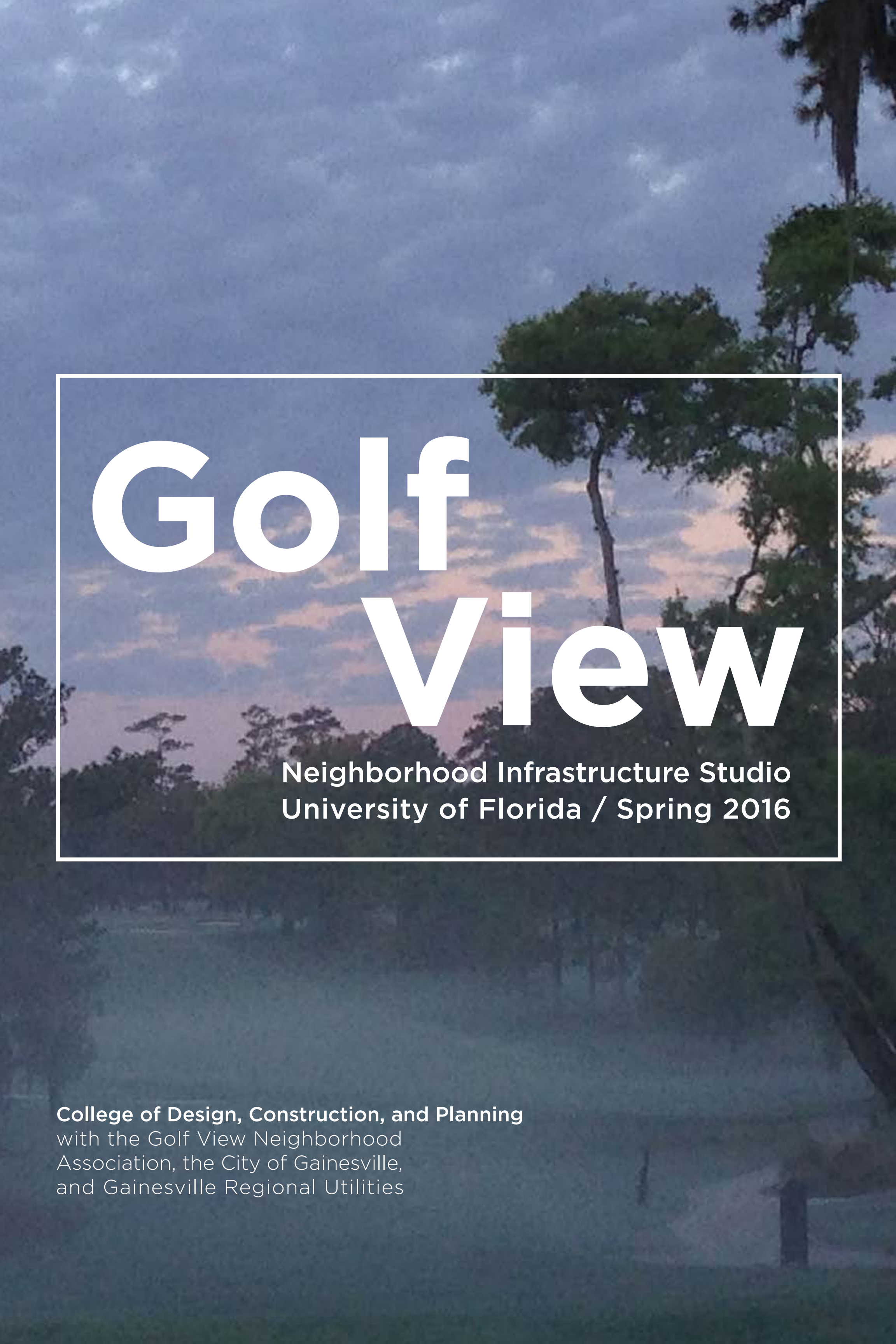

Golf View

Neighborhood Infrastructure Studio
University of Florida / Spring 2016

College of Design, Construction, and Planning
with the Golf View Neighborhood
Association, the City of Gainesville,
and Gainesville Regional Utilities


8 asphalt pavement patches on SW 26th Street
25 asphalt pavement patches on SW 27th Street
19 asphalt pavement patches on SW 28th Street
4 asphalt pavement patches on SW 3rd Place
13 asphalt pavement patches on SW 4th Place
3 asphalt pavement patches on SW 5th Place
72 asphalt pavement patches in Golf View, Spring 2016

Presenting an integrated neighborhood infrastructure for the 21st century

Editors and designers: Maria Barrios, Michelle Eshelman, Naomi Kurpier, and Kim Tanzer.

Faculty members: Rob Holmes, Ravi Srinivasan, Kim Tanzer

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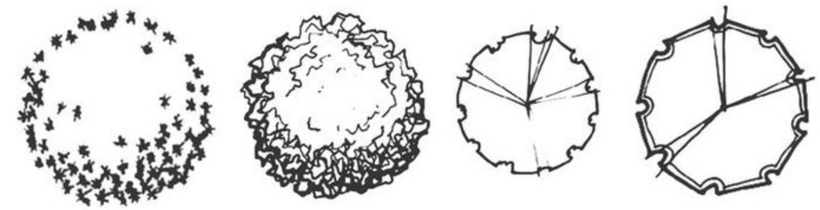
Holmes / Srinivasan / Tanzer



Rob Holmes
Assistant Professor
School of Landscape Architecture
University of Florida

Across disciplines, American designers, engineers, and the other professionals who construct the built environment are perhaps more concerned with infrastructure today than they have been at any time in the past century. This concern is sometimes born out of the recognition that American infrastructure is in crisis, that we are watching a slow disaster unfold at a national scale in individual events: lead in drinking water, decades of deferred maintenance eroding the capacity of subway systems, a bridge collapsing. It is also motivated by hope and optimism, by the belief that infrastructure can be a potent cultural symbol, an aesthetic achievement, and a public commons. Both urges recognize the early 21st century as a moment of poised choice, where aging infrastructures will either be (barely) maintained and lurch forward as patchwork ensembles, or they will be rethought, rebuilt, and reinvented.

This studio considered these issues at an unusual scale, the scale of a single neighborhood: Golf View. Rethinking Golf View's infrastructure has not required imagining a new Works Progress Administration; rather, it has demanded attention to precise details and dimensions, to the fabric of an existing neighborhood, to the potential of a small stream largely buried in pipes. These students have been challenged to think about infrastructure in new ways, all of which ask them to not only consider roads, powerlines, and water pipes — though those 'hard' infrastructures are critical to any viable infrastructural future Golf View might have — but also the value of 'soft' infrastructures, the importance of time in both the construction and operation of infrastructures, and the value of landscape as infrastructure.

Each of these aspects might be taken as additional directions that further design research into neighborhood infrastructure, for Golf View or elsewhere, might proceed. Soft infrastructures, such as practiced routines of participatory maintenance, the networks of social relations that invisibly but essentially weave the neighborhood into a whole, or shared rituals of food production, water harvesting, and ecological planting all present ripe design opportunities. The choreography of installation, operations, and maintenance through time can and should become not secondary to the design process, but directly integrated into it. And the landscape itself — in the students' proposals, deployed to improve runoff water quality and as a potential source of food — might be further cultivated as a source of infrastructural functions, such as the reconsideration of the neighborhood as home not only to many people, but also a wide variety of other species whose needs and habitats might be taken into account.

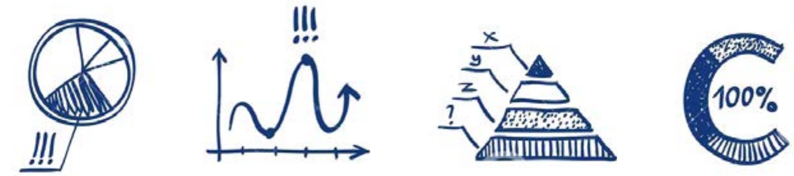
Holmes / **Srinivasan** / Tanzer

Ravi Srinivasan
Assistant Professor
School of Building Construction Management
University of Florida

In today's complex, biased, and intolerant world, we need solutions that are simple, scientific, and sustainable. A critical component of developing such solutions is to bring in all stakeholders to share, access, and analyze in an equitable manner, and utilizing the capabilities that are being offered in their respective fields. The Golf View neighborhood project studio, as part of the Integrated Project Delivery, is a true testament to such an approach where students from various departments collectively designed and developed replicable solutions taking into consideration the social, economic, and environmental aspects of the neighborhood. These solutions, with further refinements, will form a strong basis for the 21st century neighborhood infrastructure across the globe.

What the students have achieved in this short time is truly remarkable. To name a few – the social smartphone app that can bring a stronger community / neighborhood feel and potentially lead the community toward the larger goal of sustainability. The rainwater balance tool, a simple yet scientific application that can provide feasibility analysis for sloped sites and community-wide rainwater collection.

And, the Smart-U or Smart-Utility infrastructure modules that can be manufactured, implemented, and managed in an economical manner considering the lower life cycle cost and environmental impact as compared to traditional approaches. In addition to being 'smart' in terms of organizing and potentially monitoring the wet (water, sewer, stormwater) and dry (electric, CATV, telecom, natural gas) utilities, as well as the modular structure of the system, the students estimated that the Smart-U module will cost 35% less than traditional utility systems considering life cycle cost comparison. Moreover, estimates have shown that integration of Smart-U modules for the Golf View neighborhood is equivalent to removing 10,000 cars from the roads, assuming approximately 130 grams of CO_2 per kilometer of CO_2 emissions. In other words, if Golf View neighborhood utilities were to be entirely replaced using the same, traditional approach, it is equivalent to adding 10,000 cars to the already busy streets. Well, enough with the numbers now!



In essence, students, beyond just being students and working in silos, transformed into promising professionals and entrepreneurs through constant discussions and deliberations within themselves, with faculty mentors, and industry experts to solve problems in a collective manner. What a true sustainable approach to problem solving!

Holmes / Srinivasan / **Tanzer**

Kim Tanzer FAIA
Professor
School of Architecture
University of Virginia
Visiting Lecturer, University of Florida

We need a new narrative for a new time.

Everything has a lifespan. Over the past 100 years in the United States, we have invented and built a number of national, connective conveniences—drinkable water, convenient waste removal, abundant, easily available energy, accessible and cheap transportation, and a range of communications technologies. We have come to expect these as normal.

But each of these systems--along with their pipes, wires, and surfaces, and the business models and workers who supply them-- has a natural narrative arc. They begin as new, expensive inventions, then they become the standard expectation, then they become so common as to be invisible. Just as we assume we will always have these amenities--exactly as they are today and seem always to have been-- they begin to fall apart. We should see this as the natural course of all things, but somehow we do not. We have not. We have become so lulled by the ubiquity of today's infrastructure that we expect it to continue indefinitely.

Reality tells a different story. Across the country, especially in every older neighborhood, infrastructure is aging and failing. Our challenge is how best to respond. Should we hope our infrastructures will outlast our lifetimes by even a little bit? Or can we see this as an opportunity to envision a new century, balancing community resources and our neighbors' resourcefulness? Can we recognize the important role of natural systems in providing what technocrats describe as ecological services? Can we create a new narrative, integrating social and natural infrastructures while transforming current expectations for requisite "utilities" into the satisfied desire for safe, healthy, and convenient living conditions?

In this interdisciplinary studio, we worked to stretch our own imaginations along with those of our local civil servants and community members. Our initial goal was to envision a way to replace existing infrastructure, to redesign it, and, in the process, to redefine it. As we were doing so, we learned other lessons. We have come to see that:

Infrastructure revitalizes:
Major cities sometimes rely on infrastructure to freshen their urban aspect, leading to economic renewal. Too often, these efforts overlook adjoining residential fabric.

As first ring suburbs lose their luster—in part because infrastructural elements are in need of repair and replacement—property values, owner-occupied housing rates, and desirability often decline. Cities become hollow from the center out. As smart community redevelopment agencies have realized, investing in infrastructure is an investment in the health of the center city. Vital older neighborhoods, filled with character and history, provide convenient, diverse housing close to city centers. This leads to a more robust workforce, increased demand for urban commercial goods and services, reduced reliance on extended sprawling transit patterns, and ultimately to revitalized, stronger cities.

Infrastructure restores:
The act of fabricating, installing, and maintaining infrastructure is often characterized as a burdensome cost few communities are able or willing to pay.

At the same time, ironically, we are engaged in a national conversation about the loss of jobs and industries in America. Surely no sector of our economy is more necessarily local than infrastructure renewal: it cannot be off-shored, because it can only be built in place. And, while we often transport components over long distances, could not every town have it's own "build on demand" factory to create infrastructure components locally? Rebuilding America's infrastructure could inspire new products and services, sourced, built, and maintained locally. This could replace a vicious cycle of disinvestment with a virtuous cycle of increased employment, better incomes, and more revenue available for further community investment.

Infrastructure re-stories:
The heroic infrastructure narratives of the 19th and 20th centuries often involved major projects that, for all their good, also damaged the environment, while they exponentially increased reliance on centralized management structures. Can the infrastructure of America's fabric—thousands of "minor" infrastructures—place increased emphasis on community members' ongoing participation, and the value provided by the natural environment? Can we create new stories of interdependence and continual, collective, thoughtful transformation?

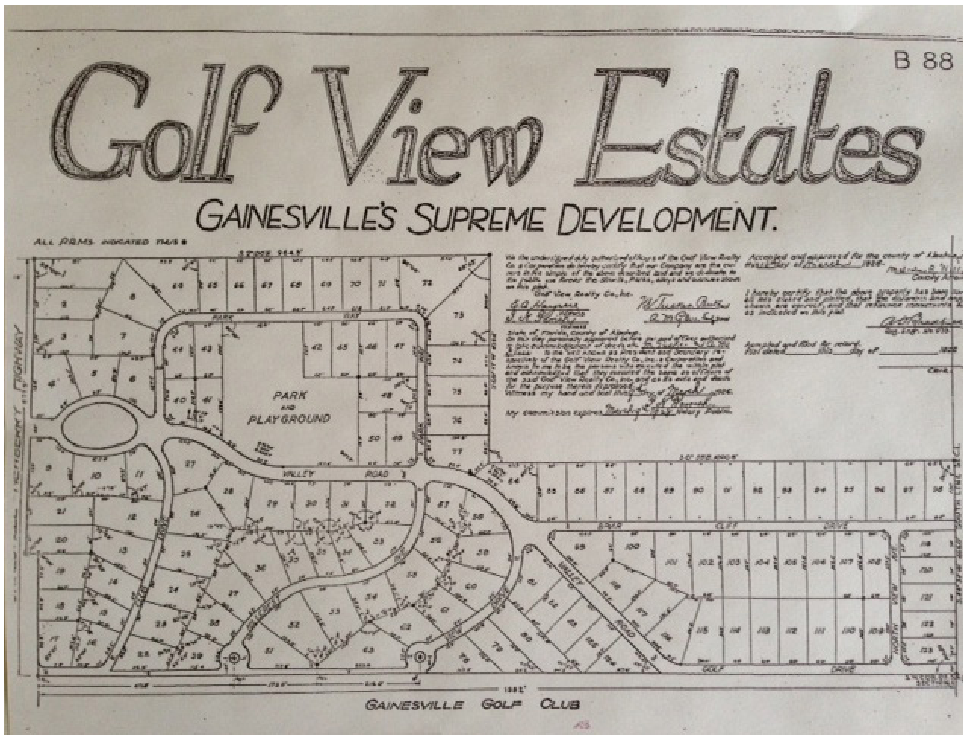
Postcard views of the Golf View golf course c. 1927

Introduction

The aqueducts and road systems of the Romans; the stepwells of the classic Indian period; the road systems of the Incans and Mayans; the canals, gondolas, courtyards, and community wells of Venice—each of these cultures is defined by its creative and useful infrastructure. Similarly, the story of America's rise to prominence can be told through its 19th century railroad network, and its 20th century interstate highway system and heroic hydroelectric projects, as well as through the Rural Electrification project and the widespread adoption of "indoor plumbing" as a marker of community success. The public history of this nation, and of many other cultures, relies on the scaffolding of collective constructions known as infrastructures.

But in recent decades this story has taken an unfortunate turn. Most prominently, in 2007 a bridge crossing the Mississippi River in Minneapolis collapsed into the river during rush hour, killing 13 and injuring 145, leading to the popularization of the phrase "fracture critical" infrastructure. In recent months, especially following the much-publicized water crisis in Flint, Michigan, America's infrastructure has become the focus of increased national attention.

The American Society of Civil Engineering has determined that many of our nation's roads and bridges are failing, and they have raised the alarm to policy makers and to the public. More insidiously, it has been calculated that our nation's potable water supply is widely compromised due to century-old leaking pipes. Our waste and stormwater systems, too, are reaching the ends of their lifespans. Our electrical grid faces opportunities provided by new sources of energy, but also the challenges of current business models, as it, too, ages. And emerging practices (FedEx, recycling) and technologies (the internet and the internet of things, solar and wind collection, drones) have not yet achieved their transformative potential. At this time, across the country, 21st century technologies are constrained by a late-19th century conception of infrastructure.



Original 1926 Plan of Golf View Estates

Project Scope

While inventive large-scale infrastructure projects are emerging in major cities, the "fabric" of our country—its neighborhoods, housing stock, subdivisions—has not been addressed. This project seeks to find prototypical solutions to go beyond repairing our existing, aging infrastructures, to, instead, envision an integrated 21st century neighborhood infrastructure. Such an infrastructure should be replicable across first-ring suburbs across the country, typically characterized by narrow right-or-ways, mature vegetation, and relatively small lots, along with aging pipes, wires, and poles, and dwellings.

This project, set in Gainesville's Golf View neighborhood (platted in 1926), was designed by students from a variety of disciplines including landscape architecture, architecture, building construction, and mechanical engineering who focused collaboratively on one neighborhood throughout the semester. Experts, including staff from the City of Gainesville Public Works and Gainesville Regional Utilities, were active participants. Following a period of research, analysis, and iterative designs, this book records the studio's final proposal which was presented to the neighborhood, the City, and the public, along with University experts.

