Disclaimer: The information in this report is intended as guidance for the Ki:Ki Association and Gu Achi District in informing decisions related to this project. The research, design process, and recommendations were achieved to the best knowledge and judgment of the Drachman Institute staff, students, and faculty, and is subject to verification by the Tohono O’odham Ki:Ki Association (TOKA) and the Gu Achi District or other parties prior to implementation of any action.

The Drachman Institute is a research and public service unit of the College of Architecture and Landscape Architecture at the University of Arizona, dedicated to the environmentally sensitive and resource-conscious development of neighborhoods and communities. The Drachman Institute dedicates its research and outreach activities to the proposition that housing is the building-block of neighborhoods, and neighborhoods are the building-blocks of communities.

Drachman Institute
R. Brooks Jeffrey, Director
Marilyn Robinson, Associate Director
Peter McBride, Architecture Research Coordinator
Amy Wood, Graduate Student - Landscape Architecture
Colleen Cummings, Undergraduate Student - Architecture

Architecture Students - ARCA02:
Colleen Cummings
Heidi Grimwood
Gerardo E Valenzuela Gutierrez
Amanda Spear
Karie Westfall

Tohono O’odham Ki:Ki Association
Renee Reddog, Director
Alton Antone, Project Coordinator
Darrell Juan, Development Manager
Laurie Suter, Environmental Compliance Specialist

Arizona Department of Housing (ADOH)
Karia Lee Basta, Technical Assistance Coordinator

September 2009
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>6</td>
</tr>
<tr>
<td>Historical/Cultural Research on the Tohono O’odham</td>
<td>9</td>
</tr>
<tr>
<td>History</td>
<td>10</td>
</tr>
<tr>
<td>Culture &amp; Traditions</td>
<td>12</td>
</tr>
<tr>
<td>Demographics</td>
<td>16</td>
</tr>
<tr>
<td>Architecture</td>
<td>18</td>
</tr>
<tr>
<td>Sources</td>
<td>24</td>
</tr>
<tr>
<td>Site Introduction and Analysis</td>
<td>27</td>
</tr>
<tr>
<td>Introduction</td>
<td>27</td>
</tr>
<tr>
<td>Analysis</td>
<td>28</td>
</tr>
<tr>
<td>Constraints Map</td>
<td>36</td>
</tr>
<tr>
<td>Housing Concepts</td>
<td>39</td>
</tr>
<tr>
<td>Multi-Family Houses</td>
<td>40</td>
</tr>
<tr>
<td>Single-Family Houses</td>
<td>42</td>
</tr>
<tr>
<td>Site Concepts</td>
<td>47</td>
</tr>
<tr>
<td>Preliminary Concepts</td>
<td>48</td>
</tr>
<tr>
<td>Overall Master Plan</td>
<td>50</td>
</tr>
<tr>
<td>Phase 1</td>
<td>52</td>
</tr>
<tr>
<td>Phase 2</td>
<td>53</td>
</tr>
<tr>
<td>Site Perspectives</td>
<td>54</td>
</tr>
</tbody>
</table>
Established in 1996, the Tohono O’odham Ki:Ki Association (TOKA) is the Tribally Designated Housing Entity (TDHE) of the Tohono O’odham Nation and is responsible for the development of affordable housing in accordance with the Native American Housing and Self Determination Act (NAHASDA). TOKA requested that the Drachman Institute - through a technical assistance grant from the Arizona Department of Housing (ADOH) - provide master planning and design for a 640-acre site in the Gu Achi District.

The Drachman Institute, through site analysis and research, developed a constraints plan that helped to define land within this site that was suitable for development. Through the constraints map and coordination with TOKA, the Drachman Institute developed a multi-phase Master Plan site concept that included single-family and multi-family housing. The primary focus of this plan is the provision of 80 affordable home sites. To support the housing community, other amenities such as commercial development, a community center and recreation area, public service facilities, and water supply and waste water treatment facilities have been incorporated.

Additionally, Peter McBride and Corky Poster (former Director of the Drachman Institute) led five 4th-year professional architecture students in an intensive four-week design studio project at the University of Arizona School of Architecture (ARC402 class) in the spring of 2009. Through the class, students developed different housing designs for both multi-family and single-family units. These housing designs were presented to staff from TOKA and will be used to demonstrate how affordable housing can be culturally and environmentally responsive and meet the needs of members of the Gu Achi District and the Tohono O’odham Nation who live in the beautiful Sonoran Desert.

This document presents the housing designs and the Master Site Plan that was developed through that process and will provide TOKA and the Gu Achi District with a viable plan that will help make affordable and sustainable housing a reality.

### TIME LINE OF EVENTS

**Spring 2008**
Tohono O’odham Ki:Ki Association (TOKA) approached the Arizona Department of Housing (ADOH) for technical assistance.

**Summer 2008**
ADOH contracted with the Drachman Institute and a Scope of Work for “Gu Achi District Housing Master Plan” was developed.

**July 31, 2008**
Planning meeting was held between the Drachman Institute and TOKA which included an initial site visit.

**December 4, 2008**
Due to staff changes at the Drachman Institute, an additional planning meeting was held with TOKA which included a site visit.

**January 2009**
The Constraints Map and initial site concepts were developed.

**February 13, 2009**
The Constraints Map and initial site concepts were presented to the Gu Achi District Council for review and feedback at their monthly district meeting in Santa Rosa.

**Feb./March 2009**
ARC 402 students developed housing design concepts.

**March 13, 2009**
ARC 402 students presented their housing design concepts to TOKA staff and other guests for review and feedback at the University of Arizona.

**April/May 2009**
The Master Site Plan design and housing concepts were developed and refined.

**May 30, 2009**
The Master Site Plan design and housing concepts were presented to the Gu Achi District Council for review and feedback at their monthly district meeting in Santa Rosa.

**July 31, 2009**
Government officials, agencies, schools, and District members who might be affected or would have influence on the Gu Achi District housing project were invited to a public meeting where the Master Site Plan and housing concepts were presented for review and feedback.

