



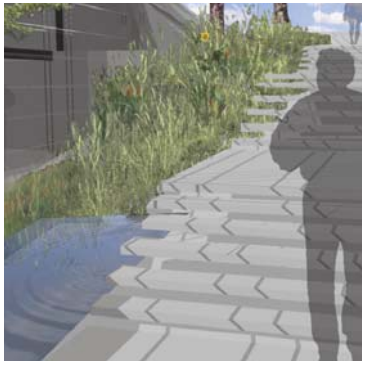
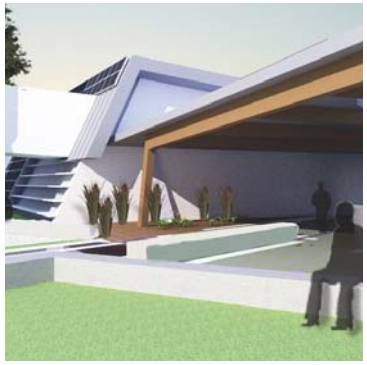

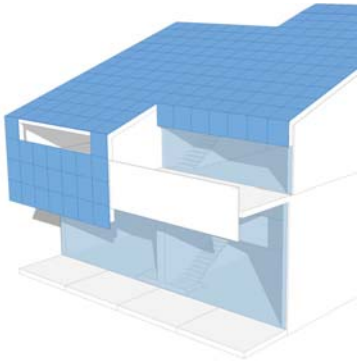



greensburg
envisioned


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envisioned

Design Concepts from Kansas State University
Students in Landscape Architecture and Architecture
College of Architecture, Planning and Design
December 2007

Presented to the courageous, determined, and visionary citizens of Greensburg and Kiowa County as a partial response to the Long-Term Community Recovery Plan.

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Advising and Editing by Professor Melanie Biggs Klein, Landscape Architecture and Professor R. Todd Gabbard, Architecture

table of contents

project background

On May 4th 2007, an EF-5 tornado (the highest rating on the Fujita scale) ripped across a nearly two-mile-wide swath of Kiowa County, Kansas, leaving catastrophic destruction and death in its wake. Ninety-five percent of the town of Greensburg was leveled while the rest of the town was severely damaged. Twelve people died in the storm, ten of them Greensburg residents. Both Kansas Governor Kathleen Sebelius and President George W. Bush declared Kiowa County a disaster area, initiating a wave of regional and national support for recovery, restoration and rebuilding. Shortly after the tornado, a 12-week process involving multiple meetings and discussions by teams of local, state, and federal officials, business owners, civic groups, and hundreds of citizens resulted in "The Greensburg/Kiowa County Long-Term Community Recovery Plan" (LTCRP), which expresses the Greensburg/Kiowa County community's vision for recovery. Community participation provided an invaluable source of input which was used to refine and prioritize the projects contained in the plan. (http://www.greensburgks.org/recovery-planning/long-term-community-recovery-plan) Professors Gabbard and Klein coordinated their fourth and fifth year design studios to begin addressing the needs of the residents and other stakeholders in Greensburg by envisioning design solutions to projects specifically called for in the LTCRP. The professors conceived the projects as being a catalyst for conversation as the town considers their reconstruction efforts.

Intent

The purpose of this book and the work it contains is evident in its title. Greenburg Envisioned was conceived as an early step towards visualizing what a reconstituted Greensburg might resemble. The visioning of an entire town, regardless of size, is a complex undertaking. The task before the residents, landowners, businesspeople, and other stakeholders is incredibly daunting. This is perhaps underscored by the totality of the town's devastation. The work ahead seems more like building anew than rebuilding. Does one reconstruct as closely as possible what was there before the storm, or start from a clean slate? Which mode of thought predominates: new ideas or still-vivid recollections?

To their credit, the inhabitants of Greensburg have expressed a strong will to look forward as they strategize the reconstruction of their town. Their long-term recovery plan describes a hope for a new type of community that conserves and capitalizes on resources, provides for economic and ecological revitalization, creates opportunities for recreation and education, and pushes Greensburg to be at once more self-reliant and better linked to the world at large. Priorities of the new Greensburg, as listed in the LTRCP, include:

Community

"…jobs, education and recreation (are) reasons to stay in Greensburg/Kiowa County… a regional and national model for integrating residents of all ages and needs with services of all kinds."

Economy
"…entrepreneurial spirit, customer service, and a sustainable economy permeate the business sector …a full line of locally owned businesses that provide jobs and services to an exceptional example of small-town America."

Education
"…a school system that provides excellent elementary and secondary education, uses state-of-the-art technology, and provides adult learning opportunities. self-reliance: an up-to-date, affordable rural community where housing plans and strategies incorporate energy-efficient design and materials."

Environment
"…a community that recognizes the importance of the natural environment and balances the need for growth and economic development with the maintenance and improvement of the environment."

-from the Long-Term Community Recovery Plan (p4)

The architecture and landscape architecture student authors of the schemes that follow could not help but be inspired by the enthusiasm and determination of the people of Greensburg and their plan. Individually or in teams, the students identified specific projects called out in the Long-Term Recovery Plan as important components of the new town. Each of the twelve projects that follows embodies the spirit instilled in the Plan. Though quite different in scope and scale, there are some common themes that thread through the proposals, linking them to the intent of the LTRCP, and fulfilling the mandate of the people of Greensburg, including:

Sustainability
A strong undercurrent, all of the projects encompass aspects of ecological sensitivity, resource efficiency and resident health and well-being. Many projects take these ideas to a higher level. The Educational and Recreational Campus not only embodies sustainability through sensitive building placement, sensitive site design, replenished natural areas, and renewable energy generation, but the project incorporates these aspects into the experience of the complex. Conserved areas become teaching laboratories for schoolchildren. Passive and recreational spaces for picnicking and play are interspersed with native prairie areas that ground activity in the natural world. Interpretive pathways double as exercise trails. Even the pool complex and community center contains a highly visible wind turbine that at once provides power and a symbol of the sustainable intent of the community.

The Sustainable Housing Center, part of the two alternate Eco-Village projects, also takes on this educational aspect. Meant as a resource for the community as it rebuilds itself, the Housing Center is a built example of sustainable building technologies and strategies.

Some of the projects, like the Downtown Master Plan, do not prescribe sustainable design features, but instead illustrate possibilities. This project considers the scale of buildings and exterior areas and recommends solutions for daylighting, passive heating and cooling strategies, and

rainwater collection that complement the orientation and size of potential development in this area. This project includes bike paths and walkable streets to encourage healthy alternative transportation.

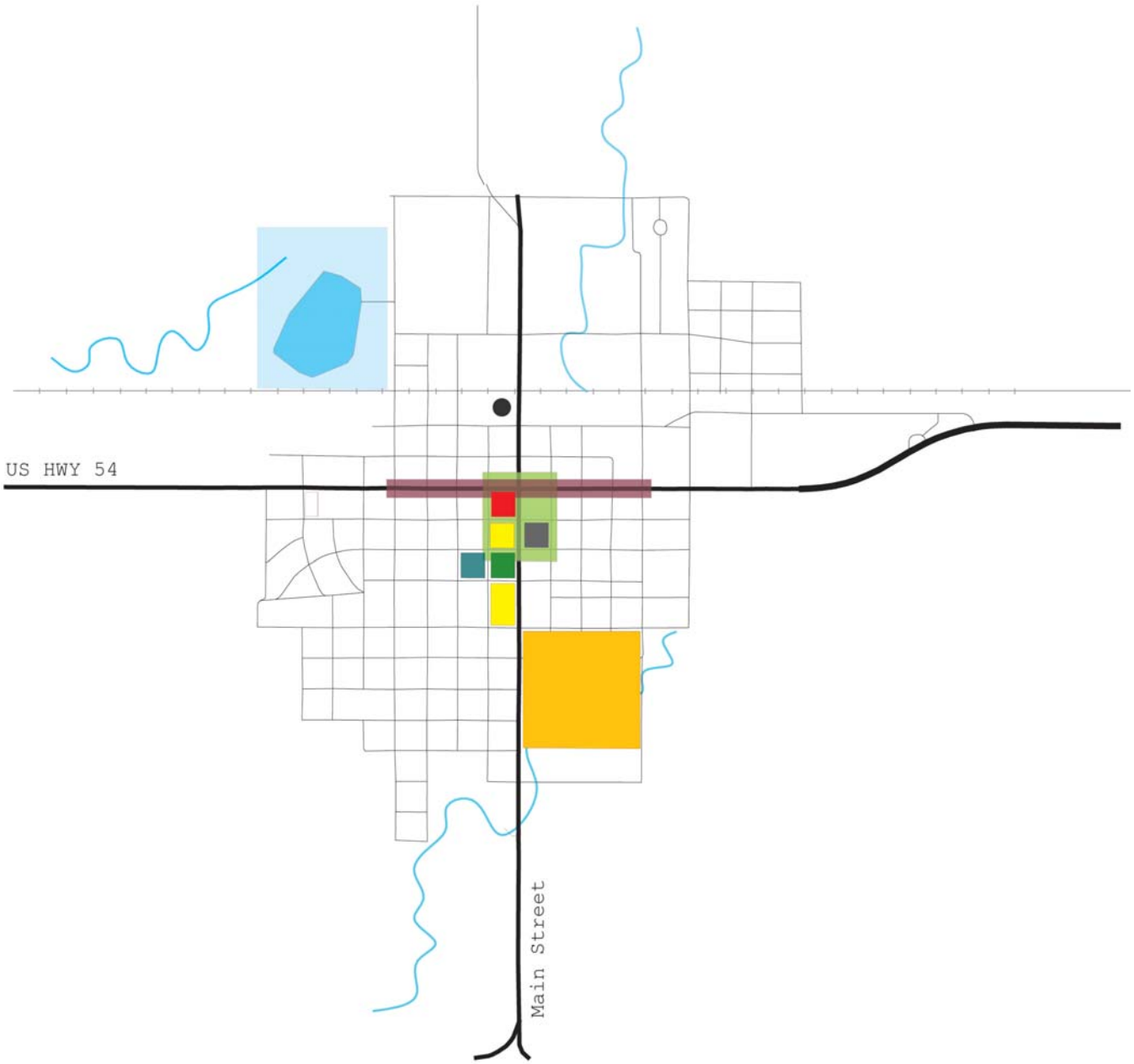
Community Viability and Growth
For the reconstruction of a small town, sustainability has broader implications than the generally accepted definition of reduced environmental impact, conscientious resource use, and the preservation of human well-being. Ensuring the viability of the community - its economy, institutions, and infrastructure - is of vital importance. Many of the projects address these issues by enhancing existing community resources, or creating new ones. The Big Well Tourism Center proposal enhances this major attraction with a new interpretive center. The water tower that will be rebuilt on the site is incorporated into the attraction, adding an inhabitable lookout space high above Greensburg that will let visitors comprehend the scope of the tornado's destruction. The Lake and Fairground project capitalizes on the potential of this area, viewing it as a regional resource for not only a variety of recreational activities but also the rejuvenation of the local ecology.