Design Development

Processes & Flows

Systems

Scales

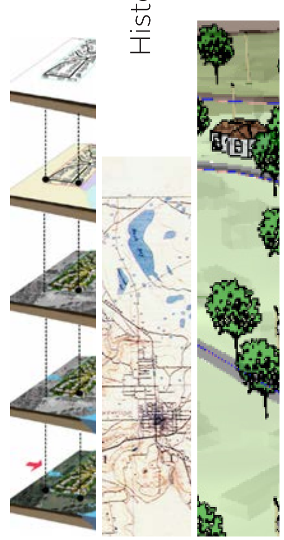
Assignment 1

PRECEDENTS AND PROSPECTS

Energy · Vegetation

History · Legal · Maintenance

Models



Assignment 2

ANALYSIS AND VISION

Sustenance, Itinerary & Energy

Food Community & Social Infrastructure

Communication & Rainwater Infrastructure

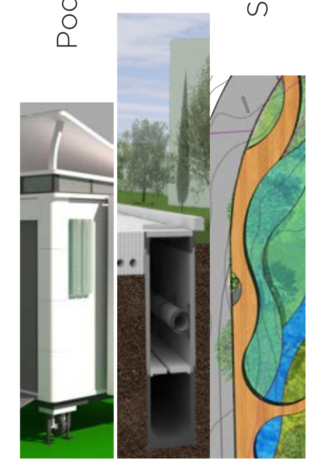
Assignment 3

DESIGN MASH-UP

Pods & Temporary Housing

Energy

Stormwater Management



Assignment 4

BREAKOUT DESIGN

History and Stories of Golf View

The Florida Railroad linked Fernandina and Cedar Key, through Alachua County. Residents voted to create a new town on the railroad line, Gainesville, founded in 1853. The original city plat followed a traditional gridiron design, approximately eight blocks surrounding a courthouse square.

By 1860, the town's population had reached 269. Gainesville became a Confederate storehouse during the Civil War. After the war, education thrived with the Gainesville Academy, Ocala's East Florida Seminary, and Union Academy. On April 14, 1869, Gainesville was incorporated. Gainesville also became a large cotton and citrus shipping station. By 1882, the city's population reached nearly 2,000. Gainesville expanded to include neighborhoods developing in the north, south, and east.

Public improvements shortly followed. Gas became available in 1887 and a public water system in 1891. Telephones and electricity arrived in the late 1890s and a sewer system was established in 1907. It became the fourth largest city in Florida in the early 1900's with a population of nearly 4,000.

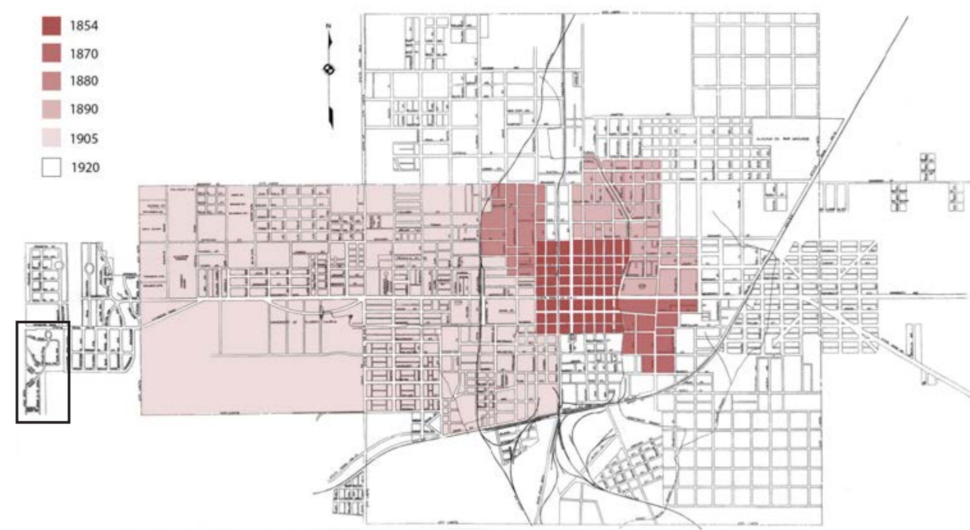
After the establishment of the University of Florida in 1905, subdivisions sprang up around the University. Platted in 1907, College Park is the oldest of the university area subdivisions. Later, subdivisions like University Park, University Heights, and University Terrace were developed in the 1910s. By 1920 the city's population soared to over 10,000.

The University became an important economic factor to survive the collapse of the local cotton and phosphate industries during World War I. Throughout the 1920s and 1930s development drew the University and city westward.

During the 1920s subdivisions Palm Terrace, Hibiscus Park and Golf View reflected Gainesville's response to the Florida land boom. These subdivisions feature trees forming shady arcades over streets, while water-filled sinkholes create ponds full of plants.

Golf View was a development project of the late 1920s and 30s. It was headed by the Golf View Realty Company during the Florida housing boom. The plat was registered on March 10, 1926 and shows 123 plots of nearly equal area. The low swampy ground between what is now 26th and 27th streets had been set aside as a park to be owned jointly by all property owners in Golf View. The last of these early subdivisions to be completed, Golf View remains the most attractive and self-contained. Planned as an affluent enclave, development did not begin until the 1930s. It reflects popular architectural styles prevalent in Florida from the 20s onward.

The Expansion of Gainesville, 1854 - 1920



The first homes were built at the south end of the subdivision, with more homes infilled over time. These homes were built on two lots, allowing more spacious homes and yards. However, in later years, speculative builders began to build one-story houses on single lots, which made for a crowded look. Golf View was outside the City of Gainesville, and because all streets were dead-ends, Alachua County refused to accept streets as public roads. This, as well as bad drainage, resulted in the street paving deteriorating rapidly. The housing boom slowed in 1940, and few homes sold. During this period Golf View was truly in bad shape.

The Golf View Association was formed in 1942, and a board was established. To keep the association functioning, there was a monthly fee voted for each home and vacant lots. The board of directors hired a construction company to resurface streets with a coat of tar and crushed rock in 1946. The circle at the entrance to Golf View was unattractive, featuring a hole at the south end of circle and abundant shrubs and bare spots. Around 1950, the board authorized beautification of the circle. The hole was filled with dirt, drain tile was installed at lower end, and a sprinkler system was installed. A resident with a road building company helped install steel railings and concrete posts to protect the circle.

Gainesville's First-Ring Neighborhoods and Suburbs

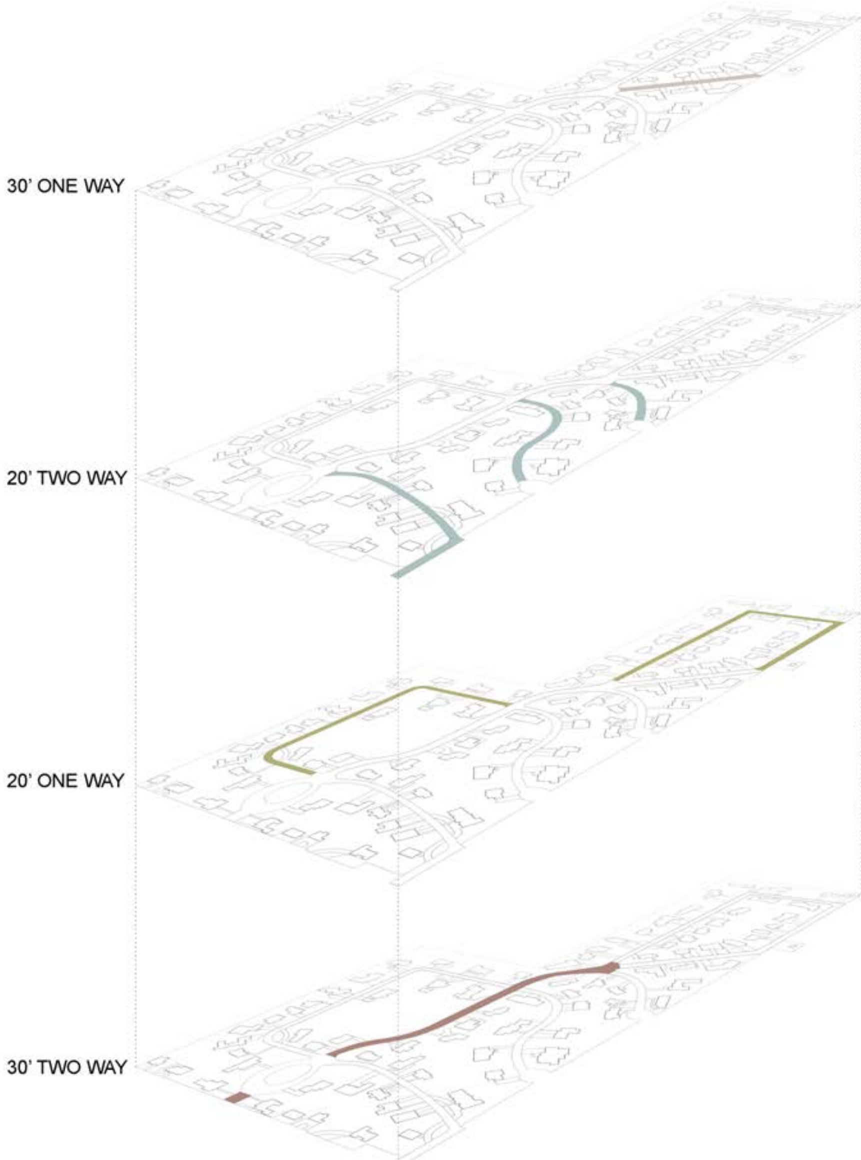
The Growth of Golf View by Decade

The Golf View Improvement Association continued to function with almost complete support of residents. The streets were swept each year, which kept pavement in fair condition. The drainage was improved and curbs were brought in. It is a fine example of the close-knit community and citizen effort. The community continues to hold events to facilitate communication between neighbors, including an annual picnic and holiday events.

On January 1, 1962, the City of Gainesville extended its borders and Golf View became a part of the city. In 1963, the city installed a complete sewerage system. After the lines were put in, all streets were resurfaced. These improvements were paid for through city taxes.

Following World War II, the University greatly expanded westward. By the 1970s newer residents responded to the charms of the older residential areas and fought to preserve these neighborhoods. Many older homes were sold to developers and rented to students, which caused deterioration and turned neighborhoods into commuter parking. The residents organized associations to protect their homes. They fought successfully against zoning changes and made the city institute a decal parking system to clear the streets. Their efforts worked to redesign and redevelop these areas as residential communities in the midst of urban and University growth.

Social Strip and Transportation Diagram



The Social Strip provides access from the entrance, as well as connections between all regions of the neighborhood. It also facilitates interactions between walkers, bicyclists, and even vehicles passing through; all with safety and security in mind.

The Street

Like many first-ring suburbs, Golf View's streets are narrow and comprise the only public right of way. This suggests that utilities and all modes of transport must be integrated within this shared path. The design proposes that all utilities be bundled as a set of smart utilities and placed under the pavement. Furthermore, it suggests traffic calming, more walkable streets, designated on-street parking, and clarified traffic flow.

Social Strip

Golf View is an active community where individuals use the streets daily, despite not having sidewalks to go safely throughout the neighborhood. The Social Strip is a safe, walking addition to the existing narrow streets that currently reside within Golf View.

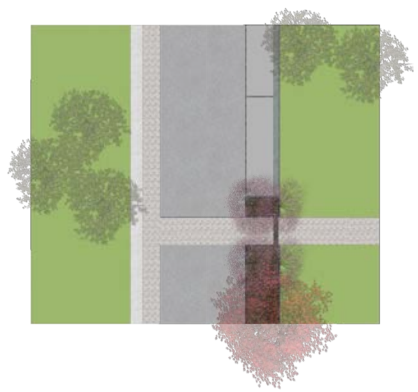
The Strip is located on each street within the neighborhood and resides on the side of the street that reflects the utilities installation. With the new Smart-Utilities system designed as a module it seemed reasonable to design the Strip in the same manner. In order to maintain consistency in design, carrying the module throughout the neighborhood provides the simplest means of access for both daily use by the residents as well as access for maintenance crews.

The Strip portion of the road consists of True Grid pavers which are permeable, resilient, and durable. The pavers rest within each module and provide easy access of utilities maintenance for both dry and wet utility cavities. These pavers are designed to be installed uninvasively, with simple tools and technology. They allow for water runoff to be contained and properly dispersed into a respective raingarden. They also have the strength to bear the weight of a fire truck or garbage vehicle, so that they may have full access of the road.

Transportation and Parking

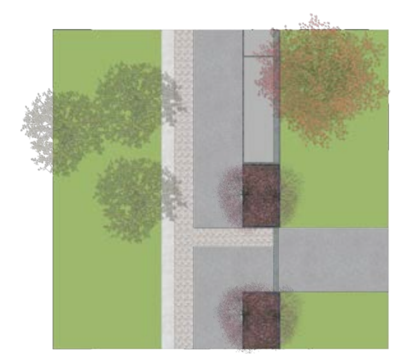
Two Way Corridor

This section of road will maintain its current use as a 30-foot, two-way corridor. It serves as the primary entrance and exit for the neighborhood, an contains the entry loop. The updated design for this stretch of road incorporates the 6-foot social strip along the edge, along with two 8.5-foot travel lanes for vehicles. It also features a 7-foot area, alongside the travel lanes, for parallel parking and planting.



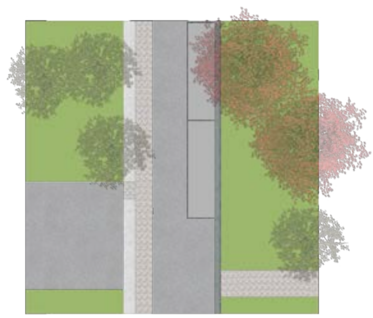
One Way Loops

This illustrates the locations of the one-way loops within the neighborhood. Each of these two loop sections will be 20-feet wide, and accessible from the main two way corridor. This design incorporates the 6-foot wide social strip on one side, along with a 7-foot vehicular travel lane. It maintains the 7-foot stretch designated for parallel parking and planting.



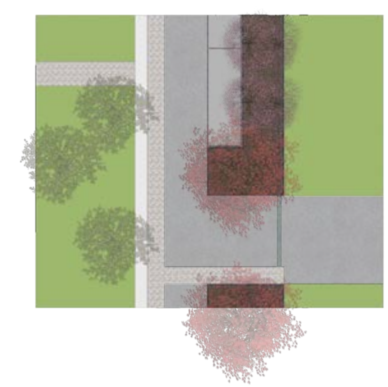
Two Way Cul-de-Sacs

This is a plan view of the 20-foot, 2-way cul-de- sac. This design incorporates the 6-foot social strip, along with one 7-foot travel lane. An additional 7-foot stretch for parallel parking and planting is incorporated in certain locations. However, in other locations, there is a 14-foot travel lane in both directions, with no parallel parking.



One Way Corridor

This section of road will be a 30-foot, 1-way corridor. This design incorporates the 6-foot social strip along the edge, and one 8.5-foot vehicular travel lane. It includes 15 feet for planting and the daylit stream, running parallel to the road. In the planting closest to the road there will be areas spaced intermittently for parallel parking.



Integr

By implementing the street systems previously mentioned, we hope to achieve the goal of having a more walkable, active, and scenic neighborhood road infrastructure. The social strip will allow walkers, bicyclists, and pet owners to walk throughout the neighborhood safely and out of the way of vehicular traffic. By modifying the traffic patterns throughout the neighborhood, Golf View will gain traffic flow organization and improved driving routes. By utilizing structured parallel parking and planting areas, street parking will become more organized throughout and congestion due to misparked cars will be alleviated in the neighborhood.

Public Space and Stormwater

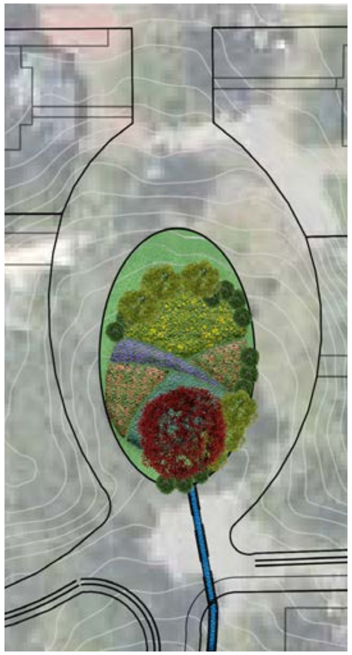
Golf View's three City-owned public spaces are reimagined as a linked system of fresh water and stormwater conveyance—both a public amenity and a cleansing system for the neighborhood's runoff, which naturally flows onto the adjacent UF Golf Course.

Topography and Flow

The main goal of this stormwater project is to collect water as a resource in a visible, elegant and enjoyable way. This design combines function and aesthetics based on the topography and water flow direction. According to the site analysis, the general topography of the neighborhood is that the north-east is relatively high while the south-west is relatively low. In general, with such a topography the water will flow from north-east to south-west. Therefore, we are going to use the entrance garden, boardwalk, daylit stream, and stormwater park to organize a stormwater system and deal with the water in a natural, visible way. We also wish to provide space for people to gather together, have a picnic, walk their dog, enjoy scenery and so forth in the neighborhood. For the sequence, the water is retrieved from the raingarden entrance and transported by the water channel. The water passes by the conservation area and boardwalk, and in turn flows into the stormwater park which is then transported, cleansed, into the golf course's lake.

Entrance Raingarden

The proposed rain garden features a beautiful red maple, the anchor of the design. Complementing the red maple, there are ornamental plants such as irises and lilies. These are well-adapted to wet conditions, will retain the runoff, and allow it to percolate through the soil and replenish the aquifer. New planting will be incorporated alongside some of the existing planting; which has been installed and well cared for by Golf View residents. This rain garden will offer an aesthetically pleasing space, and it will serve as the first vehicle of the stormwater treatment system. One of the main functions of the rain garden is to provide an outlet for the stormwater to make its way to the daylit stream.

