



*The New
Old Pueblo*

The New Old Pueblo

College of Architecture & Landscape Architecture
University of Arizona / 2012

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Emily Nottingham

Interim coordinator of the Sustainable City Project

Statement

The over arching goal of this project is to develop a sustainable urban living prototype for Tucson. A prototype that approaches sustainability across an array of dimensions: economic, environmental, cultural, aesthetic, and functional. We hope to encourage development within the existing infrastructure of downtown Tucson through the revitalization of many unrealized/underutilized amenities spread throughout the area. We also wish to revitalize and feature this diverse social, economic, and environmental potential in the following manner:

- Remediating / revitalizing the natural features that exist:
 - Santa Cruz River
 - washes
 - “A” Mountain
 - mitigation of landfill hazards
- Highlighting historic features
- Revitalize existing infrastructure through the creation of walkable and dense mixed-use urban infill
- Providing dynamic new spaces for hosting Tucson events
- Create jobs by developing a new village center, incorporating research and urban agriculture
- Create strong relationships among the following:
 - Connections between nature and the urban fabric
 - Connections across existing neighborhoods
 - Connections spanning I-10
 - Connections to outlying regional destinations
 - Connections that unify and associate elements within our design
 - Connections among habitat patches and wildlife corridors

Introduction to the site

Tucson lies in the heart of the Sonoran desert in southern Arizona. Known for its purple mountains, glowing sunsets and striking saguaro cacti piercing the skyline, Tucson has become a destination for tourists and a growing population. The pressures of growth in recent years have caused widespread sprawl and dried rivers. We are at a crossroads in planning for Tucson's future. We need to carefully balance the influx of human population with the diversity of desert plants and wildlife that are so unique and important to the Sonoran desert and Tucson's identity.

What makes Tucson unique? Tucson's active arts community and diverse cultural population bring a breadth of community and cultural events to the city. From the All Soul's Procession, to the Mariachi Festival, to the Gem Show, these events contribute to Tucson's rich cultural heritage and sense of community. Although the population and size of Tucson is significant, it still feels like a small town and it's common to run into friends and neighbors around town. This sense of community is why many people love Tucson and is important to consider as Tucson plans for development.

The University of Arizona is the pride of the Tucson community. As the state's land grant university and a Carnegie Foundation Research I university, the University of Arizona has become a world renowned university known for excellence in interdisciplinary research and academic programs. The University of Arizona is an integral part of Tucson's identity and future development.

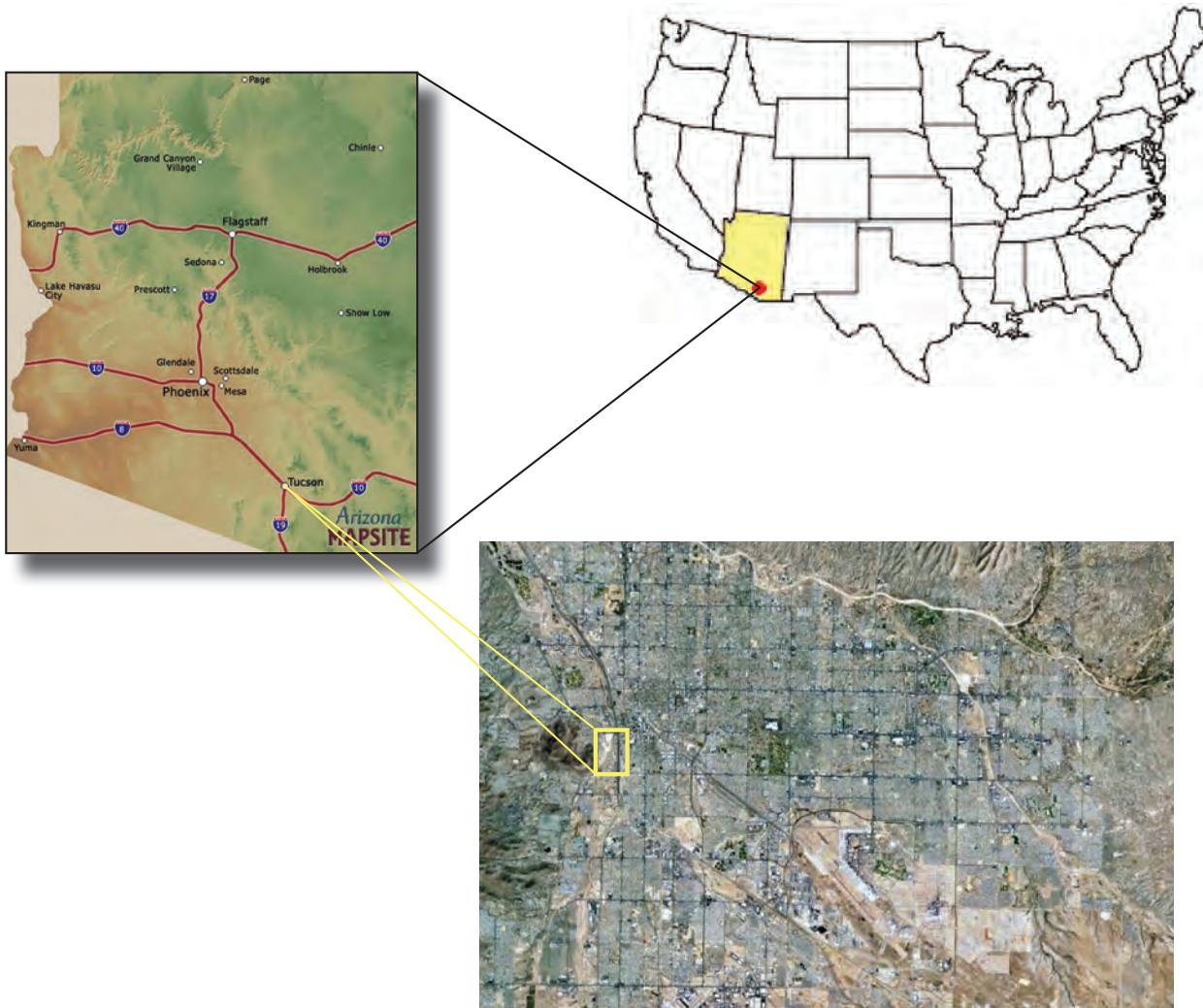
The birthplace of Tucson

The Santa Cruz River, which runs through the heart of downtown Tucson, has supported life in the area for 12,000 years. It is the reason why Tucson exists. Descendants of the native people who settled here still live in Tucson today, contributing to Tucson's rich cultural wealth and history. Unfortunately, in the past hundred years or so, we have lost sight of the significance of this life giving river and how precious our resources in this arid climate can be. We have over pumped our groundwater supplies to the point that our rivers no longer flow. Without surface water, we no longer support the diversity of life that once lived in this valley. The large expanses of Sonoran desert that surround us have been replaced with endless subdivisions of human habitat, which also contribute to this loss.

Tucson's values

Striving to make wiser choices for the future, Tucson is already prioritizing new ways of thinking about development. We are recognized as having one of the greatest solar resources in the nation. Solar electricity and hot water have become a priority in the region as well as an economic incentive. We are pushing toward making our streets more pedestrian and bike friendly and have started construction on a new modern streetcar line. Tucson is also pioneering new ways of thinking about green infrastructure and water reuse. Water harvesting, water reclamation and storm-water infiltration have become essential components to the way Tucson thinks about its water use.

Today, downtown Tucson is facing economic hardship due to issues of urban sprawl, riparian degradation, brownfields and landfills, segregation due to highway and road infrastructure, and general economic hardship. We believe the way to overcome these issues is through progressive thinking and innovative development. This project strives to put Tucson at the forefront of sustainable design and intends to promote Tucson as a model for sustainability in the Southwest. The time has come for changing the course of Tucson's future. We propose that change starts here, at the site next to the Santa Cruz River, Tucson's birthplace.



UA Downtown Studio / LAR 611

Purpose & Methods: for the past twenty-two years the LAR 611 / Tejido Group Studio has developed into an interdisciplinary and collaborative community outreach effort in which faculty, students and professionals in Architecture, Landscape Architecture, Planning and Business Management collaborate in apprenticeship-style learning environments. The Tejido Studio is focused on a wide range of project types including: sustainable community development, urban and small town revitalization, urban waterfront design, coastal planning, campus master planning, and sustainable tourism development projects in the United States, Latin America and the Middle-East.

Project selection for this studio is based on several criteria: 1) the project's potential impact on society and the environment; 2) client need; and, 3) project uniqueness and pedagogic value in developing our students into exceptional practicing professionals. Pedagogically, it is intended that the collaborative experiences developed in Tejido will catalyze in our students a better understanding of the potential influences and confines inherent in our design and planning professions regarding their ability to effect meaningful change in urban and small town fabrics. These experiences help students establish the relevance of their professional skills within a global forum. And, it has been our experience that some of the most meaningful interpersonal and professional exchange occurs within collaborative apprenticeship environments in which all participants are focused on common tasks and real-life outcomes of value. We seek to develop learning environments where mutual interests become increasingly apparent; where participants begin to realize that they are in the process of acquiring professional skills capable of effecting consequential change; and if we are fortunate enough, an environment where a shared sentiment begins to emerge that we are a part of something significant and enduring.

It is intended that cultural and professional commonalities will emerge and become increasingly apparent to all participants. Although all urban and small town areas are vividly distinct across a range of criterion; all must contend with an array of critical environmental and social issues, i.e. uncontrolled growth, economic stagnation, transportation inefficiencies, a dearth of open space and recreational opportunities, environmental degradation, unemployment, a diminishing sense of place, as well as political intrigue and corruption.

Although we work on a wide variety of project types in an array of environmental and social contexts, we are most frequently involved in sustainable community development and the planning, design and revitalization of urban environments. Over the years we have developed a series of interesting design and planning methodologies that seem to serve us well in the formation of sustainable urban fabric. We inevitably engage a range of design tools on any one project. But, in the formation of intelligent and versatile urban fabric, we have become very impressed with the capacity of certain LAR-based planning strategies to affect meaningful change in our cities, towns and neighborhoods. We have come to understand and embrace Landscape Architecture as an effective catalyst of consequential economic, environmental, social and aesthetic change in urban environments. It is a remarkably effective tool for urban and small town revitalization. Although our process inevitably varies according to project type, client, site, budget, etc., we find that with most complex planning projects, landscape architectural organizational criteria and sources of form prove quite effective as design tools.

Although we remain apprehensive regarding the use of the term “sustainability”, we do honor it as an elusive yet worthy goal integrated into all of our planning and design efforts. We believe that a truly sustainable urban environment must necessarily be defined across an array of dimensions: economic, cultural, environmental, functional, and aesthetic. Accordingly, in our more complex projects we evaluate the relative merit of our ideas according to the following design and planning ordering systems: **Economy;** is the design economically sustainable? Does it create jobs and income sources for the community? **Environment;** is the design environmentally sensitive? Does it connect and enhance existing ecosystems? Does it reduce our carbon footprint? **Culture;** does the design create opportunities for meaningful social exchange and learning? **Function;** does the design circulate effectively? Is it safe? Is it easily maintained? **Aesthetic;** has the design identified and created an aesthetic sensibility appropriate to the history and culture of the region and its vision of the future?

These systems are a form of checklist deeply embedded in our design process, and we believe that an idea’s relevance and usefulness increases according to the number of different ordering systems that it engages. For instance, an idea that concerns itself with only aesthetic issues is not as useful as an idea that fully engages not only spatial and image-related issues, but also explores economic, environmental and social issues as well. A park with flowers is fine, but a park with flowers that meanders its way through a community increasing land values, creating economic opportunities, mitigating erosion, promoting urban water harvesting and encouraging meaningful social interaction is a richer, more layered and therefore more relevant concept and eventual urban component.

We use these invariably interconnected systems as a means of verifying the relevance of our ideas. Our solutions must be multi-layered and satisfy the complex range of design determinants present in all urban settings. Over the years, we have come to understand and appreciate that landscape Architectural design and planning strategies have the ability to encourage meaningful transformation in urban environments. These ordering systems have in turn, become our definition of sustainability.

In summary, it is our experience that Landscape Architecture has the capacity to effect profound change in urban environments. And, it places an array of revitalization tools at our disposal: it can stimulate economic development with modest initial investment; it can purify and preserve our precious air, land and water resources; it can preserve and remediate wildlife habitat. It can encourage meaningful socialization and recreation; it can focus growth and reduce sprawl. And, it can offer an urban respite to soothe an otherwise stressful existence. We designers are fortunate people, and are in possession of skills that can positively impact surrounding urban fabrics. The students in the Tejido Studio often begin to think of themselves as urban “design” guerrillas. They come to feel comfortable in “ugly” places. It is where we belong.

*Replace grey with green and blue
Replace noise with sound.
Replace cars with couples strolling
Replace garage doors with front porches.
Replace asphalt with parks and children playing.*

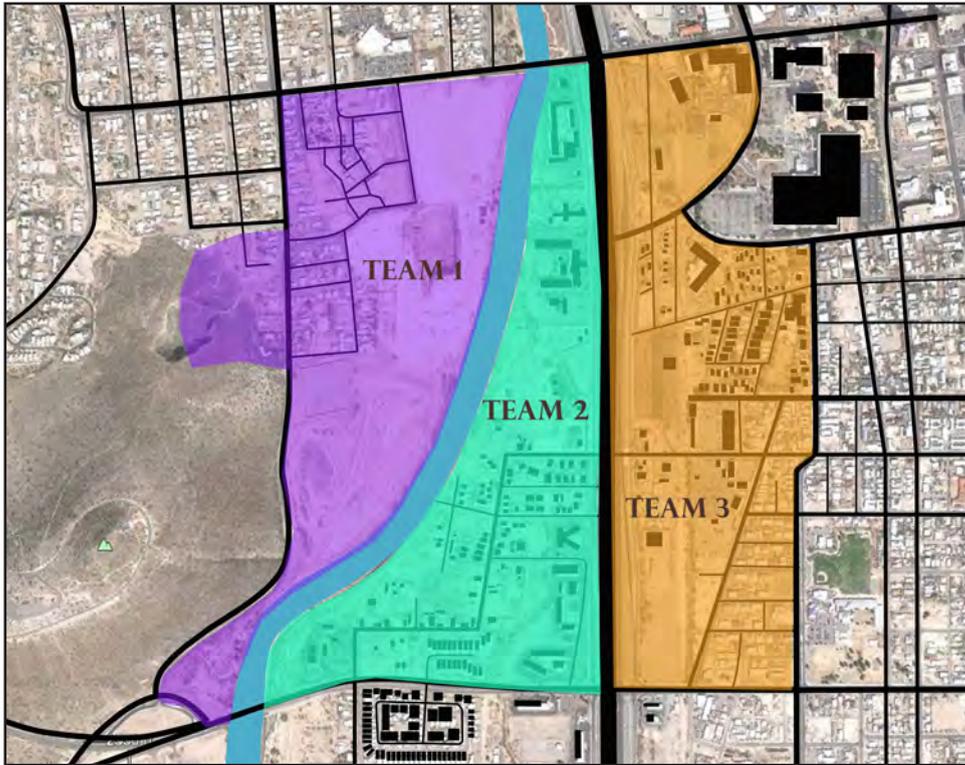
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Site Analysis



Site Context

Our site is bounded by Congress St. to the north and 22nd St. to the South. “A” Mountain and Tumamoc Hill act as natural site boundaries to the west and on the urban boundary made up of the Tucson Convention Center campus and Barrio Viejo exists to the east. The now perennial flowing Santa Cruz River flows from 22nd to Congress and diagonally crosses through our site. I-10 runs north/south and almost divides our site in half. We split into three teams in order to conduct site visits in a timely manner.