The Business Incubator project is conceived not only as a resource for the local economy but for the entire community. Though new enterprises may occupy the project temporarily, the project also includes meeting space, a permanent restaurant space and a farmer's market. Placed prominently at the intersection of 54 and Main, the Incubator is designed as a magnet for a wide range of activities and populations, energizing the downtown area.

Looked at in one way, Highway 54 is the life's blood of Greensburg - its link to the outside world. The highway's relationship to Greensburg is a major determinant of the viability of any economic activity here and ultimately the prosperity of the city. One of the landscape architecture students proposes that the highway remain in its current location to ensure the highest exposure of passersby.

Connectivity
One of the issues each project had to address was its connection to other projects and the city. Careful consideration of these linkages resulted in richer projects that ultimately reinforce the notion of community and of Greensburg as a whole. The proposals for an Eco-Village integrate housing, commercial space, recreation, and civic programs. The disparate components work together to develop a cohesive identity. The location for the village was carefully chosen as to be a transition between the busier commercial and civic district and the surrounding blocks of housing. The Educational and Recreational Campus encourages purposed and incidental interaction with residents. Lastly, the project called "The Sustainable Icon" reconsiders virtually every preconception of what Greensburg is. It accepts the fact that Greensburg is literally a clean slate and suggests a denser, more efficient land-use plan that is inherently more connective.

project locations



- a sustainable icon: and alternative master plan
- kiowa county lake, fairgrounds and rodeo
- educational + recreational campus
- highway 54 corridor
- downtown master plan
- downtown business incubator
- big well tourism center
- media center
- green park development + greensburg's green
- sustainability center + park
- modular transitional housing
- transition relief housing
- civic + residential streetscapes

design projects

section one

a sustainable icon: an alternate master plan

jeremy anterola + scott capps

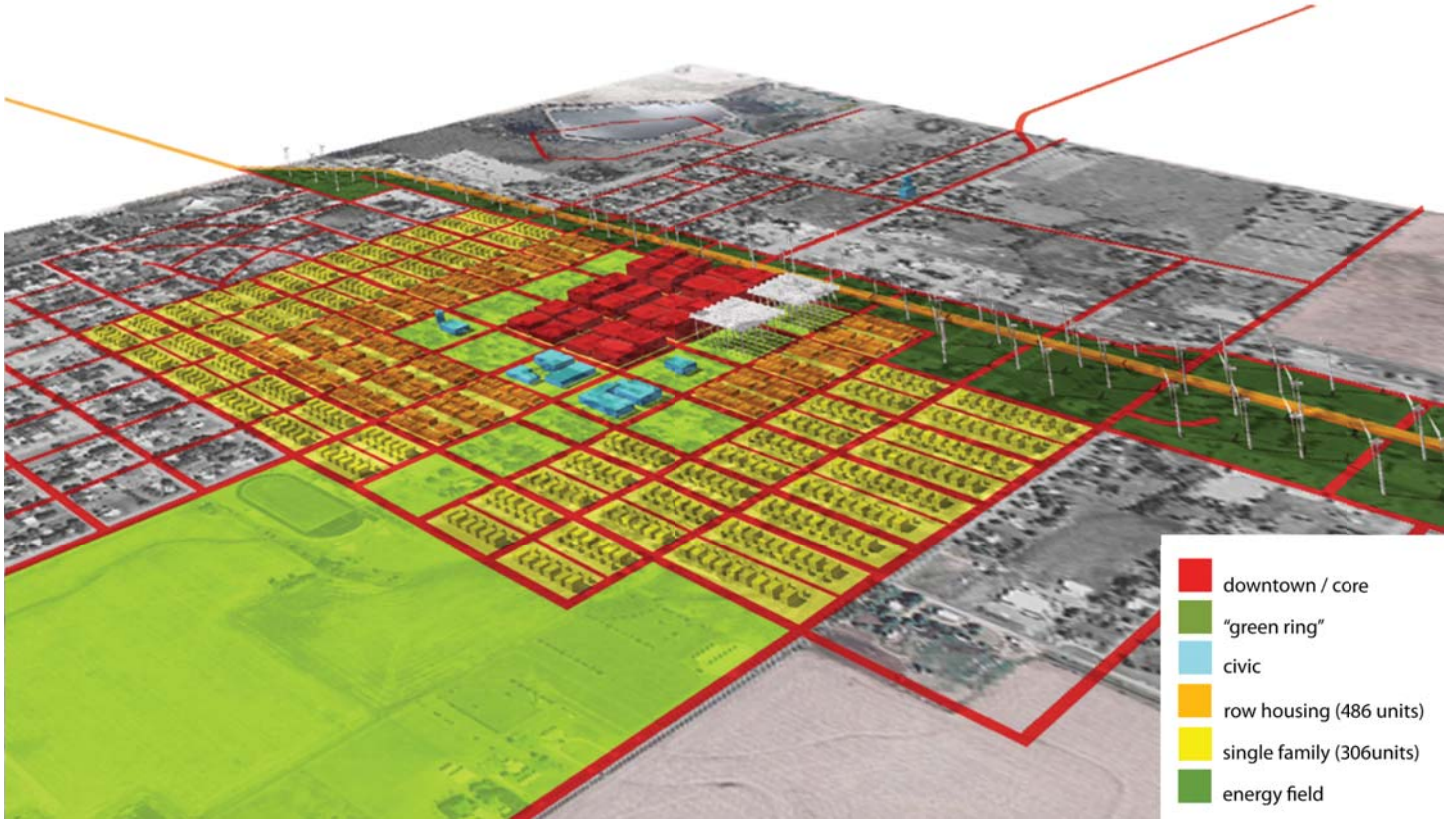
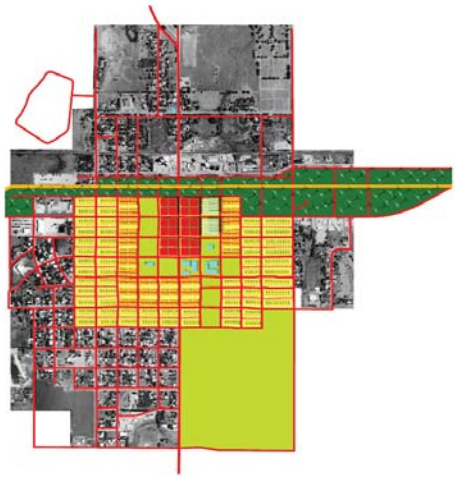


fig. 1a: A sustainable icon comprehensive master plan with legend (not to scale)



Greensburg: A Sustainable Icon is a comprehensive master plan that seeks to refine site specific goals from individual design components of the Long-Term Community Recovery Plan (LTCRP) (including downtown, residential considerations, civic space function, open space opportunities, educational cluster innovations, and recreational activities).

In addition, this comprehensive master plan will achieve social, economic and ecological sustainability goals above and beyond those outlined in the LTCRP by delineating a revised form for development.

Problem

The LTCRP is limited to site specific needs.

Does not fully consider future implications of development and potential impact on city form and structure.

A formal strategy for comprehensive cohesive development is necessary limit the disjuncture of private development and public needs, the negative effects of sprawl, and maximize the potential for future economic and residential development.