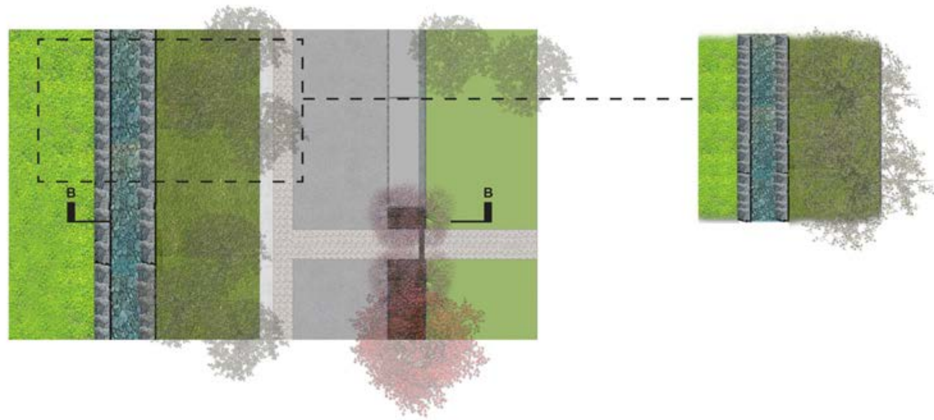


Boardwalk

The boardwalk will be nestled within the conservation area. This boardwalk facilitates a closer interaction with nature and gives the user a better appreciation for the wildlife. For instance, birdwatching and other nature-oriented activities will be more feasible and enjoyable on the boardwalk reducing the footprints on the natural contents of the conservation area. The boardwalk provides connectivity across the north-east region of the neighborhood. The undulating construction, which is influenced and guided by existing trees, allows for interesting views as well as the preservation of those existing trees in order to maintain the natural setting.

Daylit Stream

The daylit stream is located between the front yard and the green space of the road. Currently, the stream goes underground and our plan is to modify the stream into a daylit stream. The new design would transport water in a visible, elegant and enjoyable way. This stream will run the length of the neighborhood, from the entrance raingarden, through the conservation area, to the stormwater park on the southwest side. The water channel will be four feet wide throughout the neighborhood, and the the channel will be made of various-sized rock.



Stormwater Park

The stormwater park is located at the lowest elevation point of Golf View and the design principle is to combine function and aesthetics; and transport water in a visible and elegant way. The stormwater park not only cleanses and transports water via the water channel, pond, and weir, but also provides a multi-purpose field for people to enjoy various outdoor activities. Additionally, the stormwater park is under the existing canopy trees and in this image we can see the boundary and location of the existing canopy trees. The stormwater park helps us to transport and deal with the water in a visible way by a clear sequence based on the topography of the Golf View Neighborhood. The design will also improve people's quality of life by providing beautiful scenery and freedom to enjoy various activities.

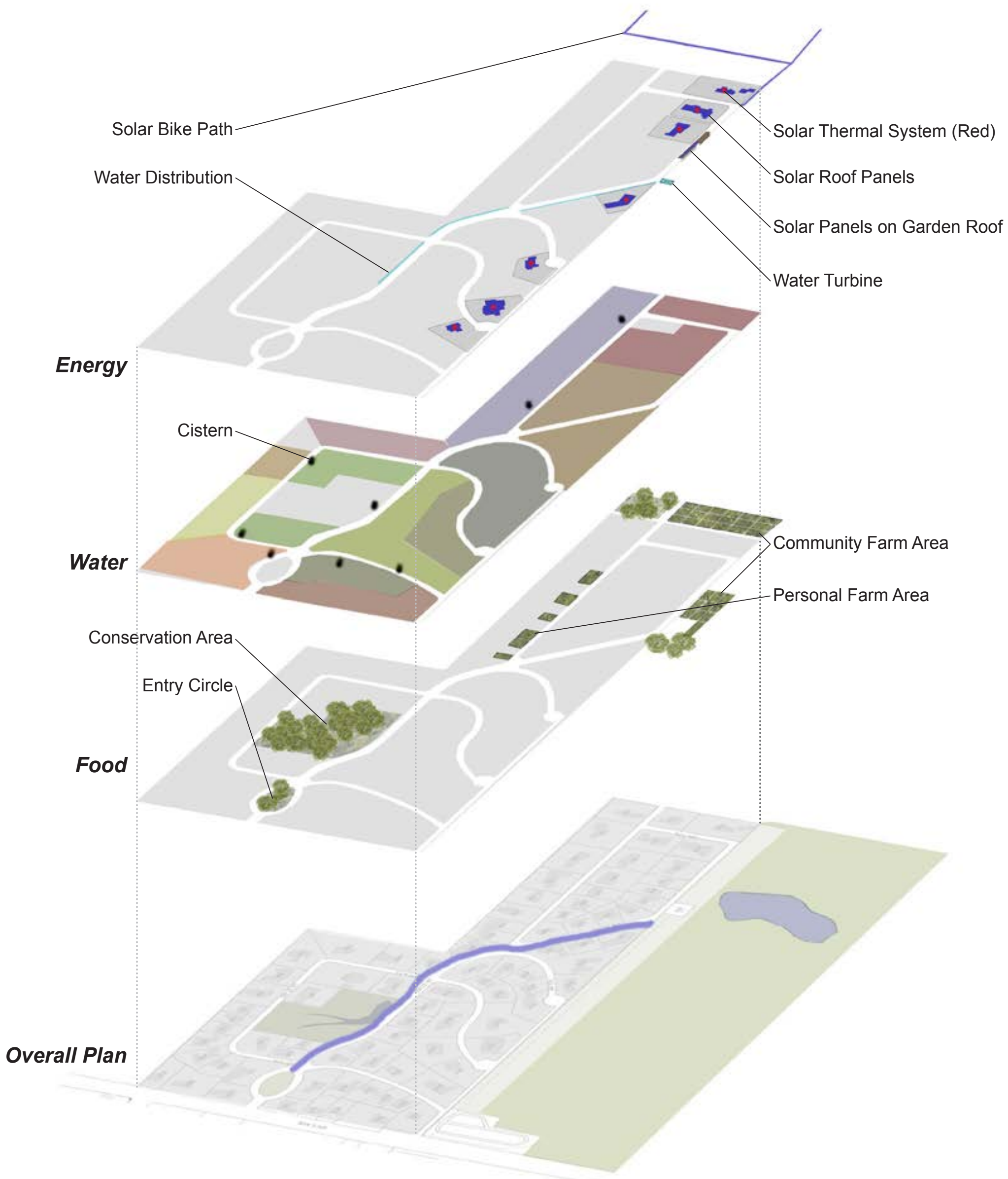
Detail of water transportation: The water is transported into the stormwater park via the water channel, which then flows into the pond. The pond not only transports water, but also can clean and purify the water. Additionally, there are two weirs-- small dams that control the flow and direction of water into the next area. Finally, the water is transported into the existing golf course lake.

Detail of the weir design: The design incorporates marsh grasses and rocks to reduce the water speed. The water travels through the middle part of the weir, which encourages the water to flow in a more natural and elegant way.

Stormwater Park

People can enjoy the beautiful planting on the deck, take a stroll along the path, and enjoy the water scenery on the grass or on the bridge. They can also participate in various activities such as gathering together, having a picnic, playing in the multipurpose field, walking their dog, enjoying the view of the golf course, taking a break, and relaxing in nature.

Golf View Axonometric Diagram



Infused Infrastructures

Following the previous Witters Competition projects (presented in late February), these three proposals are suggested as “add on” options to be layered on top of the basic design. The proposals focus on neighborhood-scale water, energy, and food strategies.

Layers of Infrastructure

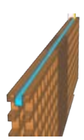
The image to the left presents several different layers of infrastures available for construction in the Golf View neighborhood. The intent is to be able to construct each layer as a whole in the neighborhood, and to have it as a replicable model for neighborhoods across the country. However, these layers are not mutually exclusive. Individual pieces of each layer may be implemented, combined, or partially mixed together to create one unique design for the neighborhood. For example, in construction one could combine the stormwater and cistern layers together, to create a system that collects even more water. These could then be combined with a food layer, to provide energy and cost-saving irrigation.

Water

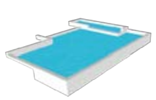
This layer is representative of a unique cistern design used to collect and distribute rain water between zones. A zone in this respect is considered a cluster of houses within Golf View. This is an innovative cistern design that harvests and distributes water collected from roof tops utilizing the natural slope of the land. Houses are grouped together based on elevation and current water demands. Using gravity and slope as an advantage, pipe lines can be laid to distribute the water among a group of houses at a lower elevation to supply water for things such as lawn and garden irrigation.

Roof-top water channel
Collects rain water from the roof

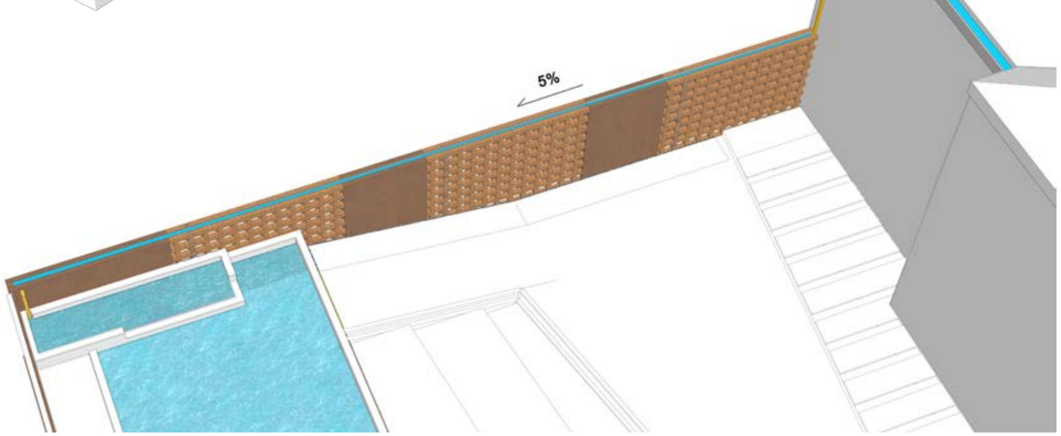
Pipe
Transports water from the roof to the wall-top channel



Wall-top water channel
Transports water to the highest point, and creates a vertical garden



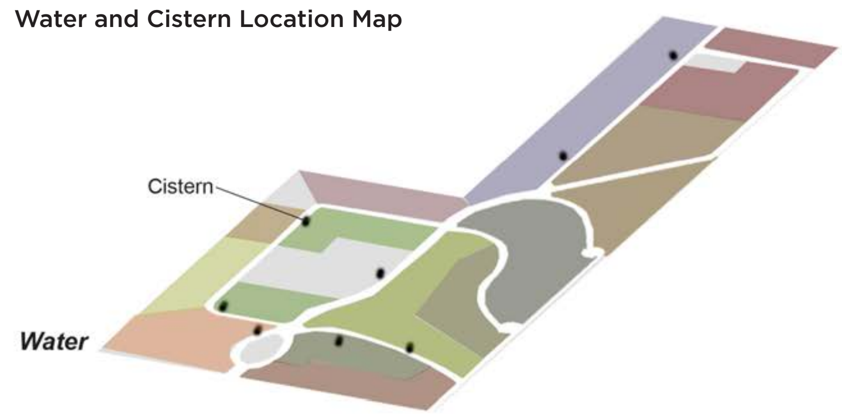
Cistern
Stores the water, and creates a water feature



Rainwater Balance Tool:

We developed a rainwater harvesting tool, which helps group all the houses based on their inflow and outflow. This tool utilizes data based on three criteria: elevation, cistern height, and amount of water collecting and supplying. It calculates the rainfall for each house, every month, and then picks out the maximum rainfall for a year. Following this, the outflow is decided by amount of irrigable area as well as number of occupants in the house. If the design is feasible, it will tell how much water can be collected and what the size of cistern should be. It allows you to group the houses together and input the lowest house elevation for inflow and input the highest elevation for a house in outflow group. In this way, it helps to decide if the cistern is feasible in that group of houses.

Water and Cistern Location Map



Rainwater Balance Tool

Inflow House Group at Elevation (ft) 127

Building Number	Number of Floors	Building Area	Roof Area	Efficency (%)	Maximum Inflow (gallons/month)
2	1	1508	1508	55	3687
3	1	1138	1138	55	2784
4	1	1328	1328	55	3247
5	1		0	55	0
6	1		0	55	0
7	1		0	55	0
8	1		0	55	0
9	1		0	55	0
10	1		0	55	0
10					13822

Outflow House Group at Elevation (ft) 109

Building Number	Occupants	Irrigable Area (sft)	Outflow (gallons)
	2	1379	1816
	2	1095	1482
	3	1170	1666
	4	1041	1610
	2	1370	1806
			0
			0
			0
			0
			0
			8379

OUTPUT / Decision
Feasibility check on cistern height
YES
Feasibility check on Elevation
YES
Feasibility check on Supply
NO
Overall Feasibility Check
YES

Cistern Radius (ft)	12	
	Gallons	Height (ft)
Cistern	5443	12.04

GOAL: RAINWATER COLLECTION

GOAL: FEASIBILITY BASED ON ELEVATION

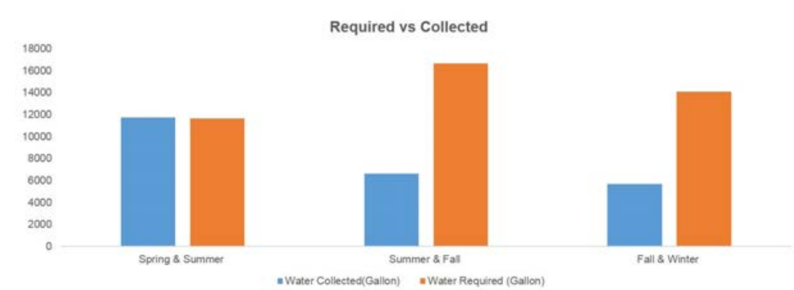
FLORIDA RAINFALL (inches)= 47.37

INFLOW:

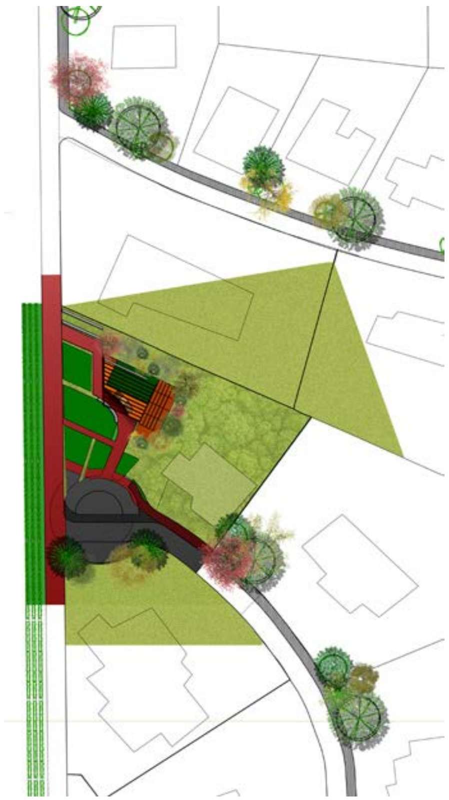
MONTHS	ANNUAL RAINFALL (inches)	BUILT UP AREA (sqft)	NUMBER OF STORIES	ROOF AREA (sqft)	EFFICIENCY (%)	VOLUME (gallons)	INFLOW VOLUME (gallons)	VOLUME (gallons)	VOLUME (gallons)	VOLUME (gallons)	VOLUME (gallons)	VOLUME (gallons)	VOLUME (gallons)	VOLUME (gallons)	VOLUME (gallons)
January	3.31	5000	2	**2500**	65	3353	2239	2959	4662	2438	2909	0	0	0	0
February	3.19			1744		3232	2254	2852	4493	2350	2804	0	0	0	0
March	4.33			2206		4387	3060	3871	6099	3190	3806	0	0	0	0
April	2.68			3476		2715	1894	2396	3775	1974	2356	0	0	0	0
May	2.48			1818		2512	1753	2217	3493	1827	2180	0	0	0	0
June	7.13			0		7223	5039	6374	10043	5253	6267	0	0	0	0
July	6.06			0		6139	4283	5417	8536	4464	5326	0	0	0	0
August	6.38			0		6463	4509	5703	8987	4700	5608	0	0	0	0
September	4.41			0		4468	3117	3942	6212	3249	3876	0	0	0	0
October	2.87					2907	2028	2566	4043	2114	2523	0	0	0	0
November	2.05					2077	1449	1833	2888	1510	1802	0	0	0	0
December	2.48					2512	1753	2217	3493	1827	2180	0	0	0	0

Individual House Data

Seasons	Water Collected (gallons)	Water Required (gallons)
Spring & Summer	11727	11646.65
Summer & Fall	6639	16661.31
Fall & Winter	5703	14084.58



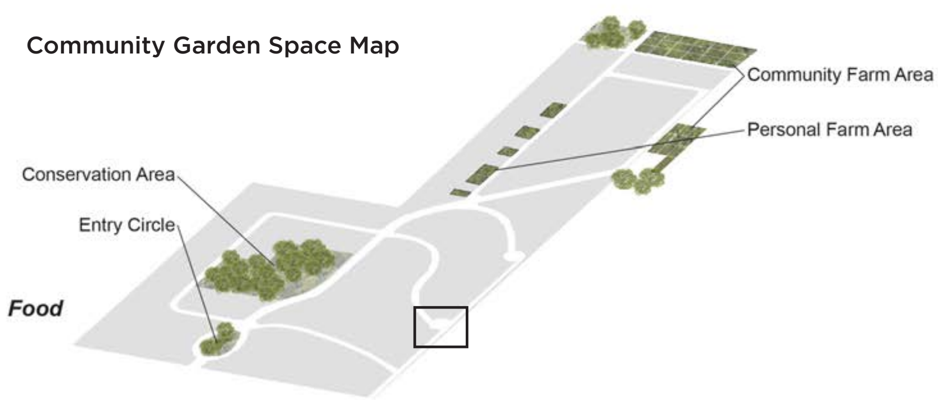
Food



There is an abundance of useable space in Golf View for food production. This is an instance where processes may be combined. Utilizing the path of stormwater flow, water can be diverted to different gardens through underground pipes. Also, using the cistern layer, water can be collected and transported to the additional gardens that do not naturally fall within the path of drainage.

The diagram to the left proposes a kitchen, located near the community gardens (designated by box on map below). This would be a space for community food preparation, gatherings, and neighborhood dinners, themed by food produced that season.

Community Garden Space Map



For crops, rotating seasonal fruits and vegetables will maintain a year-round food supply for the neighborhood. The total calories for one single family (one male adult, one female adult, and one child) are about 6400 calories. The proposed seasonal vegetables will meet nearly 70% of the daily required calorie needs.

A proposed irrigation design uses rainwater to irrigate the edible garden on this site. The layout of the channel divides the yard into sections for different crops.

The menu (left) is an example of a themed neighborhood dinner, using the seasonal fruits and vegetables grown in Golf View. By highlighting various ethic cuisines, the neighborhood might celebrate and enhance community diversity.