**September 2009**
This document - The Gu Achi District Housing Master Plan - reflecting feedback throughout the process, was developed and published as part of completion of the Drachman Institute’s work on this project.
**Scope of Work Overview**

**Site Visit + Meeting**
- Site photos
- Project introduction to community (DI with TOKA)
- Community survey introduction to community (DI with TOKA)

**Constraints Plan**
Drachman Institute shall compile and analyze the following information into a singular “Constraints Plan” to inform development limits:
- Environmental assessment (provided by others)
- Hydrology study/report (provided by others)
- Flood plain limits and setbacks (DI to determine based on Pima County standards)
- Topography (provided by others)
- Existing Utilities and Infrastructure (BIA route access) (provided by others)
- Natural resources and protection (provided by others)
- Historical and cultural resources and protection (provided by others)

**Community Survey**
- Questionnaire development (housing needs, housing type preferences, housing finance preferences, public use areas, amenities, other program elements, cultural perspectives of outdoor uses, veteran needs, senior needs, assess existing overcrowding conditions, etc.) (DI with TOKA)
- Survey administration (by others)
- Survey results’ analysis (DI with TOKA)

**Community Meeting**
- Present Constraints Plan for review and feedback (DI with TOKA)
- Present community survey results (DI with TOKA)

**Master Plan Concept development**
- Two – three concept plans
- Land uses and program elements defined (DI with program information from TOKA)
- Infrastructure (roads, sewer/septic, water, utilities) (DI with existing infrastructure information by others)
- Housing development options (SF detached, SF attached, cluster housing, multi-family, etc.)

**Community Meeting**
- Master Plan concept presentation (2-3 plans) for review and feedback

**Master Plan Synthesis**
- Develop preferred Master Plan scheme based on review and feedback

**Community Meeting**
- Master Plan concept presentation (preferred plan) for review and feedback

**Conceptual Housing Design**
- Housing development options (SF detached, SF attached, cluster housing, multi-family, etc.)

**Schematic Housing Design Presentation**
- Present schematic housing designs for review and feedback (DI with Architect as selected by TOKA)
While working with the Tohono O’odham Nation to help design a new residential community for residents of the Gu Achi District, it was of utmost importance to respect and respond appropriately to the strong history and tradition of the land and people. While it became apparent that it would not be possible to fully understand this rich culture, research was conducted to provide an educated and responsive design approach to the many different cultural characteristics. This research resulted in an appreciation for the Tohono O’odham culture, the people’s relationship with the desert, the community-based social structure, and many meaningful traditions. This understanding became a driving force behind many design decisions and has provided a standard against which our design is measured. This research should continue to provide a foundational understanding of the culture and land ethic that will inform any further design work.
The Tohono O’odham Nation is comparable in size to the state of Connecticut. As of December 2000, the population was reported at nearly 24,000 people. There are 11 districts, each with an appointed Chair, Vice-Chair, Secretary, and Treasurer.

The lands of the Nation are located within the Sonoran Desert in south central Arizona. The largest community, Sells, functions as the Nation’s capital.

The landscape is consistently compelling: a wide desert valley, interspersed with plains and marked by mountains that rise abruptly to nearly 8,000 feet.

“The Nation’s four non-contiguous land bases total more than 2.8 million acres at an average elevation of 2,674 feet. Of the four land bases, the largest contains more than 2.7 million acres. Boundaries begin south of Casa Grande and encompass parts of Pinal, Pima and Maricopa Counties before continuing south into Mexico. San Xavier is the second largest land base and contains 71,095 acres just south of the City of Tucson. The smaller parcels include the 10,409-acre San Lucy District, located near the city of Gila Bend, and the 20-acre Florence Village, which is located near the City of Florence.”

(Official Website of the Tohono O’odham Nation: http://www.tonation-nsn.gov/location.aspx)
17th Century - The first contact between the O’odham and Europeans was with Spanish explorers searching for gold in the Southwest. However, none was found. Later, Spanish missionaries who had heard of the O’odham’s existence began traveling north to establish missions and convert the O’odham to Christianity.

1687 - Father Eusebio Kino, a Jesuit missionary, arrived in Sonora. From then until his death in 1711 he built missions and worked with the Tohono O’odham and Pima, introducing Christianity, wheat, livestock, fruit, and metal tools. In 1700, he established the San Xavier mission.

1821 - Mexico declared independence from Spain. Mexico’s new secular government closed most of the missions existing in the O’odham’s land.

1846 - The Mexican American War broke out, which did not affect the O’odham directly. However, the Treaty of Guadalupe Hidalgo did. The treaty was signed in 1848, ending the Mexican American War and granting Mexico most of the Southwest territory, including the O’odham lands.

1853 - The Gadsden Purchase re-defined the Mexican-American border, effectively cutting the O’odham lands in half. While the US had signed a treaty promising to grant citizenship to all Mexicans and “indigenous people” who suddenly found themselves residing on American soil and also to honor Mexican land ownership, the O’odham were seen as “uncivilized” and therefore not worthy of the rights granted in the 4th Amendment - that is, the right to own land.

1862 - The Homestead Act allowed Anglos to claim rights to lands in the southwest, and the O’odham, having no rights, receded into the desert in an attempt to accommodate the invading culture. They maintained their traditional lifestyle, but with the addition of cattle ranching, which provided both a new food source as well as some trading opportunities. However, some Anglo ranchers began to invade and take over O’odham ranching lands and some O’odham resisted.

1874 - On July 1, the first O’odham reservation was established under President Grant. The reservation included around 70,000 acres of land in the area around the mission San Xavier del Bac.

1887 - The Dawes Act, or General Allotment Act, was an attempt to assimilate native American tribes by dividing lands up according to household. This not only contradicted the O’odham’s concept of communal property, but also attempted to introduce a patriarchal system of thought. The O’odham simply ignored the new property lines and continued living in their traditional way.

1917 - The main Tohono O’odham reservation was established.

1934 - The implementation of the Indian Reorganization Act was seen by its proponents as in the best interest of the native Americans in that it would give back some of the land taken by the federal government and allow the formation of tribal governments, provided they were approved by the US Secretary of State.

1937 - The Tohono O’odham adopt their first Constitution. They are known as the Papago Tribe, from an early term used by the Spanish to refer to “bean-eaters”.

1986 - The Tohono O’odham adopt a new Constitution establishing a three-branch form of government and changing their name officially to the Tohono O’odham Nation.
“There is a word for our way of life: Himdag,” says Ofelia Rivas, an O’odham member. “Our way of life is based on the land and living in harmony with the land.”

(Kristina Pycliik and Jennifer Leibig, Living in No-Man’s Land, September 13, 2006, Cultural Survival Quarterly, Issue 30.3)

Himdag

Important aspects of himdag include the language, history, traditional games, crafts, music, and dance. Cooperative activities, such as games, singing, and dancing were considered a means to maintaining a healthy community in the face of problems. Games included toka (which can be compared to hockey), kickball (involves throwing a wooden ball with one’s toes), races, relay-races, etc.