Solution and Design Intent

To provide an alternative comprehensive solution for Greensburg that:

Fully considers the LTCRP as envisioned by studio goals and visions

Assesses the validity of a sustainable city based on Greensburg's 12 goals and LEED standards, and

Realizes the potential for development with retainment of original programming requirements envisioned within a new form

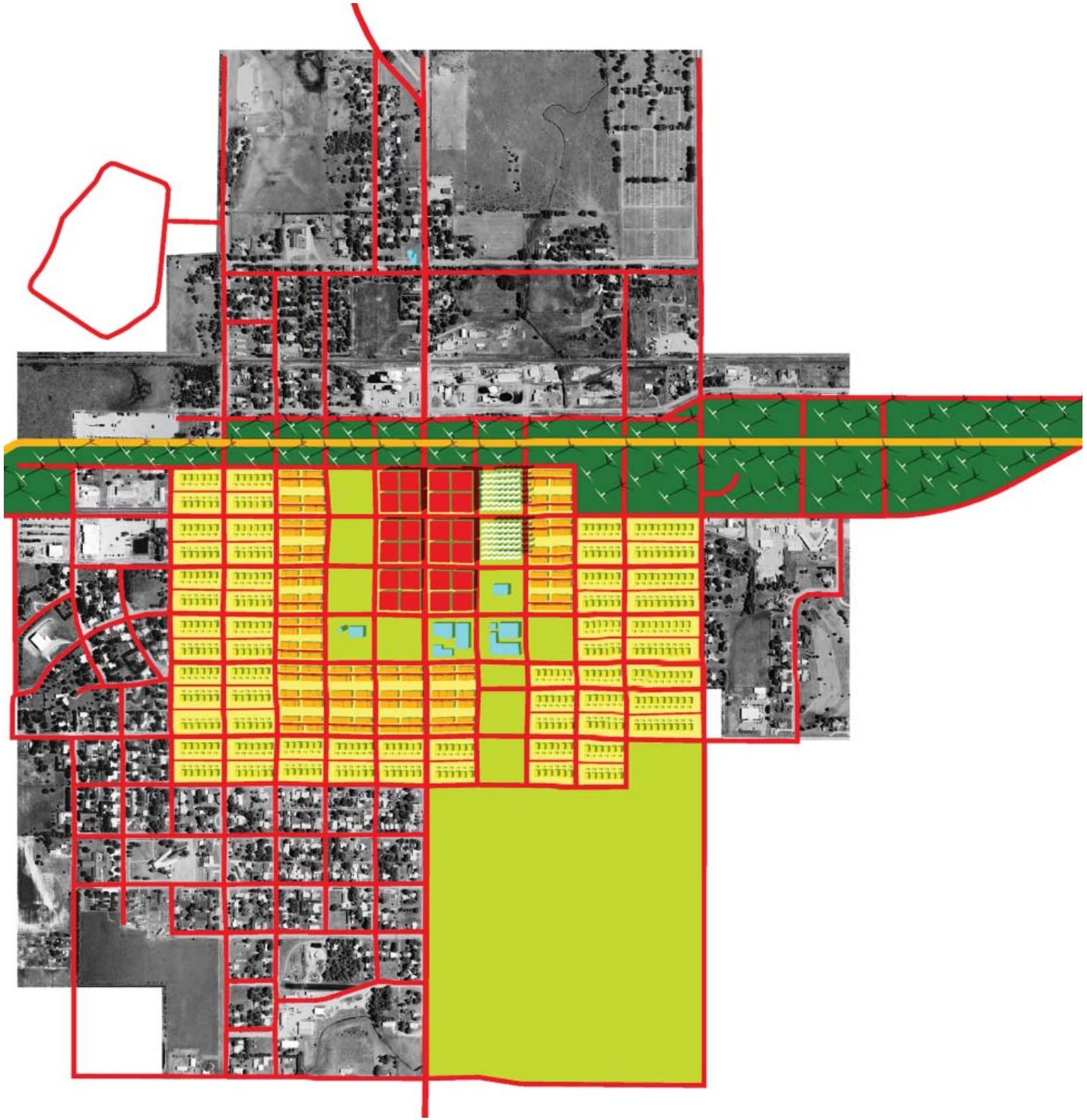


fig. 1b: Full phased plan (20 years) overlaid on aerial map (not to scale)

Concept

The basic program of each site is retained but the location, arrangement, and function changes to accommodate the most accessible, functional, and long-term sustainable alternative. The plan proposes that the creation of the most sustainable, walkable, iconic, and economically successful progressive community shall integrate the basic ideas and general locations from the LTCRP while not compromising the program requirements.

fig. 1c: Conceptual perspective showing **big ideas.**
Sustainable while utilizing **existing infrastructure.**
Walkable yet condensed in beginning,
expanding outwards with **housing choices**
centrally focused and continuing to grow

Program Comparison

Project #1
Defined: The LTCRP with site specific projects as defined with the assistance of BNIM:

Benefits

Begins with existing buildings and structures

Transforms into variety of construction projects with range of types, including residential, commercial, civic, and retail with focus on private development

Results in a city that utilizes existing infrastructure to rebuild from footprint
benefits

Capitalizes on economics and cost

Consequences

Neglects stated goals of sustainability and future potential impact compromising for economic gain

Results in traditional, static small city form

Urban sprawl within small city has lack of formal order, missing connections between recreation and education to central core

Program Requirements
Project #2
Attain LEED Platinum standards
Downtown/Core

Media center, business incubator, bookstore, plant store or nursery, coffee shop, Greensburg green office, hotel, grocery, bank, child care, convenience store, haircare, hardware store, healthcare, laundromat, medical office, dentist, pharmacy, place of worship, restaurant, supermarket, twilight theater, movies, mixed-use development, small office, row housing

‘Green Ring’ with Civic (blue)

Energy structures, wind as art, positive water management, solar power

Educational structures connecting across green park/ open space (pre-Kindergarten to elementary, middle school and high school)

Community center – theater, recreational, community space, linkage through green space and park system, establish davis park

New parks, daycare center, library, dog park

(Civic Spaces)

Courthouse, police/fire/EMS, post office, public health, big well, city hall, justice center, office of tourism

fig. 1d: Location map - downtown/core

fig. 1e: Location map - ‘green ring’/civic spaces

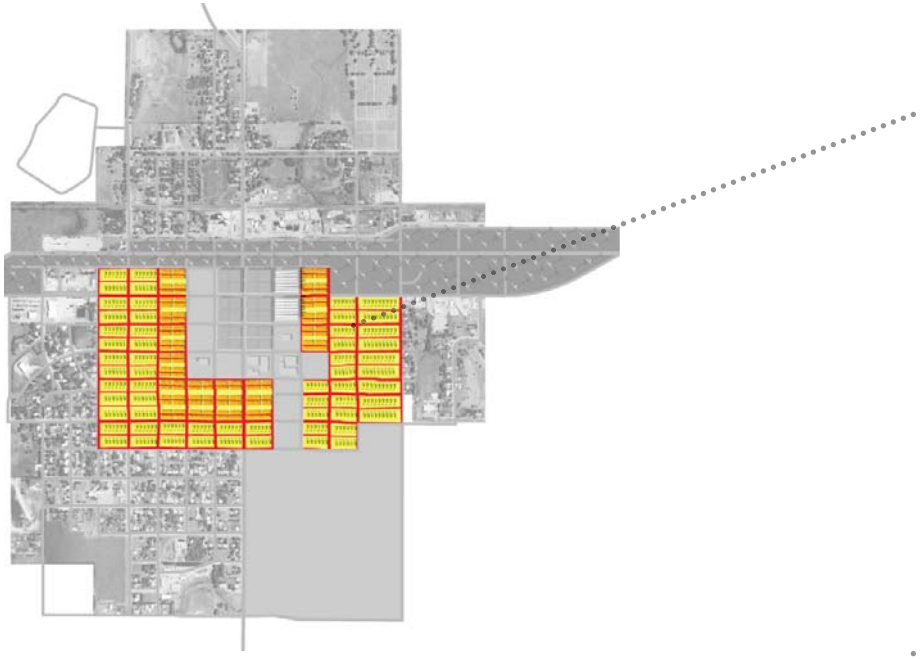


fig. 1f: Location map - residential units

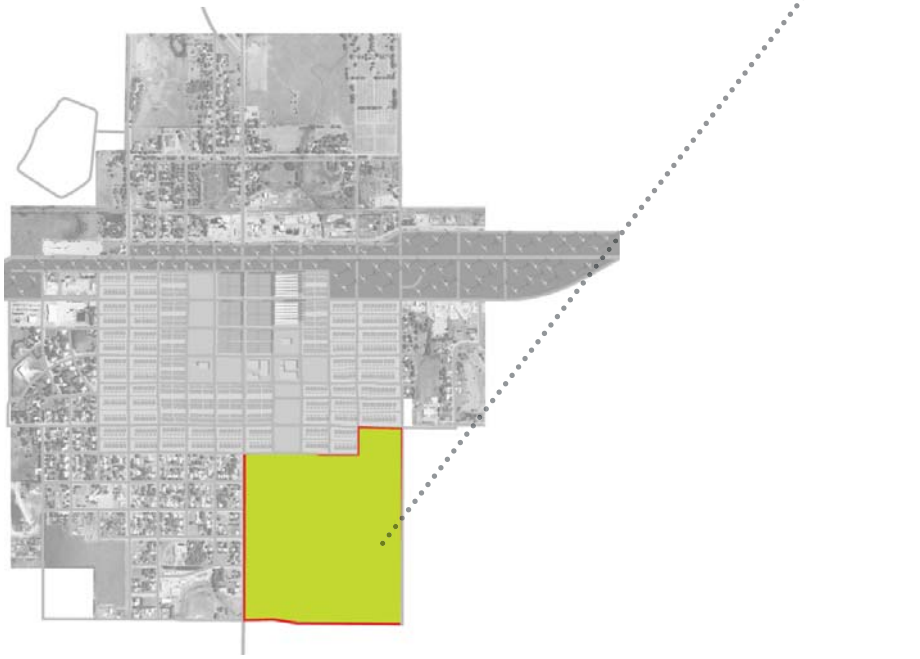


fig. 1g: Location map - natural retained areas

Program Requirements
Project #2
Residential

Single family housing, lots sized @ 1500 sf with no setbacks or fences, sidewalks close to front of house