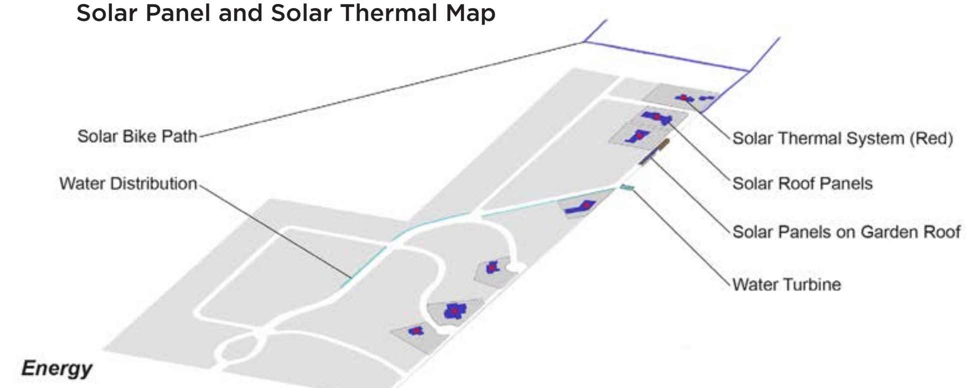
Energy

These images denote the potential solar energy systems in Golf View, including the location of each solar home. Based on the tree canopy and sun angle of Golf View, pre-determined locations for solar energy were established for systems such as solar thermal, solar panels, and a solar bike path. As mentioned elsewhere in this book, solar thermal systems can be implemented on the roofs of individual homes in certain areas. Solar panels can be placed in a potential community garden area located at the end of stormwater drainage system. These panels can be used to supplement the energy that will be needed to irrigate crops. Lastly, commuting between Golf View and UF can be enhanced by way of an attractive and useful solar bike path that could generate electricity for not only Golf View, but UF as well.

Solar Panel Data

Area per panel = 15 sq. ft.
Area available = 600 sq. ft.
Number of panels = 38 panels
Generation per panel = 200 W
Total generation = 7600 W or 7.6 kW
Efficiency 60 % = 4.56 kW

Solar Panel and Solar Thermal Map



Utilities System

The state of America's infrastructure is not good. The American Society of Civil Engineers most recent Report Card gives the grade of "D" to roads, drinking water, wastewater, and transit, while our nation's energy infrastructure receives the slightly better grade of D+. This is not surprising, as much of our infrastructure approaches the end of its lifespan. Rather than addressing this challenge proactively, governments across the country have chosen to address ruptures as they occur, in the face of other pressing civic demands. The result has been a national process of demolition by neglect, leaving our roadways, water systems, and electric and communication systems frayed or worse.

To Repair or Replace?

This proposal seeks to reimagine an integrated 21st century infrastructure that is compact, flexible, and can be manufactured locally. It is designed to be installed within the narrow right-of-ways typically found in older neighborhoods. Its installation and maintenance are intended to minimize impacts to residents' daily lives.

The Smart Utility, or "Smart-U" system is a modular version of the common utility setup. Rather than installing each utility separately, according to its own technical and installation logics, all of the utilities are bundled into two common channels, one deep or "vertical" and the other shallow or "horizontal". The vertical channel contains wastewater and, below, stormwater. Its depth allows the elevation adjustments necessary to achieve proper drainage. The horizontal channel contains "dry" utilities including electric, gas, CATV, and telecommunications.

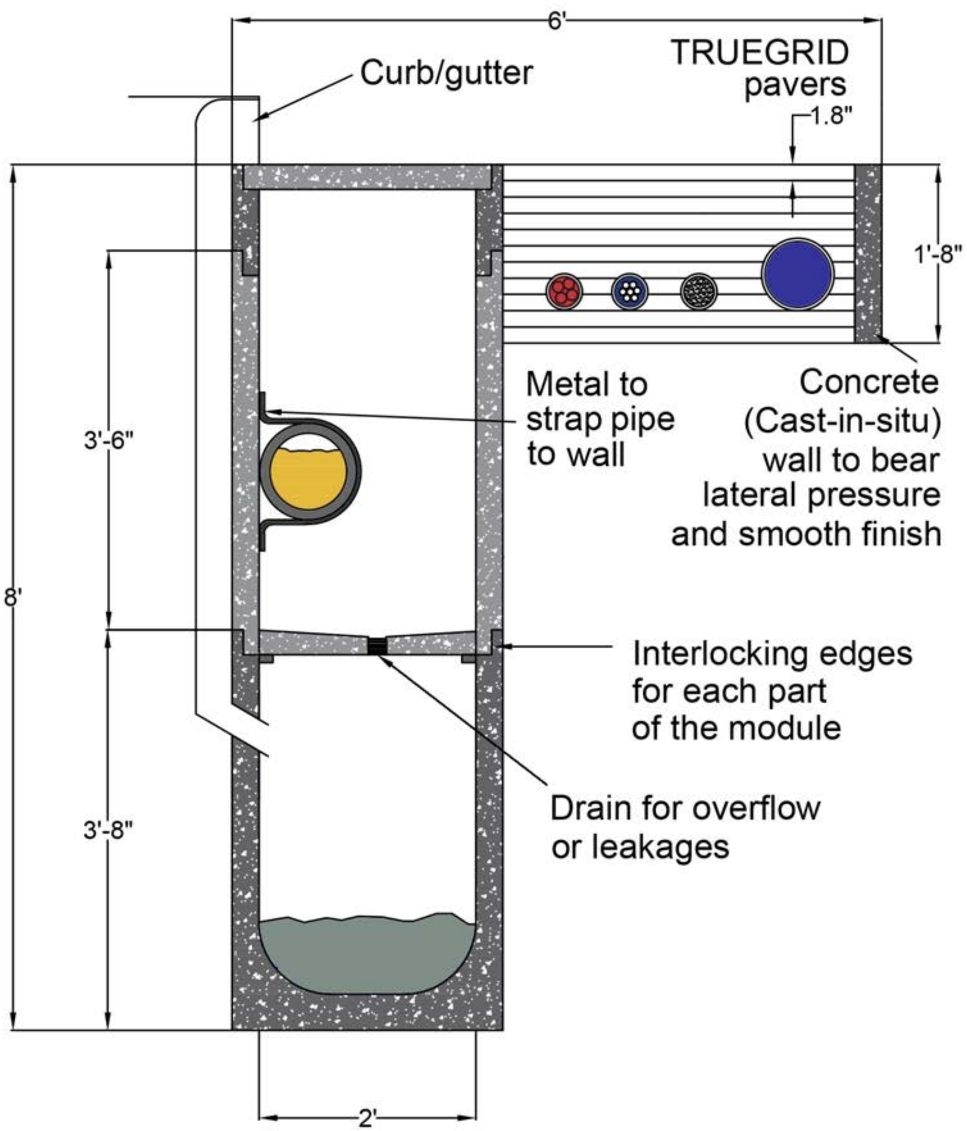
It also includes potable water, which must be separated from wastewater for safety.

The Smart Utility Infrastructure System

Small diameter conduit and pipes are a common denominator in the horizontal channel.

The Smart-U system allows flexibility in utility setup. It takes a component-based approach to the manufacturing, installation and future maintenance of underground utilities. It also works to eliminate digging up streets in case of repair, maintenance, or the installation of future emerging technologies.

Smart-U Assembly Diagram

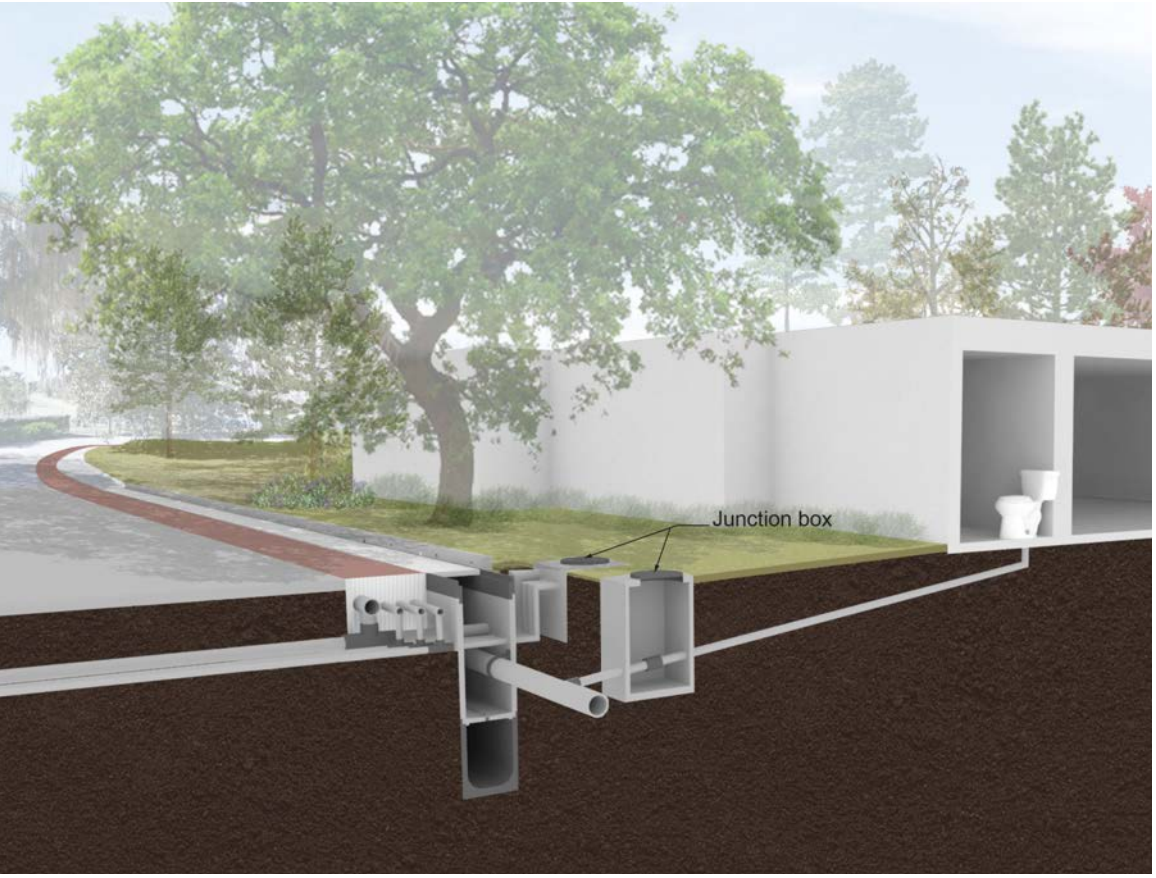


Assembly of Smart-U System

The Smart-U is a pair of modules, one part made of prefabricated reinforced concrete, housing wet utilities (sewer and stormwater), and the other part made of interlocking geo-mesh pavers made of HDPE (high density polyethylene) filled with gravel, housing dry utilities (electric, CATV, telecom, gas, plus potable water). The concrete module is deep, allowing topography and gravity to assist with drainage, while the geo-mesh paver module is shallow, allowing easy access for future repairs and replacement. Both are identifiable on the street's surface as the "social strip".

Most of the utilities, in the "dry" module, are close to the surface and can be accessed by hand-holes at specific locations with easy-to- remove pavers filled with gravel around the pipes, providing permeability for surface water runoff. The wastewater and stormwater pipes are installed in a 2'-6" wide and 8' deep (varies) reinforced concrete channel. The "wet" concrete modules will contain manholes at required lengths to allow for servicing and repairs. The partitions or material separation allow distances between various utilities to be minimized. It also bundles utilities in smaller, more convenient locations to the side of the primary traffic lanes. Additional designs for manholes and intersections and pull-boxes at corners can be added to the standard module design; together these will be capable of being implemented in any and all topographies.

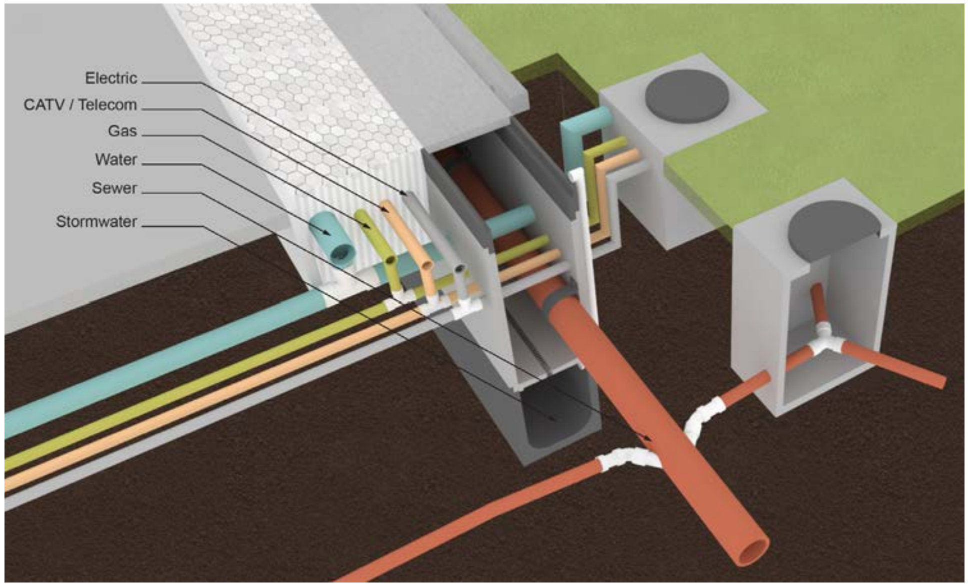
The diagram at the left is representative of the different prefabricated pieces in a single, two-part (vertical and horizontal), module. The interlocking concrete components might be about 4 inches thick, or of different thicknesses as recommended by the local authorities. The components could be manufactured locally, contributing to the City's economic health and providing opportunities for new jobs in a new industry.



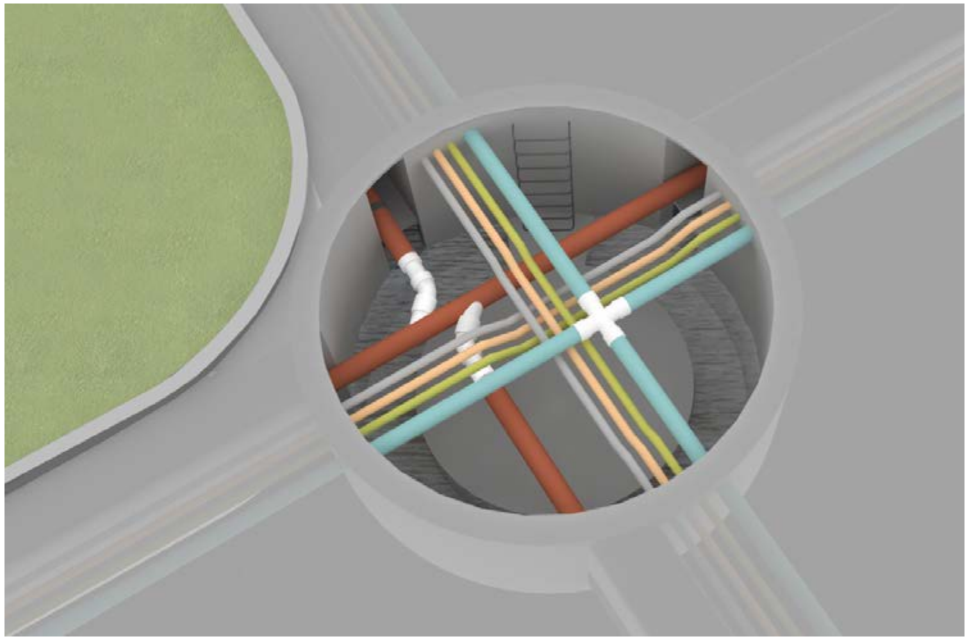
Junctions and Intersections

Junction Detail: To represent each utility, the individual lateral connections have been color coded for clear distinction. This detail also demonstrates the leading connections to the junction boxes of the property. Since the city provides utilities up to the property lines and the individual owners connect to the utilities at the street's edge, the junction boxes would serve as a meeting point for both. Junction boxes allow for ease of maintenance and repair operations. Due to contamination concerns, the sewer is separated from the rest of the utilities.

Intersection Detail : The image shows the design of a 4-way intersection. There will be a hollow cylindrical structure with about 8 feet in diameter. A specially designed manhole will be provided for maintenance and repair.

