental Narrative

DOE 2.2 -eQuest Simulation Program

Top Ten Measure 8: Materials & Construction

Materials description: The small scale and minimal materials palette of the dog adoption park and bungalows influenced the design team's approach to materials selection and construction methods. Where possible, selections were made that allowed for either high recycled content or greater renewability.

By weight and volume, structural fill accounted for a significant percentage of this project's construction material. Rather than importing soils, the abandoned remains of the water treatment plant were diverted from being exported to the County's construction waste landfill and were processed onsite and reused as the project's structural fill.

The bungalows themselves are wood framed buildings with stud wall infill. The project's wood specification specified wood from FSC certified sources in accordance with the project's LEED

platinum goals.

Finish materials for the project require no paint.

Top Ten Measure 9: Long Life, Loose Fit

Long life, loose fit: The projected need for animal sheltering in the Las Vegas Valley assures that the project will be used for its intended purpose for the forseeable future. Given the project's reliance on passive building systems, durability of construction materials, and the simplicity of mechanical systems, the dog adoption bungalows should prove to be in use at the end of this century.

In the unlikely event that the site is redeveloped, the bungalows will prove to be easily recycled. In addition to the wood structure, major cladding materials are either ferrous metals or aluminum. Strong recycling streams are currently established in Las Vegas for these products.

Day lighting the bungalows led to the reduction of the project's built square footage. This reduction was possible as a synergy evolved between the effective use of natural light, the bungalow section, and the use of exterior circulation. The narrow bungalow section necessary for effective lighting allowed for kennels to be adjacent to external glazing and subsequently viewable from the outside minimizing the need for interior circulation. This synergy ultimately led to a smaller structure capable of handling large volumes of visitors while providing a less stressful environment for the dog.

Top Ten Measure 10: Collective Wisdom & Feedback Loops

Collective Wisdom & Feedback Loops: Sustainable design is new to the Las Vegas Valley and, at the time the design of this project was begun, the topic was just gaining awareness in the region's design community. A serendipitous encounter shaped the future direction of the design when the project designer and architect for the Animal Foundation attended a school facilities presentation on energy efficient design and met the individuals who would ultimately become the project's ecological and sustainable consultant. What was particularly inspiring to the architects was the engineer's presentation of traditional wind powered cooling methods from the middle-east and the Asian sub-continent. This chance encounter evolved into the adoption bungalow's iconic form and cooling method, grounding the project into an older and worldwide knowledge base.

The project is being commissioned according to LEED guidelines.

Section 5 - Project Economics

Finance: As the Animal Foundation is a non-profit organization establishing alternative funding streams was essential to realize the goals of this project.

To support the cost of photovoltaic and wind turbine systems the Animal Foundation pursued and received a Department of Energy Award for Renewable Energy and a billing rebate from Nevada Power, the local electric utility. The combined total for these awards was $420,000.

Seeking to support its operations, the Animal Foundation is pursuing branding partnerships for individual bungalows. In support of this, the external cladding of the bungalows is

designed to support the application of supergraphics similar to those seen on public buses. Guidelines for branding graphics have been established and will be appropriate to the nature of the dog adoption park and the mission of the Foundation. The success of this form of marketing, architectural imaging, is particularly strong in Las Vegas and will prove to be a major source of revenue for the adoption park.

Cost and payback analysis: The only unforseen cost in the project involved the remains of the water treatment plant. Following the abandonment of the plant the in-ground concrete structures had been buried and were not visible. The structures were discovered during test borings and it was estimated that the excavation and removal to the construction waste landfill would cost in excess of one million dollars. Working with building officials from the City of Las Vegas a modified structural fill incorporating the pulverized remains of the plant was approved. The tanks were then pulverized in-place and reused onsite. This led to cost reductions throughout the project as construction waste was minimized as well as the need for the purchase and importation of fill.

