RICE UNIVERSITY

Dovetail Ranch at Ajo Valley

by

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Planned communities are inevitably criticized for such failings as creating forced and thus inherently false modes of social interaction, rigid rules and regulations dictating not only the structure, but the dull and repetitive aesthetics, as well as the environmentally insensitive sprawl that is created from inefficient land use planning.

Despite these criticisms, most planned communities excel as models of financial and even social success. The same strict system of rules and regulations set up by homeowners associations that create monotonous suburban landscapes are what help maintain consistently high property values. Cul-de-sac street designs and inward facing architecture prohibit community wide social interaction, but also provide enclave type atmospheres that promote the sense of identity that people associate with living in a planned community.

Edges are the conscious and unconscious reminders of providing distinctions between property lines, public and private areas, where one discerns the difference between the man-made and "natural". Typical developments have a simple language of abutments to convey these edge conditions. Dovetail is an attempt to expand this language to exploit the possibilities of combining the elemental factors (landscape, the built form, and circulation) that make up these developments, to develop a new prototype of residential living.
Coming soon! A new fly-in community for retired soaring enthusiasts that integrates private living with a public lifestyle, incorporates the desert environment with built form, and dovetails your passion for flight with your passion for living. Experience a new way of life in an architecturally designed planned community and come see all that Dovetail has to offer.
This thesis is dedicated to

-My family, who so graciously forgave my apparitional status
-My friends, the golden girls, who I can’t begin to thank enough
-My committee, who bore such patience for my methods of working

"On a wing and a prayer" - it still holds true
<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>THE PLANES</td>
<td></td>
</tr>
<tr>
<td>DEFINITION</td>
<td>4</td>
</tr>
<tr>
<td>DIMENSIONS</td>
<td>6</td>
</tr>
<tr>
<td>STORAGE</td>
<td>7</td>
</tr>
<tr>
<td>GROUND MOVEMENT</td>
<td>8</td>
</tr>
<tr>
<td>AIR MOVEMENT</td>
<td>9</td>
</tr>
<tr>
<td>THERMALS</td>
<td>11</td>
</tr>
<tr>
<td>FLY-IN COMMUNITIES</td>
<td>14</td>
</tr>
<tr>
<td>THE ENVIRONS</td>
<td></td>
</tr>
<tr>
<td>AJO + WHY</td>
<td>18</td>
</tr>
<tr>
<td>WEATHER</td>
<td>22</td>
</tr>
<tr>
<td>HYDROLOGY</td>
<td>25</td>
</tr>
<tr>
<td>DIRECTIONALITY</td>
<td>26</td>
</tr>
<tr>
<td>TOPOGRAPHY</td>
<td>27</td>
</tr>
<tr>
<td>GEOLOGY</td>
<td>28</td>
</tr>
<tr>
<td>NATIVE VEGETATION</td>
<td>29</td>
</tr>
<tr>
<td>THE LIFESTYLE</td>
<td></td>
</tr>
<tr>
<td>THE PITCH</td>
<td>31</td>
</tr>
<tr>
<td>CODING/ANALYSIS</td>
<td>33</td>
</tr>
<tr>
<td>SITE PLAN</td>
<td>39</td>
</tr>
<tr>
<td>SECTIONING</td>
<td>41</td>
</tr>
<tr>
<td>APPROVED PLANTING / MAINTAINED</td>
<td>46</td>
</tr>
<tr>
<td>INTERIOR</td>
<td>48</td>
</tr>
<tr>
<td>PLANS</td>
<td>50</td>
</tr>
<tr>
<td>RENDERINGS</td>
<td>56</td>
</tr>
<tr>
<td>SOURCES</td>
<td>60</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>61</td>
</tr>
</tbody>
</table>
The word “community” is an idea that appeals to many people seeking a way of life consistent with childhood memories or idealistic desires. Community represents a cohesive environment where everybody knows everybody else, where crime is a rarity, where there is pride in one’s sense of place. People are looking for a community that can give them some sense of identity culturally and environmentally. Despite character-rich downtown centers and neighborhoods within the city, not everyone finds these desirable places to live. The housing stock is older (prone to expensive repairs), they have crime, and property values and community character can’t be guaranteed as these neighborhoods naturally evolve.