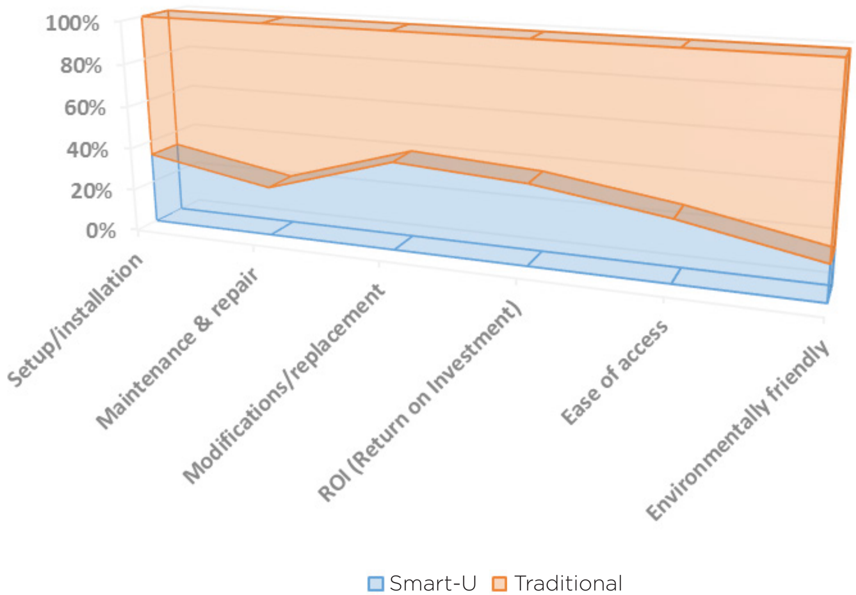


Junction Detail



Intersection Detail

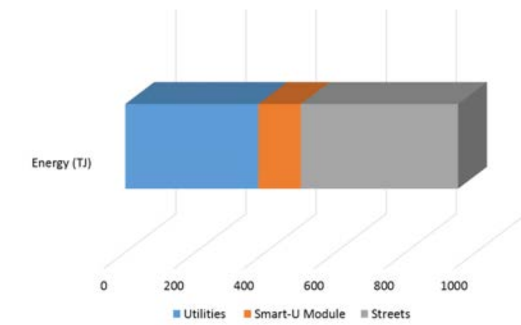
Smart-U vs. Traditional Utilities

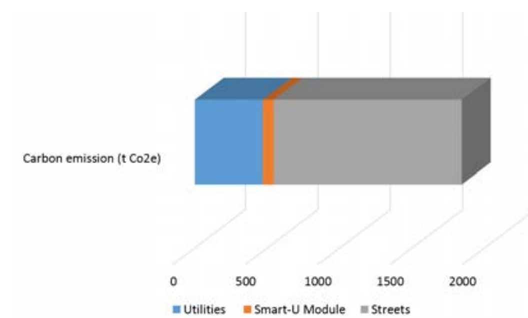


Comparison to Traditional Utilities

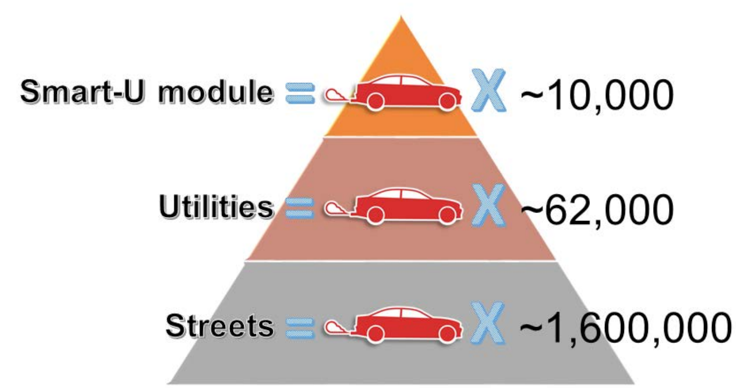
Comparing the Smart-U system with a traditional utility setup, The Smart-U system's flexible nature saves both on cost and time, when considering repairs and maintenance. In a traditional setup, you would have to dig up the main street and disturb the right-of- ways of local traffic. This not only adds to the cost, but also takes more time in practice. The pavers in Smart-U module are LEED certified and also qualify for tax rebates by some state laws. Whereas, the traditional setup does not have any added benefits; the Smart-U modules are porous and permit surface water run-off while keeping the soil integrity. Smart-U systems will also cost about 35% less in expenses than traditional utility systems currently in use.

Environmental Impact





The orange coating in the charts indicates the contribution of Smart-U in comparison to the regular pipelines/ utilities and making new streets/roads. Because streets must be repeatedly dug up in order to maintain and repair the existing utility systems, the Smart-U system is more efficient in the long run. We estimate that the Smart-U module would be equivalent to the carbon dioxide emissions of about ten thousand cars; assuming each car creates about 130 grams CO2/kilometer.

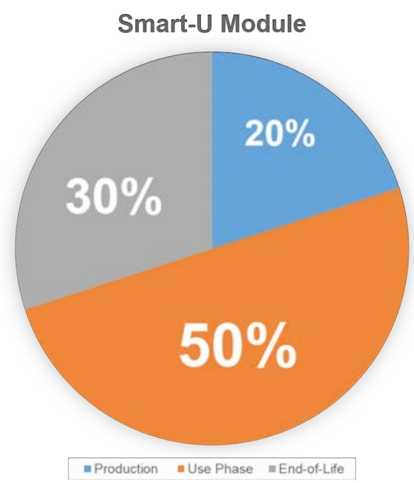


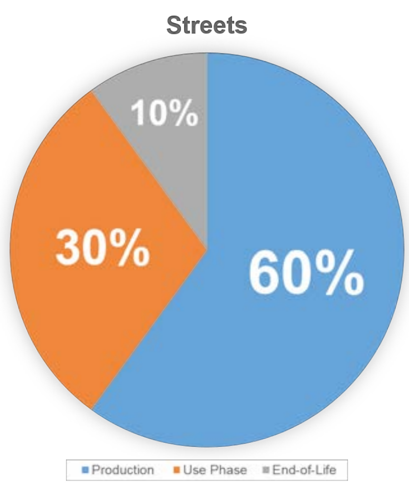
CO2 Equivalence Chart

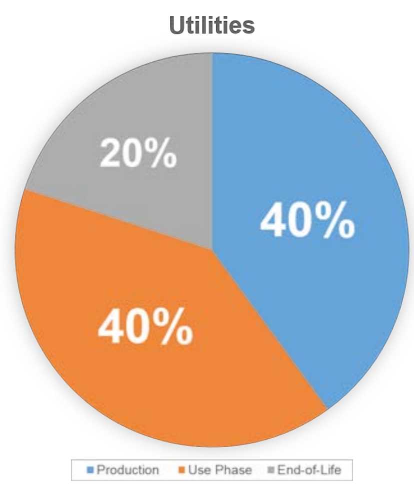
Life Cycle Assessment

Advantages of Smart-U

- Ease of implementation
- Time-saving
- Less labor intensive
- Ease of maintenance
- Cost effectiveness
- Durability of the structure
- Environmental benefits
- Disturb less surface/top soil
- Porous pavers help surface water runoff
- Recycled High Density Polyethylene (100% Post Consumer)
- Nontoxic, harmless to plants, animals, and microorganisms
- Inert material, groundwater neutral







Life Cycle Assessment (LCA)

Category	Energy (TJ)	Carbon emission (t Co2e)	Transportation (Ton km)
Utilities	379.662	467.936	64900
Smart-U Module	120.78	76.43	355075
Streets	448.63	1298.477	12023.9

Source:
Carnegie Mellon University Green Design Institute. (2016) Economic Input-Output Life Cycle Assessment (EIO-LCA) US 2002 (428 sectors) Producer model [Internet], Available from: <http://www.eiolca.net/> [Accessed April 15th, 2016]

Category	Production	Use Phase	End-of-Life
Utilities	40	40	20
Smart-U Module	20	50	30
Streets	60	30	10

Note:
Utilities include Water, Electricity, Stromwater, Sewage, Telecommunications, CableTV & Gas.

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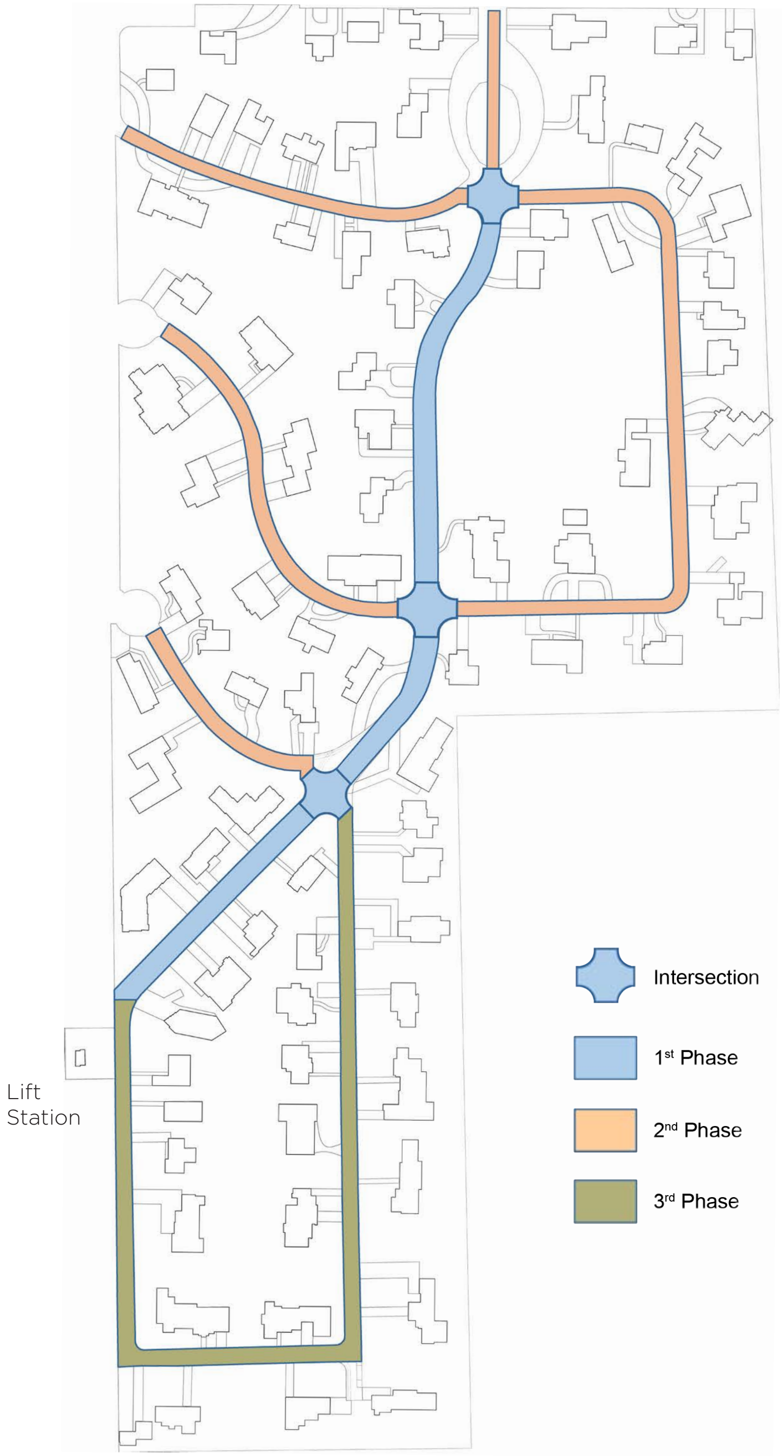


Implementation

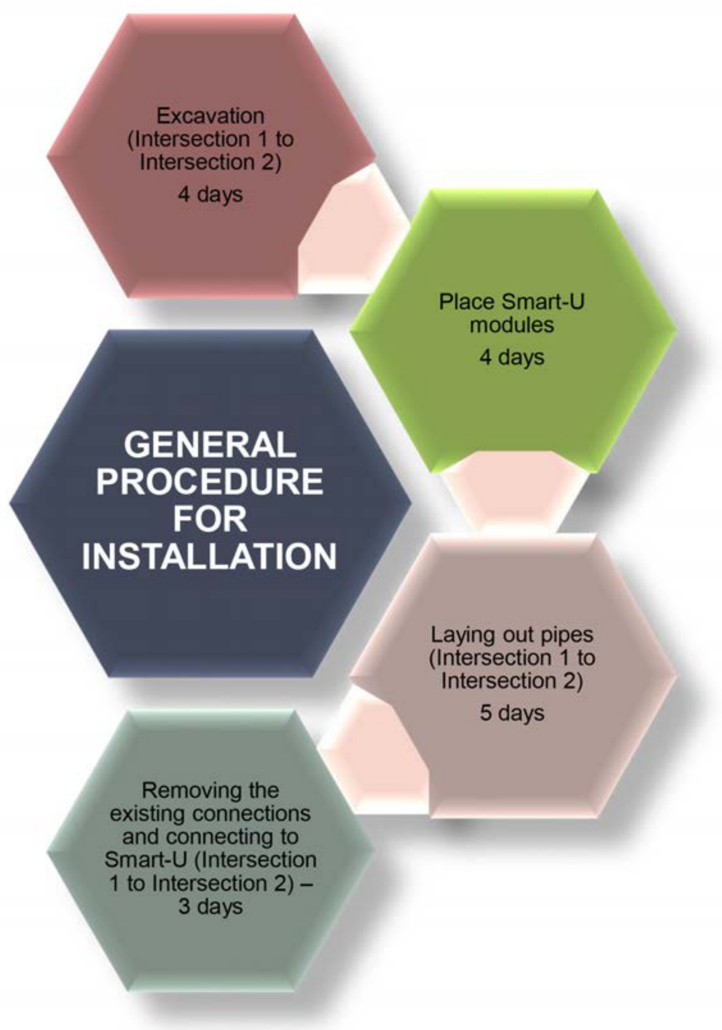
While some of the proposals, above, are “low hanging fruit”, others will be much more difficult and costly to achieve. It is important, in any case, to seriously address these challenges of cost, inconvenience, and potential changes in personal behaviors. Without a plan towards action, we (the neighborhood, the City, and the country) will remain stuck with increasingly degraded, even dangerous, century-old infrastructure. The first step toward reimagining the world for the coming century is confronting these challenges with determination and optimism.

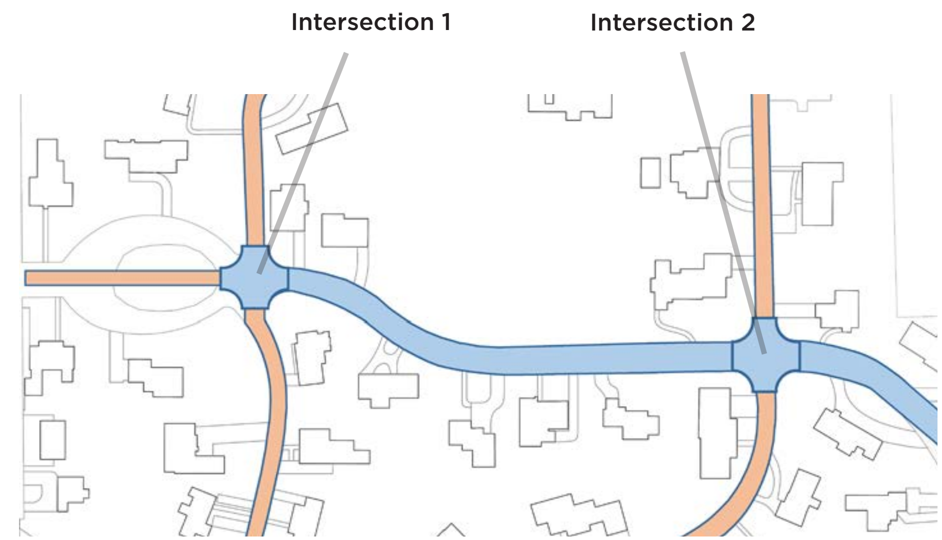
Sequence

Golf View is a neighborhood with narrow and varying street widths. There is hardly any provision for sidewalks; however, if some streets are remodeled as one-way streets we have provision to install sidewalks of about 6-foot wide throughout the Golf View neighborhood. These sidewalks would then be able to host the module under and along its length. Also the neighborhood has plenty of contours and an uneven topography which will demonstrate the overall feasibility of the modules and serve as a good testing platform for the concept. The image shows the sequence for the installation of Smart-U within Golf View. This process will begin with Phase 1, which spans from the entrance circle, south of SW 2nd Avenue, to the lift station. Phase 2 will include the lateral streets, and connect them to the utilities laid out in Phase 1. The third and final phase will work on the southern part of the neighborhood and connect it to the lift station. The entry circle would be maintained. The diagram simplifies the geometry for illustrative purposes.

Installation Chart

This chart (below) shows the construction sequence for the installation between intersection 1 and intersection 2 (right). We have considered and included a tentative construction schedule for these particular phases of the new neighborhood design. Based on our calculations we conclude that Phase 1 would take 48 days, Phase 2 would take 84 days, and Phase 3 would take 44 days. This would result in a total duration of 176 days (working days) which is approximately nine months.





Pods and Temporary Housing

The following are temporary housing solutions to mediate the installation of utility lines throughout the neighborhood. These temporary "pods" will facilitate some of the necessary household functions that members of the community may be without for up to a few weeks.

Each of the prototypes will be easily transportable, and provide mobile utility facilities. They use sustainable, off-the-grid solutions to provide homeowners with basic needs like water, electricity, sewer, and telecommunication services. Most of the pods realize that homeowners will have their homes for usual functions, like sleeping and storage. But some of the pods can be adapted for use in disaster relief situations, where persons and families are without homes altogether.

HC² Family Pods

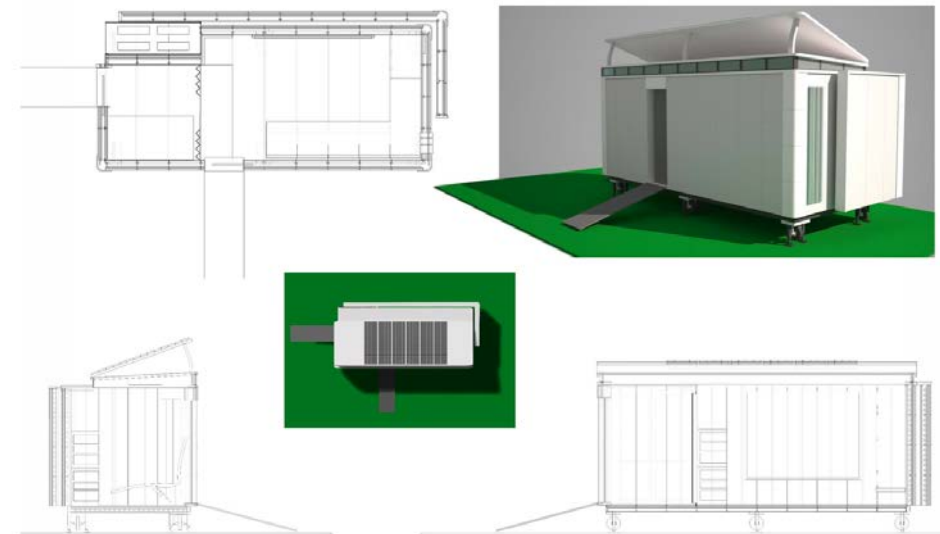
Mimi Kurpier

Hygiene Pod: Drinking Water, Bathing, and Rainwater

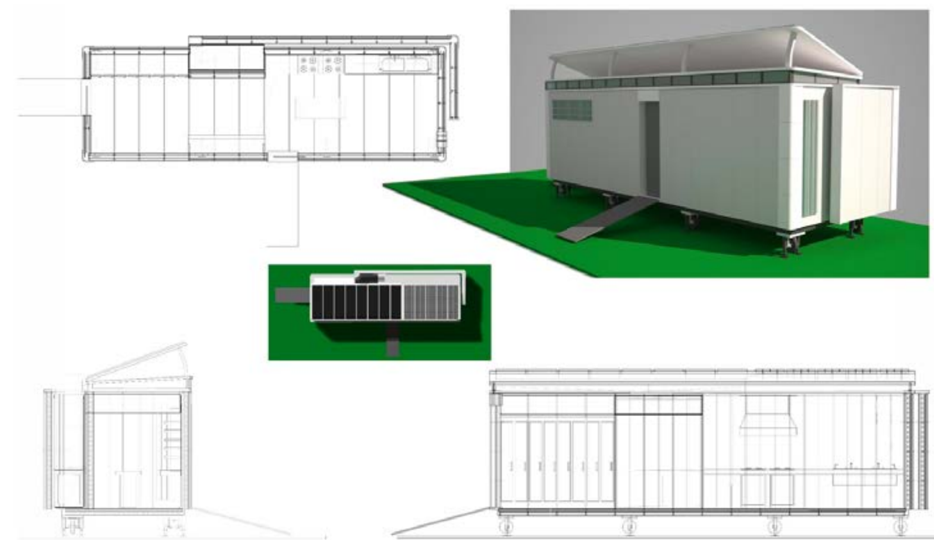
These pods are versatile, easily installable units that act as self-sufficient service models. There are exclusively three types of pods with a specific set of functions and purposes dedicated to each specific pod. Although each pod acts independently of the others, they are a family set that provide full- functionality for entire neighborhoods during natural disasters and/or other service demanding situations. These pods provide for the most necessary priorities ranging from familiarity and comfort to connection during crucial times of need.