O’odham songs and poetry are very expressive of himdag and the chthonic tradition. Nearly always, they focus on a single moment in nature, for example clouds breaking over the mountains or an eagle circling overhead. The songs and poems are simple in form, but rich in implied meaning. As the songs are said to come to the authors from spirits through dreams or visions, they are not always easy to decipher.

Language

Language is considered one of the most important ways to be O’odham. There are 11 different dialects of the traditional language, but its use is waning. Most O’odham speak English or Spanish, although many make an effort to preserve their culture through learning and teaching the language.

Community Roundhouse

The traditional roundhouse was the heart of the O’odham community. This is where the community council would gather to discuss anything affecting the community, such as planting, hunting, ceremonies, or dealing with enemies. Every man was a member of the council and every member was given a turn to speak, uninterrupted, on the matter at hand.
Origin of the Desert People

“There are many variations of the O’odham origin story, but the most common is the story of a desert people who forgot their spirituality. The Creator brought about these desert people; after a time all became sinful except for one man, I’itoi (Elder Brother). The Creator warned I’itoi of a flood which would come and sent him to the top of Baboquivari Peak, a sacred mountain of the Tohono O’odham. After the flood, I’itoi helped the Creator create the Hohokam, from which the Tohono O’odham are descended, and taught the people right from wrong. They lived in harmony for a time, but eventually turned on I’itoi and killed him; his spirit went back to Baboquivari Peak and remains there today.”

(from Tohono Chul Park, permanent collection, http://www.tohonochulpark.org/permanentcollectionmaze.html)

Religion

The introduction of Catholicism by early missionaries did affect the Tohono O’odham religious practices. Rather than integrating the two religions, the Tohono O’odham simply supplemented their beliefs with aspects of Catholic faith that fit. For instance, St. Francis Xavier is considered a source of supernatural healing power similar to their own revered figures. The accompanying diagram depicts the Tohono O’odham notion of heaven and hell, a hybrid of traditional and Christian beliefs.

CULTURE & TRADITIONS

Of the Desert

As is the case with nearly all native tribes, the chief concern of the Tohono O’odham has been their battle with the elements. From their attempts to control wind and weather for the good of the Nation stemmed their traditional religious beliefs and practices. Traditional observances include:

• wikita harvest rite - a masked performance taking place in the autumn
• scalping ritual - women elders dance around a pole with the enemy scalp on top
• vigida ceremony - the most important event of the year, this ceremony is preceded by the preparation of saguaro wine, which is consumed (by the men only) over 4 days of dancing, singing and story-telling in order to bring about the summer rains.
• shaman rites for curing, weather, war, and crop growth

Tohono O’odham mythology is rooted in the native people’s close relationship with the desert, starting with their legend of origin, which describes how they were brought forth from the earth by I’itoi. The “staying earth,” where the O’odham reside, is more than just physical geography; it includes plant life, precipitation, sacred mountains, shrines, springs, etc. They recognize that not only people, but also animals and places have spirits which must be respected.
Traditional Lifestyle

The traditional food system of the Tohono O’odham has proven central to the culture and lifestyle of the people. In addition to providing healthy foods, the system supports a local economy, maintains the people's physical well-being, and provides the material foundation for Tohono O’odham culture. The activities involved in food production and preparation (and their cultural supports, such as dancing) promote high levels of physical activity and fitness. Furthermore, these activities bring people together, reinforcing their sense of community.

Historically, the three parts of this traditional food system have been:

• Ak Chin Farming – Using the flood waters that accompany the summer monsoons, thousands of acres were planted with crops.
• Harvesting Wild Foods – Throughout the year, the desert provides a wide variety of wild foods that were collected and eaten.
• Hunting – The hunting of rabbits, deer, javelina, and other desert dwellers was a significant supplement to the foods grown in O’odham fields and collected in the desert.

Diet

The staple diet of the O’odham included:

• tepary beans (a local pink bean)
• mesquite beans (make nutritious flour)
• agave hearts (roasted)
• cholla buds (boiled/baked and dried for future use)
• prickly pear fruit and pads (peeled and boiled)
• cactus fruit from saguaro cactus, organ pipe cactus, senita, hedgehog, christmas cholla, and banana yucca

Education

Knowledge and traditions are passed down within the families. Men and women have different roles in the tribe, so they are taught different skills when growing up:

• Men teach boys to be active and develop skills such as woodcarving, rope making, and how to care for the gardens, raise cattle, hunt, and build houses and fences.
• Women teach girls to carry water, make baskets and pottery, and give them knowledge about the wild plants (how to prepare and serve them).

Basket-weaving

Basket-weaving has been an important part of Tohono O’odham culture for countless generations, combining utility, trade, ceremony, and artistry. Women weave baskets that are used to carry water and wood, store household items, prepare food, and use in various ceremonies. Baskets are woven from local materials such as green and white yucca, beargrass, banana yucca, devil’s claw, and for small baskets, even horsehair. All colors used in the basket-weaving occur naturally in the materials (without the use of dyes).
“Twenty years ago, the Waila Festival started as a way to showcase the musical and artistic talents of the Tohono O’odham culture to the Tucson community. Today, co-founders Angelo Joaquin Jr. and Karen Seger carry on the same mission and traditions that have been celebrated annually since 1989.”

(Mackenna Guest, Tucson Citizen, 28 May 2008.)

Return to Tradition

“Virtually all elements of traditional culture – ceremonies, stories, songs, language – are directly rooted in the system of food production. O’odham culture is truly an agriculture. As a result, destruction of the traditional food system has contributed to the significant loss of many elements of the O’odham Himdag – Desert People’s Way.”


Many Tohono O’odham are working to revitalize their culture with the help of elders who remember what life was like when the tribe was self-sufficient. Organizations, such as Tohono O’odham Community Action (TOCA) and San Xavier Coop Farms, are taking action to improve the cultural and physical health of the Tohono O’odham.

Founded in 1996, Tohono O’odham Community Action (TOCA) is a non-profit, community-based organization dedicated to creating a healthy, culturally vital, and sustainable Tohono O’odham Nation. In order to achieve these goals, TOCA has developed four current program areas: Tohono O’odham Basketweavers Organization; Tohono O’odham Food & Wellness System; Tohono O’odham Community Arts and Culture Program; and Youth/Elder Outreach Program.