A niche has been filled by developers who have attempted to formulate a solution to the demands of the consumer. They try to accelerate the process of creating the idealistic townships by designing and carrying out a community all at once. They are complete with some sort of public realm, open spaces, a variety of housing types and all focus upon some sort of grand amenity, such as a golf-course or lake (or both). These are usually situated on the perimeter of a city rather than in-fill the city center because of cheaper land costs, etc.

The southwestern desert has always drawn people to it’s leisurely lifestyle. The twentieth century introduced sanatoriums which were built for tuberculosis sufferers who claimed healthful benefits to the dry, arid, and relatively allergen-free climate. The restful sanatoriums gave way to equally relaxing resorts and spas, and today the desert has become a prime retirement destination. Del Webb recognized how he could fill the niche market in the 1970’s when he introduced Sun City; labyrinthine circles of neighborhoods complete with clubhouses and golf course. However, these developments only cater to a generalized strata of society and much more can be done to market towards groups of people with more specialized interests.

The same dry air that claimed curative benefits also touts preventative qualities, although in a more mechanical than biologic way. AMARC, Aviation Maintenance and Regeneration Center, exists as a virtual “graveyard” of airplanes stored in the desert southwest of Tucson, Arizona precisely because the dry air prevents rust or corrosion.

These perfectly preserved planes do not want to stay bound to the earth
when the ground begins to warm. The solar influence upon the land raises the hot, dry air to new heights, begging soarplanes to rise up with them.

One of the beneficial aspects of becoming a soarplane pilot, is the fact that one does not have to be continually re-certified to maintain licensure. What this means, is that there is no retirement age forced upon these pilots, and they can continue to fly as long as they are physically able.

Ajo, Arizona combines the best of what one is looking for when one is looking to live in the desert. The landscape, both on the ground and in the air, is a prime location to create a new prototype of a planned community.
A sailplane is an airplane specifically designed for sustained flight without use of a motor. It has the same basic controls as an airplane and will take off, fly and land under full control of the pilot.
Typically constructed of fiberglass or carbon fiber with long wings and highly polished surfaces, sailplanes are aerodynamically very efficient. Pure sailplanes are launched by winch or behind a tow plane while motorgliders have engines for launch. A sailplane stays in the air by climbing in rising columns of hot air called 'thermals', or by flying in the wind flowing up and over mountains. In good conditions, a sailplane can fly all day and travel hundreds of miles without landing.
Sailplane dimensions must be carefully considered in the aid of residential or hangar design. Wingspans vary from 50 to 100 feet depending upon the type of aircraft desired.
These standard sized T-hangers are typically designed for small single-engine aircraft. Sailplane hangars must be doubled in width, or the aircraft may be dismantled and stored in portable trailers.
Glider Ground Handling and Parking

It is very easy to damage a glider by moving it in and out of the hangar. Because of their light construction, gliders are always at the wingtips and cockpit area and the airfoils or at the wheels. Therefore, the ground handling details below are to be followed.

Ground Towing

When towing gliders by vehicle the tow rope should be tied at the wingtip and cockpit area and the airfoils or at the wheels to be stationed at the nose of the glider. If towing in strong downwind conditions, control surfaces must be rigidly and rudder-control used.

Ground surface

The ground clearance on some gliders is very small and the towing of a hand surface should be lifted not lifted so high as to cause the nose section or the run.

Moving Gliders by Hand

The leading edges of glider wings are generally robust and normally not moved backwards. Under no circumstances should the rear of the fuselage during such operations as to precaution result in damage. Care must be taken to reduce the pressure on the wing tips when moving gliders.

Wingtip Holder

Unless a tailpod trolley is being used, the wingtip holder must be firmly held in the hands of the person responsible for towing the glider at all times when it is being moved. This will ensure that the person responsible is not injured if the wing tips are not properly controlled.