Multiplex units for apartments and townhouses to encourage mixed-use, higher density development (leads to less costly housing construction)

At least 50% of first phase housing located within 1/4 mile walking distance of downtown core and campus

Retained Existing Features

Lake area to north to remain undeveloped but utilized for recreational, low-impact

Rodeo structure relocated to much more sustainable location along southern portion of city

Biannual events can occur on south property originally proposed for educational campus

Remove educational campus proposed location from south to be located along green ring (concept that education can serve as connecting factor)

Southern portion of site undeveloped with unplanned recreation, integrate stormwater management and BMPs, active recreation

Program Comparison

Project #2
Defined: The Sustainable Icon Comprehensive Plan proposed

Benefits

Begins with existing buildings and structures

Transforms into variety of construction projects that follow a general datum to dictate formal order

Results in a city that compresses footprint of development to allow for future potential growth while expanding current services and amenities for city, county, and visitors

Limits development to retain maximum potential for future considerations

Concentrates city and plans to prevent sprawl

City is actually sustainable and iconic, becoming visible from a distance on Highway 54, encouraging motorists to exit Highway 54 and visit the iconic city

Consequences

Higher density issue

Requires greater communication between development, construction, and planning

Precedents

Borneo, Sporenburg Residential (designed by west 8):
innovative multi-family residential

Loosely structured architecture

fig. 1h: Sporenburg housing units with loosely structured, dense cluster style (Boren Sporenburg Image)

Prospect, Colorado (designed by duany plater-zyberk):
innovative multi-family residential design

New urbanism-esque community

Variety of housing offers choice for economically savvy Greensburg residents

fig. 1i: Prospect, Colorado new urbanist community housing (Prospect, Colorado)

Celebration, Florida (designed by cooper and robertson):
mixed-use residential development at relative scale to Greensburg

Single-family housing intermixed with retail, commercial, and multi-family opportunities

Unified architectural style gives sense of community identity

fig. 1j: Celebration, Florida centrally organized community (Celebration, Florida)

fig. 1k: Low income dense housing focused on sustainable energy (Leonardo Energy)

Bedzed, London:
low-income housing transformed into sustainable construction with economic opportunity

Provides examples for row-housing incorporated into Greensburg's multi-family and construction housing

fig. 1l: Stormwater used as both amenity park/walkway and water filtration (Reed, P.)

Hanover, German
(designed by herbert dreiseitl):
sustainable community with integrated stormwater management techniques that daylight water, create amenity public spaces, and prevent dangerous flooding or overflow

The creation of a walkable, green community that is self-sustaining is possible within Greensburg if contour configuration and relative topography is considered

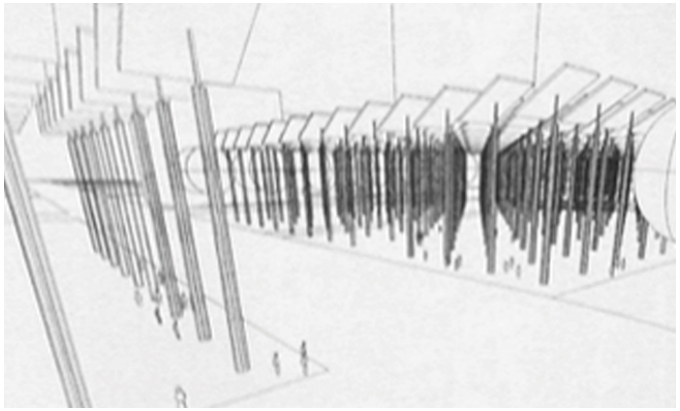


fig. 1m: Alternative solar energy used as both energy and determining form of park (Weller, R.)

Perth, Sun City, Australia
(designed by richard weller):
in order to take advantage of sun and open space, the idea was to take a relatively unused parcel of paved concrete/asphalt areas and utilize it into an energy efficient community

For Greensburg, a similar idea could be integrated within the park system so that instead of open, unplanned areas, opportunity for both economic gain and recreational activity is possible

Design Goals

Provide a progressive comprehensive master plan that:

Achieves LEED Platinum Certification by attaining a score of 80-106 as compared to proposed separate elements within the LTCRP

Attains Platinum Certification on:
- Smart Location and Linkage equals 30 out of 30 points,
- Neighborhood Pattern and Design equals 38 out of 39 possible points

Community

Comprehensive plan considering quality of life for present, near future, and long-term development

Family

Creation of a destination that retains residents, creates employment opportunities, innovative educational opportunities, and a variety of recreation

Prosperity

Employment opportunities offered by creation of multiple construction jobs, service industry, retail, small business, ag. agencies

Environment

Balancing of development and growth by retaining existing natural features

Lake area has buffer protection from development yet functions as fishing ground

Due to rarity of fairground use, relocating closer to residential and downtown development will concentrate use of area for multiple purposes while decreasing the size of development footprint

Southern portion of site relatively undeveloped, with buffer to protect existing intermittent stream channel

Affordability

Alternative energy uses created within linkage system, provides sustainable energy source for city that reduces cost to homeowners and businesses

Denser housing on 90,000 square feet average blocks reduces cost of housing due to shared construction costs

While some sustainable housing methods have a higher initial cost, the life-cycle costs are lower, resulting in retained resident base

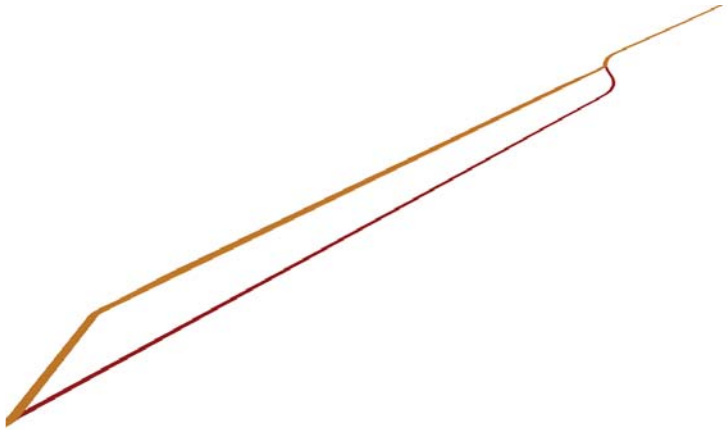


fig. 1n: Phase 1a - initial relocation of highway 54 from through main street to north as elevated highway

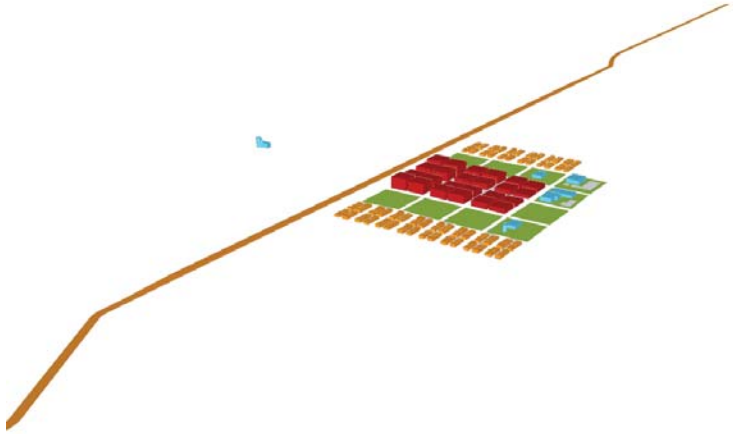


fig. 1o: Phase 1b - introduction of core through rebuilding of downtown buildings (red), initial green ring connecting corridor (green), immediate necessary civic structures (blue), and single-family transitional housing (orange)

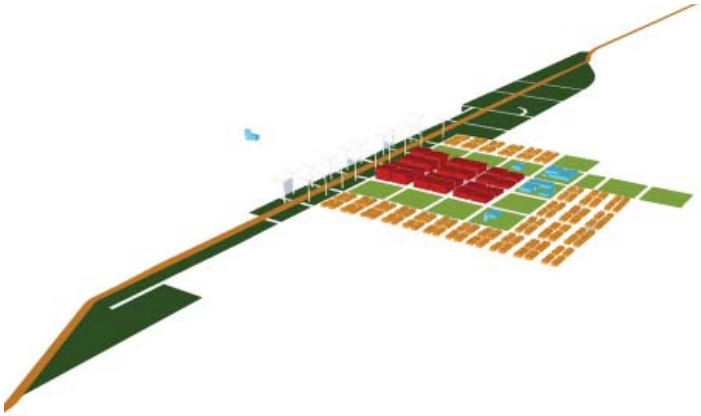


fig. 1p: Phase 2 - implementation of core through construction of wind turbines for energy and sculpture, second phase higher density residential radially expanding from portion of site