Contemporary Lifestyle

The adoption of a more contemporary western lifestyle has seriously affected the Tohono O’odham both physically and culturally. The forces of western culture - school systems where O’odham language and culture are not embraced, military duties which during WWII caused men to leave their fields for months or years at a time, easy access to processed foods, increased farming and field work - have led to the slow disappearance of traditional farming techniques, ceremonies, songs, legends and language in the last century.

“The most immediate and devastating effect of the loss of the traditional Tohono O’odham food system has been upon the physical health of the people. For centuries, traditional desert foods – and the physical effort it took to produce them – kept the Tohono O’odham healthy. The introduction of processed foods, however, changed all of that, leading to unprecedented rates of adult-onset diabetes. As recently as the early 1960’s, diabetes was virtually unknown among the Tohono O’odham. Today, more than 50% of the population develops the disease, the highest rate in the world. Adult-onset diabetes has even begun to appear in children as young as seven-years-old.”

The 2000 U.S. Census reflects the need for affordable housing options within the Tohono O’odham Nation. With staggering unemployment rates and extremely high rates of houses with no plumbing, kitchens or telephones, it is clear that quality affordable housing is necessary.

The Tohono O’odham Community Action website offers a summary of some of the census data for the Tohono O’odham:

“Despite the richness of the Tohono O’odham culture and the community’s many assets, there are many extraordinary challenges to be faced:

• Economics — Per capita income on the Tohono O’odham Nation is $6998 (compared with $21,994 nationally), the lowest of all U.S. reservations. Median family income is $21,223 (compared with $50,046 nationally). 41.7% of all households and 50.6% of households with children are below the poverty level (compared to the U.S. averages of 9.2% and 13.6% respectively). Only 31.3% of the adult population is currently employed.

• Health — Until the 1960’s, no tribal member had ever suffered from Type 2 Diabetes. Today, more than 50% of all Tohono O’odham adults have Type II (adult-onset) diabetes, the highest rate in the world. Children as young as six-years-old suffer from the disease. Life expectancy is more than six years shorter than the U.S. average. The primary cause of diabetes within the community is the change from a diet consisting primarily of traditional food and the destruction of a sustainable Tohono O’odham food system.

• Education — Fewer than half of the Tohono O’odham community’s adults have completed high school, the lowest rate of all U.S. Native American tribes. A dropout rate in excess of 50% continues to be the norm. 48.3% of the population is under 25-years-old (compared with 35.3% nationally).”

Traditional Architecture

Traditional architecture in any community develops as a response to technology, environment, and culture. As such, it becomes not only an educational model for future architecture, but also a cultural icon which is embraced by the community. While building technology has changed drastically in recent decades, the cultural and environmental strengths of traditional Tohono O’odham architecture remain relevant. In planning for future communities, there is much to be learned from the past.

Building Construction

Construction was traditionally performed by the men. Although the houses would be used by only one family, other members of the community would help in the building process.

Traditional construction materials consisted entirely of locally available earth and plants. Because there were no saws, structures were made with the naturally occurring wood forms. The introduction of sawn wood and metal tools (such as shovels, picks, baling wire, nails and axes) changed the face of O’odham architecture in the early 20th century, especially with the appearance of adobe bricks.

“O’odham architecture, moreover, was a practical consideration in an arid land. Mesquite, grass, ribs of saguaro cacti, and similar plant materials were used in building structures. ... To build them was not labor intensive and to give them up, either permanently or temporarily, caused no great sacrifice to individual or community. O’odham, who slept and cooked out of doors except in inclement weather, rested lightly upon their landscape.”


The first type of house was the ki. This was a dome-shaped structure made of brush with mud on the exterior. The sleeping quarters were located within the ki and cooking took place outside. There was only one opening, just large enough to crawl through.

More modern homes (19th-early 20th centuries) used a post-and-beam structure and were rectangular in shape with a flat roof and ramada (or watto) outside. The structure was as follows:

- posts hold up main crossbeams (mesquite);
- secondary beams perpendicular to the crossbeams form the ceiling (saguaro ribs or ocotillo);
- brush is laid atop the ceiling beams and dried mud forms a waterproof barrier.
In the winter, villages were established around desert springs, or “charcos” (deep pits), which served as wells. In the summer, villages were moved to the mouths of arroyos where ak chin farming took advantage of the rich soil and monsoon rains.

The ramada was the most active space in daily life. Here, there would be an olla (a low-fired clay pot to keep water cool), beams from which food would hang, and at least one oven. Often, the ramada was given walls on two or three sides for protection from winds. The walls would be made of ocotillo branches, which would take root and grow leaves if planted deeply enough.

Settlement Patterns
The Tohono O’odham are traditionally a semi-nomadic tribe, moving settlements twice a year with the changing seasons.

Traditional Tohono O’odham communities were made up of several family lines. The houses of a single family were generally organized in clusters. Other family clusters were located far enough away to offer privacy, often hundreds of yards. This resulted in fairly spread-out villages, but the Tohono O’odham thought nothing of walking the distance to visit their neighbors.

Outdoor Living
For the most part, the Tohono O’odham lived outdoors. Traditional O’odham homes were small buildings whose main purpose was the storage and protection of goods and as sleeping quarters in bad weather. Most of the daily activity took place under the watto, the ramada structure built in front of the entrance to the dwelling unit.
Contemporary Architecture

Preferences
The article Toward A Responsive Tohono O’Odham Dwelling, published in the Arid Lands Newsletter in 1989 and written by Richard G. Brittain and Mats A. Myhrman, reported on research conducted in the late 1970s on the housing preferences of the Tohono O’Odham. Through interviews and meetings, certain desires and issues arose regarding previous and current attempts to provide affordable housing to the Tohono O’Odham communities.

While it must be taken into account that each response reflects only the desires and opinions of the individual and that the interviews took place several decades ago, these testimonials can help the reader to develop an awareness of culture and an idea of what aspects of living might be most important to the Tohono O’Odham today.

The authors of the project state:
Our general goal is to help the Tohono O’Odham build for themselves and respond to the following conditions:

• the tendency for Federal money spent on Indian housing to go to non-Indians as payment for materials and contracted services;
• the tragic scarcity of job opportunities on the Reservation and, in particular, a lack of satisfying, creative, constructive work with a visible product that the creators can be proud of;
• the preference of many Tohono O’Odham for a dwelling that, although modern, comfortable, and energy-efficient, reflects their cultural heritage and the desert in which they dwell.