The cost of renewable energy systems was offset by the grants from the DOE and Nevada Power. As most green measures have resulted in the construction of less complex systems and costly structures the payback period for the project will be less than five years. The investment return of the Living Machine treatment system has at this time not been calculated as water rates in the region are expected to change as the drought in the southwest worsens.

Section 6 - Process and Results

PreDesign: From the outset, the non-profit status of the Animal Foundation had an impact on the design team's efforts. A long time supporter of the Animal Foundation, the architect for this project also assumed a leadership position in support of the Foundation's fundraising for this project.

The Foundation's goals for the project exceeded their available budget and contingency strategies were developed where green measures could be phased-in over the course of time. This resulted in the design of a dual infrastructure. One, a conventional system tied into the campus' existing non-renewable infrastructure, and a second system supporting renewable energy. Concurrently, the design team spearheaded successful grant applications to afford renewable energy sources. The success of these efforts led to the construction of the green energy systems at the time of construction of the bungalows.

Design: At the time the design of the dog adoption park was begun, the City of Las Vegas' building code did not allow design methods and material uses considered essential to green building. As this project was the first green project within the City's jurisdiction and on City property, it became an opportunity for the design team to partner with city building officials to develop codes and acceptable construction methods to enable LEED certification and other green inspired projects. This was a dynamic process and continued throughout design and construction. As a result, City of Las Vegas building codes now provide a cogent framework for the review and approval of subsequent green buildings.

Environmental modeling was an essential tool during the design process. The design team relied heavily on Ecotec, an environmental program that is used to calculate day lighting, internal room comfort, building insolation, and the impact of building site massing on thermal performance. The building form and wind tower design were further modeled using aerodynamics software to ensure the efficiency of the passive cooling system.

Construction Process:

Operations/maintenance:

Commissioning:

Measurement & verification/
post-occupancy evaluation:

Rating System Name:
Version:
Rating Date:
Score or rating level:
Credits:

Sections 7: Visuals

Exhibit A

Site-Context.jpg

Image has been scaled down. Click it to view actual size...

Description: Aerial image of the urban context. Significant adjacenies include mixed income housing to the west, a public park to the northeast, the fire training center directly south, and mixed industrial.

Exhibit B

Site-Plan.jpg

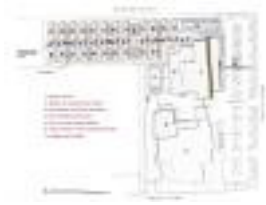

Image has been scaled down. Click it to view actual size...

Description: Project Site Plan

Exhibit C

Bungalow-Plan.jpg

Image has been scaled down. Click it to view actual size...

Description: Dog Bungalow Plan

Exhibit D

Bungalow-Section.jpg

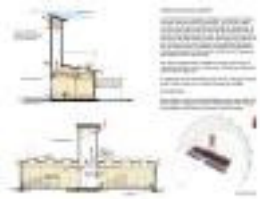

Image has been scaled down. Click it to view actual size...

Description: Dog Adoption Bungalow Section

Exhibit E

Animal-Foundation-1.jpg

Image has been scaled down. Click it to view actual size...

Description: Dog Adoption Bungalow South Porch

Exhibit F

Animal-Foundation-2.jpg

Image has been scaled down. Click it to view actual size...

Description: Exterior view of dog adoption park circulation

Exhibit G

Animal-Foundation-3.jpg

Image has been scaled down. Click it to view actual size...

Description: Cooling tower detail as seen from west

Exhibit H

Animal-Foundation-4.jpg

Image has been scaled down. Click it to view actual size...

Description: Interior view of kennel

Exhibit I

Animal-Foundation-5.jpg 

Image has been scaled down. Click it to view actual size...

Description: Detail views of wind towers

Exhibit J

Animal-Foundation-6.jpg 

Image has been scaled down. Click it to view actual size...

Description: Exterior view of dog kennels and wash down drain. All wash down water is directed to the on site treatment plant