Speed

Whether being moved by vehicle or by hand, the maximum speed of a glider is not to exceed walking pace.

Strong Wind Conditions

When moving gliders in strong wind conditions they are to be double-manned, except at the wingtip. Club members sitting in the cockpit as ballast are to be properly strapped in and should keep their hands and feet on the controls to prevent control slaming across. Glider canopies are to be properly manned if removed or opened.

HANDLING OF AIRCRAFT

Circulation systems must be considered when transporting the planes from hangar to runway. The planes are quite lightweight (only averaging only 600 lbs) so they are easily maneuvered by hand or with the aid of a small tractor or motorized cart.
A GPS tracking system installed on a glider maps out a typical flight path. Loops indicate where a thermal was found by a pilot who used it to gain greater altitude. Depending on conditions a glider may travel 20 minutes after release to lasting several hours in the air.
Distances travelled and time invested in various transportation methods. Speed is determined, in combination, the planes glide ratio, as well as the velocity of the winds currents.
Ajo's broad treeless expanse of desert, combined with low-lying mountains, provides the three main types of thermal lift soarplane pilots are in need of.
LIFT TO RIGHT: THERMAL LIFT, RIDGE LIFT, AND CUMULUS CLOUDS
The physical manifestations of the meteorological phenomenon are more akin to how pilots read the landscape. They are a direct visual supplement to weather reports that are generalized over greater expanses of land.
As general aviation and commercial airports are becoming more crowded and adopting more restrictive security measures, the concept of “living with your plane” has become increasingly popular. The freedoms associated with these communities has spurred the growth of more than 450 of them in the U.S. (17 in Arizona) although none on record are devoted exclusively to motorless flight.
Stellar Airpark is located in a pre-existing suburban area in the midst of the city. The circulation systems of airplane and car are kept as separate paths. Sky Ranch Airpark, located on the outskirts of Scottsdale, was designed with shared circulation systems before the FAA ruled against such designs.
The thought given to the integration of plane and house is reflected in many pre-existing house plans on the market today. The exteriors strive to coexist with traditional market-driven homes. Very little can be read from the facade about just how much square footage is devoted to its storage capacity.
Ajo - A small charming town situated deep in the Sonoran Desert is just 43 miles north of the Mexican border. Residents and visitors alike enjoy low humidity, year round blue skies and pure air. The old Spanish style plaza affords a pleasant stroll and shopping with many additional businesses and services in the north end of town. At the end of your day you will be enchanted by the magnificent sunsets.
Ajo + Why
Municipal Airport
Golf Course
Windowpane Observatory
Three area hotels
Supermarket
Gas station
New Cornelia Branch Hospital

Environ
Organ Pipe Cactus National Monument
Cabeza Prieta National Wildlife Refuge
Rocky Point beach just an hour away
2 hour scenic drive to Tucson
1 1/2 hour drive to downtown Phoenix