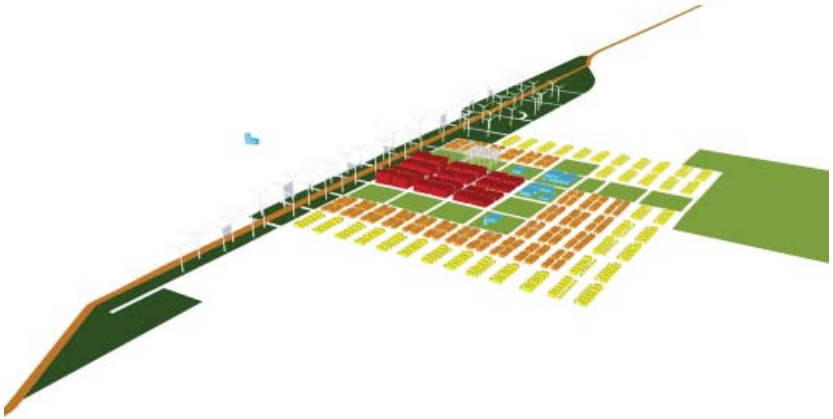


fig. 1q: Phase 3 - expansion of core; orange for higher density housing connecting through green area; yellow for single-family residential

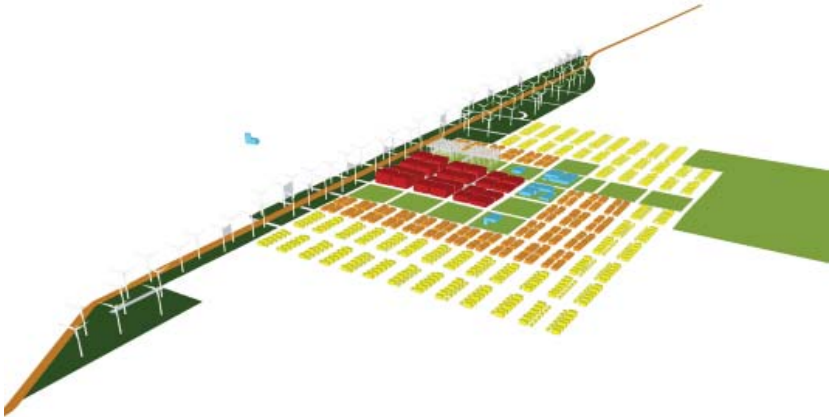


fig. 1r: Phase 4 - extension; city expands from downtown to result in a condensed form that still retains all program components

Growth

New job opportunities from construction of new buildings, openings for positions within offices, corporate offices for large corporations such as wind and solar energy corporation headquarters

Educational opportunities for both children and adults, describing processes of sustainability, adult education opportunities, continued learning for adults

Renewal

Innovative city that utilizes existing infrastructure (existing utility lines in grid system, existing renovated structures, existing natural patterns), capitalizes on strengths (wind to create jobs/energy/sustainable city, model city), and provides unique sense of an evolved small town Kansas feel (architectural variety, form and layout of uses, native materials integrated with technological advancements of solar and wind energy opportunities)

Water

Maintenance of original water boundaries, watershed

Educational aspect of intermittent stream channel can function as stormwater best management practice (although site rarely floods)

Smaller footprint of development equals less impermeable pavement resulting in a greater aquifer recharge

Health

Entire city is walkable, provides dedicated biking lanes within existing vehicular infrastructure

Condensing the core of business and denser, less expensive and sustainable housing units provides an easily accessible point from the outskirts to the interior of the town

all non-residential amenities located within a ½ mile from over 50% of residential units

Energy

Structures comply with Green Construction and Technology LEED standards

Sites would be self-sustaining over long period

Wind

Use wind to serve as an energy source, unique landmark, create jobs

Wind corporation can be the large company in town in tallest landmark building providing tours and other educational opportunities bringing Highway 54 motorists into town

Built Environment

Relates to all aspects of city design

Active, Public Spaces, Local Food, Education

Green ring open space system links residential area to centralized downtown with connecting factor found in educational system - schools, daycares, library, energy ring as educational component

Circulation, Access

Compactness, streets interconnected bike/walk trail with max 1/4 to 1/2 mile travel distance between services reduces automobile use with access allowing through streets to encircle development

Existing Infrastructure, Natural Patterns

Lake to north and stream channel to south relatively untouched. recreational use encouraged for lake with stormwater best management principles applied in south stream

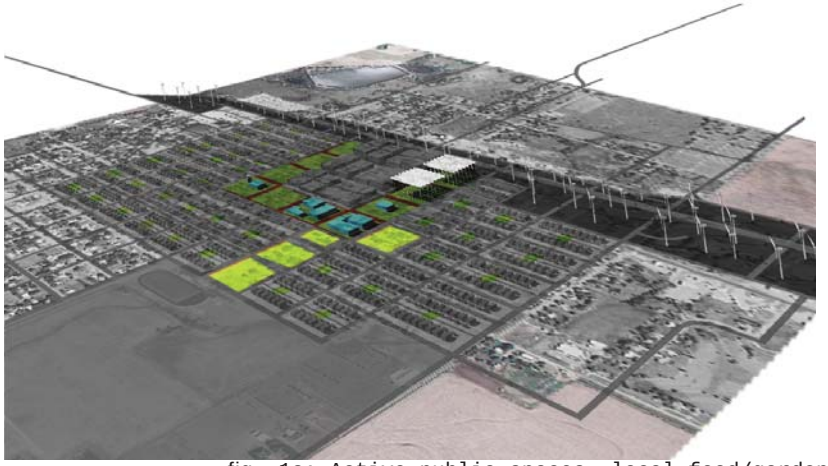


fig. 1s: Active public spaces, local food/gardens

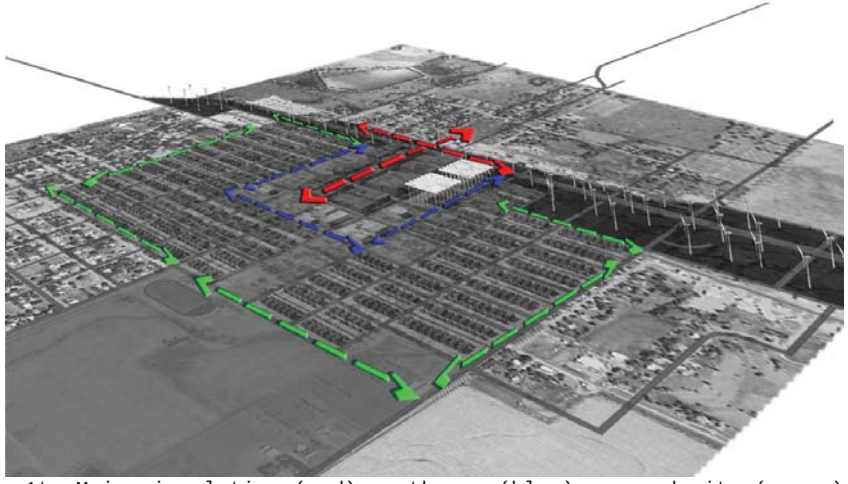


fig. 1t: Main circulation (red), pathways (blue), around city (green)

fig. 1u: Natural patterns, existing stream channels, water bodies

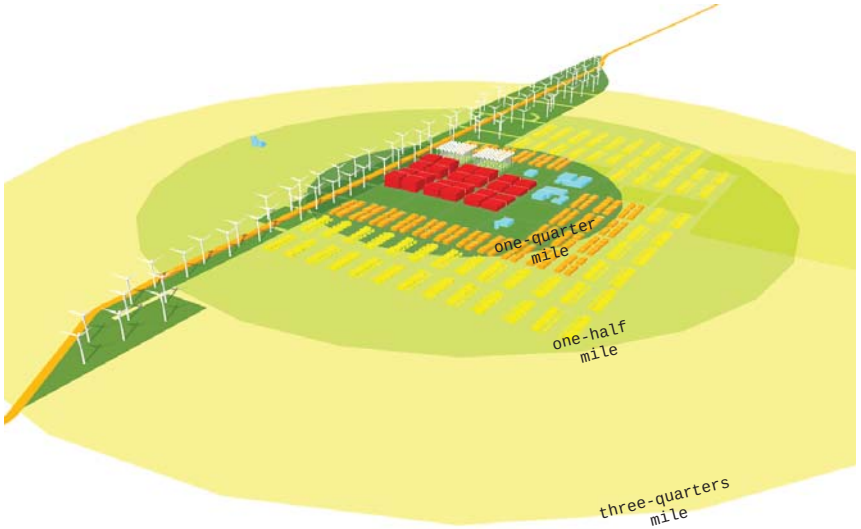


fig. 1v: Proximity diagram depicting maximum location from central core of Greensburg