According to the article, a number of activities occurred, beginning in 1976, that produced information about Tohono O’Odham preferences for housing. The first was initiated by Father Richard Purcell, then priest at the Covered Wells Catholic Church on the Reservation. His informal interviews with Tohono O’Odham revealed a strong preference for certain aspects of traditional earth houses:

“...For my house I always want to have it like the way we are supposed to have it in our way. I want my kitchen to be in another place away from our sleeping place, yes, like two different buildings, but close together and with the wattu (shade) in-between to kind of hold them together.”

“... We need to have a cooking place in one house and a sleeping place in another house. It’s not good to sleep and eat in the same place. And you shouldn’t put your toilet too close to your house like they always do in town.”

“... The only kind of house I want is one made out of shampt (adobe). That’s the best kind. And I like it to have cement on the outside.”

“... But in my new house I want a special little place in one of the rooms for my saints ... I don’t like them to be just on the dresser or someplace like that ... Yes, something built into the wall like that is what I want and I always want to cook on a wood stove and use wood fire to make the house warm.”

“.. I don’t like that new house we got now. It’s too big, and it’s all cement walls and floors. It makes us sick to stay in a house of cement. It gives us colds in the wintertime. And that gas for the heat is bad for us Papagos, too. It makes us get a headache. I guess wood is the best thing to use in the stove. The beans just won’t cook on that gas.”


While what people say they want can help determine their needs, often the best indicator is how people have built on their own. For instance, many homes on the reservation have added ramadas, often made of whatever material was most readily available at the time. The fact that inhabitants put in their own time and effort to build these indicates the importance of that space.

These images reflect the importance of an attached ramada space, outdoor sleeping space and a space for religious materials.
Concerns

“In 1977, representatives of the Tribe requested assistance from the College of Architecture (University of Arizona) in developing alternatives to the Federal Department of Housing and Urban Development (HUD) program. These Tohono O’odham representatives described several problems associated with the program, many of which were later identified in a report for HUD by the Papago Planning Department (1978):

- the image created by the houses was inappropriate - they didn’t look like they belonged in the desert or to a Papago;
- the housing was too costly to be paid for by those who most needed it and cost too much to heat and cool;
- only the needs of people living in, or willing to live in the larger communities were being addressed;
- the replacement of owner-built traditional housing by contractor-built housing meant the loss, to the extended family, of the benefits of working together on such a project;
- traditional Papago values like sharing, equality, and not standing out as better than your neighbors are undermined by the sharp contrast between expensive federally-subsidized new homes and the traditional low-cost owner-built adobe homes;
- of the millions of dollars spent to construct HUD housing, none of it had entered the Papago economy. The money had all been used to stimulate the Anglo construction industry through purchase of materials and services off the Reservation.”


Opportunities

Careful attention and response to a culture and environment as unique as are found in the Tohono O’odham Nation can result in affordable, sustainable, healthy communities and architecture. Aspects such as the traditional grouping of related dwellings, the incorporation of outdoor spaces for daily use and the use of local, natural, sustainable materials provide opportunities to create unique and appropriate dwellings which meet the needs of both the community being served and the sponsoring entities.

The images above are examples of housing which are responsive to a specific Native American culture and a specific location. The images to the right are examples of the type of housing that has often been provided by federal funding in the past. Advocates of the Tohono O’odham community are concerned that federally funded houses built on the Tohono O’odham Nation may not respond appropriately to the culture and environment found there.
Design Example

Baboquivari District Office Building

The Baboquivari District Office Building, designed by R. Brittain and M. Myhrman in 1981, was built in 1983. The intention of the designers was to respect and respond to the Tohono O’odham culture and environment through the design process, space-planning, material and design choices.

Siting specific to the Tohono O’odham

- The building site was staked out and the council members were permitted to walk around the proposed building, making changes to certain dimensions until a consensus had been reached.
- The buildings of the complex are separate, but define an outdoor space used for gathering and socialization; the outdoor spaces are as important as the indoor rooms.
- The long south wall faces 15 degrees southeast, which captures early morning sun during the winter months and also provides views of Baboquivari Peak, held sacred by Tohono O’Odham as the home of their creator I’itoi.

Sustainable practices seen at the Baboquivari District Office Building:

- Passive heating and cooling strategies require less energy consumption:
  - Thick adobe walls provide the required thermal mass for a passive solar design.
  - The roof overhang on the south side is designed such that the south wall and its glazing are fully shaded during the hottest summer months yet allow full penetration of the winter sun into the structure. Ground cover prevents reflected radiation during the summer.
  - During cold months, the building depends primarily upon direct solar gain through south-facing glass in doors and windows.
  - The office utilizes only ceiling fans, cross-ventilation and convective venting.

Local materials used wherever possible, supporting the local economy:

- Many of the walls were built using adobes made in Pisinimo, about 60 miles from the job site. Transportation charges added significantly to the cost of the bricks, but since the hauling was done by Tohono O’Odham, the money was kept in the local economy.
- Mesquite firewood purchased from local woodcutters replaces nonrenewable fossil fuels that must be purchased off the Reservation.
- A red and a white flagstone found in the nearby foothills was used to pave the main entry ramada on the northwest corner of the main building.

Planning for the future:

- Adobe construction skills can be learned easily by workers or owner-builders.
- Very little maintenance would be required for the exposed adobe walls.
- In terms of the demonstration value of the building, it made sense to build with a user-friendly material, one appropriate for owner-builders.
- The traditional structures enable the Tohono O’Odham to associate the materials used in the new building with the buildings they constructed in the past.
Design BuildBLUFF is a design-build program at the University of Utah College of Architecture and Planning. Hank Louis, founder and director of the program, directs students in designing for affordability, energy-efficiency, and overall sustainability.

Many of the Design BuildBLUFF projects have been houses for members of the Navajo community. Among other aspects of architecture, the students focus on building for the specific client needs, resulting in unique and expressive homes.

While Navajo culture and architecture are vastly different from that of the Tohono O'odham, these homes demonstrate that affordable design can be innovative, sustainable, responsive to the site and expressive of the client’s identity, even if that identity is not shared by the designer.
Images were taken from the following sources:

Cover:

Page 9:

Page 10:

Page 11:

Page 12:

Page 13:
Tohono O'odham Diagram of Heaven and Hell. Kozak.