Two hours away by car from Phoenix, or two and a half hours from Tucson, Ajo is one of Arizona's best kept secrets. Once you spend time in Ajo, you discover great people living in a great place. The giving, caring spirit that you encounter here is genuine. From the level of trust to the multi-ethnic, multi-cultural feelings you see and experience, what more people are coming to know.
Ajo, the birthplace of copper mining in Arizona, has a rich history dating back over 150 years. Today it is a popular tourist destination and retirement mecca offering an affordable lifestyle. Located in western Pima County, this ethnically diverse town is on State Highway 85, north of the junction with State Highway 86 and south of I-8. Ajo, at an elevation of 1,798 feet, is unincorporated. Mountains and the Sonoran desert surround the region.
Many of the residents of Why, Arizona are retired mine workers from the Phelps Dodge mine in Ajo. The majority of the population resides in Coyote Howls RV Campground which utilizes the native vegetation to demarcate property lines.
The average daily temperature is only around 83 degrees, making it comfortable for the inhabitants, yet still ideal for soarplanes to find the thermals caused by radiant heat from the earth. However, it is not uncommon for the temperature to rise above 100 degrees, so design considerations must utilize shading as much as possible.
For the majority of the year, the winds flow in a generally northwesterly direction, but during the summer "monsoon months" the winds flip direction, bringing heavy rains and strong winds. The wind direction determines the placement and orientation of the runway for flight safety in takeoff and landing.
The majority of the rains that fall to the earth are not easily absorbed by the earth. Water runoff cuts small arroyos, small washes, to continue the waters southerly flow. Although only a relatively small amount of water is measured in each rainfall, flash flooding is a problem because of the accumulation of runoff on the ground.
Water is a hot topic in Ajo. The municipal water is pumped from a deep volcanic source which maintains the water at a hot 106°F. The temperature of the water drops somewhat during the trip from the well to the treatment plant and then to the consumers, however during the summer months, the water temperature at the shower head is over 90°, allowing us to turn off the water heater for many weeks.
The towns of Ajo and Why exist in a virtual island of public land. The valley is surrounded by Organ Pipe National Monument, the Tohono O'odham Indian Reservation, and the Barry Goldwater Air Force Range. The primary topography is a blend of washes, arroyos, and mountain ranges.
A Cu-Ag-Au, silica, feldspar, mica (Mo-Zn) mining area located in T.12 -13S., R.6-7W., in the Little Ajo Mountains and Chico Shuni Hills. Workings include predominantly open pit mining operations. Small, irregular production of high-grade, oxidized copper ore occurred from about 1854 to 1917 and almost continuously thereafter from the open pit operations. Total production through 1972 would amount to some 350,000,000 tons of ore containing about 2,800,000 tons of Cu, 19,000,000 oz. of silver, and 1,550,000 oz. of gold. Considerable silica flux and some feldspar and scrap mica were also produced.17
Along with the giant symbol of the American Southwest, the saguaro cactus, there are more than 50 types of cacti, including hedgehog, barrel, prickly pear, fishhook, cholla, and teddybear. Only the Sonoran Desert can boast to have tree-sized cacti, and desert plants that grow tall and densely enough in places to be called a forest. Jojoba and palo verde trees are also found among the cacti. Dryer portions of the Sonoran Desert are inhabited by the creosote bush and mixed scrub, with many plants being able to tolerate silty or salty soils. It is considered one of the most biologically diverse deserts in the world, and often referred to as a "garden desert". Here, one can find more than 600 plant species, 200 of which are annuals (mostly wildflowers). Peak flowering time for most annuals and perennials is from March to early April.
You've worked hard for your retirement and now is the time to be good to yourself. Arizona is one of the top destinations for those seeking a resort lifestyle. Live the active retirement lifestyle you've been dreaming about. Our communities feature beautiful homes with private hangars, paved runway, tennis, swimming, fitness, entertainment and volunteer pursuits. These activities are the foundation for new friendships and camaraderie with people just like you.

The gorgeous multi-million dollar Dovetail Ranch community is the hub for social and recreational activities. Beautiful stone work, rich leathers, dark woods and impressive art set the stage in this striking clubhouse, a place you'll be proud to share with family and friends. Here, you'll forge new friendships as you meet your fellow neighbors while enjoying the outstanding amenities. Imagine yourself sunning by the pool, exploring new interests in the library, enjoying a beautiful dinner, working out in the state of the art fitness center or having the freedom to fly from your private airstrip. This is the place to share good times with good friends.
Residences

20 permanent residences (integrated hangar home)
- 5 four-bedroom/3bath/2 car garage
- 5 three-bedroom/2bath/2 car garage
- 10 two-bedroom/2bath/2 car garage

30 "Snowbird" semi-permanent residences (condominium hangar storage)
- 15 two-bedroom/2bath/carport
- 15 one-bedroom/1.5 bath/carport