Team 1

This portion of the site is relatively undeveloped. It is rich in history and ready to flourish once again. There are existing historical and natural features that should be distinguished and celebrated such as The Mission Gardens and the Santa Cruz River. Views from this site to the Catalinas and of the downtown skyline should be considered. It is important to note that a good portion of the site lies on a capped landfill (1972), which has twelve shallow landfill gas probes, and four groundwater monitoring wells surrounding the landfill, and different development restrictions apply. The greatest opportunity within the site is the Santa Cruz River. How can we restore, educate and celebrate water preservation in the Sonoran Desert as well as take advantage of the site's ideal location, between "A" Mountain and Downtown Tucson, and create opportunity to densify, connect, and revitalize the birthplace of Tucson?





Team 2

Some initial observations of this part of the site was the number of people living in the area and the general site conditions. The eventual design needs to be considerate of the existing population living within the project area, and how to minimize any negative impacts and work with the existing site amenities.

The lack of services within close proximity to the residents was immediately evident. Initial ideas are to provide a grocery store or food options to minimize the amount of travel for nearby residents.

Another interesting observation was the amount of private art and sculptures found erected outside many of the homes in this area (as seen in the photo to the right). Perhaps the art reflects a sense of pride that people have in the area for their neighborhood and it should be respected and used to inspire future design in the area.



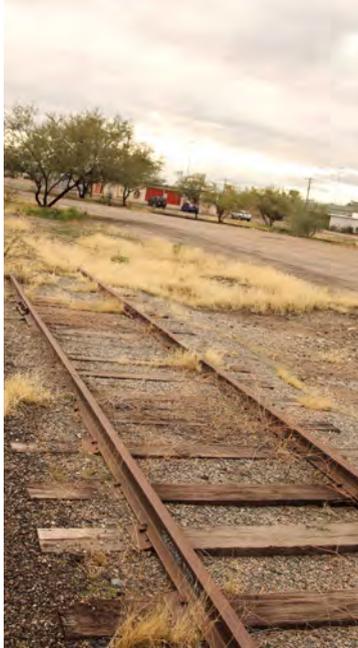
Team 3

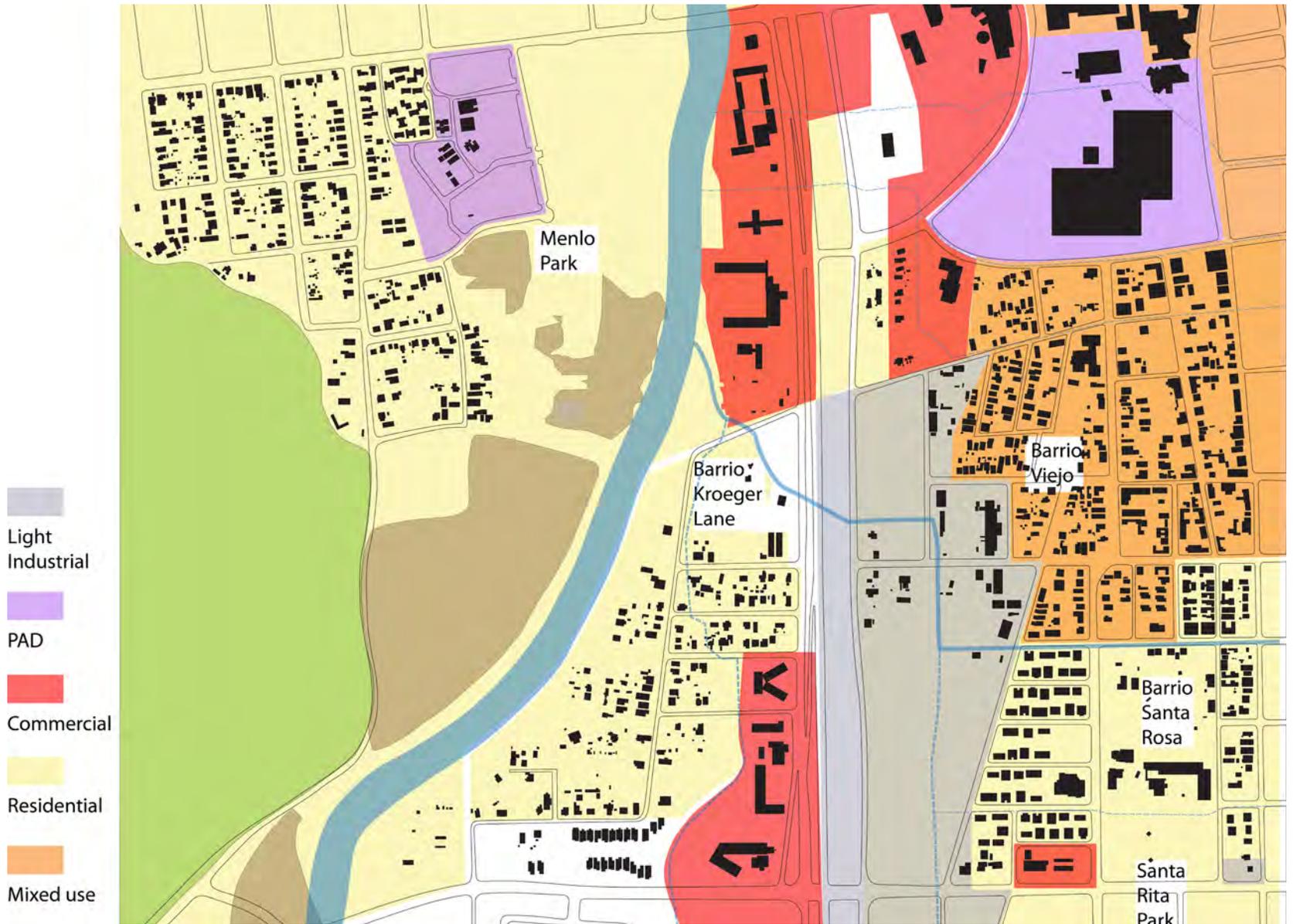
The east side of the site has several crucial areas worthy of attention. The I-10 not only creates a strong east/west barrier, but also creates a buffer of undesirable space along the highway. This buffer currently consists of empty lots, frontage roads, and industrial space.

Examining the existing connectivity through I-10 was also necessary. The site clearly needed a better pedestrian connection from downtown through I-10.

Existing washes on site were examined and found to be in poor condition. Channeled and natural washes were cluttered with debris and litter.

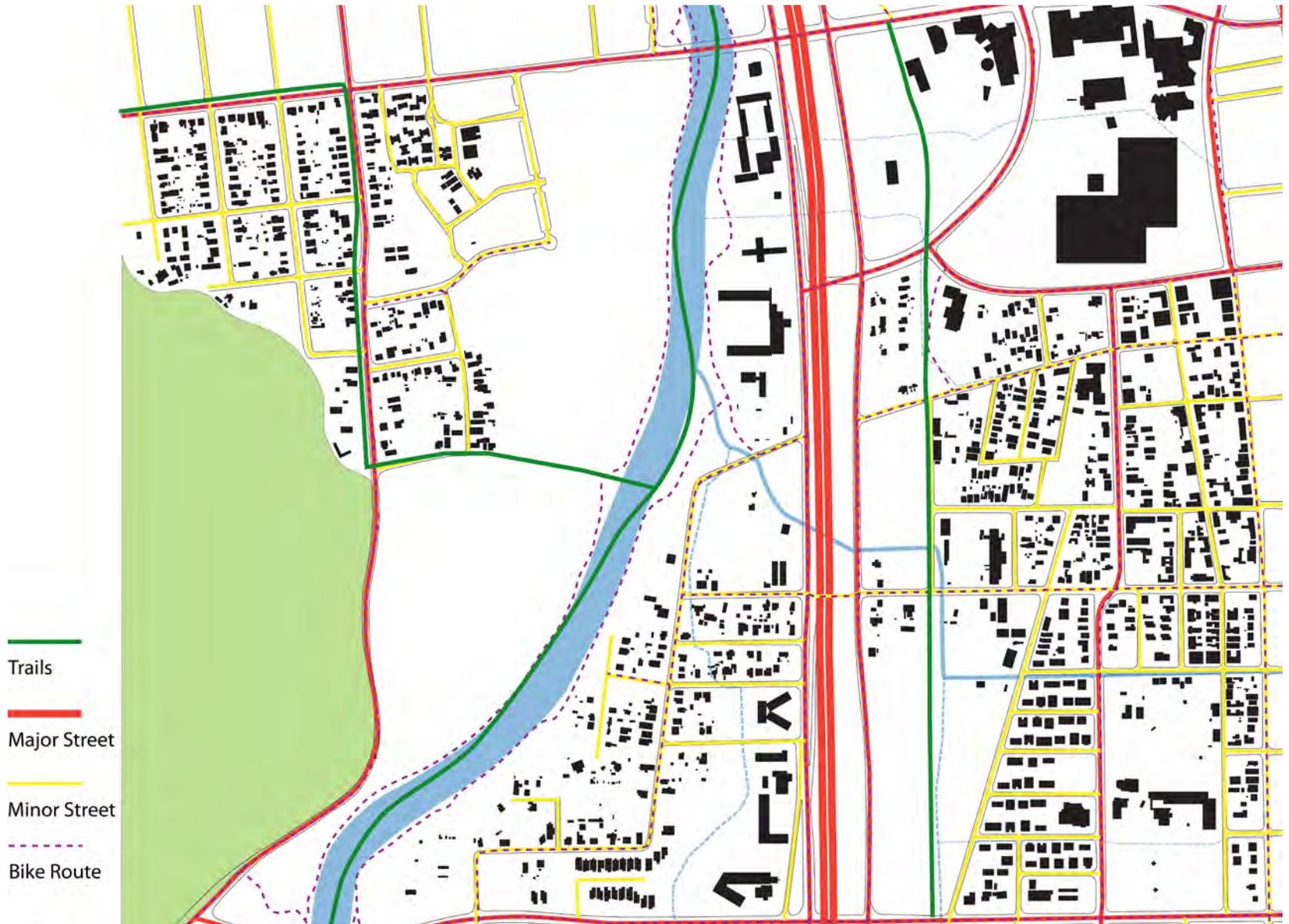
The El Paso/Southwestern greenway runs through this portion of the sight offering opportunity to connect to existing successful greenways.





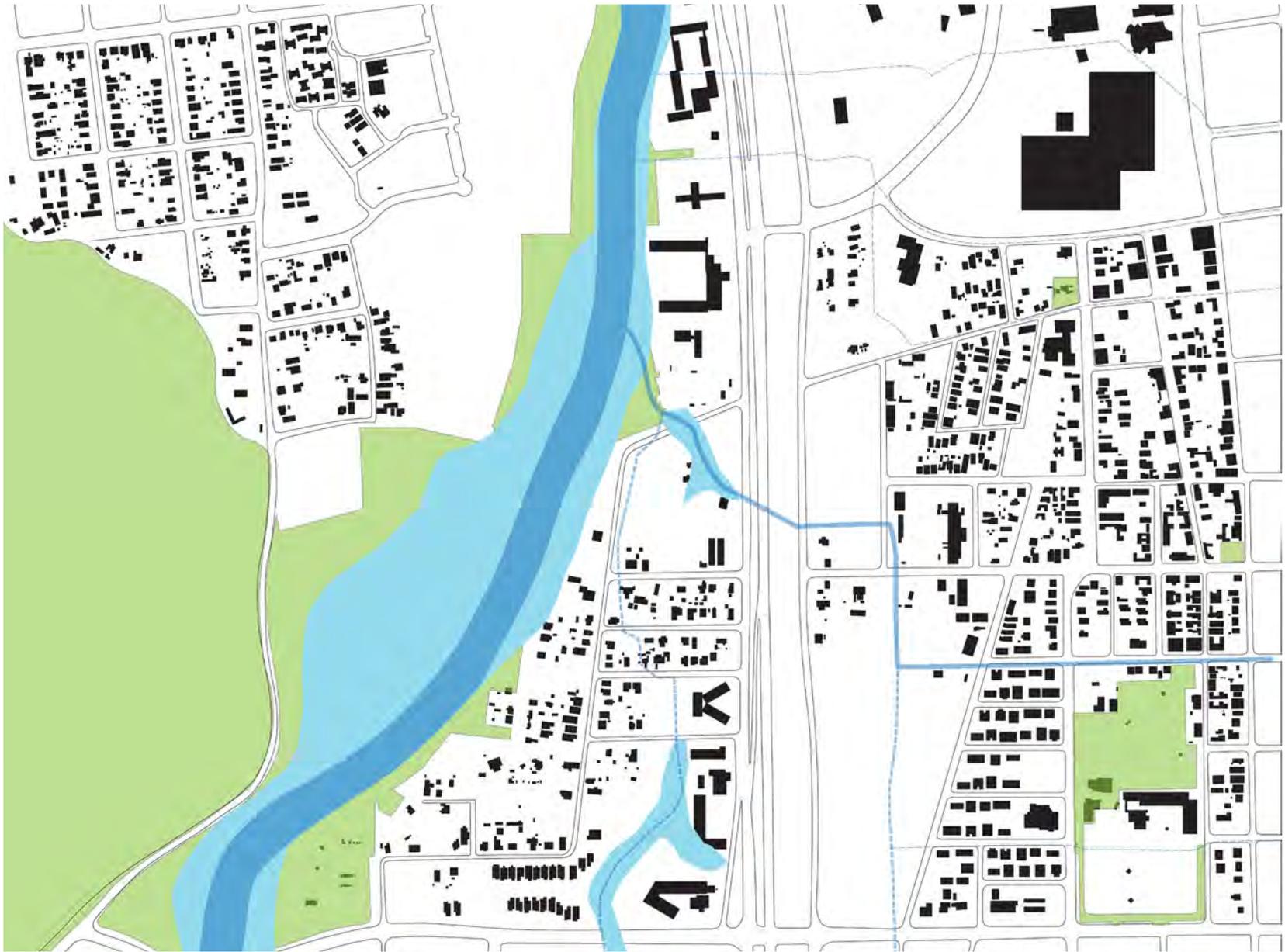
Landuse

Looking at the landuse diagram here, we see how the site has large areas of specified landuses. The final project is looking at redefining urban development where perhaps areas of commercial, light industry, and residential can coexist.



Circulation

Part of our project is looking at how to make our site more pedestrian and bike friendly. We are also working with Tucson's plans to build a light rail. Understanding existing circulation routes helps us identify areas of congestion and locate where to put more crosswalks and multi-use paths. I-10 cuts right through our site and is something we have to address.



Green Space and Existing Water Ways

The project is also looking at connectivity of green spaces. Within the urban spaces we see very little green. We need to remedy this and be mindful of the floodplain and existing washes.



Historic Locations

Tucson is an old city and the site is surrounded by historic neighborhoods and contains many historic sites with their potential not yet realized.