Page 14:

Four Men Playing Reed Game. Dinwiddie, William. 1894. ArtStor (http://library.artstor.org/library/welcome.html#3 | search | 1 | papago | Multiple2Collection20Search | | type3D3126kw3Dpapago26id3Dall26name3D) 29 Oct 2009

Page 15:

Pages 16-17:
All data used to generate graphics from the 2000 US Census.


Drawing of Ki and Ramada. Bahr.


Ramada. Bahr.


Playing Toka, A Ball Game. Original Title/Description: Tohono O’odham women’s tóka (double ball) game, played with a bent stick made of cat’s-claw and a double ball usually of 2 small sticks tied together by a short cord. The aim of the game is to throw the ball past the opponent’s goal. At Santa Rosa Indian Day. Teiwes, Helga September 1979. Arizona State Museum, University of Arizona, Tucson: 52206 (http://www.statemuseum.arizona.edu/exhibits/goldie/quiltblock_25.shtml) 27 Oct 2009


Page 21:


Typical housing development, Tucson AZ. Photo: B. Vint. Bahr.

USDA sponsored affordable housing subdivision in Yuma Az. The designs are conventional detached suburban houses. Photo: B. Vint. Bahr.


Page 23:

All photos and information on this page are from DesignBuildBLUFF. (www.designbuildbluff.org) 27 Aug 2009.
Located in the Gu Achi District of the Tohono O’odham Nation, the project site is situated 4 miles southwest of the village of Santa Rosa, Arizona, and 8 miles northeast of the intersection of Indian Route 15 and U.S. Highway 86. Gu Achi Peak, whose summit is at an elevation of 4,521 feet, is just northeast of the site.

The project site is a 640-acre parcel (one square mile) of undisturbed desert, both parallel and perpendicular to IR-15 centered at mile post marker 8.

A large wash cuts through the site from the southwest to the northeast.

The site is generally level, with an elevation change of approximately 50 feet, from 2,007 feet (west corner) to 1,950 feet (east corner).

The nearest towns are those of Sells, AZ (pop. ~2,800) and Santa Rosa, AZ (pop. ~450).
Climate

“The Tohono O’odham land lies within the hottest of North American deserts. Hot summers, cool winters, extreme diurnal temperature fluctuations, low humidity, high evaporation and a biannual rainfall pattern dictate strategies for maintaining human comfort.”


There has been no data collected on-site, so the climate is measured at the nearby cities of Ajo and Sells, Arizona. At Sells, average daily temperatures range between 72° F to 103° F in July and 35° F to 65° F in January. Sells receives a yearly precipitation of about 12 inches with approximately the same amounts falling during the winter and summer rainy seasons. Water evaporation from an open tank can exceed 6 feet annually.

Wind

The closest climate recording stations are about 50 miles away from the site at Gila Bend and Maricopa, where conditions are somewhat different due to intervening topography. The site lies in a shallow valley running north and south; it is likely prevailing winds blow from the south as cooler air is pulled toward the lower, warmer Phoenix basin.
The overall average slope on the site is between 1% and 5%, which indicates that the majority of the site, other than the washes and associated setbacks, is suitable for building. Water drainage moves across the site towards the northeast. Based on recommendations made in a Drainage Report by the Blossom Design Group for this site dated September 6, 2000, any new building pads should be elevated 1.5 feet above the highest adjacent existing grade, due to sheet flooding.
In 1999, the Pima County Board of Supervisors agreed to work with the Tohono O’odham Nation in the development and implementation of a plan to preserve the natural and cultural environment in Southern Arizona. This plan reflects some of the assets of and concerns related to life in the Sonoran Desert of Arizona and Mexico, in which the Tohono O’odham life and culture are inseparably rooted.

Pima County spans more than 9,000 square miles and is at the crossroads for two ecoregions – the Apache Highlands, which create the mountainous sky islands, and the Sonoran Desert, which stretches west from Tucson across the Colorado River into California and south into Mexico. Considered the hottest of North American deserts, the Sonoran Desert is also the most biologically diverse, with bi-annual rainfall and mild winters.

Unique in its approach, Pima County’s plan is structured to reflect the natural system through large working landscape reserves, as opposed to the more traditional species-specific level approach which usually sets aside small and isolated refuges.

This regional planning approach looks to combine short-term actions and long-range planning to protect and enhance the natural and cultural environment. Planning efforts focused on six elements: Habitat, Corridors, Cultural Resources, Mountain Parks, Ranch Conservation, and Riparian Protection.

The agreement signed by the Tohono O’odham Nation and Pima County Board of Supervisors

Examples of two aspects of conservation addressed by the SDCP
Vegetation

The site is located in the heart of the Sonoran Desert and, based on site observations, contains many protected species. Some areas of sensitive vegetation have been indicated on the constraints map, specifically, locations of saguaro cacti. An environmental assessment report should be conducted and consulted before any design and/or construction work begins. It may be necessary for another survey to be conducted, in accordance with the Native Plant Protection Ordinance. Consultation of the Sonoran Desert Conservation Plan is recommended.

Wildlife

Raptor nesting areas were found on-site, as indicated on the constraints map. Based on initial findings of an environmental assessment report, surveys have also been conducted for other animal species. There was no reported evidence of pygmy owls, or nesting sites for desert tortoises. A full environmental assessment report should be conducted and consulted before any design and/or construction work begins.
Washes

A major wash system imposes a major physical barrier (+/- 8 feet deep), essentially dividing the site. It is recommended that the majority of development occur on the west side of this wash system, and that the wash be left undisturbed.

Minor washes occur throughout the site. These waterways and their respective setbacks define the buildable areas of the site, which significantly affects the overall plan.
**FLOODPLAIN SETBACKS, PIMA COUNTY**

**Ordinance**

Title 16 Floodplain and Erosion Hazard Management, §16.54.030

Chapter 16.40

**EROSION HAZARD AREAS AND BUILDING SETBACKS**

Sections:

16.40.010 Building setback requirements.

16.40.020 Setbacks near major watercourses.

16.40.030 Setbacks from minor washes.

16.40.010

**Building setback requirements.**

In erosion hazard areas where watercourses are subject to flow-related erosion hazards, building setbacks are required as set out in Sections 16.40.020 and 16.40.030. (Ord. 1999-FC-1 § 1 (part) 1999; Ord. 1988-FC2 Art. 12 (part), 1988)

16.40.020

**Setbacks near major watercourses.**

For major watercourses, with base flood peak discharges of two thousand cfs or greater, the following building setbacks shall be required where approved bank protection is not provided:

A. Along the following major natural watercourses where no unusual conditions exist, a minimum building setback, as indicated below, shall be provided at the time of development unless an engineering analysis which establishes safe limits is performed by an Arizona registered professional civil engineer and is approved by the county engineer. Unusual conditions include, but are not limited to, historical meandering of the watercourse, large excavation pits, poorly defined or poorly consolidated banks, natural channel armoring, proximity to stabilized structures such as bridges or rock outcrops, and changes in the direction, amount and velocity of the flow of waters within the watercourse.