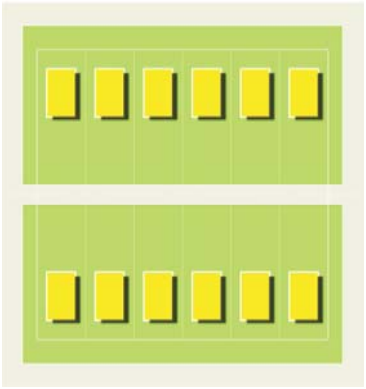


fig. 1w: Housing diagram - single family housing in yellow showing closer lots, less to zero setbacks creating better sense of community

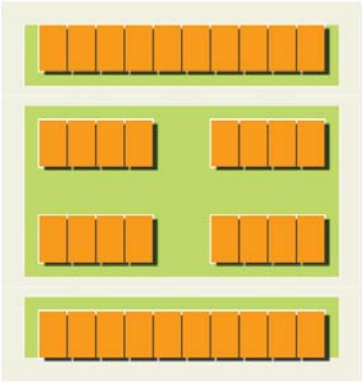


fig. 11x: Housing diagram - multi-family housing with denser cluster lowering cost of construction

Proximity, Smart Location, Walkability

Walkable, accessible city with shops, services, facilities, and residential units within 1/4 mile walking distance up to 1/2 mile walking distance with access to alternative transportation forms

Diversity, Openness and Choice of Housing, Density

Variety of housing reduces cost of construction, provides choice, enables an open community with no fencing or gates at a higher density level of living

Traditional Single-Family Detached Residential Development

Traditional housing can be condensed to create sense of community between neighborhoods, limiting areas of parking and reducing right-of-ways and easements

fig. 1y: Typical single family photomontage

Multi-Family Residential Housing Within Walkable Community

Condensing units will increase sense of community, create walkable streets with a positive street relation, and create less expensive housing due to shared construction costs and a higher concentration of units to property square footage

fig. 1z: Typical denser multi-family or duplex housing

Variety of Multi-Family Housing with Mixed-Use Potential

By providing unique housing styles that integrate pedestrian-oriented features, universal accessibility, and reduced dependence on both automobile and paved surfaces, life-cycle costs of construction will decrease while the quality of life increases

fig. 1aa: Typical higher density, closely spaced housing units

fig. 1bb: Typical wind field as visible sustainable landmark

Wind Gateway Concept

Wind turbine gateway element capitalizes on the Kansas department of transportation's relocation of highway us 54 to create an iconic gateway to attract what would normally be pass-through vehicular traffic. By providing a vertical element alongside a potential major transportation route, the city is distinct from other Kansas towns through its significance of approach into the city.

Solar Panel Urban Park

Richard Weller's Sun City in Perth, Australia capitalizes on energy infrastructure as aesthetic design element and functional feature. The urban park takes the paved footing needed to stabilize the solar panels and creates a tree-like canopy to provide a shaded place beneath.

With future integration, solar panels can also be incorporated within residential units to provide sustainable design alternatives

Calculations show that the turbines combined with solar panels produces twice the energy required for the city of Greensburg.

living	units	average annual energy use (per home)	total	
single family	306.00	8,900 kW	2,723,400.00	
row house	486.00	8,900 kW	4,325,400.00	
total household energy used:			7.0488 mW	
energy	units	size	power	output
wind	82.00	typical	175,200 kW	14.3664 mW
solar	98.00	50' x 25'	15 W per sq ft	1.83750 mW
total energy produced			16.2039 mW	
total energy leftover			9.1551 mW	

Calculation information adapted from the American Wind Energy Association and the Advanced Energy Group.

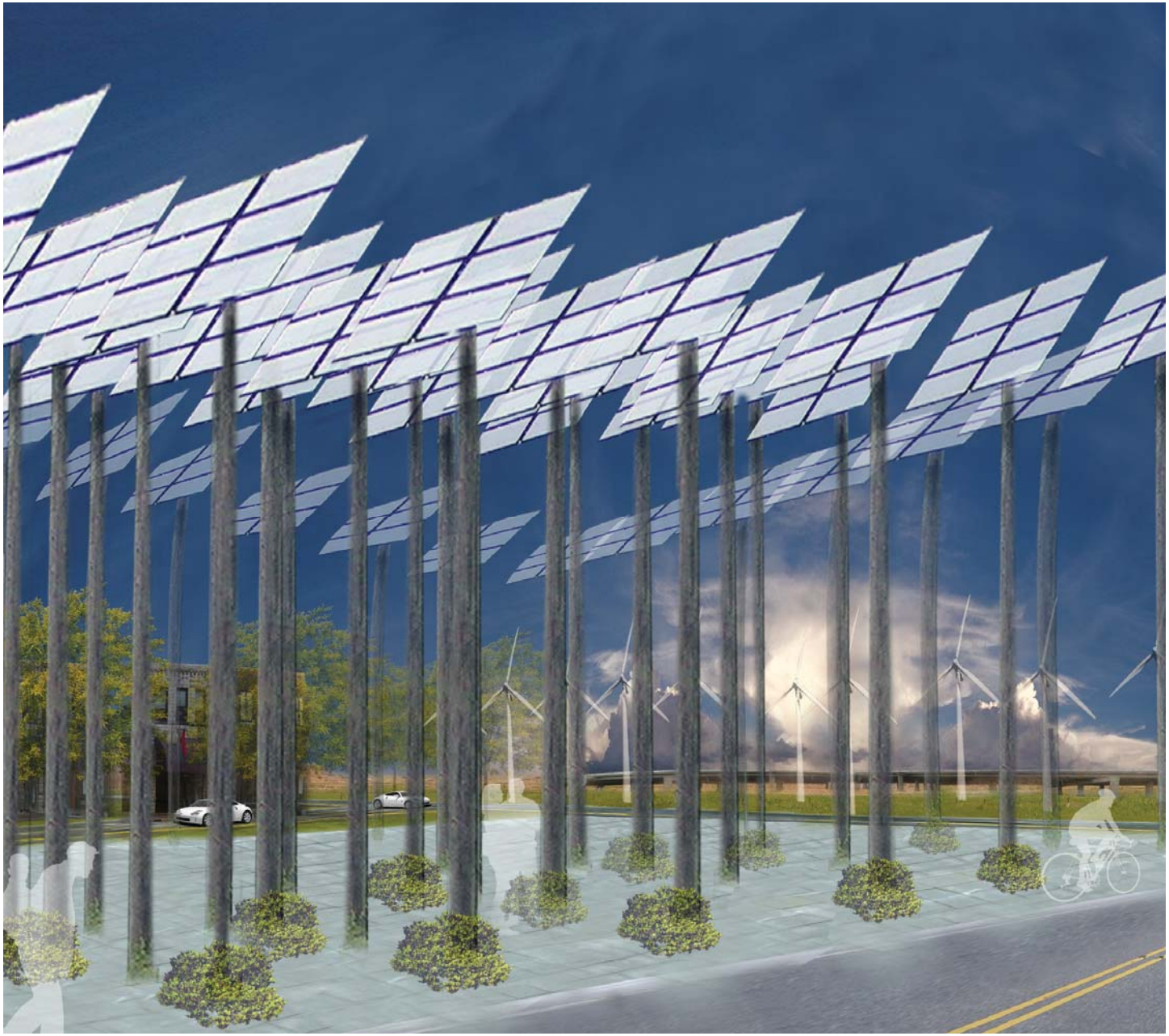


fig. 1cc: Typical solar field located adjacent to downtown core within green buffer

fig. 1dd: Typical downtown depicting small-town buildings on right and higher mixed-use on left

Progressive Mixed-use Downtown

The downtown atmosphere acknowledges the feel of a distinctly Kansas small town, combined with the need for a progressive, sustainable city that not only focuses on environmental features, but also on the pre-disaster declining population and age gap. By retaining residents and providing opportunities within the city, Greensburg has the potential to create amicable public spaces for citizens to live and work.