Features

Communication Pod: Electricity, Media, and Telecommunications



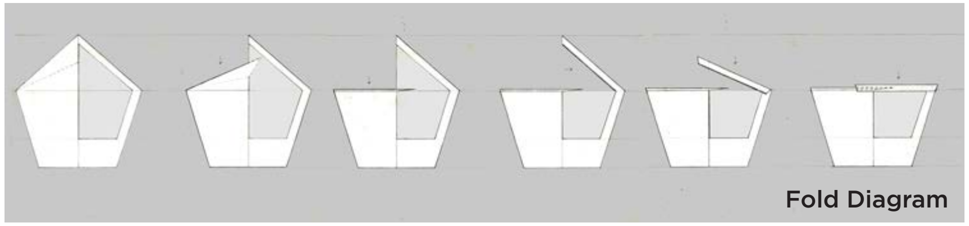
Cooking Pod: Storage, Preparation, and Community Kitchen



Transport

Flexigon Pods

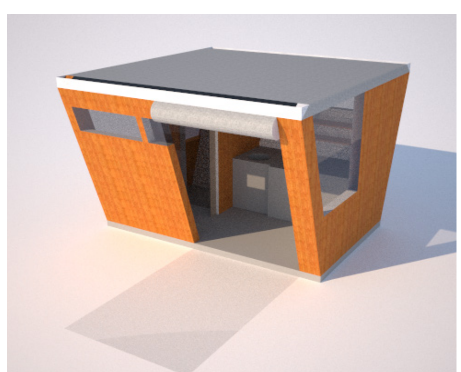
Michelle Eshelman

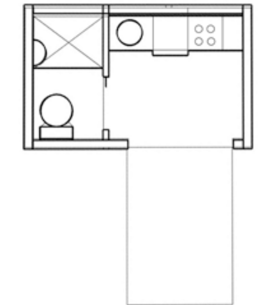

Fold Diagram

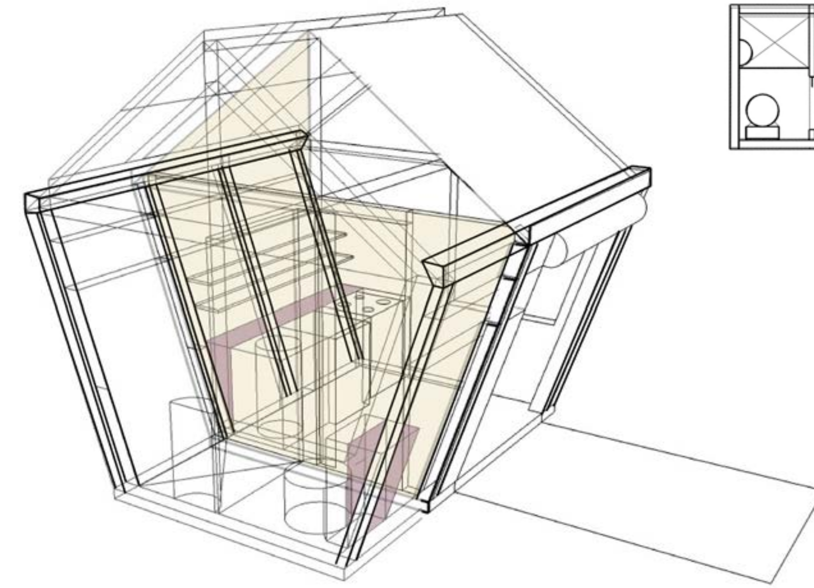
Concept, Plan: The Flexigon is a folding polygon concept pod that provides for basic utility needs. It features a compact kitchen, bathroom, indoor/outdoor living space, and an upper loft for sleeping or storage. Large entryway and windows provide for openness and ventilation. The entire unit can fold and flip on its side for easy highway transportation.

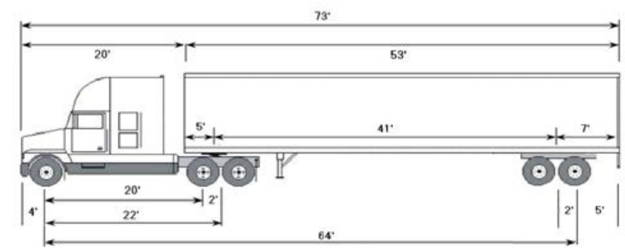
Fold, Flip, Transport: The back loft section of the Flexigon roof folds inward (see fold diagram). The front top windows fold inward, and the front roof section folds to lock on the anterior roof. Ready to transport after top space is compressed. The entire Flexigon flips onto the back kitchen space for transport (see flip diagram). Up to four Flexigons can fit onto one standard Semi-truck.

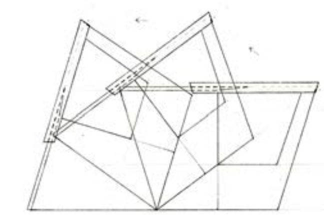
Energy Systems: A rainwater collection system on the roof channels water to an internal cistern, and provides 90 gallons of rainwater storage in kitchen. Fourty-five gallons of waste storage is provided in the bathroom. Solar Photovoltaic (PV) panels on roof can be used for minor electrical needs (lighting, charging, etc). 7 solar panels = 1.33kW. This can produce 1,867 kWh/year or around $242.71 worth. Passive heating/cooling can also occur through large, operable windows.





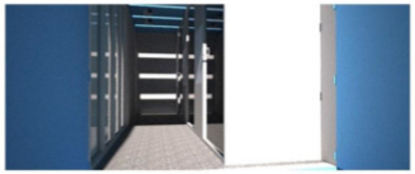

Rainwater and Waste Storage

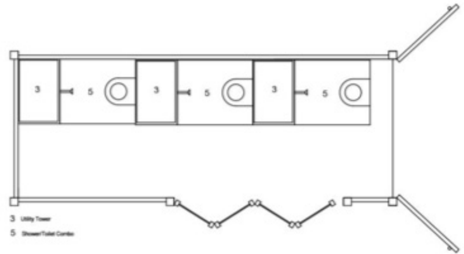



Flip Diagram

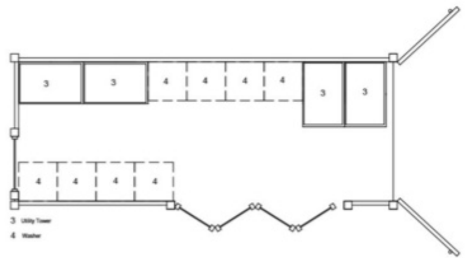
dWell Pods

Brandon Woolf

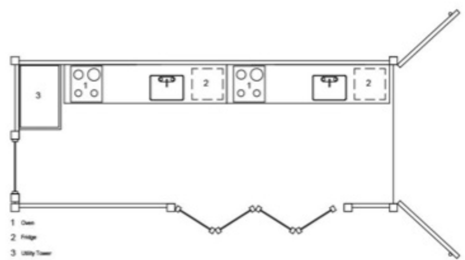




Hygiene and Bathing



Laundry



Kitchen and Prep Space

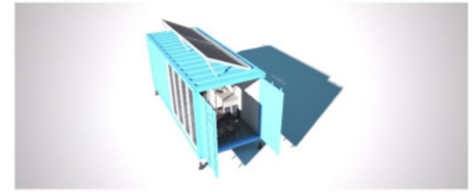
Power/Utility
- 155 gallons of water storage
- Ample power storage via batteries
- 155 gallons of wastewater storage

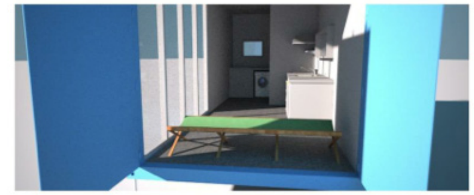
Hygiene
- Shower/Toilet combo
- Efficient water usage

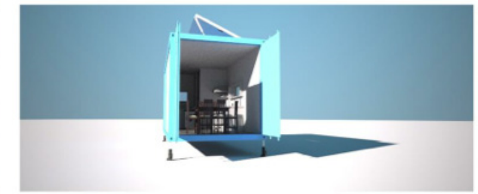
Laundry
- Compact washer/dryer combo
- Vanity/counter
- Storage

Kitchen
- Range/Oven
-Storage
- Sink
- Mini Fridge

Living Unit:
- Outfitted with adjustable solar panels
- Modular space or sleeping or dining
- Hydaulic jacks for leveling
- Functional container doors for energy saving ventilation



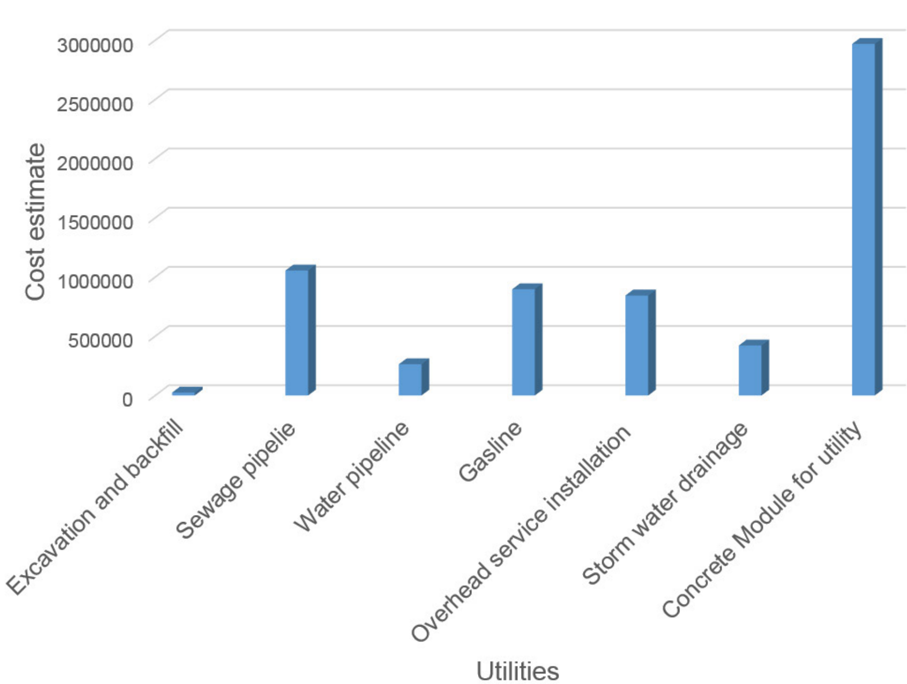




Placement:
- Delivery via truck
- Can be rolled off a truck
- Hoisted & placed by crane almost anywhere
- Durable and reusable

Cost Estimate

In order to evaluate the feasibility of installing the Smart-U module and reinstalling a whole new utiliy system, it is crucial to estimate the project budget. In order to properly study the economic impact, we worked on estimates including a cost/worth analysis and life cycle cost analysis. The elements included to complete the study were: excavation of road to 8 feet deep, demolishing the existing utility lines, and installing new systems-- including equipment and labor to complete the work. We then categorized the utilities into two sub-categories. Dry utilities which run horizontally within the Smart-U module, and includes gas, electric, telecommunication and water. Secondly, wet utilities which run vertically in Smart-U and include sewage and stormwater.



Before cost estimating for individual utilities, we did quantity takeoff using On-Screen software and that provided quantity for each element. After calculating the quantities, they were entered to RS Means software to get the individual cost for utilities and total project cost which is 6.5 million dollars (includes General Contractor's markup fee). The chart below provides the quantity and cost estimate for the complete project to re-install the new Smart-U utilities.

Cost estimate: Golfview Utilities

Date release: April 2016 **ASSEMBLY ESTIMATE**

Item Name	Description	Quantity	Unit	Unit cost	Total Cost	Date release	Labor typ	CCI location
Excavation and backfill	Machine excavation 8' deep, backfilling, sand ,gravel and offsite storage	1013.75	CY/2000	$25/CY	$ 25,343.75	Year 2016	open shop	FLORIDA / GAINESVILLE (326,344)
Concrete Module for utility		5280	LF	562.4/LF	$ 2,969,472.00	Year 2016	open shop	FLORIDA / GAINESVILLE (326,344)
Horizontal Utilities								
Water pipeline	Waterline, 6" diameter, PVC class 200	5280	LF	$50/LF	$ 264,000.00	Year 2016	open shop	FLORIDA / GAINESVILLE (326,344)
Gasoline	Gasoline, polthn, 60 PSI, 4' deep	5280	LF	170/LF	$ 897,600.00	Year 2016	open shop	FLORIDA / GAINESVILLE (326,344)
Electrical & Telecom	Overhead service installation, includes breakers, metering, 20' conduit & wire, 3 phase, 4wire, 120/208 V, 200 A w/c circuit beaker	5280	LF	160/LF	$ 844,800.00	Year 2016	open shop	FLORIDA / GAINESVILLE (326,344)
			Horizontal utilities cost $		2,006,400			
Vertical Utilities								
Sewage pipeline	Sewage piping, 8" diameter, plain PVC	5280	LF	$200/LF	$ 1,056,000.00	Year 2016	open shop	FLORIDA / GAINESVILLE (326,344)
Stormwater drainage	36' CMP Pipe	5280	LF	80/LF	$ 422,400.00	Year 2016	open shop	FLORIDA / GAINESVILLE (326,344)
			Vertical utilities cost $		1,478,400			
			Total cost estimate		$ 6,479,615.75			

Dry Utilities (Horizontal in Smart-U)
$ 2,006,400 Water
Electric CATV/Telecom Gas

Wet Utilities (Vertical in Smart-U)
$ 1,478,400 Sewer
Stormwater

Total cost estimate
(to uninstall existing
and install new utilities)
$ 6,479,615.75

A Pileated Woodpecker in Golf View

Social Infrastructure

Members of the neighborhood are a critical part of the community's infrastructure. A proposal to create a neighborhood welcome process and updated welcome basket, along with a neighborhood booklet and digital app, are intended to fortify the neighborhood's social fabric.

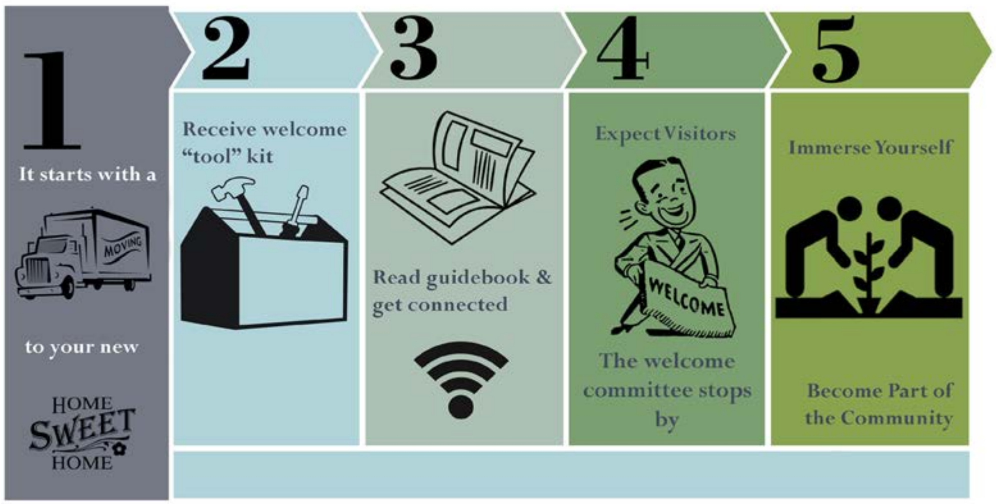
Golf View Defined

The social infrastructure of Golf View, like most neighborhoods is very distinct yet informal, hard to define and often overlooked, despite being essentially the "personality" of the neighborhood. This is a proposal for an organized system to welcome and acclimate new residents to the neighborhood in tandem with keeping current residents active and committed to the success of Golf View. Golf View is characterized by its unique charm and diverse population, one that is highly educated and has very close ties with the nearby University of Florida. It has a reputation as a heritage neighborhood exemplifying historical Gainesville and is a leader in community action and outreach. This neighborhood thrives because historical Gainesville continues to be held in high regard.

The goal of this proposal is to create an organized process for more established communities to welcome new residents into an active and connected community, thereby strengthening the bond of the community as a whole. This is a proposal will create a more connected neighborhood, by using traditional means alongside new technologies.

Social Proposal

Step-by-Step Process



This program is intended to assist new residents in establishing their foothold within the community and utilizing the resources of the social infrastructure of Golf View. Examples of success in this program would be: new residents reading the digital neighborhood weekly newsletter for events, attending a neighborhood committee meeting, using the app to report a gator sighting and warn neighbors to keep pets safe, or simply having dinner at a member of the welcome committee's house after a friendly meeting with them. Any number of small steps taken by the new resident to become an involved member of the community would be considered a success of the social infrastructure system. The program also gives new neighbors the confidence and skills to not only know their neighbors, but to become part of the fabric of their neighborhood.

1. A Move

New residents move into the neighborhood - they are unsure of Golf View's daily routines, the general behavior of their new community or its social customs.

2. A Basket

Upon the first days of "Move-In", the new residents will receive a welcome basket containing pertinent information about Golf View. This will include information about its daily functions, social activities and community involvement, as well as gifts that promote Golf View's brand.