1. The building setback shall be five hundred feet along the Santa Cruz River, Rillito Creek, Pantano Wash, Tanque Verde Creek and the Canada del Oro Wash downstream of the confluence with Sutherland Wash;

2. The building setback shall be two hundred fifty feet along major watercourses with base flood peak discharge greater than ten thousand cfs;

3. The building setback shall be one hundred feet along all other major watercourses with base flood peak discharge of ten thousand cfs or less, but not more than two thousand cfs.

B. Along major watercourses where unusual conditions do exist, building setbacks shall be established on a case-by-case basis by the county engineer, unless an engineering study which establishes safe limits is performed by an Arizona registered professional civil engineer and is approved by the county engineer. When determining building setback requirements, the county engineer shall consider danger to life and property due to existing flood heights or velocities and historical channel meandering. Unusual conditions include, but are not limited to, historical meandering of the watercourse, large excavation pits, poorly defined or poorly consolidated banks, natural channel armoring, proximity to stabilized structures such as bridges or rock outcrops, and changes in the direction, amount, and velocity of the flow of waters within the watercourse. (Ord. 1999-FC-1 § 1 (part) 1999; Ord. 1988-FC2 Art. 12 (A), 1988)

16.40.030

**Setbacks from minor washes.**

For minor washes with a base flood peak charge of two thousand (2000) cfs or less, the following building setbacks shall be required where approved bank protection is not provided:

A. Along minor watercourses where no unusual conditions exist, a minimum setback of fifty feet shall be provided at the time of development unless an engineering analysis which establishes safe limits is performed by an Arizona registered professional civil engineer and is approved by the county engineer. Unusual conditions include, but are not limited to, historical meandering of the watercourse, large excavation pits, poorly defined or poorly consolidated banks, natural channel armoring, proximity to stabilized structures such as bridges or rock outcrops, and changes in the direction, amount, and velocity of the flow of waters within the watercourse.

B. Along minor washes where unusual conditions do exist, building setbacks shall be established on a case-by-case basis by the county engineer, unless an engineering study which establishes safe limits is performed by an Arizona registered professional civil engineer and is approved by the county engineer. When determining building setback requirements, the county engineer shall consider danger to life and property due to existing flood heights or velocities and historical channel meandering. (Ord. 1999-FC-1 § 1 (part) 1999; Ord. 1988-FC2 Art. 12 (B), 1988)

---

Although Pima County has no jurisdiction on the Tohono O’odham reservation, it is recommended that the ordinances in place in Pima County be used as guidelines for the design in the Gu Achi district.

---

http://landuse.law.pace.edu/landuse/documents/laws/reg9/Reg9_A2_PimaCounty_Riparian.doc

---

**SITE ANALYSIS**
Views

Views from the site are predominantly positive, capturing the Quijotoa Mountains to the north and west, the Santa Rosa Mountains to the north and east (including Gu Achi peak), and the Comobari Mountains to the west. Views across the continuing plain to the south of the site are mainly obscured by vegetation. The view directly north is slightly less desirable due to the prominent water tower at the elder care facility. Views into the site from Route 15 are fairly exposed as it is a flat area.
View of site from Sunrise Hill
The compilation of the information from the site analysis led to the creation of a constraints map, which helps determine which parts of the site are appropriate for development.
Design Considerations:
- accessibility
- thermal comfort
- material/labor cost and local availability
- cultural appropriateness - finding a balance between traditional and modern lifestyles as desired by residents
- environmental appropriateness
- integration of outdoor space
- flexibility of design to accommodate different/changing family sizes
- environmental sustainability (water-harvesting, solar collection, passive solar strategies, thermal mass)
- economic sustainability (cost of maintenance, cost of utilities, support of local economy)

Multi-Family Units
The multi-family designs focus on:
- sustainability
- expression of local culture and environment
- integration of exterior spaces while maintaining privacy

Single-Family Units
The single-family designs focus on:
- sustainability
- expression of local culture and environment
- ease with which the house can be made to accommodate a variety of family sizes, from 1-4 bedrooms

The Drachman Institute led five 4th-year professional architecture students in an intensive four-week design studio project at the University of Arizona School of Architecture (ARC 402 class). Students worked with staff from the Tohono O’odham Ki:Ki Association and the Drachman Institute to design both single-family and multi-family housing prototypes.

The first step in the process was a period of intense research, through which students gained an understanding of the Tohono O’odham culture, especially with regard to their relationship with the built and natural environments – how they both influence and are influenced by their culture and society.

Students then developed conceptual diagrams to abstractly and graphically demonstrate the merger of cultural significance with modern application. These diagrams became the conceptual generator for the students’ architectural design response.

Finally, each student developed a culturally and environmentally sensitive design for one particular housing type. Two students designed multi-family units while three students developed single-family homes. After review by the Drachman Institute, the designs were presented to staff from the Tohono O’odham Ki:Ki Association for their review and feedback.
Multi-Family Attached Housing

Design by Karie Westfall

Design incorporates:
• Thermal mass wall on NW to moderate summer afternoon heat gain
• Semi-private porches to the South
• Water-harvesting from roofs
• Natural ventilation through placement of windows and the orientation relative to prevailing winds
Multi-Family Attached Housing
Design by Heidi Grimwood

Design incorporates:
- Use of natural daylight to reduce lighting costs
- Semi-private, covered porches to the south to prevent heat gain from sun in summer, letting winter sun in
- Water-harvesting from roofs
- Private back porches to provide desert access
**Single-Family Detached Housing**

Design by Gerardo E Valenzuela Gutierrez

Design incorporates:
- Private, semi-covered porch central to house
- Use of natural daylighting to reduce lighting costs
- Flexible-use room adjacent to kitchen - doors and windows open almost completely creating indoor/outdoor space
- Kitchen/dining/living space to south has large windows which are shaded in the summer, but let winter sun in to warm the space, reducing heating costs

![View east from kitchen - summer morning](image1)

![View east from kitchen - winter day](image2)

![Central porch area](image3)