New urbanism
Landscape Urbanism
Smart Growth
Smart Code
Leed

Research

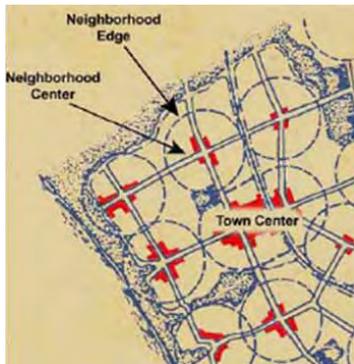
Theories

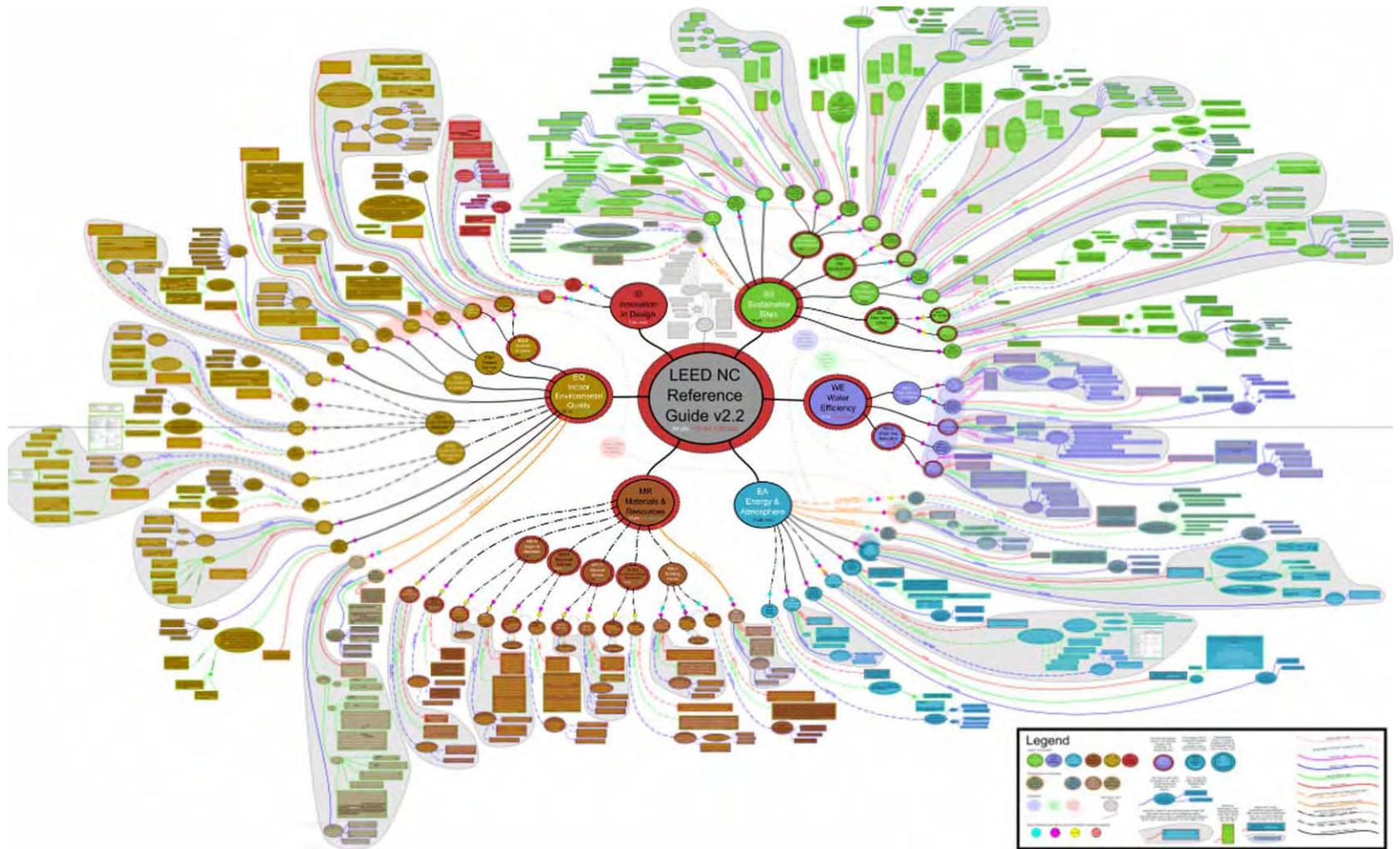
1. New Urbanism promotes quality architecture and urban design to create a dense mixed use community that is: walkable, connected, sustainable, and has a high quality of life. New urbanism is a descriptive style of human habitat that is community focused and socially sensitive to human functions. The landscape is formed into the built human space.

2. Landscape Urbanism is an approach to the organization of the design of human habitat based upon the existing landscape form and not on architectural form. Landscape urbanism is an ecological approach to human habitat that is process focused and contextually sensitive to ecological functions. The human space is integrated into the landscape.

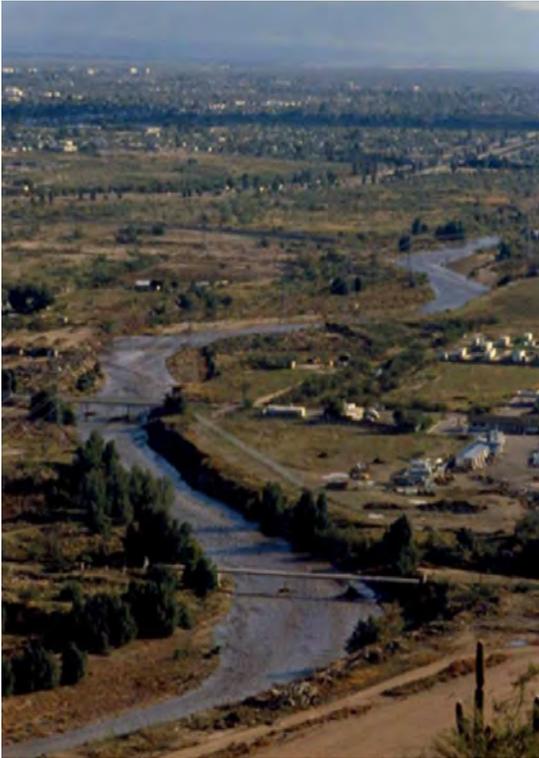
3. Smart Growth is an approach to controlling growth by concentrating growth at urban centers in order to minimize sprawl. Smart growth is a transit based infill built upon policy and relies on growth management tools to make decisions and encourage sustainable communities, combat sprawl, and strengthen urban centers through existing infrastructure.

4. Smart Code is a unified land development ordinance for planning and urban design. It considers: zoning code flexibility, subdivision regulations, urban design, and architectural standards. Smart code supports community vision, transit options, mixed use, and conservation of open lands while preventing sprawl and auto dominated streets.





5. LEED is an acronym for Leadership in Energy and Environmental Design. It offers four quality levels: Certification, Silver, Gold, and Platinum. LEED harnesses existing resources, like transit, public infrastructure, and historic buildings, and builds upon them with pedestrian-friendly streets, amenities, and green building techniques.



Water

On average, only 1% of the land in Arizona is riparian, it supports approximately 75-90% of all life in Arizona. Over 90% of that 1%, has been lost due to impacts from settlement and urbanization, including most of the Santa Cruz River. Over the last sixty years Tucson has lost most or all of its riparian habitats due to overuse of the aquifer and droughts. Riparian degradation is the cause of decreased river biodiversity and eroded riverbed. City river restoration programs usually focus on the following points:

- River water management: flood management, water resources, erosion control, water quality and water pollution regulation
- River ecological management: river biology habitat, vegetation irrigation, wetland management
- Social activity space: waterfront landscape



management. Potential solutions include using the city's reclaimed water as source for the dry river, constructed wetland for rainstorm harvest and flood control and living machine for wastewater treatment.

Tucson's reclaimed water has been used to irrigate school grounds, parks and golf courses. There is a possibility to transfer water from closed pipelines to our site as a source of water for the Santa Cruz River. To the north of our site, is Sweet Water Wetland that collects storm water, treats wastewater and creates great habitat. The living machine system uses living plants and beneficial microorganisms to turn wastewater into clean water. It is well utilized at various scales from a single house to a large complex with 1 million gallons of wastewater per day. It is a green technology perfect for the wastewater treatment of the site.

The average water consumption in Tucson is about 100-120 gallons for each person per day. Since the expected population at the site is 10,000, a rough estimation for the overall water use amount is 1 million gallons per day. Waste water is 85 gallons per person per day, so the total wastewater is estimated to be 850,000 gallons per day.

The main water issues on our site are river rehabilitation, flood control and wastewater





Urban Agriculture

Urban Agriculture as defined by FoodSecurity.org is, “the growing, processing, and distribution of food and other products through intensive plant cultivation and animal husbandry in and around cities”. Urban Agriculture continues to be a topic in smart growth and urban design, yet its incorporation into the main stream landscape is slow. There are many types of urban agriculture that can be integrated into the design of our communities: micro-farming, community gardens, co-ops and large-scale agro-enterprises. As the population of the world continues to grow, there is a concurrent growing concern about our food production and our food security. Currently food products travel from 1,500 up to 2,500 miles from the place of production to our tables. Due to this lengthy transport of produce, almost half of our produce is lost to spoilage along the way. Incorporating urban agriculture into our urban fabric could help reduce the overall carbon footprint and enhance the taste of the produce. Because the food travels long distances, produce needs to be selected unripe and very turgid.



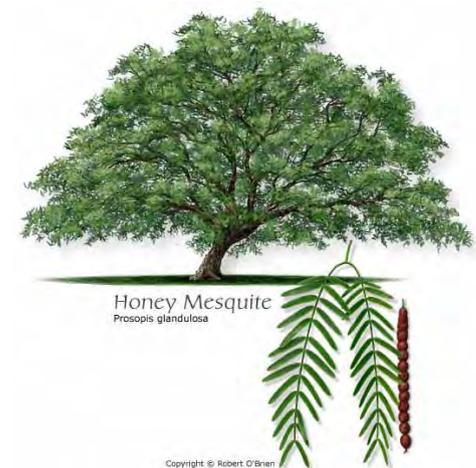


This means that there is an excess amount of water to keep the produce plump, which then reduces the flavor. By incorporating agriculture into the design of the city, we can potentially reduce the carbon footprint, cultivate better tasting foods, reduce the costs of transportation, and become less dependent on other cities for fresh produce.



Plant Materials

The approach to identification of landscape plant materials stems from the individual plant's capability to serve multifunctional purposes while meeting the requirements to survive the abiotic conditions of the site. Vegetation is classified into eight categories: sun, desert, shade, tree, ground cover, screens, aquatic, and food production. Human comfort and sensory enjoyment are taken into consideration. Urban plants can be strictly for the purpose of food production through urban agriculture either in field, greenhouse, or hydroponic conditions. Roof top gardens and atriums can produce fresh herbs, nasturtiums, strawberries, and potentially produce a coffee harvest for use in the local coffee shop. Other plants such as switch grass and horsetail can be used as experimental crops by the UA's urban agriculture department. If chosen wisely, landscape plants can serve as sources of harvest food in addition to elements in the environment. Some possibilities include shade trees such as jujuba, elderberry, and mesquite. The fruits of native desert plants; Ocotillo and prickly pear serve human dietary needs as well as supporting wildlife. Large shrubs like wolfberry serve as food and habitat for wildlife while



...serving as a screen in the built landscape. A line of fence post cactus serves as a porous screen and way-finding element.

Shade plants and ground covers provide sensory delight when in the built environment while serving basic needs as screens and fragrant shade structures; Star jasmine entwining a trellised restaurant patio. Grasses and the plume of Apache plume supply nesting material for birds.

The site, at an elevation of 2,360 has a full southern Sonoran Desert exposure. Agave spp., bunch grasses, daminita, and Texas mountain laurel are good drought tolerant and lush plants to include in the arid landscape. Higher water requiring deciduous trees such as Chinese pistach offer summer shade and winter sun to residential units.

Aquatic plants are necessary for a river restoration design that incorporates on site grey and black water treatment and reuse. This requires the plant palette to contain a mix of vegetation that can withstand the ephemeral catchment of storm water and the regular flow of high nutrient waste water in treatment ponds. The choice of plant material and

the design of the placement of plants near water must consider the reduction of glare and wind to minimize evaporation while considering the needs of wildlife.

The image to the right depicts one possibility of how plants can be used to serve multiple functions in the urban landscape.





History

This site is said to be the birthplace of Tucson. The name of the city is derived from the O'odham word *chuk shon* which means "at the base of black mountain". The volcanic lava cone that is "black mountain" is known today, as "A" mountain and was a natural feature that historically brought underground water to the surface. It was this surface water that made it possible for humans to settle at the site. Above is a composite image of two photos taken from the same vantage point at Sentinel Peak, at different times in Tucson's History. The top half is from Tucson's present and the lower half is from 1880 when Tucson was predominantly an agrarian community. The image to the right shows trenchirras, pre-historic agricultural terracing located on Tumamoc Hill.

There is a strong link between the Santa Cruz River, the mountains, and the people who have called Tucson their home for so long. From the pre-historic settlements (2500 BCE - 1450 CE), to the Spanish-Colonials (1694-1850) that brought agriculture and the San Augustin Convento to the site. In the early 1900s Tucson established its first public park, Carrillo Gardens, which featured an orchard, ponds for boats, a saloon,



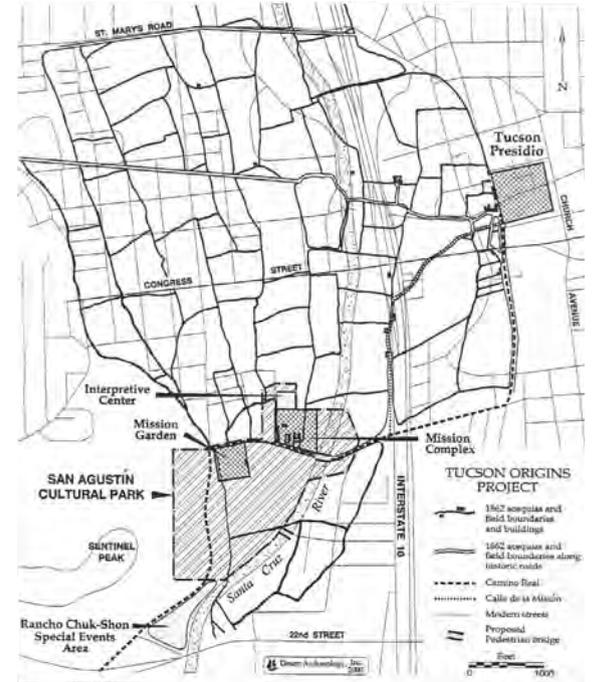


a 6-mile, multi-use, car-free, transportation corridor. The Santa Cruz River Park Trail that runs along both sides of the river, is also part of the Juan Bautista De Anza National Historic Trail that runs from Nogales, AZ to San Francisco, CA. It is important to know the history of the site because it offers many implications for design.

Tucson is proud of its history. The Turquoise Trail (left) is a guided urban walk to visit some of Tucson's oldest historic sites. Unfortunately, the Turquoise Trail only runs on the east side of I-10, completely ignoring the rich history to the west of I-10 mentioned on the previous page. The image on the bottom right is from the Tucson Origins Project which highlights the location of major historic sites on the west side of I-10. The images on the bottom left indicate the former Convento (top) and the location of excavated Hohokam pit houses (right).

and dance hall. When the river dried in the 1930s due to overdrawn water use, people no longer had a source for water and they turned their back on the river. This is most evident in the site's recent history which includes the "A" Mountain landfill.

Tucson is working to daylight more of the history at the site and they are doing so through the creation of greenways. The El Paso and Southwestern Greenway follows the path of the former railroad and provides



Transportation

Highways by definition, are any public road, however, the application of the definition tends to vary from area to area. Conventionally, the term highway is used to designate major roads. A set of highways can be referred to as a highway system, a highway network, or a highway transportation network.

Interstate 10 cuts through the site on a north-south axis, splitting downtown and the eastern end of the site from Rio Nuevo and the western end of the site. Its recent widening from 6 to 8 lanes and use as a regional link creates unique circulation and connectivity opportunities and constraints for the site.

Features should enable foot and bicycle traffic to better access the site along an east-west axis. More importantly, these corridors should be essential in creating a “dog-bone” or connection between the downtown Tucson and the site. Pedestrian tunnels are underground tunnels that serve as pedestrian corridors.

They:

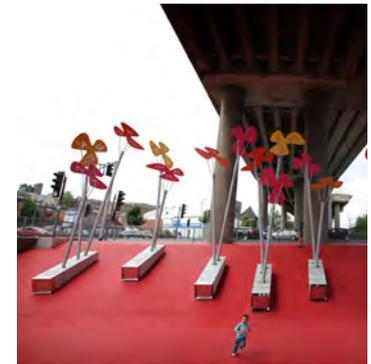
- Extend to commercial buildings
- Extend to underground parking lot

- A type of underground commercial street
- Art exhibition space

Viaducts are a type of urban freeway used to improve traffic efficiency and accomplish the following:

- Avoid conflict with ground traffic
- Occupy large vertical space
- Block sight
- Have significant influence on urban landscape
- Space under the viaduct can be used as community gathering space
- Green space connects two sides of the freeway and reduces the negative effect of the viaduct

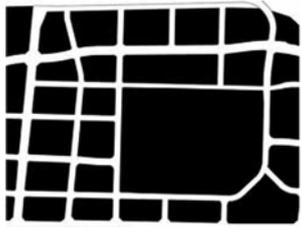
A 7-mile stretch of the DeAnza Trail passes through the site, running north along the Santa Cruz River. The official DeAnza Trail route is on the raised paved, cement berm along the west side of the river used by bicyclist and pedestrians.