3. A Book

The new residents will read the Golf View Welcome Guidebook, to learn about the formal and informal rules, and customs of Golf View. They will also learn about the Digital Platforms, such as an app designed specifically for connecting Golf View's residents, meeting their needs, and providing step-by- step information on how to get connected. Both the book and the app might include information about local restaurants and shopping, repair and lawn services, pet sitters, and cleaners.

4. A Neighbor

Over the first month of "Move-In", three members of the chosen welcome committee will stop by, one per week, to greet the new resident. They will introduce them to Golf View and ensure they know about upcoming community social events and local activities and how to partake.

5. An Activity

The program reaches its first phase of completion for new residents when they utilize the resources provided that define Golf View. At this point, they will hopefully make steps towards involvement or at the very least, contribute to the neighborhood by following and understanding the social customs.

Welcome Basket and App

To help develop an identity of Golf View, we administered a voluntary questionnaire, available to all residents. The overwhelming response was that Golf View is a positive and active community. Our motivation in doing so was to gain an understanding of the deeper character of Golf View that could start to curate a visual identity, brand the components of the proposal, and give a clear association that residents can recognize and identify with. We hope this might become a symbol of unity for the residents. The phrase “Organic. Rooted. Intellectual.” was taken from the survey and really captures the defining features of Golf View. Additionally, the pileated woodpecker, which appears throughout the book, became the neighborhood’s unofficial bird. It is often seen in its natural habitat within Golf View, and it is also on the Golf View entrance sign.

This social infrastructure proposal contains elements to keep residents involved and committed to Golf View, even after the initial excitement upon move-in wears off. This will be done through the utilization of the digital platforms, which will keep everyone connected and up to date with what is happening in the neighborhood, along with other activities for involvement. Additionally, the system would help organize other extensions into the community such as newsletters, community meetings and annual events. It would formally extend the system past the first days of joining the community, and help to maintain the social infrastructure and keep residents active in Golf View.

Realm of the Home

We often think of infrastructure as collective utilities, delivering services to each home, and removing waste. But each home can be reconceived as an active, contributing element of the neighborhood's infrastructure. Resident-specific efforts too, can reduce dependence on the grid, improve the environment, and save money. These ideas work at the scale of the individual and the home. Processes like saving or collecting energy or water will work to improve individual and community health and well being. Each of these methods will also focus on how to save money through innovation and reimagining systems.

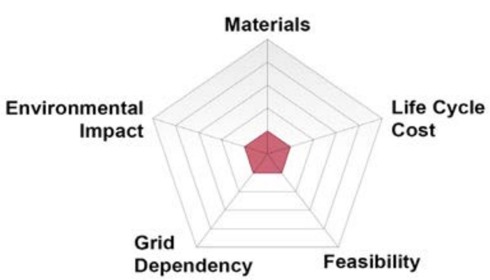
12 Ways to Move Off the Grid and Save Money

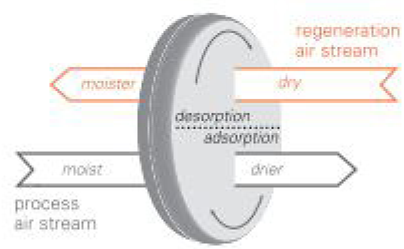
The following are specific ways that would help the residents of Golf View to not only move towards being independent of the utilities grid, but also save money on the cost of these needs in the future. In each case, a radar graph assesses relative impacts according to five criteria: materials, life cycle cost, feasibility, grid dependency, and environmental impact. A smaller 5-pointed shape symoblizes a more sustainable choice.

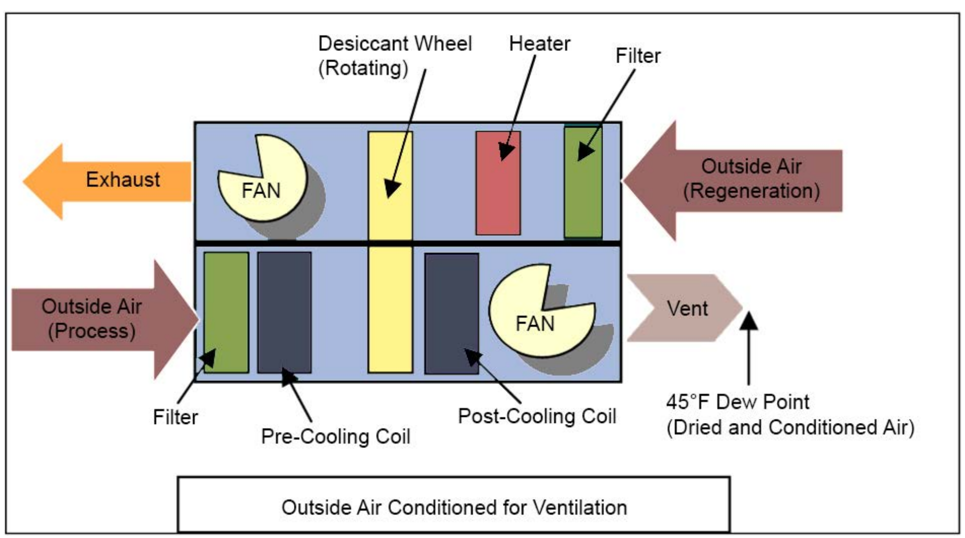
1. Dehumidifier
2. Transportation
3. Rainwater Collection
4. Solar Thermal
5. Air Sealing
6. Stormwater Use
7. Window U-Value
8. Growing Food
9. Passive Sun Shading
10. Cool Roofs
11. Home Automation
12. PV Panels

1. Dehumidifier

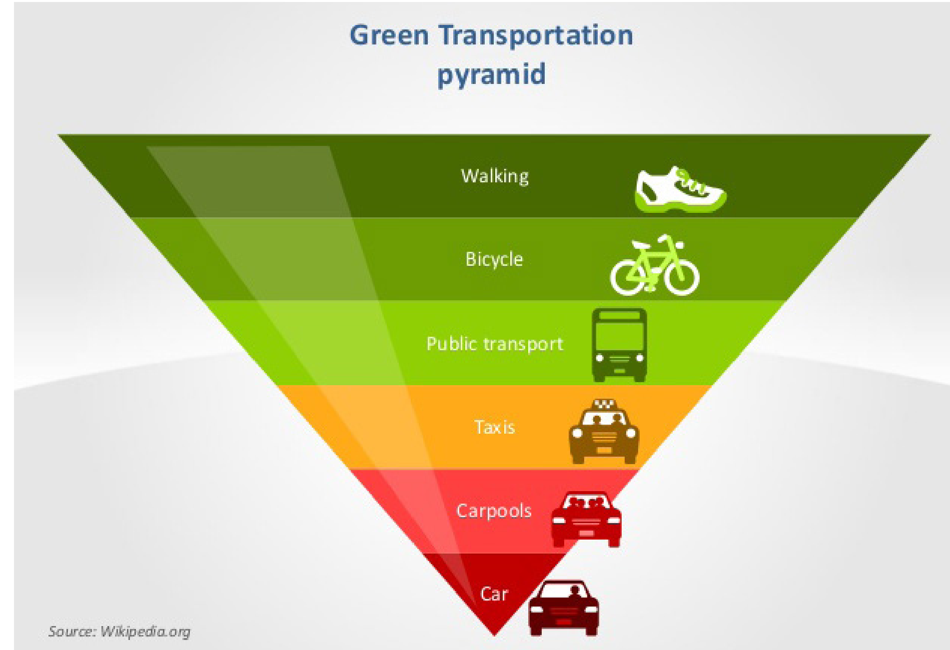
In humid climates such as Florida, air conditioning systems typically run for a longer period of time and also at a lower temperature in order to remove moisture out of the air. The desiccant dehumidifier is a component that is added into the air conditioning system sequence, to remove the excess moisture from the air. The desiccant wheel is embedded with material like silica gel, which can absorb moisture from the air. This would in turn reduce the cooling load on the air conditioning system and the use of energy.





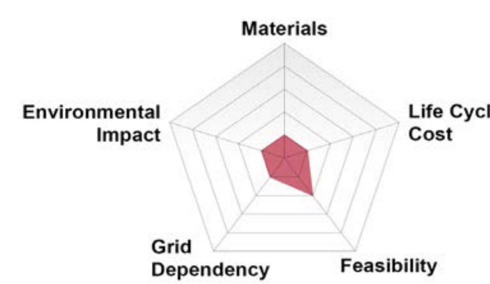


Source: http://www.devatech.co.in/humidification-and-ventilation-equipment.html



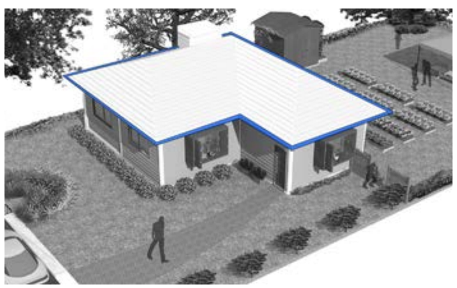
2. Transportation

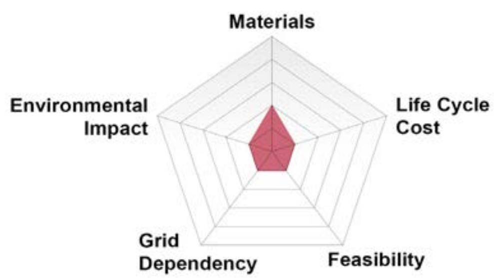
The transportation sector includes the movement of people and goods. Greenhouse gases are most commonly emitted by the transportation methods mentioned above. CO2 emissions cause consistent problems to the atmosphere and environment. There are a variety of transportation options available. Some are more efficient than others, like walking or bicycling. Bio fuels are another way of curbing the excess amount of CO2 given out to the atmosphere. The pyramid diagram shows how one can be environmentally friendly; walking being at the top of the pyramid, having the most green impact on the en vironment. Bicycling and public transports are also other measures through which we can promote green transportation, and reduce energy, CO2 emissions, and personal expense.



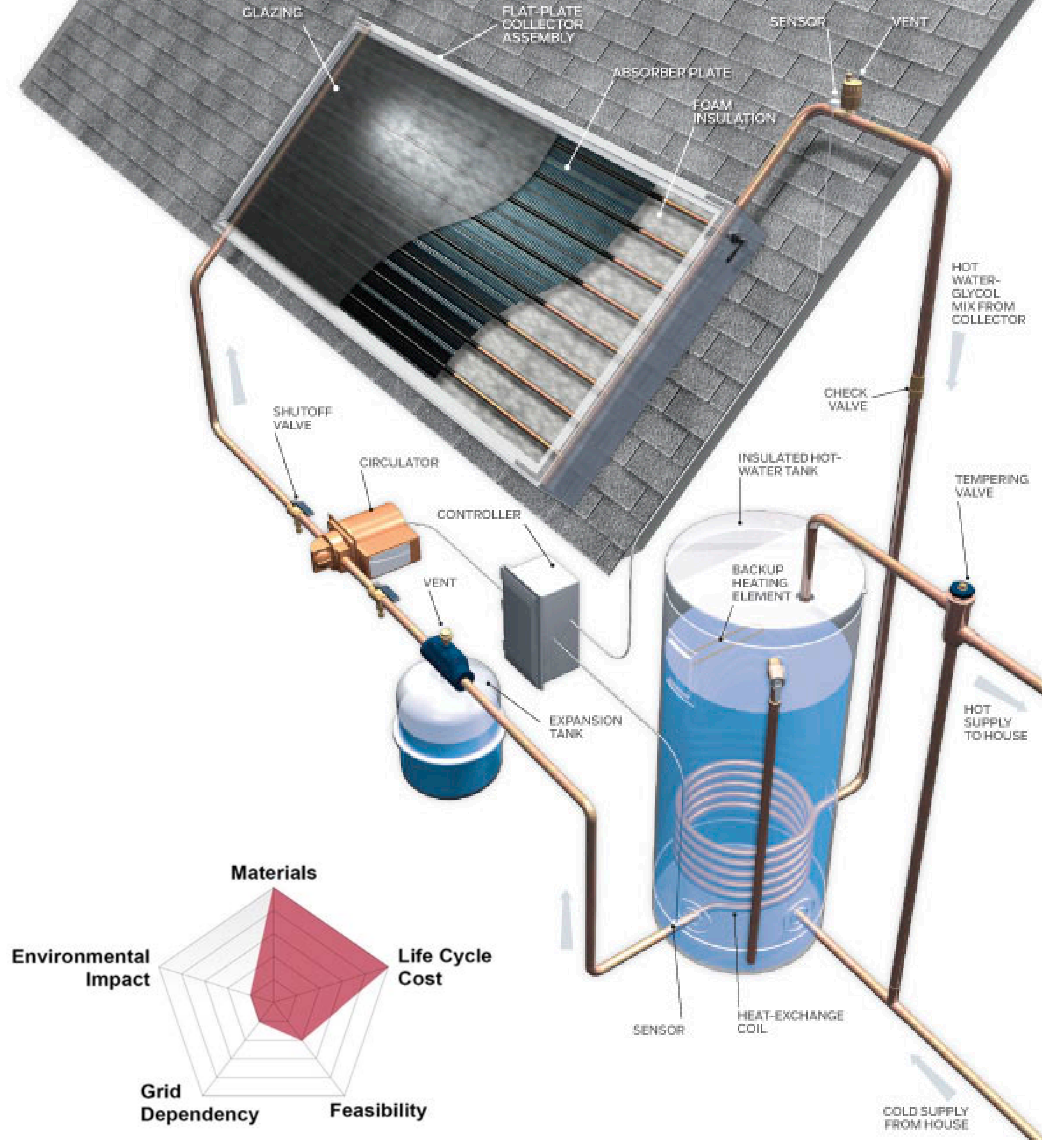
3. Rainwater Collection

Houses with rainwater collection units can save money and energy through the retention and storage of fresh water. For example, 700 gallons of water can be collected from a 1,200 square foot roof with just one inch of rainfall. Essentially, the larger the roof, the more water that can be collected. In Gainesville the average annual rainfall is 47.33 inches. So, a 1,200 square roof can collect more than 33,000 gallons of water per year; and using a rain barrels is a great way to conserve water. Rain barrels are easy and inexpensive to make or buy. Moreover, adding a gutter along the roof can make the collection more effective. One effective way of using the stored rainwater is to irrigate a personal garden and potentially move off grid for water and energy needs.





Source: http://www.climatetechwiki.org/technology/solar-thermal-hot-water

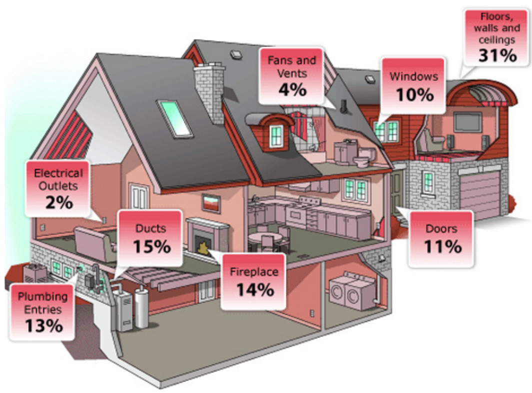


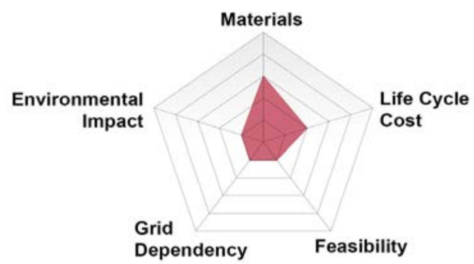
4. Solar Thermal

When consiering all the possible ways to utilize the sun's energy, while reducing carbon emissions, solar thermal water heaters provide an excellent alternative. The evacuated tubes absorb the heat from the sun, which then heats up cold water inside the tubes. This water is stored in a tank and later used for domestic purposes. This is a great alternative to traditional water heaters and use of electric power to heat water for homes.

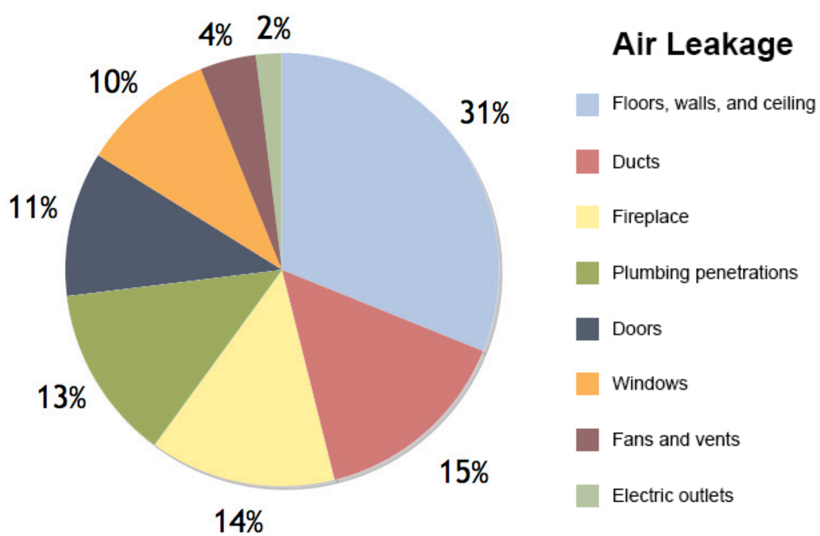
5. Air Sealing

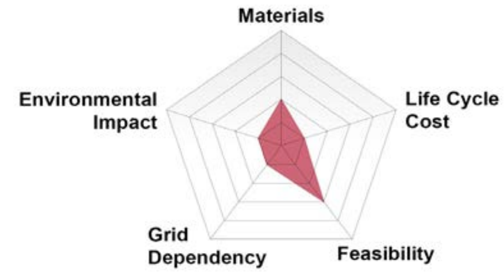
In homes, much energy is lost due to the presence of air leakages. As the figure demonstrates, the main areas of concern are the floors, walls and ceilings, as well as the ducts and fireplaces. Energy and money that we pay to cool our house is lost through cracks and crevices. It is important to have a building inspection done with a thermal imaging camera, so that one can locate the exact location of the leaks and cracks. By locating the areas of concern and fixing them, homeowners can save money on their electric bills.