fig. 1ee: West to East site section showing multiple layers moving from small scale (residential) on outside to larger buildings (commercial) and green spaces/energy field within interior

section two

kiowa county lake. fairgrounds. and rodeo

jessica blackwell

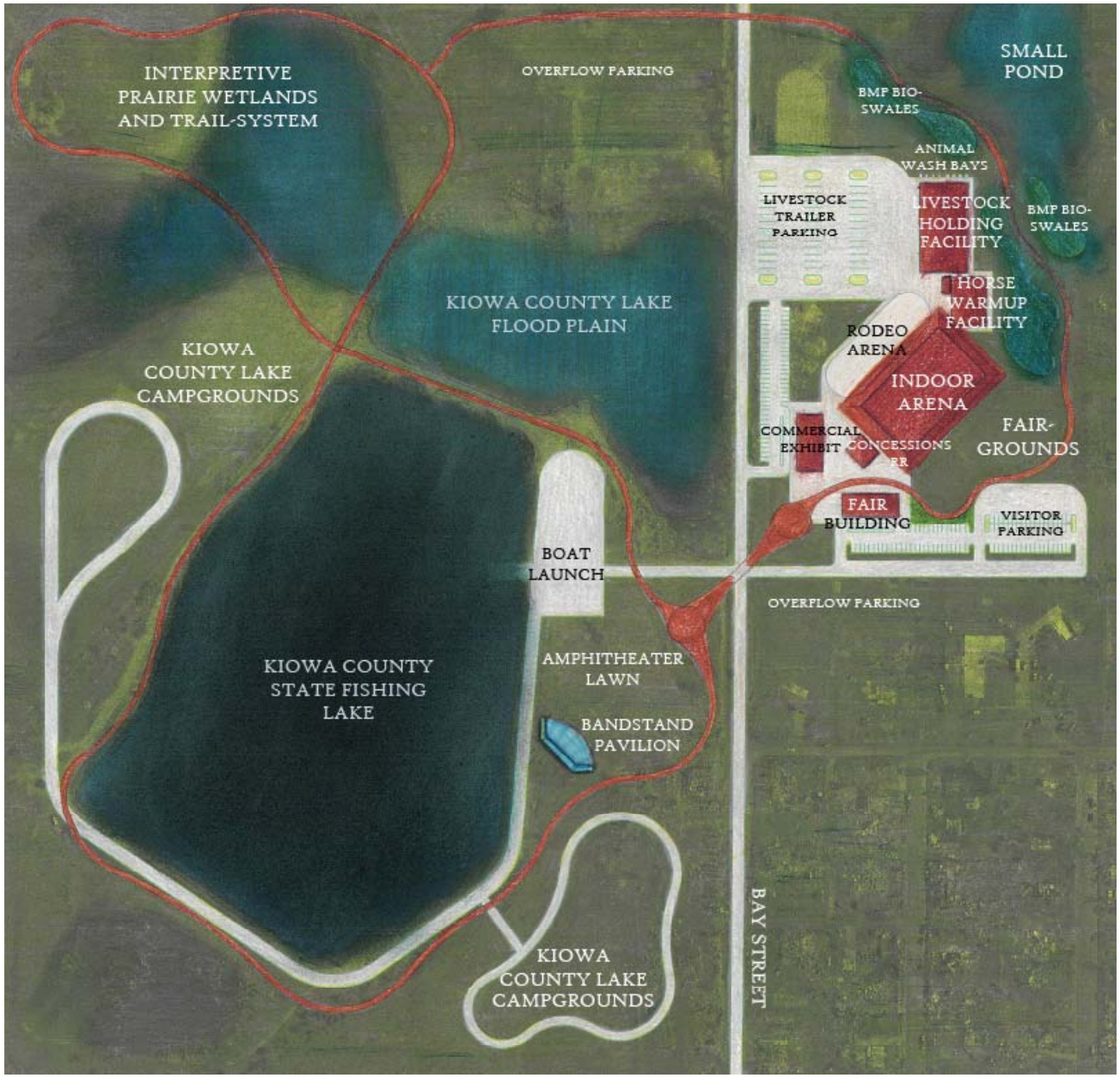
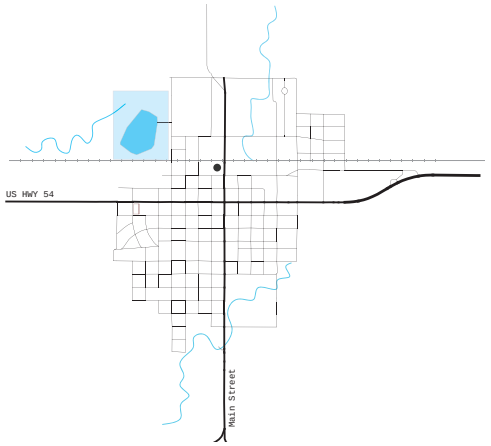


fig. 2a: Kiowa County Lake fairgrounds and rodeo master plan



According to the Long-Term Community Recovery Plan (LTCRP), the project calls for “Relocation of the County Fairgrounds and the development of outdoor recreation facilities nearby at the State Fishing Lake as a moderate recovery value, and is in direct response to the County Fair facilities having been destroyed at their former location.”

“The County Fairgrounds is an important community gathering place providing space for the annual County Fair and 4-H Club activities. The County, Fair Board and the Rodeo club have discussed the opportunity to relocate the Fairgrounds to the northwest side of town near the Rodeo and Kiowa County State Fishing Lake.” (LTCRP)

Project Description: (LTCRP)
“The Kiowa County Fairgrounds would be reconstructed adjacent to the Rodeo property and near the Kiowa County State Fishing Lake. This will create a linkage between these recovery projects that will minimize the use of shared facilities and help stimulate community recovery. This project includes the development of the new County Fairgrounds, rebuilding the Rodeo grounds, and a variety of recreational facilities at the Fishing Lake, including trails, wildlife habitat, interpretive stations, picnic facilities, camping facilities, and disc golf course.” (LTCRP)
“The project creates a regional park facility that provides support for community economic development efforts by providing a “destination” for tourists and visitors.”

Kiowa County State Fishing Lake is in the northwest corner of Greensburg, Kansas. Located in the middle of a 43 acre plot of land, the 21 acre lake has great opportunity for recreational improvements. Prior to the tornado destruction, the lake area included a boat ramp, fishing docks, five shelters with picnic tables, and one vault toilet. Reinstating these facilities as well as the Fairgrounds and Rodeo, will establish a destination that promotes regional tourism.

fig. 2b: Interpretive trail at Silver Lake Visitor’s Center (Mount St. Helen’s Visitor Center)

fig. 2c: Adobe Creek, Palo Alto, California (Palo Alto Baylands)

fig. 2d: Kiowa County Lake fairgrounds and rodeo. Aerial perspective view toward Northeast

fig. 2e: Yellowstone River Audubon Conservation Education Center in Billings, Montana (Audubon Center)

fig. 2f: Wetland mitigation bank, Lincoln, Nebraska (Lincoln Wetland Bank)

fig. 2g: Kiowa County Lake fairgrounds and rodeo. Aerial perspective view towards North-Northwest

Design Goals and Objectives:

Promote outdoor recreation
- Promote walkability
- Accommodate campgrounds
- Accommodate fishing
- Accommodate Rodeo
- Accommodate Fairground
- Expand Lake recreation

Promote tourism and visitor economic development
- Create destination area for tourism
- Accommodate outdoor community theater
- Accommodate campgrounds for RV tourism

Promote outdoor educational events
- Accommodate interpretive educational trails
- Promote regional nature education

Promote sustainability
- Consolidate facilities
- Prairie restoration/ preservation
- Utilize Best Management Practices in Storm water management
- Utilize solar and wind energy

Additional recreation attractions include a band-stand pavilion to be used for multiple outdoor events such as music, theater, or outdoor education events, and an interpretive trail system to promote walking and biking in our natural environment.

The flood plain area would be utilized as a wetland prairie system with raised interpretive trails, preserving the natural Great Bend Sand Prairie ecosystem and educate visitors about our role in preservation of the environment. The trail system would provide a pedestrian link from the lake campgrounds, bandstand pavilion, the fairgrounds, and rodeo.

Day use picnic areas located around the pavilion would promote the recreational activity as well as provide formal seating and dining areas for large outdoor events.

The band-stand pavilion structure would harness the sun and wind for energy needs by implementing a building cap system that is comprised of an integrated skylight with photovoltaic solar paneling along with Aerotecture wind turbines that would form the roof structure.

Photovoltaic (PV) solar panels on roof generate enough electricity for household use and for export-ing power to the National Grid

Aeroturbine at roof crest con-tributes 6KW of continuous power in 20mph wind - complementing the PV array

fig. 2h: Aerotecture Building Cap concept (Architects, Concept Gallery, Renewable House)

fig. 2i: Cuthbert Amphitheater, Eugene, Oregon (Hultz Center for Performing Arts, Eugene, Oregon)