The design completion of the Tucson Modern Streetcar is scheduled for 2013. It will serve as one of the conduits linking the cores of downtown Tucson and the University of Arizona. The Light Rail will be a central feature that will serve as one of the main transportation alternatives for people living, visiting or using the site.





MISSISSAUGA



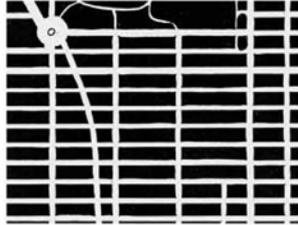
BARCELONA



COPENHAGEN



LONDON



NEW YORK



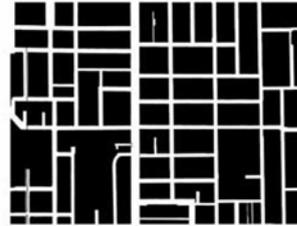
PARIS



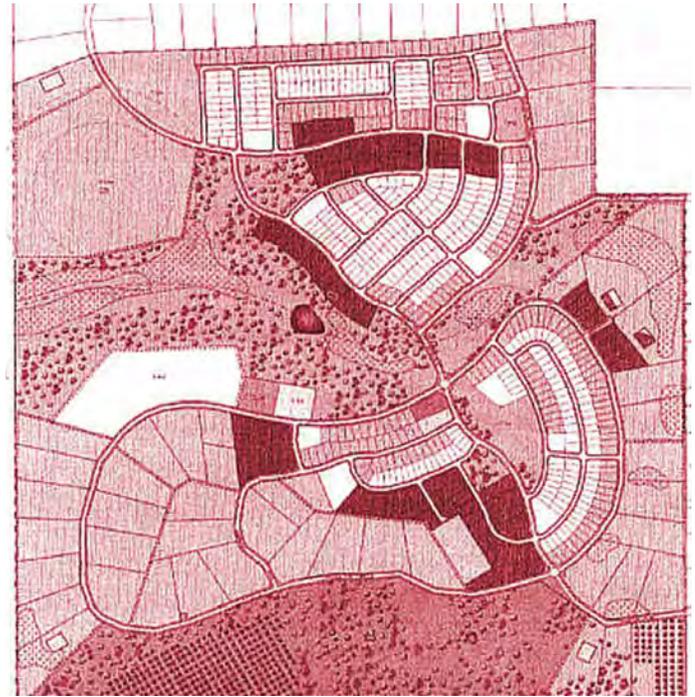
ROME



SAN FRANCISCO

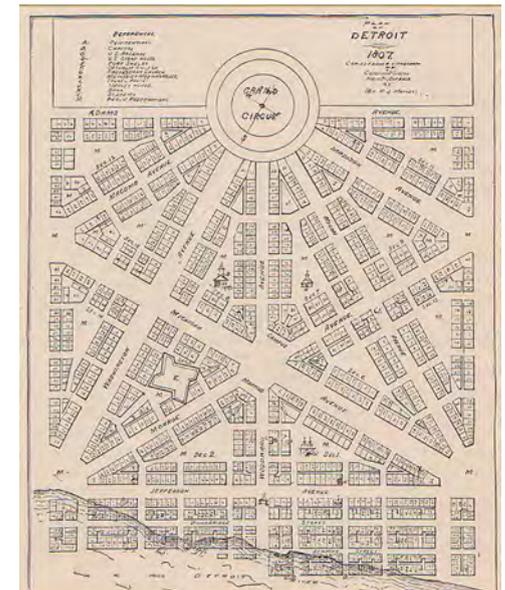


TORONTO



Block Layout

The city block or block layout is defined as the central element of urban planning and urban design. It is the space for buildings within the street pattern which forms the urban fabric of our cities. Presently there are several block layout types including square blocks, elongated blocks, irregular blocks and situations where the design of the block should allow natural features to shape and create a high degree of connectivity and permeability. The proximity of suburbs and cities of today continue to separate the naturally integrated human activities of dwelling, schooling, working, shopping, circulating, and recreating. This separation has been mitigated by widespread automobile ownership and use, which in turn has increased the demand for vehicular mobility as well as carbon footprint. Block layout can be used as a tool to combat urban sprawl and design neighborhoods that are compact and walkable.



The shape of the blocks is not random, it should satisfy two imperatives:

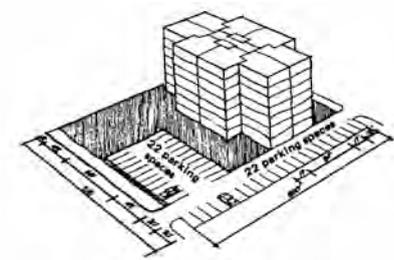
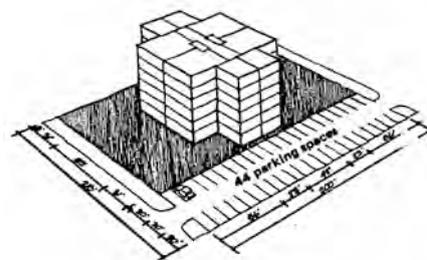
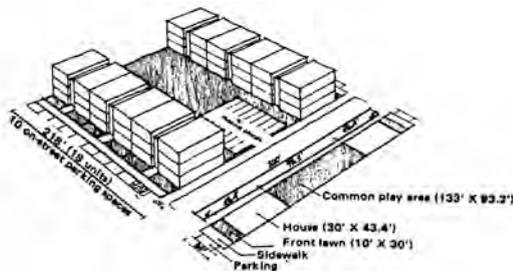
- merge blocks with the existing landscape
- maintain a high degree of permeability while retaining interconnectivity between blocks

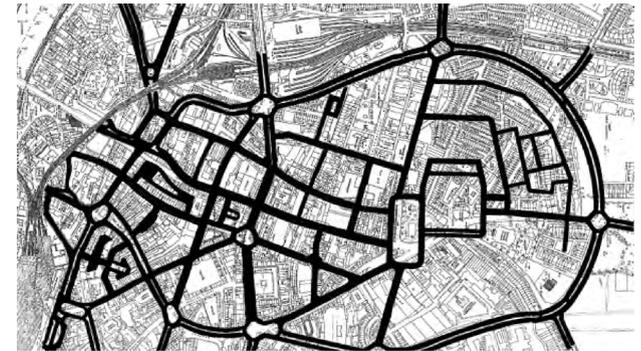
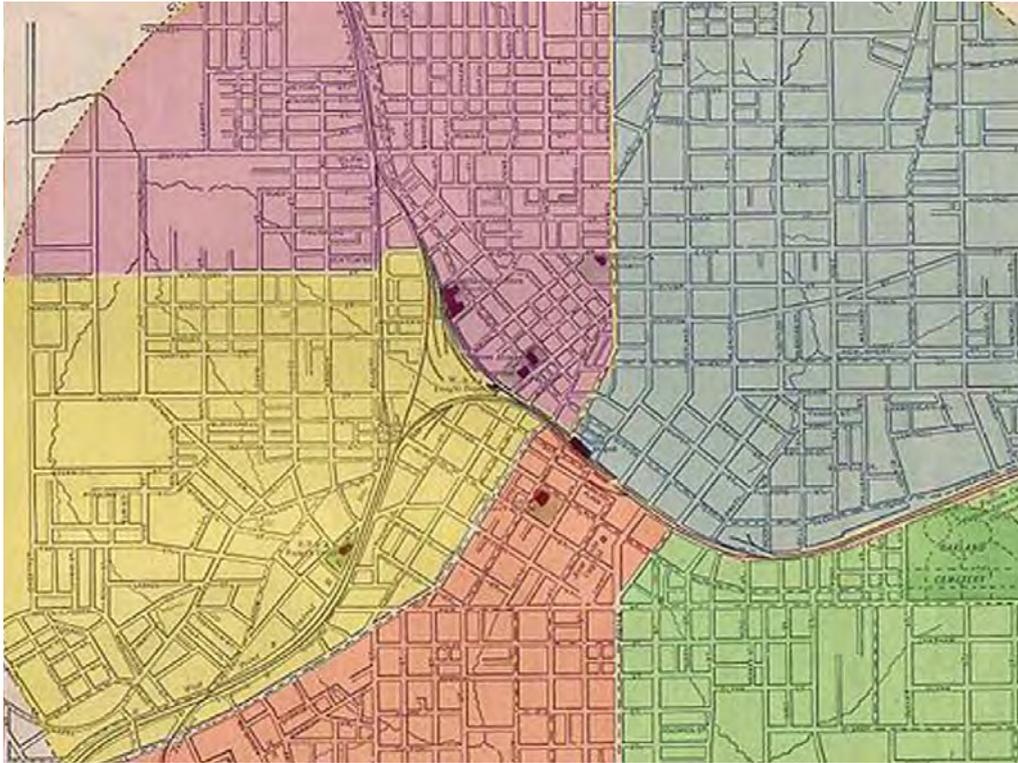
Block sizes are dependent upon the site and the surrounding context. A mixture of lot sizes and housing types should increase block density and interest in the street-scape and human experience.

The standard square blocks of prominent cities as listed below were used as reference guidelines.

- Portland: 260 by 260 feet (79x79m)
- Houston: 330 by 330 feet (100x100m)
- Sacramento: 410 by 410 feet (120x120m)
- Manhattan: 264 by 900 feet (80x270m)
- Melbourne, Australia: 660 by 330 feet (200 x 100 m)

Housing density also depends on site and context. It is important to include a variety of housing types in the community. The path to self-sufficiency is made easier if a neighborhood is planned to help residents with different incomes interact with one another. In denser urban communities, 2.5 acres of greenspace should be provided for every 1,000 people residing the area.



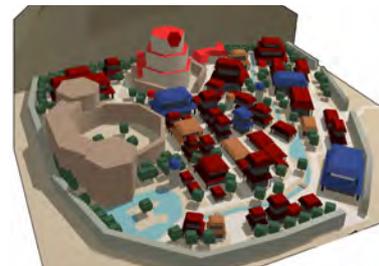


Block layout has a crucial influence on movement throughout a community and the way that spaces and places relate to and affect one another. Factors such as building type, height, function and orientation to sunlight and daylight must also be considered. In existing urban areas or as part of a developing town center, mixed-use development provides a range of commercial and residential unit sizes as well as options for transportation. A commercial node of 30,000 to 50,000 square feet of retail space is a useful target because such a district can often support a grocery store, serve day-to-day needs, and can foster walkability and social interaction. By marrying the commercial and residential nodes by way of mixed use communities, a more diversified and compact neighborhood emerges. Within the urban fabric of block layouts, connectivity is realized by the use of streets, corridors and the permeability of design. In a successful block layout design, connectivity should be porous, pedestrian friendly and designed toward community sustainability. Creating mixed use communities that are both walkable and transit oriented is a necessary component in the larger effort to reduce our environmental impacts and carbon footprint, improve human health, and increase social resilience.

Neighborhoods that are compact, mixed-use and pedestrian friendly with districts of appropriate location and size with corridors that are functional and beautiful that can integrate natural environments and man-made communities into a sustainable whole. When beginning the design process of block layouts one should consider the elements of New Urbanism and Smart Growth. These two theories promote a diverse, compact, interconnected and highly walkable neighborhoods that are vibrant and full of opportunity.

A healthy block layout consists of:

- Citizen and neighbor involvement: Communities should be designed for the interaction and mingling of all economic and age groups. This cultural interaction creates a healthy, sustainable community.
- Economic Opportunity: A mixed community provides economic opportunity for its local economy. There is also the fortune to create income in creative and sustainable ways. Locally produced produce can be gleaned by the food bank and waste composted on site.
- Diversity: Provide a broad range of housing types and price levels to bring people of diverse ages, races, and income into daily interaction, strengthening interpersonal and civic bonds essential to an authentic community.
- Infill Development: Reclaim and repair the vacant, abandoned, and bleak areas within existing neighborhoods by using an infill development strategically in order to conserve economic investment and social fabric.
- Mixed-Use: Promote creation of mixed-use neighborhoods that support the functions of daily life: employment, recreation, retail, civic and education.
- Mixed-Use: Promote creation of mixed-use neighborhoods that support the functions of daily life, employment, recreation, retail, and civic and educational institutions.
- Connections: Regional and local access to transportation options are needed in order to reduce private vehicular use which in turn results in a smaller carbon footprint and promotes healthier lifestyles.
- Density: Skillful layout of the right size blocks should manage density for the site.
- Shared spaces: Design green spaces for people to enjoy nature among their urban dwellings.
- Housing: Provide healthy and quality housing for all age and economic ranges.
- Cultural preservation: The design will demonstrate and celebrate cultural diversity .





Images left: Danahey Park, Cambridge, MA

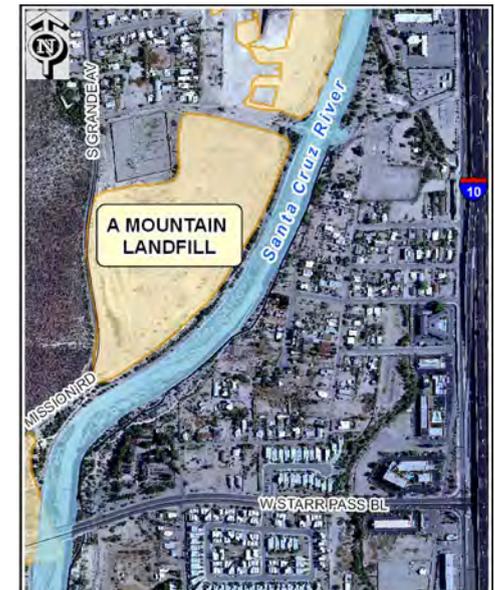
Images below: Freshkills Park, Staten Island, NY



Brownfields

Brownfields and landfills have been of keen interest to developers for some time. They are distinguished from each other by their previous land uses. Brownfields are typically industrial or commercial sites that have been abandoned and harbor contaminants that may need to be mitigated before any type of development can proceed. Landfills, which are more familiar to most of us, also need to be dealt with before new development can proceed on site. Both brownfields and landfills are prime spots for redevelopment for parks, golf courses and even commercial development. "It would be an overstatement to say that some of the nation's best urban parks have been created from landfills, or even that capped landfills automatically make terrific parks. But in a time of severe urban space and resource constraints, closed landfills present excellent new park sites for three reasons: size, location and cost. Communities from coast to coast have been jumping at the chance to convert them." (From *Dumps to Destinations: The Conversion of Landfills to Parks*)