![Floor plan with additional bedrooms in red and orange](image4)
Single-Family Detached Housing
Design by Amanda Spear
Design incorporates:
• Use of rammed earth for exterior walls, providing thermal mass and slowing heat gain
• Plentiful outdoor space, including kitchen and hallway
• Deep overhang to south prevents summer sun from heating the slab and walls
• Ease of expansion - 2 bedroom design accommodates 3rd and 4th bedroom and extra bath
• Covered parking to west keeps harsh afternoon sun from heating walls

Floor plan - 2 Bedroom
Floor plan - 4 Bedroom

Enclosure Options: Top - sliding panels; Bottom - wrought iron trellis
Air Movement
Growth Diagram

HOUSING CONCEPTS
Single-Family Detached Housing

Design by Colleen Cummings

Design incorporates:
- Private porch, dining, and garden area central to house
- Use of natural daylighting to reduce lighting costs
- Covered carport to the west protects the house from harsh afternoon sun
- Kitchen wall opens onto outdoor dining space
- Ease of expansion - bedrooms are easily added and can be coupled with the expansion of an enclosed yard
- Ample outdoor space not requiring conditioning is coupled with comfortable indoor rooms.

sustainable features

a. solar water heater reduces energy intake
b. pvc array supplements electric supply to house
c. water catchment system uses roof drainage to water plants, etc.
d. vented ramada to the west shades the house from the hot afternoon sun and allows hot air to escape the space
e. windows at different heights encourage cross-ventilation
f. porous fencing allows natural ventilation in back hall
g. front porch offers covered walkway, but allows rain to reach the garden
Based on the information found through the cultural research, collaboration with the Gu Achi community and TOKA, site analysis, and through the development of the Constraints Map, the Drachman Institute developed a Master Site Plan for the Gu Achi District housing development.

The design was based on the importance of a culturally and environmentally appropriate response. Many of the programmatic elements, such as a commercial center, a community center, public services, wastewater treatment facilities, and both multi-family and single-family residential lots were located strategically to take advantage of natural site features. Many of the roads and developments were designed in accordance with wash flow patterns. Also, the disturbance of existing significant vegetation, such as saguaro cactus, was avoided. Outdoor space became an expressed natural resource, and the community was designed to enhance the pedestrian experience, the connection to the desert through trail systems, outdoor activity around the community center, and sidewalks connecting community amenities.

The goals of the design include:

Programmatic Elements

- 80 residences - 40 attached, 40 single-family detached
- Commercial space
- Community center
- Public services
- Open space
- Wastewater treatment facilities

Quality

- Maintain aesthetic of natural desert landscape
- Preserve washes and maintain setbacks from floodplain
- Preserve wildlife habitats
- Create a pedestrian friendly streetscape
On February 13, 2009 the Drachman Institute was invited to present site plan options to the Gu Achi District Council at their monthly district council meeting. The following concepts were presented to address different design options:

**Concept A**

- **Phase I:**
  - 2 entrances from IR 15
  - 1 main road through residential and commercial zones
  - Multi-family, attached units to the northwest near commercial zone and community center
  - Single-family, detached housing to the southwest
  - Open Space split between the two zones
  - Wastewater treatment area

- **Phase II:**
  - Addition of rental and for-sale units
  - Loop roads providing access to new units
  - Expansion of wastewater treatment area
### Concept B
- **Phase I:**
  - 3 entrances from IR 15
  - 1 main road through residential and 1 road providing access to commercial zones
  - All residential units concentrated to southwest
  - Open space centralized in residential zone
  - Community Center central to Phase II plan
  - Wastewater treatment area
- **Phase II:**
  - Addition of rental and for-sale residential units to northwest
  - Loop roads providing access to new units
  - Expansion of wastewater treatment area

### Concept C
- **Phase I:**
  - 1 entrance from IR 15
  - 1 main road through commercial zone; 2 roads provide access to residential zone
  - Community Center to southwest in vicinity of Sunrise Hill
  - Open space centralized in residential zone
  - Wastewater treatment area
- **Phase II:**
  - Addition of rental and for-sale residential units to northwest
  - Addition of commercial space to northwest
  - North entrance from IR 15
  - New road connecting northern and southern zones
  - Expansion of wastewater treatment area
Based on feedback received from the Gu Achi District Council, the Tohono O’odham Ki:Ki Association, and other community stakeholders on the preliminary site concepts, the Drachman Institute developed a final Master Site Plan. This plan represents the culmination of design iterations through collaboration and expresses a community desire for a cultural and environmental design approach.

- **Phase I:**
  - 2 entrances from IR 15
  - 1 main road with a loop through Phase I residential neighborhood
  - 41 residential units concentrated to southwest (21 single-family detached and 20 attached units)
  - Open space contains trail systems bordering on the undisturbed desert to the southeast of the development
  - Community Center to the southwest, acting as a buffer between Sunrise Hill and residential development
  - Wastewater treatment lagoon placed on the far east side of the main wash away from residential development with a small access road
  - Public services provided at the north entrance

- **Phase II:**
  - 40 residential units to the northwest (20 single-family detached and 20 attached units)
  - Loop roads providing access to new units
  - Central open space in the northern residential zone, preserving natural drainage areas
On the following pages the Master Site Plan has been enlarged to show both the Southwest Quadrant (Phase I) and the Northwest Quadrant (mainly Phase II) in greater detail.
Southwest Quadrant

Phase I - Residential Units
- 6 Attached Units (1-bedroom)
- 14 Attached Units (2-4 bedrooms)
- 21 Detached Units (2-4 bedrooms)

Community Center Complex
- Community Center
- Sports Fields
- Ramadas and Picnic Tables
- Trail System
- Community Gardens
- Playground
- Parking

Commercial
- Space to accommodate a variety of commercial needs: grocery, laundromat, internet cafe, auto shop, post office, etc.
- Parking in 3 lots
Northwest Quadrant

Phase I -
Public Service Buildings
- Space Provided for Modular Units to Accommodate:
  - Health Clinic
  - Fire Sub-station
  - Police Sub-station
  - Solid Waste Management

Phase II -
Residential Units
- 6 Attached Units (1 Bedroom)
- 14 Attached Units (2-4 bedrooms)
- 20 Detached Units (2-4 bedrooms)
SITE CONCEPT

Community Center

View from Sunrise Hill looking toward the community center and park with retail/commercial development beyond.

View Location
Residential Zone

View looking north toward the one-bedroom attached units with the residential neighborhood beyond.