3 visitor casitas (on-site hangar moorage)
- all one-bedroom/1bath/carport

As all planned communities use amenities to define their own identity and lifestyle, so too does Dovetail try to integrate them too. It is a danger having a retirement community isolate itself in proximity to other communities, so efforts have been made to have it cater both to the privacy of the residents, as well as being open to visitors. Dovetail Ranch offers its services to the driving and the flying public by offering a training center and limited short term living facilities.
The initial approach before any design could begin, was to analyze a pre-existing fly-in community plan. The analysis consisted of color coding the various elemental aspects of what made up these communities. Hardscape versus softscape looks at the surfaces that are either manipulated with additional materials such as asphalt or concrete, or left in as natural a state as is visually described, such as planting or earthscaping. Public areas versus private spaces begin to show what areas are socially acceptable to inhabit and also begins to question the idea of ownership. The pedestrian, vehicular, and plane circulation paths become circuitous elements that either cross, or remain separate entities to allow for various types of movement.

Once these aspects were identified and color coded, an additional diagram was created where only a strip is analyzed to see what exists, and then what has the potential to exist.

The last step was to apply the color coded system to the physical site keeping in mind the context of the environmental factors that defined it. Directionality of flow of water, wind, and roadway were interrelated with the parceling of the site. Boundaries of ownership were softened, with property lines penetrating into others in visible and invisible ways with landscaping becoming the primary identifier.
Sectionally, the site begins to explore the dimensionality of the circulation systems. Sub-ground level is reserved for the containment of water, a highly desirable element that is necessary in a desert environment. It both acts as a natural "swamp cooler" and as a psychological comfort. Ground level is reserved for pedestrian and vehicular travel with the path paralleling one another and only occasionally crossing. Above ground circulation is devoted to the storage, viewing, and passage of the airplanes on the property. Low levels become shaded and cooled with residential views concentrating on the landscape. From this level, openings reveal and emphasize the environmental factors that pilots use to read the landscape so they can determine what flying conditions exist at that point in time.

"... a sailplane pilot, if he’s a good one, takes the sky personally...the cottony cloud tops that speak of thermals. The smoothly curved lenticular clouds, high to the lee of mountains, telling, with their eerily stacked shelf fungus, of waves. Circling birds. Drifting smoke." (Gannon, 96)

Views of the planes are limited at this elevation, so as to keep a reverential attitude toward their purpose. Glimpses can be had, but total views are reserved for when one ascends to the planes domain. There, all becomes revealed which is related to flight, and all that is domestic and grounded becomes hidden.
Mexican Feather Grass

- Very fine blades (foliage) make this plant give a very "soft" visual texture, and plants sway and undulate wonderfully in the wind, bringing movement to the garden.
- Re-seeds itself readily, and seedling are easily transplanted if done in cool season and while soil is moist. Can be a little invasive (too many seedlings).
- Sun loving, tolerant of poor soils, low water user but needs some irrigation.²³

Creosote Bush

- Scent - the aromatic oils are released into the air after coming into contact with water from the rains
SHADE TOLERANT PLANTING: ALOE VER, CREEPING PIG, AND DICHONDRA
Can we see thermals?

First, one must define “see”. I would define it as the interpretation of the pattern of “visible” light rays emanating from the phenomenon or the effects of the phenomenon. In this sense, we do “see” thermals by interpreting the patterns of light coming from the effects of them, such as clouds, refraction of light, uplifting of debris, etc. This is not inconsistent with “seeing” an image in a mirror, which is not where it seems to be or “seeing” a shadow, which is the absence of reflected light.24
The characteristics of the vegetation are very informative in allowing one to read the qualities of the atmosphere. By placing openings and plantings in select locations, one is able to quickly receive a visual gauge of the atmospheric conditions without being distracted by additional stimuli.
The views rendered in the following images belie the intentions, and calls to question the idea of living with a plane, on the same plane. When one is confronted with the beauty of the form on a consistent, recurring basis, one becomes immune to its qualities. It is only when it becomes a separate entity, when one is teased with glimpses, does it maintain a sense of surprise when caught. The final image confronts the viewer with the feeling of the expansiveness of the desert and its sky. Although one does not immediately see the physicalness of the airplane, the senses still delight in the anticipation of the freedom of flight.
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