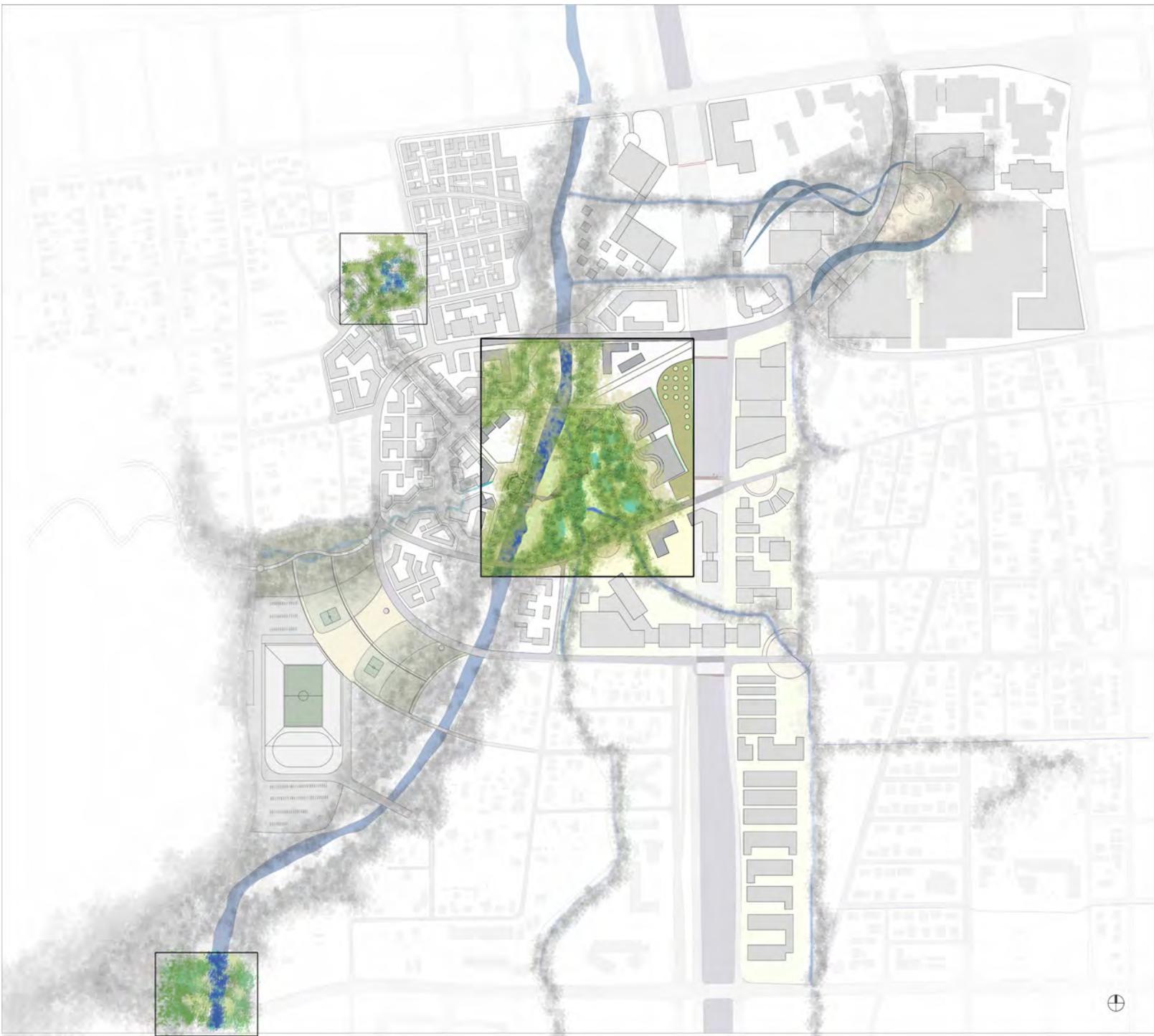
The "A" Mountain landfill that sits on the western edge of this site, was in operation



from 1953 to 1962. It consists of 31.4 acres and holds construction and municipal household waste. It is roughly 40 feet deep along the rivers edge and is more shallow, roughly 25 feet deep, along Mission Road and “A” mountain. Due to the periodic flooding of the Santa Cruz River, concrete embankments were added to help prevent water from moving into the landfill. Even though landfills seem to be prime land for development, there are issues that need to be addressed before these sites are developed. If the rubbish is not removed, the site will continually need to be monitored for methane gas. Currently at the “A” Mountain landfill there are eight monitoring wells in place. Another concern is the overall cost of building on a landfill. Strong structural slabs and deep pile foundations that are necessary can add to the overall cost of the structure and are needed features due to the problem of subsidence. Building single family residential units on landfills is typically not recommended. The main issue is the build up of methane gas and the possibility of explosions the build up could cause. Apartments are a possibility

due to the control the managers would have. The owners of the property would be responsible for continuing to monitor the site for methane gas. The grounds keepers would also have control over the landscaping and the amount of water that is percolating into the landfill. Even with the constraints of developing a landfill or brownfield, the land is quite valuable and provides a blank slate for developers. As large open plots of land become more and more scarce, these once abandoned landscapes can be turned into beautiful spaces that contribute to healthy cities and communities.





Water

Inspirational Case Reviews



Houtan Park

A linear living machine is proposed along the major trail from “A” Mountain to the village center. Houtan Park inspired us in many ways.

Built on a brownfield of a former industrial site, Houtan Park is a regenerative living landscape on Shanghai’s Huangpu riverfront. The park’s constructed wetland, ecological flood control, reclaimed industrial structures and materials, and urban agriculture are all integral components of an overall restorative design strategy to treat polluted river water and recover the degraded waterfront in an aesthetically pleasing way.

A linear constructed wetland, one mile long and 16.5 – 100 feet wide, was designed to create a reinvigorated waterfront as a living machine to treat contaminated water from the Huangpu River. Cascades and terraces are used to oxygenate the water, remove nutrients, and reduce suspended sediments while creating pleasant water features. Different species of wetland plants were selected to absorb different pollutants from the water. Field testing indicates that 500,000 gallons per day of water can be treated.



Sidwell Friends School

As another approach to the wastewater treatment on site, community-scale living machines are in consideration. Such is the case at Sidwell Friends School, located in Washing DC.

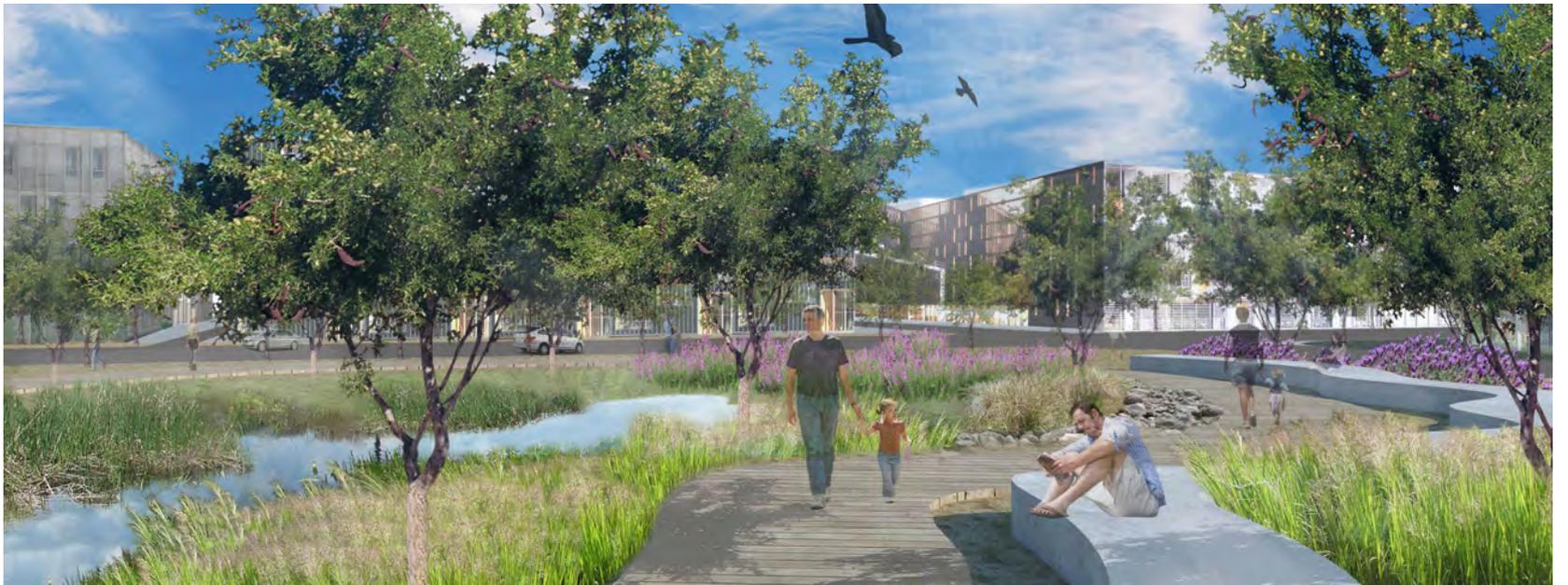
Smart water management was the focus of the project design. A central courtyard with a rain garden, pond, and constructed wetland was designed to utilize storm and wastewater for both ecological and educational purposes.

Wastewater is processed through the courtyard systems for approximately three to five days before entering a storage tank in the basement. When non-potable water is needed for toilet-flushing or cooling towers within the building, cleaned water from the reuse tank is filtered through a fine screen, disinfected using ultraviolet light and pumped back into the building in a parallel set of pipes designated for only recycled water. The wetland system receives up to 3,000 gallons per day and the high-quality reclaimed water is recycled into the building for reuse.

Living Machine



The image above shows the water treatment process of the living machine. The first flow of polluted water is covered by the dense wetland plants in Mission Garden. As it moves to the village center, the cleaner the water is, the more open it is to people. The system treats the wastewater of the village center and provides a clean water feature back to it. The plan to the right displays the research wetlands layout. Site features include wind turbines, and research and education buildings. The design also calls for daylighted washes that fill the ponds with stormwater. Connectivity to the village center west is maintained through a bridge over the reclaimed Santa Cruz.



Living Machine & Research Wetlands





Key

- (1) distribution tanks
- (2) vertical flow treatment cells
- (3) horizontal flow treatment cells
- (4) surface-flow treatment cells
- (5) polishing ponds.

The Flower and The Butterfly Model

Koh Phi Phi Don Island off the coast of the Thai-Malayan peninsula serves as a prime model case study for the research wetlands located between the Santa Cruz River and the research buildings. This design of a wastewater treatment facility was developed in conjunction with the rebuilding of the island's infrastructure after the 2004 Tsunami. Located alongside one of the island's main traffic routes, the design required an aesthetic quality in addition to the control of odors and public health considerations. The design is comprised of an underground collection system of raw effluent, a pumped distribution system, sub-surface and surface wetlands, wet ponds, and reuse storage tanks.

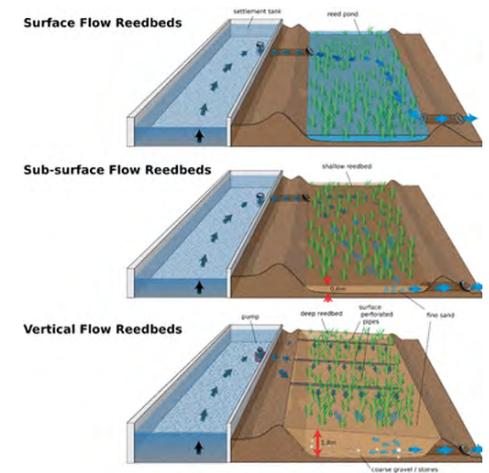
Waterworks Garden in Renton, WA was inspirational in the design of the research wetlands. In particular, the grate over the inflow in the Knoll garden served as a model for the design of the plaza's distribution center and the beginning of the secondary water cleaning process.

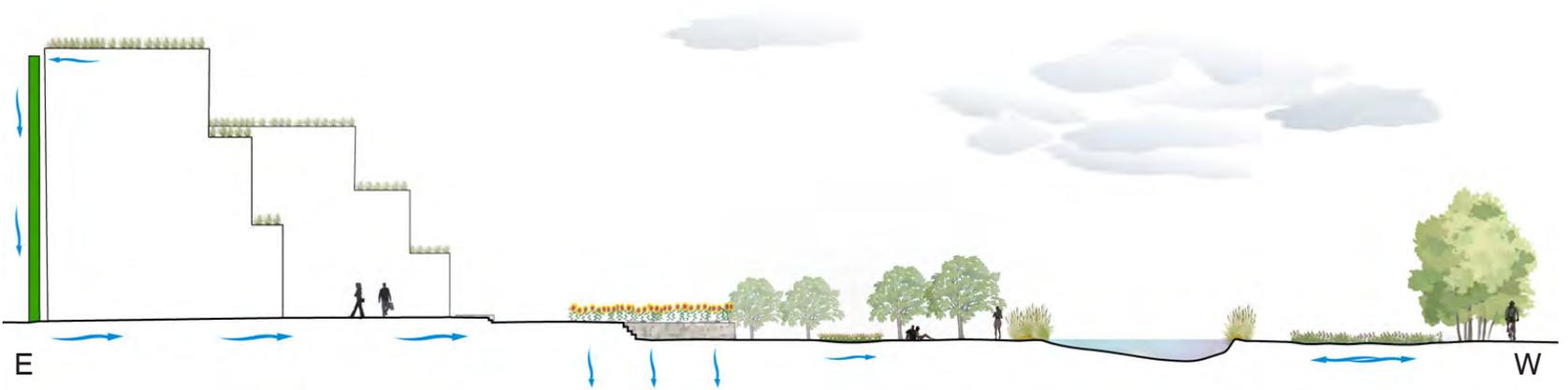




Research Wetlands

The perspective above is that of a child looking north over the research wetlands while in a tree near the southern pedestrian walkway. The two washes flow into the southern deep end of the long pond. Overflow is discharged to the river through a sculpture that is associated with the pedestrian bridge. The wind turbines behind the research buildings and the education building can be seen in the distance. The perspective to the upper right is taken from the river path looking east to the education building at dusk. The section to the right is a view looking south from within the research treatment wetlands. The treatment cells are lined with a synthetic liner, then a layer of clay, and topped with a gravel/ground glass mixture. Roof run-off is collected and stored to water the roof gardens.





Black water passes through trickle-down filters then mixes with grey water as it flows to the treatment cells.

Sub-surface vertical flow is designed as raised planters.

Sub-surface horizontal flow is designed as depressed planters.

Surface flow is designed as a marsh.

Santa Cruz River

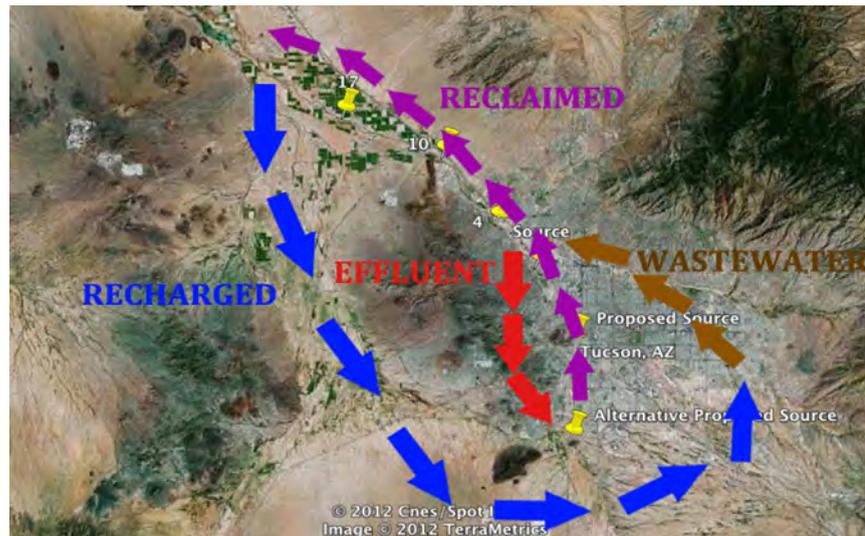
The Santa Cruz river currently has 60,000 acre-feet per year of effluent released at the Roger Rd. and Ina Rd. waste treatment plants. This effluent goes on to support 30+ miles of riparian habitat as it infiltrates into the ground for recharge. This section of the river has been partially rehabilitated and flows perennially, yet starts 5 miles north of downtown Tucson. This overlooks an excellent opportunity to aid in the downtown revitalization efforts through creating a perennial river habitat adjacent to the entertainment district.

The City of Tucson has set aside another 10,000 acre-feet of effluent for riparian projects, which is currently going unused.

This plan proposes to bring the existing effluent south of downtown Tucson to be released into the Santa Cruz in a way that creates an urban amenity. The effluent, which will require a tertiary treatment to clean it to the status of reclaimed water, can then combine with already existing reclaimed water adjacent to the site. There is a 36" reclaimed water line on the northern end of our site that can be tapped into.