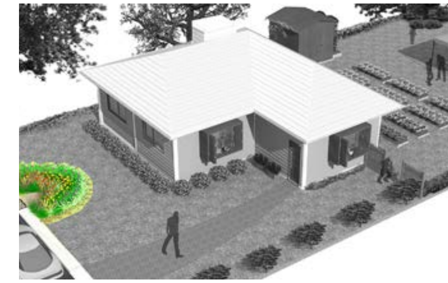




Source: http://www.triangleconstruction.com/air%20sealing







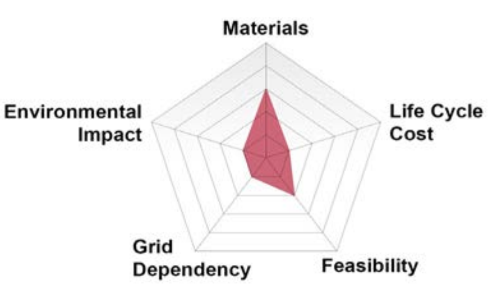
6. Stormwater Use

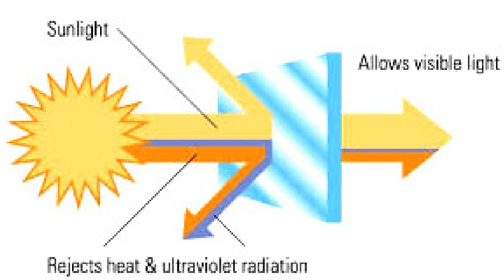
A raingarden is another way to save money and energy. The most important advantage of a raingarden is that it can filter and treat for stormwater. It can filter more than 90% copper, lead, and zinc, 50% nitrogen, 65% phosphorus, and other chemical elements. In some cities, like Portland, OR and Philadelphia, PA, the utility company provides discounts on the water bill as an incentive for residents with yard raingardens. The easiest way to start is by planting native water-tolerant plants, as well as drought-tolerant plants, near a downspout in their yard.

7. Window U-Value

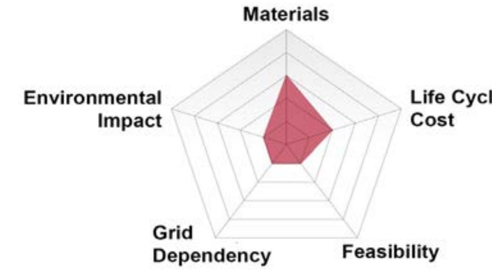
Windows play a crucial role in determining how much solar energy enters a home, which is measured by the Solar Heat Gain Coefficient (SHGC) value. The typical range of the SHGC goes from 0 to 1; the lower the value during the summer months, the better. It is desirable to have a higher SHGC value during the winter months, allowing any amount of sunlight heat energy into the house. The U-value measures how well a product prevents the heat from escaping the home. It is appropriate to have a higher U-value window for winter or cold climates, and lower U-values in summer or hot climates.

Source: http://www.WindowRatings.org





Source: https://www.nachi.org/low-e-windows.htm

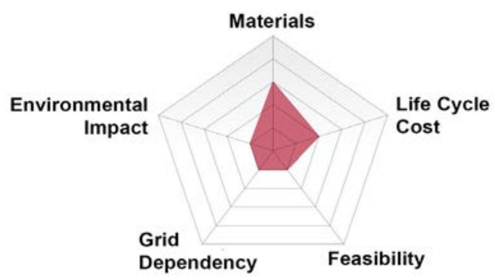


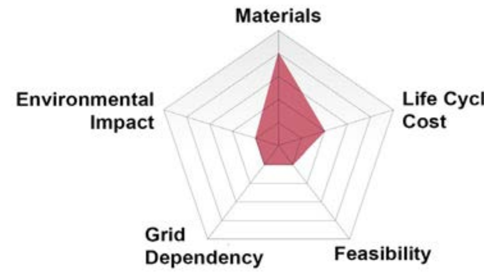
8. Growing Your Own Food

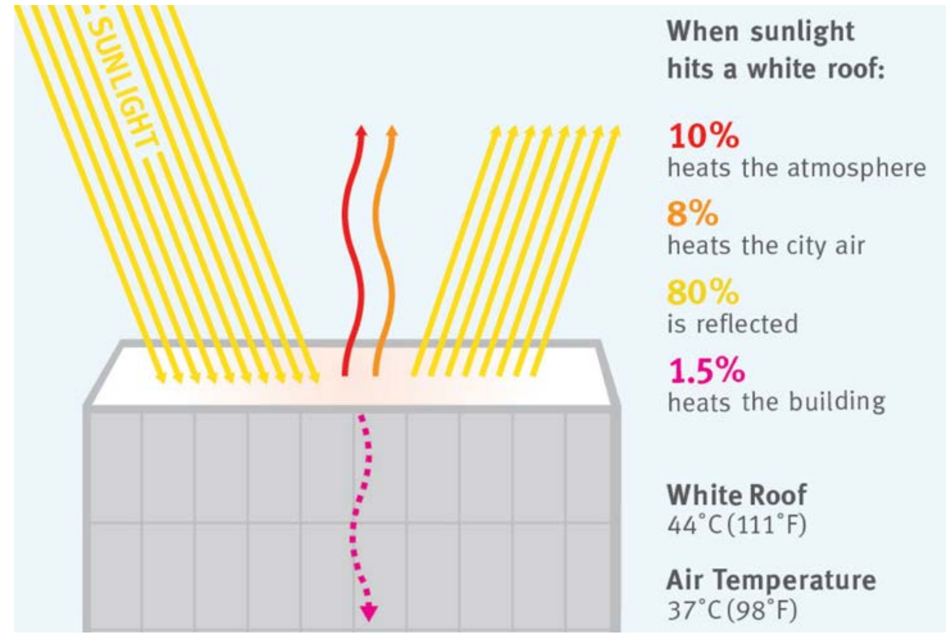
Growing your own food can be very advantageous for your diet, as well as your wallet. It's an eco-friendly lifestyle and it's easy to choose what to grow. In order to arrange the garden appropriately, one might need to build or buy a raised, fertilized bed. It's inexpensive and once installed, it can be used for a long time. With your own garden, you can save time and gas from grocery store visits, which also reduces carbon emissions. Not only will it save time and energy, but a garden can also provide a sense of pride and beauty. Additionally, vegetables that grow on vines can be implemented as a green wall, which can provide shade for the house, lower the temperature in summer, and warm the house in winter.

9. Passive Sun Shading

Passive sun shading devices are designed to control sunlight and avoid excessive solar heat gain to a house. They are a traditional but useful way to help save energy and provide natural light indoors. There are six types of sun shading devices: horizontal single-blade, outrigger system, horizontal multiple-blades, vertical fin, slanted vertical fin, and egg-crate. Each has a preferred orientation and different view restrictions. Windows that face south use the single blade, outrigger system, or horizontal multiple blades. Windows that face east or west use vertical fins or egg-crate systems. Windows that face north need no sun shade. In the illustration, the windows are facing west. The shading devices are designed based on the egg-crate type, and are improved by a louvre and folding system. This lowers view restriction, and adds flexibility and decorative function. When sunlight hits the windows, the user can simply close it, and reopen for the better views.







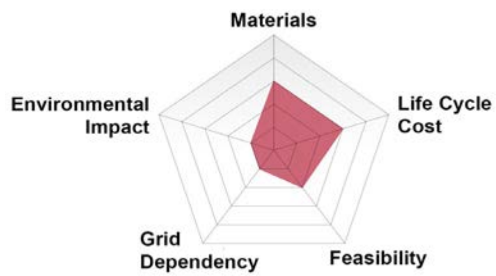
Source: https://historicalbanyfoundation.files.wordpress.com/2013/04/cool-roof.jpg

10. Cool Roofs

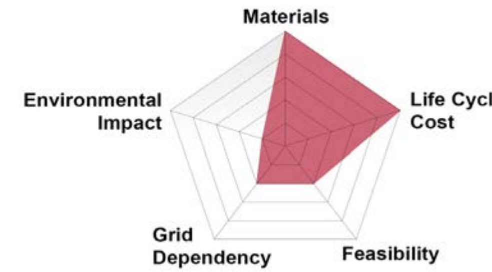
Cool roofs are designed to reflect sunlight and decrease the amount of heat absorbed from the sun. They are usually made of highly reflective materials, coatings, sheet coverings, and/or shingles and tiles. Compared to conventional roofs, cool roofs will save 10% energy, more or less, per year. Other benefits are lowering the utility bills, adjusting local temperature, preventing power outages, and lowering power plant emissions. Generally speaking, the temperature of a cool roof will be 80°degrees lower than a conventional roof when the air temperature is the same.

11. Home Automation

Smart homes are increasing in popularity. As energy demands increase, systems in our homes can operate at high efficiency, as well as adjust for times when demand is lower. There are many home automation systems available on the market that have diverse functionality, some of which are pretty costly. Various systems are capable of being coupled with washers and dryers, hot water systems, fans, lighting systems, CO detectors and other appliances. For example, suppose a Carbon Monoxide leak occurs in the house. The detector will notify the system that a leak has occurred and alert the home owner immediately. Systems like this can be a great safety asset, and allow enough time for a person or family to escape the house safely.

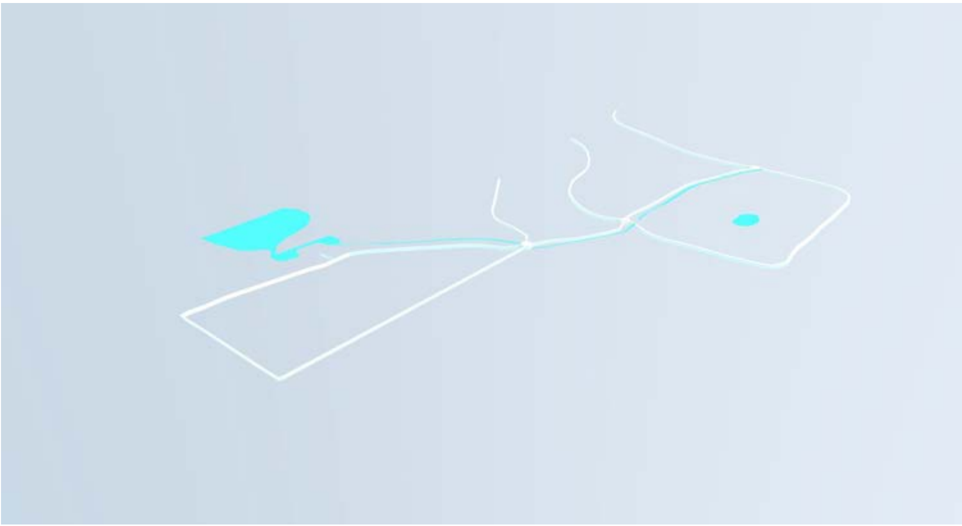


Source: http://www.canstockphoto.com/smart-house-flat-illustration-concept-18455596.html

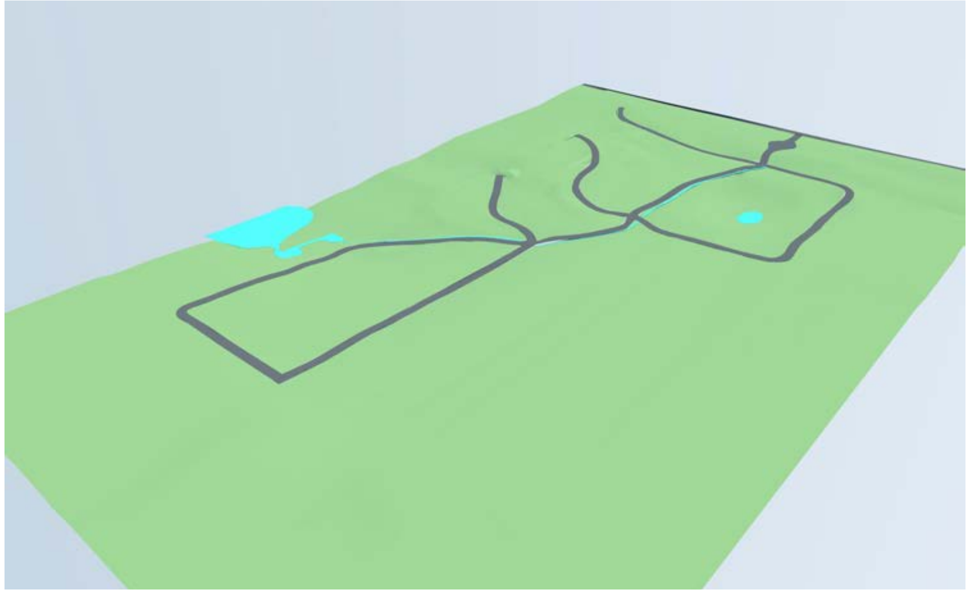


12. Photovoltaic (PV) Panels

Photovoltaic panels are a renewable energy system, that harvests solar power, which once converted to energy, can power your home. PV panels have been in close competition with the oil and gas industry, and are gaining more widespread use. The sun is an abundant source of energy that, when harvested, generates electricity. As advancements in research take place, the solar panels get both more financially accessible and feasible for consumers. Energy produced is determined by the square footage of the roof, the efficiency of the solar panels, and the amount of time the sun is over the panels.



Underground Infrastructure



Surface Infrastructure

Conclusion

As our nation nears the midpoint of our third century, at a time of extraordinary technological advancement and ecological challenges, we must actively imagine our future, together. The neighborhood unit—smaller than a city but larger and more diverse than a family—connects the talents of individuals with the strength of the collective. Through our neighborhoods we can demonstrate shared self-reliance while we advocate for the important investments our communities must make to renew aging infrastructures. We cannot afford to abandon our cities and their older neighborhoods, nor should we want to forget the histories, stories, and built wisdom they hold. Instead, by collectively revitalizing our streets, water and electric supplies, and waste removal systems, along with our natural and social infrastructures, we can strengthen our shared fabric while reasserting our individual responsibilities to the larger community.

Underground Infrastructure

While some of the proposals would be more simple to implement, others will be much more difficult and costly to achieve. Without a plan towards action, the neighborhood, City, and country will remain stuck with increasingly degraded, even dangerous, century-old infrastructure. The first step toward reimagining the world for the coming century is confronting these challenges today. The Smart Utility is a modular take on your common utility setup. This concept takes a different approach on manufacturing, installation and maintenance of underground utilities. We have separated the utilities into two sub-categories: dry utilities which includes gas, electric, telecommunication and water; and wet utilities which included sewage and stormwater. This concept and business idea would allow flexibility in utility setup, and eliminates digging the streets up in case of an emergency repair or for general maintenance service.

Surface Infrastructure

Like many first-ring suburbs, Golf View's streets are fairly narrow and serve as the only public right of way. This system means that utilities and all modes of transport must be integrated within this shared path. The Social Strip design proposes that all utilities be bundled as a set of smart utilities and placed under the sidewalk. This is an improvement of the current utility method, where lines are placed beneath the street, which causes road blockages when utility lines need repair. By utilizing the Social Strip system, the neighborhood will also benefit from traffic calming, more walkable streets, designated on-street parking, and clarified traffic flow. The integrated systems of sidewalks, parking, and streets will work to change neighborhood transportation for the better.

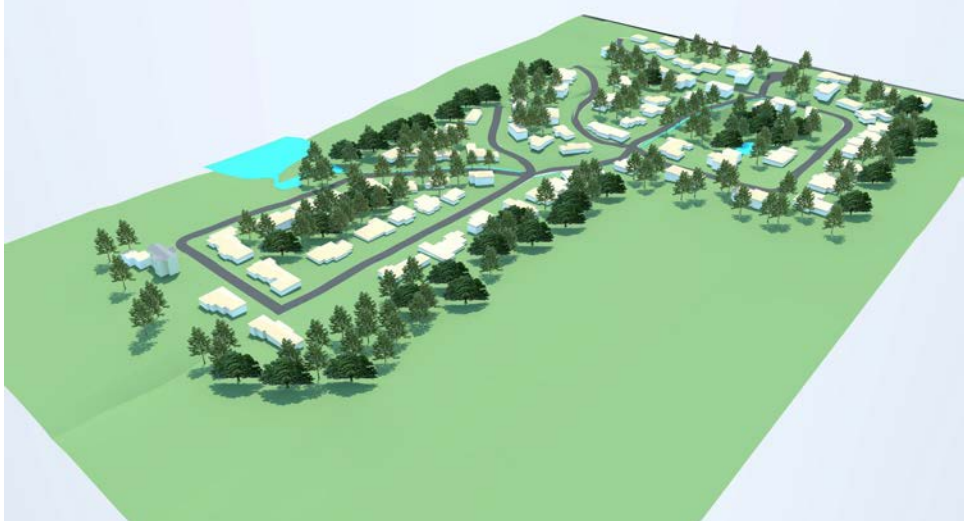
In terms of stream, stormwater, and public space, Golf View has an advantageous topography to harness the natural flow of water. Its three City-owned public spaces are reimagined as a linked system of freshwater and stormwater conveyance. They serve as both a public amenity and a cleansing system for the neighborhood's stormwater runoff, which naturally flows toward the adjacent UF Golf Course. These methods of controlling water, with the daylit stream and stormwater park, will enhance the neighborhood both visually and functionally. The water will culminate to create a place of relaxation for neighbors, as well as water reuse for the community gardens. The cleansed stormwater will also improve the UF Golf course, especially the water feature that receives the runoff.

Following the Witters Competition projects, three layered proposals serve as "add on" options to be layered on top of the basic design. These "infused" infrastructure proposals focus on neighborhood-scale water, energy, and food strategies. By investigating each layer as a separate entity, systems can be used separately or integrated together within the neighborhood. Across different scales of neighborhoods, each layer would have specific advantages and disadvantages when applied to neighborhoods in different regions, elevations, and climates across the country. Separately or in combination, these "infused" infrastructures would enhance a neighborhood's collective identity or brand.

Community Infrastructure

Members of the neighborhood are a critical part of the community's infrastructure. Golf View is characterized by its unique charm, diverse population, and close ties with the nearby University of Florida. The proposed social infrastructure will create an organized process for established communities to welcome new residents into an active and connected community. By implementing a neighborhood welcome process and gift basket, along with a booklet and digital app, we hope to bring individuals and neighbors together. These features will hopefully inspire neighbors to share a common purpose, and strengthen the bond of the community as a whole.

Reducing dependency on the grid, improving the environment, and saving money are key to having a green impact on the community. These twelve ideas suggest methods that individuals and families can use to impact their homes and utility bills. Some of the suggestions include things like saving or collecting energy and water, improving individual and community health and well being, and finding ways to save money in the process. These suggestions are just a few of the many steps that residents and neighbors can take towards making a more sustainable community and reduced carbon footprint.



Community Infrastructure

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