Santa Cruz River





Options:

- 1) Pipe effluent released at Roger Rd. to site for tertiary treatment and release
- 2) Treat and release the unused 10,000 acre-feet of City effluent
- 3) Tap into reclaimed water lines near site and release

Preferred:

- 4) A combination of the above





Marketplace



Case Studies

Pike's Place Market in Seattle, Washington is the inspiration for the market and urban agriculture area. The design revolves around the attributes that Pike's holds, from walkable spaces, to a major gathering space with street performers, table space for farmers, and housing units to accommodate the community. The goal is to become a Pike's Place Market; a gathering space for the village node. Pike's place is 9 acres with over 10 million visitors yearly and is:

- Considered the "Soul of Seattle"
- A public street market that would connect farmers directly with consumers
- Aged and tested. It opened August 17, 1907.
- Has over 200 year-round commercial businesses, 190 crafts people, 100 farmers who rent table space/day, 240 street performers and musicians
 - Has more than 300 apartment units, most of which provide housing for low-income elderly people



CowCaddens Underpass / Phoenix Flowers

The project involved the radical revitalization of a crucial link to the City Centre which was severed by the construction of the M8 motorway in the 1960s.

Christened The Phoenix Flowers, a reference to the former Phoenix Park which once occupied the site

The project recently won the 'Best Future Building' category at the 2010 Scottish Design Awards.

SengKang Sculpture Park, 2004

It's a 24,000-square meter park divided into two parts. The two parts straddle over Compassvale Street and are bounded overhead by LRT viaducts and underground by MRT tunnels.

The park evolved from Sengkang's "fishing village / marine" theme and design which called for the introduction of "Arts in the Park".



Market Plaza and Urban Agriculture



The Market Plaza and Urban Agriculture Center extends from across the urban core to the lower southeast corner across I-10 of the project site. Urban Agriculture was incorporated in the design to help alleviate a part of our carbon footprint. Moving to more sustainable ways of growing crops and transporting the produce, urban agriculture is made in the form of greenhouses, demonstration gardens, and orchards spread throughout the site. The market is an extension of the urban core, spreading across the Santa Cruz River. The idea of the market was inspired by Pike's Place Market in Seattle, Washington. The creation of this node was necessary to help promote healthy and fresh produce, attract locals and visitors to the gathering spaces, produce income, and connect the existing neighborhoods. The market stretches from the urban core and through I-10, connecting to the greenhouses on the east side of I-10 along 18th street. This connection leads to 5 points, where a later expansion can be made to link the plazas together. This market area is a link to the existing neighborhoods. It attracts consumers and creates jobs for the locals.



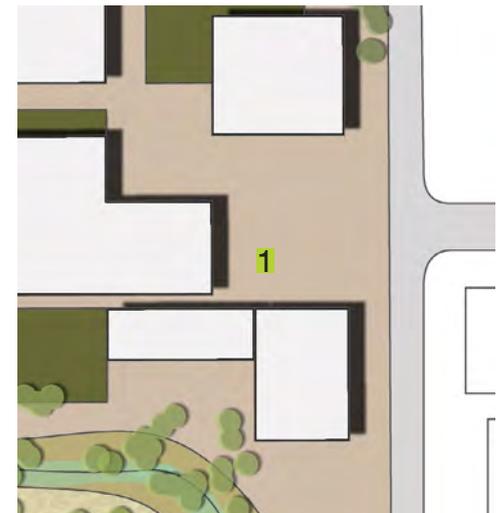


1

Design

This perspective shows the northern section of the industrial urban agriculture. Here, visitors have the opportunity to tour the greenhouse facilities and participate in harvesting activities in this community oriented space. The orchard provides a pleasing space for neighborhoods to gather, while teaching visitors about the processes and techniques used in urban agriculture production.

By having urban agriculture on our site there will hopefully be increased food production and an incentive to have farmers markets, food events, and a greater presence of locally grown food.





The marketplace becomes a node to connect the urban core with the rest of the city. Consumers can buy anything from fresh produce to souvenirs here and walk through the market to explore the plethora of vendors in the area. The market is meant to have an open feel even with a roof overhead. This creates a slight separation between the mixed use floors above the first floor market to create some privacy. Users of the second and third floors will experience a different feel due to this expected change in the atmosphere. This is done to truly create a mixed use area that can serve a wide range of people. Below is an image showing how the first floor of the market would look on a typical Tucson day.

This view shows the market's open space feel, looking at the urban core past the wetlands. The skylights on the roof help create this feel along with the open end on the west side of the marketplace.

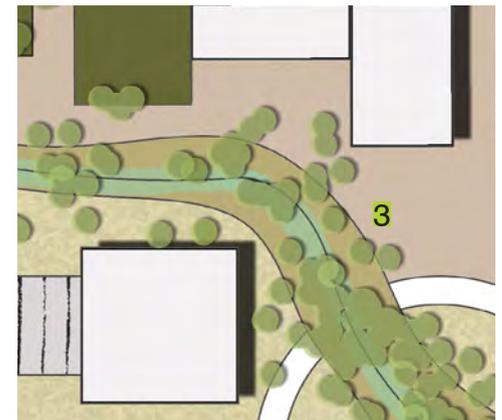




3

This view shows the viaduct in action. The wash to the left of the view goes through the viaduct and eventually tapers into the wetlands. Here we have food carts lined with shade from the trees and a beautiful view of sentinal peak. Through the viaduct is the marketplace, where fresh produce and other products can be purchased.

Also in this picture is a bridge that spans over the water. This is done in order to seamlessly connect multiple uses and prevent a division of activities.



Here we see demonstration gardens for the public. Next to the viaduct is this attractive plot of land, showing the uses of urban agriculture and how it is beneficial for the community. Different crops are grown on these agricultural plots to show the variety that can be grown in Tucson. This particular perspective shows a sample of the plants that would be envisioned on the site. Not only would this serve as food for the community, but is a major focal point of the design.





TCC Complex

Inspirational Case Reviews



Pioneer Courthouse Square

Pioneer Courthouse Square is known as “Portland’s Living Room” due to its modern design, art, amenities, flowers and trees, all of which attract a great deal of people to the site. The square holds frequent events, it’s enhanced by food vendors and a coffee shop and is a hub for the light rail and buses. Pioneer Courthouse Square is one of the first in a new generation of public squares. No longer just passive green spaces, these squares are designed to be programmed and used by the public. In fact, the infrastructure for such uses is built-in, and the spaces have management entities in charge of them to assure their ongoing effective use. The process of creating Pioneer Courthouse Square - the public debates, the fundraising, the grand opening - was designed to involve Portland’s residents. Funding and vision from Tri-Met linked people to the square and downtown as a whole. With extraordinary public support, the Square was built to be “Portland’s living room,” a center for the life of the city. Funded in part by the residents of Portland, the Square has continued its tradition of citizen participation with thousands of community events held over the past decade. With the opening of the light rail system in 1986, Pioneer Courthouse Square became both the city center and the bustling hub of transit for buses and light rail, as well as the main information center for Tri-Met. This is why the Portland Pioneer Courthouse square is so popular.



Westin Riverfront

Located in Avon Colorado is the Westin Riverfront Resort. It has achieved LEED Silver Certification and is 206 rooms.

50% of the resorts electricity comes from renewable sources including wind power and 40% of the building materials were sourced within 500 miles of the project.

The hotel enhanced and donated a 5 acre riparian zone along the Eagle River as permanent open space.

10 percent of building materials were made of post consumer/ industrial recycled content, such as the roof tiles made from recycled automobile tires .

Sophisticated building control system allows front desk associates to adjust the temperature in individual rooms upon guest arrival/departure so that unoccupied rooms are not unnecessarily heated or cooled.



Phoenix Convention

900,000 square feet of meeting and convention space and over 2 million in total square footage.

The Phoenix Convention Center (PCC) and Executive Conference Center were designed to operate with the environment in mind. The West Building is certified by the U.S. Green Building Council with a Leadership in Energy and Environmental Design (LEED) Silver rating and the North Building was built to LEED standards.

A Photovoltaic solar energy plant sits atop the west building of PCC.

New 1000 room hotel complex

Located in downtown Phoenix with easy access to the light rail.

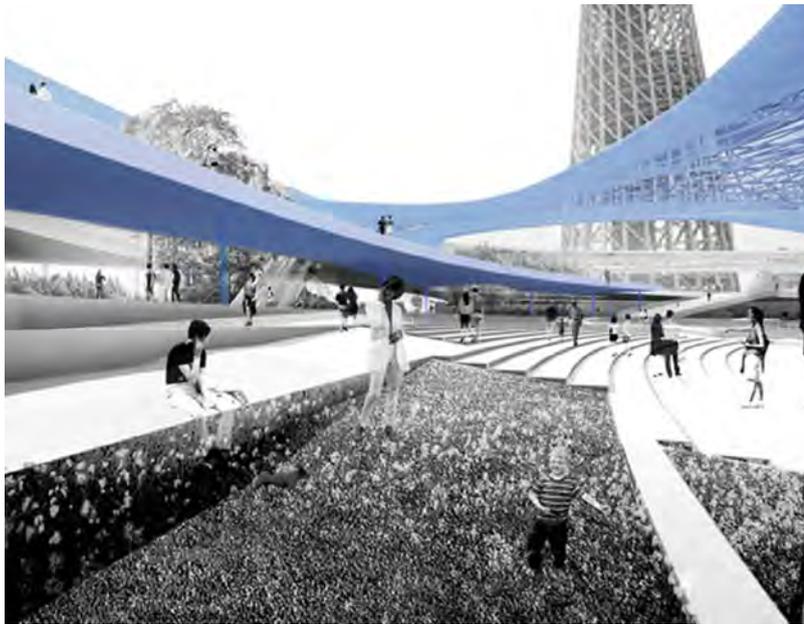
TCC Complex Master Plan



The Tucson Convention Center (TCC) was built in 1971 and consists of a 9,275 seat indoor arena, two performing art venues, and 205,000 square feet of meeting space, yet at this time the TCC is outdated and Tucson consistently loses large name performances due to its inadequacy. There have been recent plans to update and expand the TCC through the Rio Nuevo Project, but those plans have fallen through and the Rio Nuevo Project is at a standstill. Downtown Tucson also lacks hotels located near the TCC for out of town visitors.

Design Implications

- Expansion of the TCC could bring in needed revenue for the city.
- Centralized location within downtown Tucson will attract people, reviving the downtown area.



Shade Sails

- Large open central plaza can be programmed year round.
- Multi-use space can be used for many different events including outdoor musical performances to wedding receptions.
- Brining in citizen participation will keep the space active and provide a sense of community
- Restored washes provide much needed open space for recreation, but can also serve as exhibition space for local artists. TCC expansions and hotels should be built to LEED standards, always keeping in mind the environmental impact.
- Additional hotels add a contemporary flair to the site while providing the needed rooms conveniently located next to the TCC complex.



Plaza



1



A

A'



2

TCC Plaza



The large open central plaza is a welcoming spot full of life and activities and the programming for the plaza keeps it active all year long. The spiral water feature found within the plaza is fed by the condensate collected from the AC units and additional water from the drinking fountains. The water will eventually feed into the daylighted TCC wash.



3

TCC Light Rail Stop



One of the light rail stops is located next to the Tucson Convention Center and the new TCC hotel. Visitors will enjoy the convenience of taking the light rail into the the village center west to eat, shop and meet with friends. The addition of the light rail within the site will help alleviate traffic congestion and the need for expansive parking lots within the project area.



4

TCC Wash



The new large modern hotel complex sits along the daylighted and restored TCC wash. Visitors can grab a meal or a cup of coffee at one of the shops located along the wash and then take an evening stroll along this beautiful open space which enhances the overall feel of the area. Daylighting the wash will help deal with runoff from storm events helping channel and slow the water flow which will increase infiltration before the remainder of the water moves into the Santa Cruz river.



5

TCC Hotel Complex

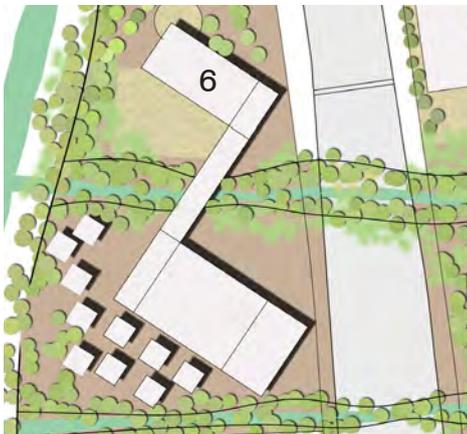


Visitors that are attending events at the redesigned and expanded TCC can stay next door in a large, state-of-the-art hotel which is connected to the TCC by a striking helix pedestrian bridge. The hotel is conveniently placed next to a light rail stop that will take visitors into the village center west which offers entertainment, restaurants and even a chance to watch a soccer game.



Santa Cruz River Hotel

6



Sitting next to the restored Santa Cruz River Hotel is an inviting, contemporary hotel complex that offers stylish accommodations along with smaller, more intimate bungalows along the river. This hotel will become a feature destination, attracting in and out of town guests who will want to stay and stroll along the Santa Cruz, take in a show and possibly visit the local market.



Village Center

Inspirational Case Reviews

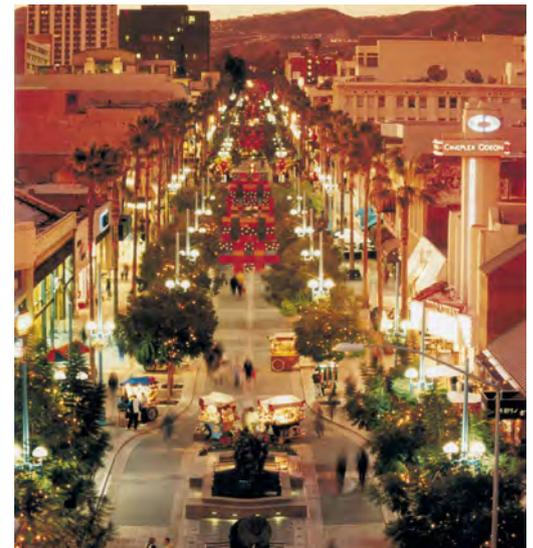


3rd Street Promenade

The Third Street Promenade is a public entertainment and commercial venue in the downtown area of Santa Monica, California. It is considered a premier shopping and dining district and draws crowds from all over Los Angeles County. Due to its proximity to the Pacific Ocean and coupled with Los Angeles's mild climate, it is a popular tourist and locals attraction.

Third Street Promenade has been a center of business in Santa Monica since the town's inception in the late 19th century. The vehicular free access and tree lined corridor make 3rd Street Promenade an inviting, vivid, exciting pedestrian mall.

This area is known for its street culture and has become a landmark for the city of Santa Monica. It encourages walkability and provides for the local economy.





Las Ramblas

Las Ramblas is a street in central Barcelona, Spain, popular with both tourists and locals alike. A tree-lined pedestrian mall, it stretches for 1.2 kilometers between Barri Gòtic and El Raval, connecting Plaça de Catalunya in the centre with the Christopher Columbus Monument at Port Vell.



Las Ramblas has no vehicular access, it is pedestrian focused with only larger roads that service the periphery. It is full of color, artwork, live art, and cultural value and identity.

Las Ramblas is an area of mixed-use with an appropriate scale of buildings. It is an identifiable district that is attractive to tourists and boosts local economy.



The Village Center Masterplan



The Village Center acts as a significant node in this revitalized design. It serves as a junction between the east and west sides of the Santa Cruz River and as a corridor between the TCC area and the Stadium. The Village Center is a vibrant, compact, mixed-use community that is walkable, sustainable, and highlights the area's natural features.

It is easily accessible by pedestrian, bicycle, and streetcar traffic throughout the site. Vehicle access is limited however pedestrian and bicycle transportation is encouraged. The street car route throughout the site makes it operative, convenient, and easily connectable to other focus areas.

The ordering systems are evident in the Village Center and helped guide design decisions and objectives.

Economically, The Village Center has a lot to contribute to the Tucson economy. There lies economic opportunity throughout the site from commercial, retail, real estate, tourism, and event attraction to name a few. This area could attract many potential visitors to spend time and money here.

Environmentally, this design is forward thinking and educational. There is a focus on how to harvest, re-use, protect and restore water in the Village Center as it is exposed through design. Throughout the Village Center water is collected, cleaned, re-

used and deposited back into the Santa Cruz River. The river will be re-vegetated and water will be infiltrated restoring parts of the Santa Cruz River and creating wildlife habitat.

The Village Center promotes cultural sustainability. It is a mixed-use community which integrates all social classes and cultures. Its relatable size allows for neighbors to have more contact and develop healthy relationships.

Functionally, this area will serve as a hub for commercial, residential, retail, and public attractions.

Aesthetically, this design respects its surrounding context. It is kept to a compact size and takes advantage of its natural surroundings.

The development of the Village Center advocates sustainability as it is a mixed-use community. It has a healthy balance of commercial, residential, retail, community green space and is compact and walkable.





River Interface

1

The Village Center has a strong relationship with the Santa Cruz River and there is an opportunity here to highlight this interface.

The Village Center accents and revitalizes the river. By implementing restorative vegetation and terracing down to add access, people can really integrate with nature and experience the river as an amenity.

The Village Center is a hub for residential, commercial and recreational activities and should become a Tucson landmark.





2



Interaction among the river increases with revitalization of the Santa Cruz. With restoration techniques this is now an area of recreation, education, and water celebration.

This design is forward thinking and encourages sustainability. Water harvesting and water re-use techniques are implemented throughout the design and are exposed at the Village Center.

At the amphitheater near the river the water from the living machine flows through and empties into the Santa Cruz. This is a significant connection.



Village Center Plaza: Day



Village Center Plaza: Evening



Village Center Corridor

3

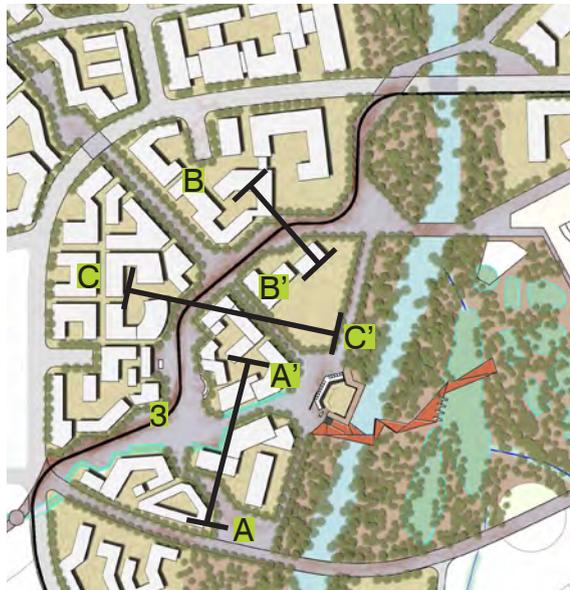


The main corridor spanning the site is a significant element in this design. It will be a lively area full of mixed-use opportunity, community recreation, culture, and education. It connects the anchors of this design and is the lifeline of the Village Center.

This type of design nurtures a community where all amenities are within a walkable distance alleviating the need to drive.

Pedestrian and bicycle access is designed for and promoted. Street car access is routed through the Village Center and made easily usable.

This corridor highlights water re-use techniques such as the living machine which are part of the design in this futuristic avenue.





4

Mixed-use

Inspired by other successful mixed-use communities, the design of the Village Center is mostly mixed-use infrastructure. It combats urban sprawl by keeping the neighborhood compact and amenities within walking distance.

In order for blocks to be comfortably walkable, the blocks in city center are designed to be about 200' x 200' with a maximum block size of 300' x 300' .

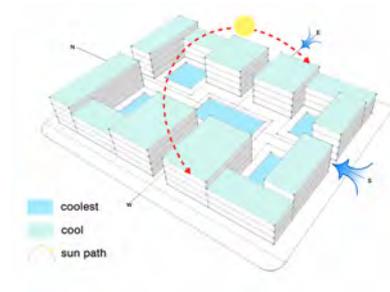
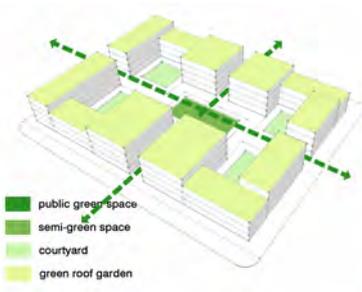
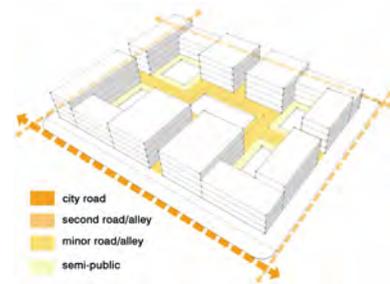
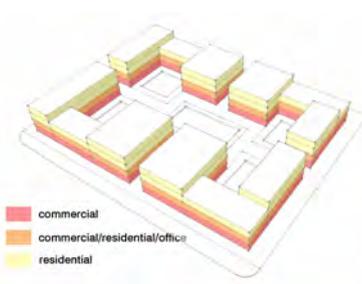
Buildings here will range from two to four stories high. The first and second floors contain commercial and retail venues for restaurants, offices, and stores. The other floors are residential including studio, 1-3 bedrooms, and other housing types.

Each building has its own courtyard, green roof, and each block will have a semi-public green space shared by 4-6 neighboring buildings. For every 1,000 people, 2.5 acres of green space will be allotted.





5



A typical mixed-use unit in Village Center might be:
 3-bedroom: 1,200 sq ft
 2-bedroom: 800 sq ft,
 1-bedroom: 400 sq ft,
 Approximately 740 units that can house 2,590 people
 There are approximately 75-80 on-street parking spaces available and the nearest public parking garage is underground at the Village Center.



Stadium

Inspirational Case Reviews

Chase Field

Phoenix, AZ

49,033 capacity

Retractable Roof & Multi-Use

Cost \$354 million in 1995

Ellerbe Becket – Architecture

Design Implications

- Retractable roofs can provide much needed shade to a large arena.
- Multi-use arenas can be popular even in hot and dry weather climates.
- A comparable facility can revitalize downtown Tucson similar to how Chase Field helped revitalize downtown Phoenix with the aid of mass transit but local businesses.
- - habitat was weighted heavily overall

University of Phoenix Stadium

Glendale, AZ

72,200 capacity

Retractable roof and field

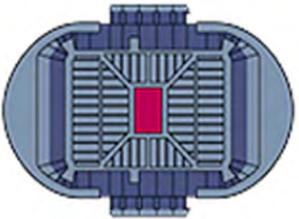
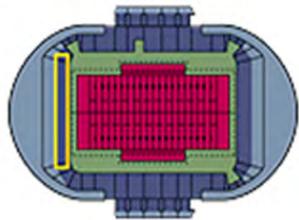
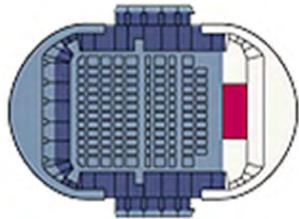
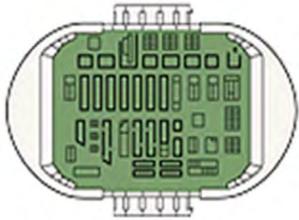
Cost \$465 million in 2003

Main architect was Peter Eisenman

Design Implications

- If a stadium is built correctly and accommodates the right events, it can easily attract enough business to pay for itself and revitalize the nearby community.
- Retractable roof is an appropriate choice for the arid Southwest.
- Multi-use, downtown location can support year-round events.





Saitama Super Arena-Tokyo, Japan

36,500 capacity

Moving Block concept – moves 9,200 seats along with restrooms and hallways, 231 ft to transform between arena and stadium.

Design Implication

- Tucson's new arena could feature such an idea to make it stand out and offer opportunities to groups besides soccer teams.

Stadium Master Plan



“FC Tucson wants to demonstrate that soccer is a highly desirable sport in Southern Arizona, a tremendous business opportunity for ownership and affiliated partners, a multi-cultural tourism attraction, and a much-needed source of pride and enthusiasm for our community.”

FC Tucson Developmental team



Overview

The Stadium District includes four elements: a multi-use stadium with an indoor velodrome, Mission Garden, and the downtown-to-top-of-“A” Mountain trail connection. The grounds surrounding the stadium allow for multiple uses including two practice fields that can be used by community members, a large entry promenade that can be used for Gem Show vendors, and an area for a future dog park along the river trail. This space is the tail end of the “dogbone” created through our overall site. Its other function is to connect downtown Tucson to the cultural and natural amenities of the historic Mission Garden and the trail systems of “A” Mountain and Tumamoc Hill. The Stadium District provides continual amenities along the existing riverfront trail system.



1



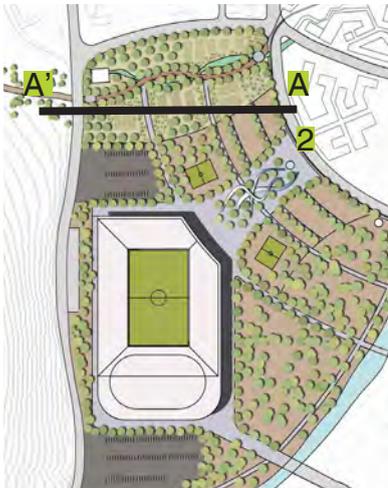
Mission Garden

The original plan to reconstruct the San Agustín Mission Garden was to create a reproduction of the early 1800s Spanish Colonial walled garden that once stood on the site. The intent was to exhibit the plants and farming techniques that were introduced to southern Arizona during the Spanish Colonial era. However, in our design, Mission Garden will be more integrated into the site. We will remove the existing wall and add interpretive signage that will explain the history of the gardens, orchards and farming techniques. The 'mountain to downtown' trail will travel through the garden allowing visitors to more easily interact with the space and learn about the rich history of the site. The trail will be constructed of a red pavement that will carry from the base of "A" Mountain through the Village Center to the TCC complex as a wayfinding method.



Stadium Entry

2



Introducing a Major League Soccer (MLS) stadium to the city of Tucson will bring many benefits to the community. Soccer is a hugely popular sport that attracts an international audience and can bring great economic vitality to the city. During the off season and during non-game and practice time, the stadium can be used for other purposes such as big name concerts and events to compliment the TCC and Gem Show vendor areas.



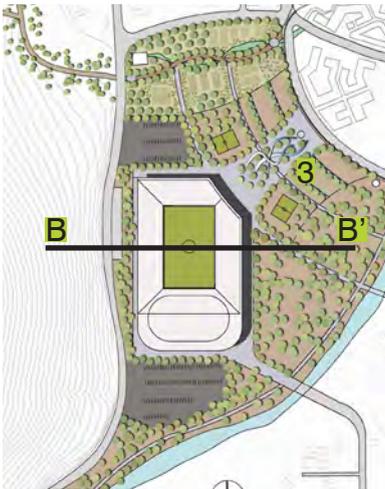
A

A'

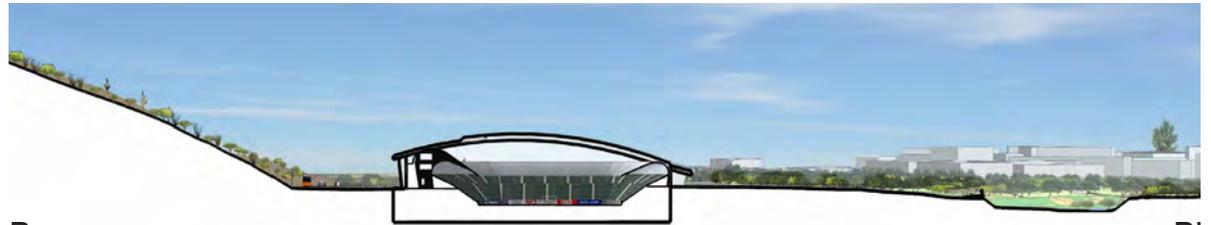


3

Stadium Grounds



Our design is sensitive to the context in which it is placed, realizing the close proximity to “A” mountain must be recognized. The architecture chosen for the stadium has an organic feel with a sloped roof that mimics the natural slope of the mountain. The area in which it is sited is a former landfill and we have chosen to excavate the refuse and dispose of it responsibly leaving an area to sink the stadium so as to minimize its visual impacts on the site.



B

B'



Master Plan

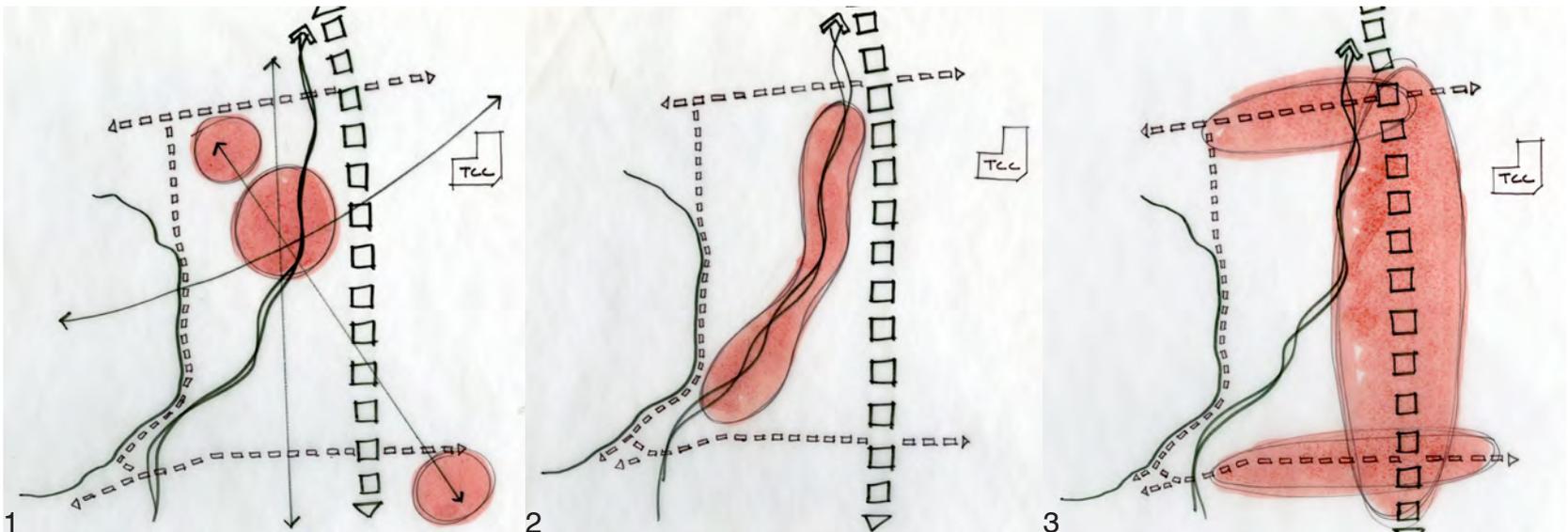
Design Process

Developing the master plan was a collaborative process between studio members, professors and professionals of the Tucson community. The process included research and case reviews, followed by stimulating discussions, charettes, and interim presentations.

Beginning with a flexible site boundary, team members were responsible for site analysis, research on specific topics relevant to the site, and its conditions. Conceptual designs for the area were developed and presented to the team, as a way of sharing significant ideas and generating alternative solutions. Synthesizing the individual plans, the studio team moved forward by exploring three distinct concepts emerging from the process. The concepts reflected three different areas proposed for dense urban development and include:

1. Development at a node where the corridor connecting major amenities, "A" Mountain and downtown, intersect with the Santa Cruz River.
2. Development focused along the Santa Cruz River, thus creating a long, linear development pattern.
3. Development is focused on the outer boundaries of the site, close to the existing major roads

From these three major concepts, the studio team evaluated each design and synthesized the successful ideas from each. Agreement was reached on general land uses and the team moved forward with a plan reflecting the node concept unified by a green network, coined "the green finger", extending from "A" Mountain into the downtown area.



Concept Development

The concept of the green finger, a vast network of green space, was developed as a means of connecting Tucson's natural amenities, the Santa Cruz River and "A" Mountain, to the man-made downtown area. The network of green space strengthens the idea of the "dog bone" by creating a link between the major nodes of "A" Mountain and downtown. The green finger presents an opportunity to introduce new, mixed-use, urban development between the nodes, while also providing an urban trail system that weaves across a revitalized Santa Cruz River and through the barriers of I-10.

Further research was conducted to support the team's ideas as the conceptual plan was refined. The site was then divided into five "focus areas" where groups would be responsible for further developing their assigned area, allowing the concept of the green finger to mold their design. Numerous discussions and charrettes were held to unify the focus areas until all designs merged together seamlessly in the final schematic master plan. The products of these efforts are presented in the subsequent chapters highlighting the master plan and the focus areas.



Concept



Synthesis

Master Plan



Focus Areas:



TCC

Village Center West

Market

Water

Stadium District

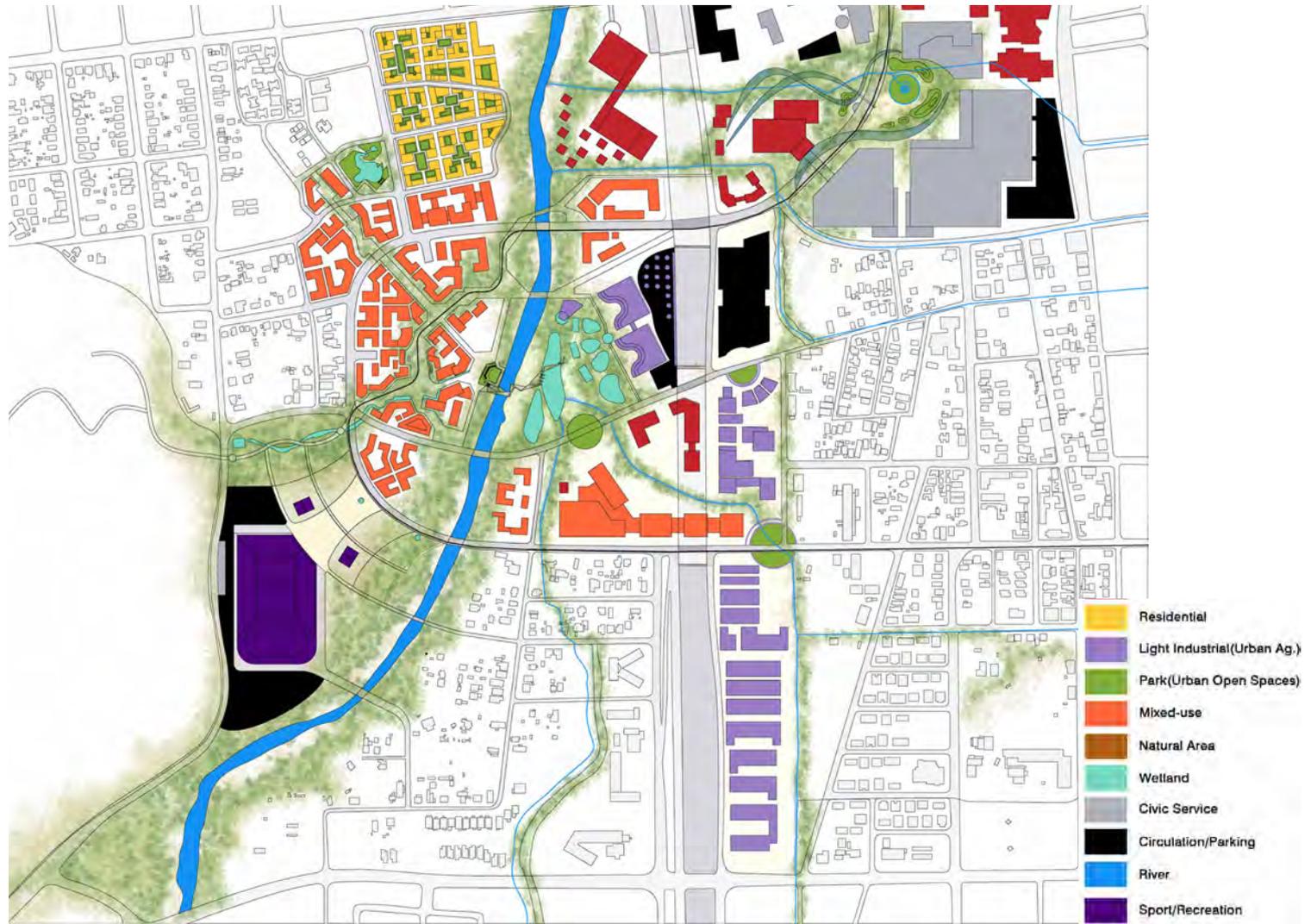
The master plan proposes a significant change in land use within our site, restoring natural systems, while also providing space for mixed-use development. The plan proposes taking what is currently a brownfield and transforming it into active, public spaces by introducing a soccer stadium, a variety of residential units, and a lively village center. Reintroducing water into the Santa Cruz River and day lighting the surrounding washes creates an amenity for users, while celebrating what was once lost. Using the concept of the green finger as an organizing principle, intersections are formed between natural and man-made systems, historical and new developments, various modes of transportation, and social activities.

The development of the master plan was largely based on designing a model for sustainable living. Within this model, emphasis was given to three main areas: the natural systems, the concept, and circulation. Diagrams demonstrating these

systems are examined in the following pages.

In addition to the master plan, which represents an overall schematic plan for the site, the area was also divided into five focus areas for further detailing. Focus areas include the TCC Complex, Village Center East, Village Center West, Stadium District, and Water. The specific designs of each focus area will be presented in detail in subsequent chapters.

Land Use



The land use changes proposed in the master plan encourage the revitalization of areas along I-10 and the Santa Cruz River. The overall strategy for planned land use was driven by the goal to provide a variety of mixed-use spaces and the introduction of an urban trail, streetcar, and green network as connectors.

Green Fingers

“Green fingers” were generated during the concept development phase as an extension of “A” Mountain’s natural system braided into the urban downtown. The green finger engulfs the major nodes of the site, weaves across the Santa Cruz River, and branches into existing neighborhoods and smaller nooks in and around the site.

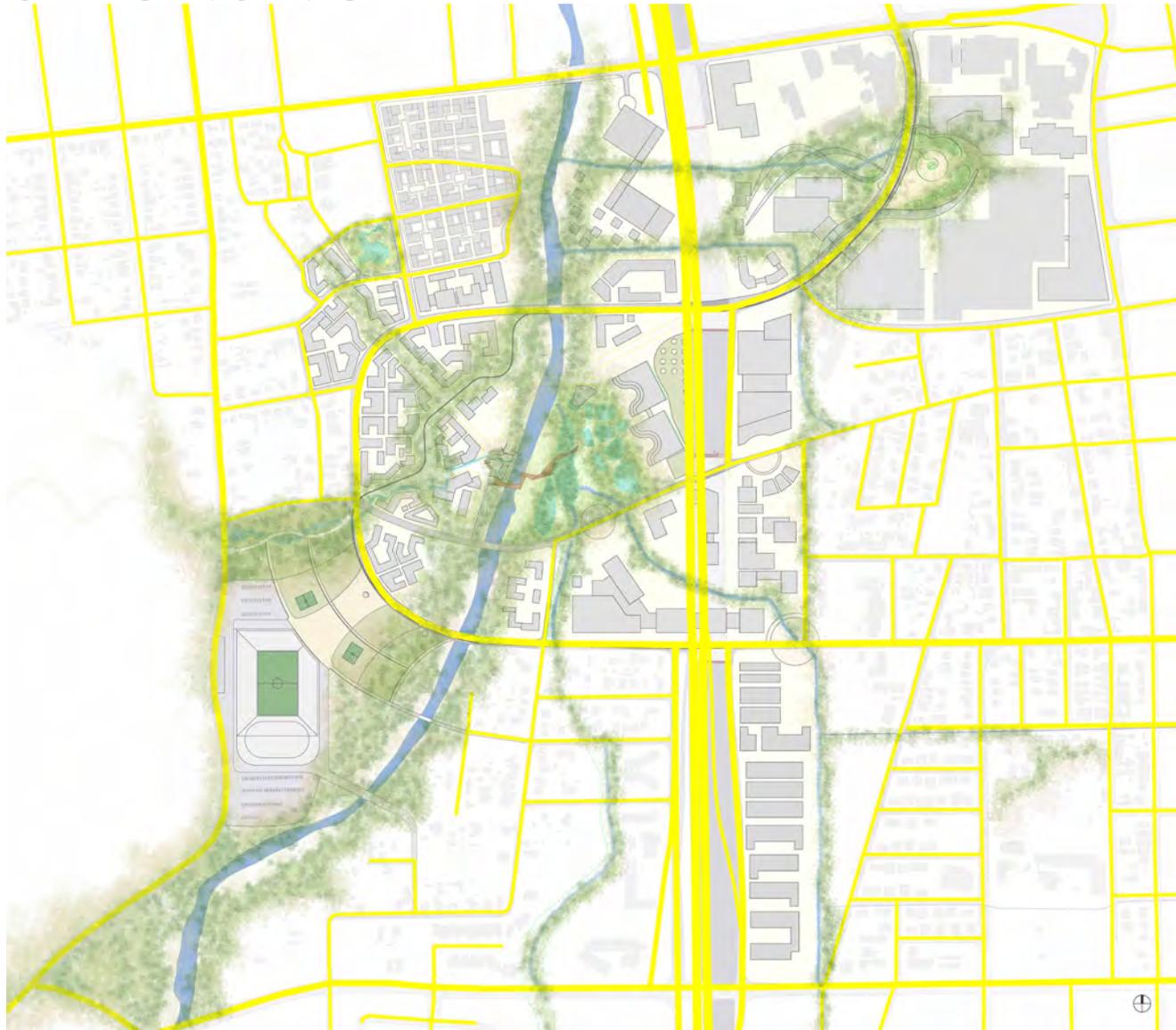


Water

Water will be reintroduced to the site in three distinct ways. First, effluent water will be discharged into the Santa Cruz River. Second, the Living Machine technology will be utilized throughout the site to bring water to several focus areas. The process of this technology is highlighted through wetland and educational area adjacent to the village center. The third source of water comes from stormwater run-off and is also contained in the wetland. The water recaptured on site will not only help to recharge our local aquifer, but will serve as an aesthetic amenity and educational tool.



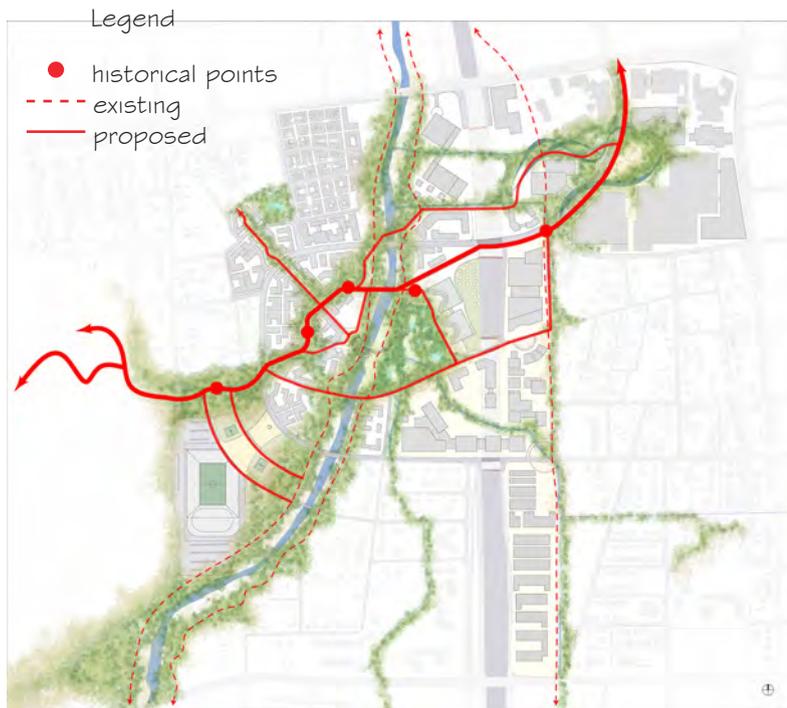
Vehicular Circulation



The master plan gives priority to pedestrian needs and public transportation, and therefore cars will not play a vital role in the greater transportation scheme of the site. The plan designates 18th Street, 22nd Street, Congress Avenue, and Cushing Street as major vehicular corridor connections.

Urban Trail

Walkability is among the top priorities in the master plan. An urban trail, designed for bike and foot traffic only, follows the green finger and acts as the main arterial from “A” Mountain to downtown. Secondary walking paths throughout the site offer alternative routes, intersecting existing trails and connecting neighborhoods to new development.



Street Car

Public transportation is essential to a vital and functional urban environment. The master plan calls for not only the connection of the already improved modern streetcar, but in addition, proposes that further routes be laid through and around the site. The streetcar is recommended to connect with the Five Points area, which will facilitate multiple light rail systems in the future. Five major stops are proposed for the streetcar including, the Tucson Convention Center, wetland and research center, village center, stadium, and the urban agriculture plaza.





Appendices

Plant Palette

Sun

- *Agave* spp.
- *Atriplex* spp.
- *Callistemon phoeniceus*
- *Carissa macrocarpa*
- *Chrysactinia mexicana*
- *Lycium Freefontii*
- *Salvia* spp.
- *Sophora secuniflora*

Desert

- *Artemisia ludoviciana*
- *Capsicum annuum*⌘
- *Echinocactus grusonii*
- *Euphorbia antisyphilitica*
- *Fallugia paradoxa*
- *Fouquieria splendens*⌘
- *Melampodium leucanthum*
- *Opuntia* spp.⌘
- *Senna covesii*
- *Sphaeralcea ambigua*
- *Yucca baccata*⌘

Shade

- *Aquilegia chrysantha*
- *Bulbine frutescens*
- *Cooperia pedunculata*
- *Justicia spicigera*
- *Justicia fulvicoma*
- *Oenothera speciosa*
- *Senecio salignus*
- *Trachelospermum jasminoides*
- *Zephyranthes* spp.

Trees

- *Cercidium* spp.
- *Chilopsis linearis*
- *Lysiloma Watsonii*
- *Olea europaea*
- *Phoenix dactylifera*⌘
- *Pistacia chinensis*
- *Prosopis* spp.⌘
- *Quercus* spp.
- *Sambucus mexicana*⌘
- *Ziziphus jujuba*⌘

Ground Covers

- *Acacia redolens*
- *Calylophus hartwegii*
- *Dalea gregii*
- *Helianthus arizonensis**
- *Hemp Sesbania**
- *Malephora luteola*
- *Muhlenbergia rigens*
- *Muhlenbergia capillaris*
- *Nolina microcarpa*
- *Sarcostemma cynanchoides*

Screens

- *Capsicum frutescens*⌘
- *Dodonea viscoa*
- *Pachycereus marginatus*
- *Passiflora* spp.
- *Vallesia baileyana*
- *Vitis* spp.⌘

Food Crop

- Anna apple
- Asparagus
- *Arabica* spp.*
- Beets
- *Chai (Salvia columbariae)*
- Dandelion
- Eatable flowers
- Figs
- Herbs
- Mustards
- Peppers (*Capsicum* spp.)
- Rosemary
- Strawberry
- Tomatoes
- Watercress
- Zucchini

Aquatic

- *Anemopsis californica*
- *Cyperus* spp.
- *Dischlis spicata**
- *Elodea* spp.
- *Equisetum* spp.*
- *Juncus* spp.
- *Panicum virgatum**
- *Rumex hymenosepalus**
- *Scirpus* spp.
- *Typha* spp.

* Potential experimental crop

⌘ Potential food source

University of Arizona Master of Landscape Architecture Program
Spring 2012
Participating Students of 2012 Tejido Group / UA Downtown Studio
Professor: Dr. Mark Frederickson LEED AP

Aaron Liggett
Charlie Ware
Christian Pederson
Cylphine Bresdin
Deryn Davidson
Desneige Halbert
James Melnick
Kawthar Alrayyan
Kelly Vandenberg
Kevin Quach
Kexin Zhao
Libby Fruit
Lori Radcliffe-Myers
Lu Li
Michaela Machado
Sara Sullivan
Xi Wang
Yuxin Wang



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