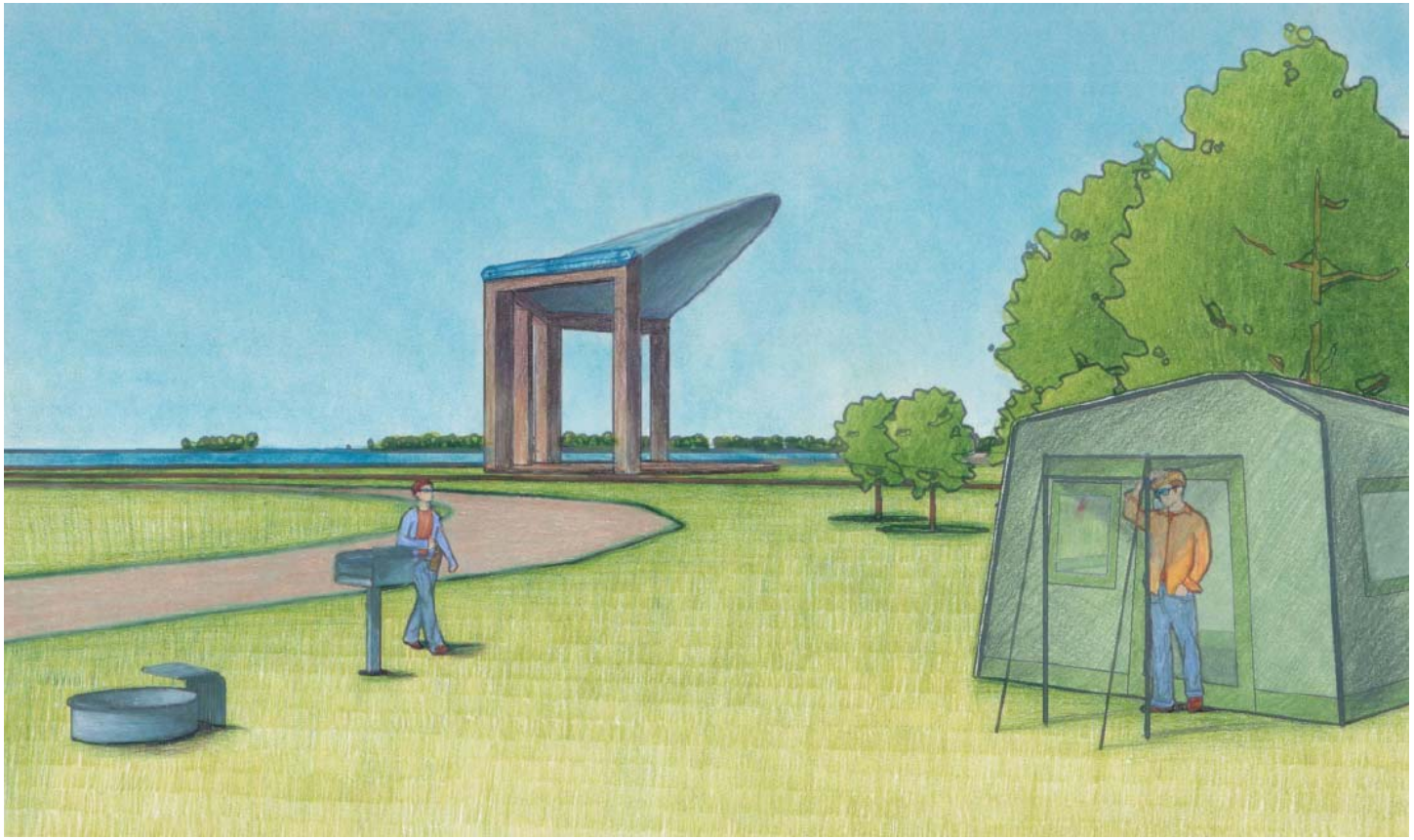


fig. 2j: Perspective image of campsite view toward Northwest

fig. 2k: Kiowa County Lake, prior to tornado (Long-Term Community Recovery Plan)

fig. 2l: Kiowa County Lake, after tornado (Long-Term Community Recovery Plan)

fig. 2a: The Lewis & Clark National Historic Trail Interpretive Center (Brown, A.)

Fairground and rodeo buildings are arranged in close proximity to each other, allowing shared facilities and sustainable land use. Limiting the amount of area used for buildings allows more prairie to be preserved. The public buildings are located closest to the main access road, Bay Street.

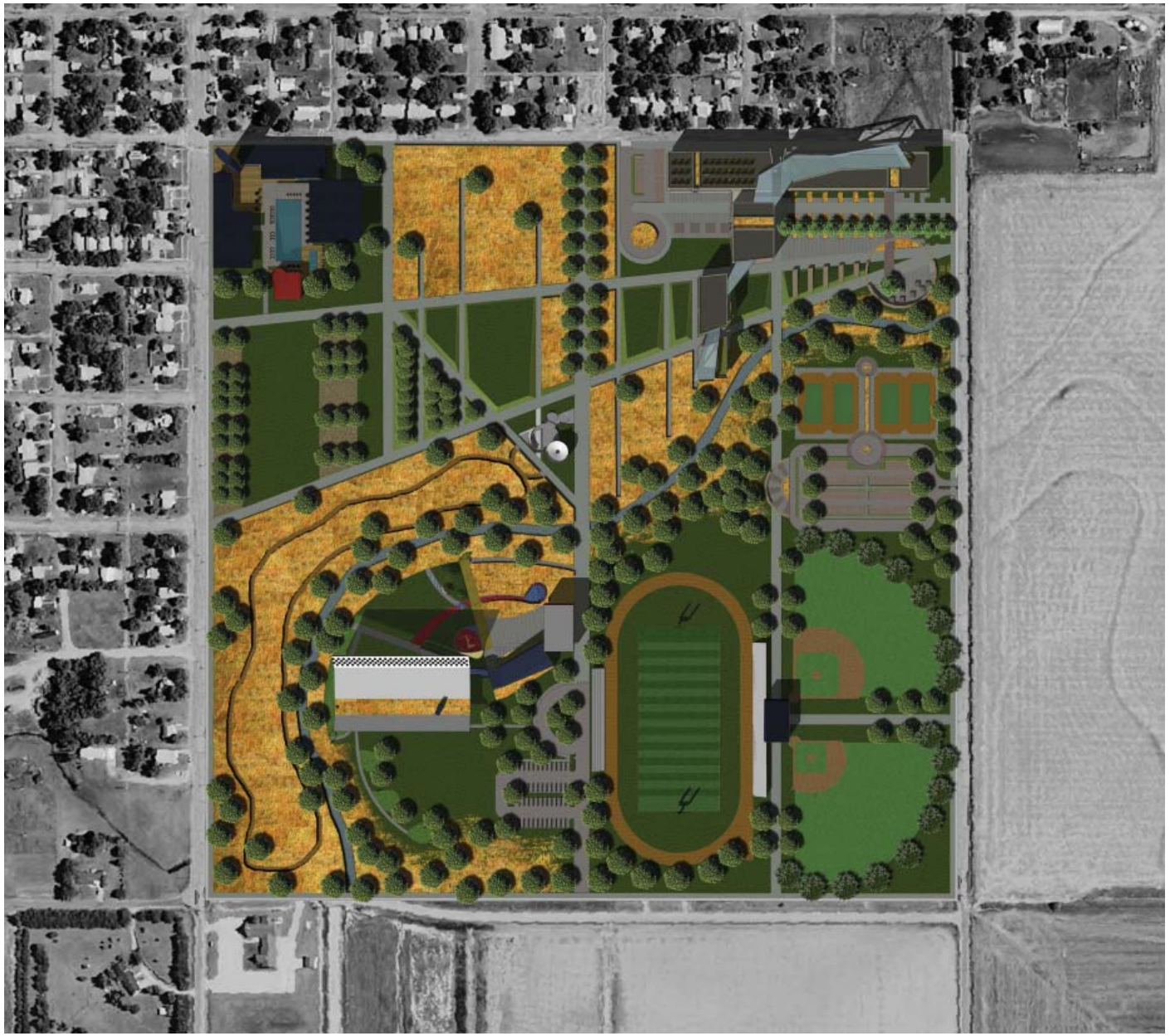
The livestock facilities are located toward the back of the site, adjacent to the large gravel parking lot suitable for animal trailer parking, allowing easy access for unloading and loading the animals. Best Management Practices (BMPs) for storm water should be implemented between the rodeo livestock facilities and the small pond at the northeast corner of the site, aiding the natural cleaning of the storm water runoff (that would carry animal byproduct) prior to reaching the pond.

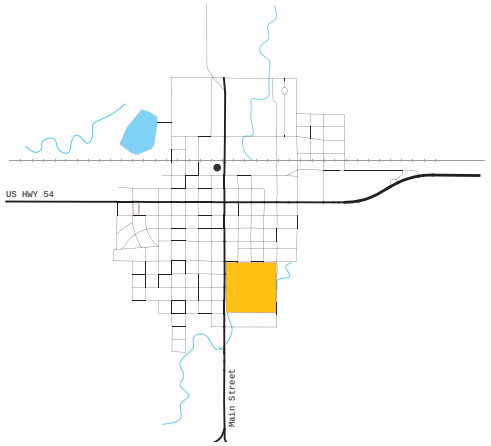
Implementing this design can help the City of Greensburg capture tourism dollars generated by visitors attending events such as annual fairs, carnivals, rodeo competitions, rodeo shows, annual circuses, festivals, music concerts, theatrical performances, road shows and exhibitions that would take place at the Kiowa County Lake, Fairgrounds and Rodeo Park!

section three

educational + recreational campus

josh lamartina + geoffrey van de riet + aaron vanderpool + laura wilke





Quality education is a high priority for any community and a key element for persons when determining a place to live. The goal for Greensburg is to rebuild elementary through high school facilities with cutting-edge technology and a strong curriculum. Along with these buildings, a 16-square block proposal sets forth the foundation to an educational recreation campus in Greensburg.

The site is situated in the southern part of town, serving as an anchor to the Main Street businesses and surrounding community housing.

fig. 3a: Educational and recreational master plan

Due to the location, the area proposed for educational use and the new Davis Park will be immediately accessible to the greater population of Greensburg. These areas will strengthen the school's importance as a community-gathering place and allow convenient opportunities for shared uses and events.

Specific areas for the site include an elementary school, middle school, and high school with associated ground amenities such as a track/ football field, two baseball diamonds and several tennis/ basketball courts. Surrounding the community center is the town's public pool, with a nature center pavilion a short distance away. The entire site is geared toward pedestrian circulation, incorporating various walking trails and bike paths.

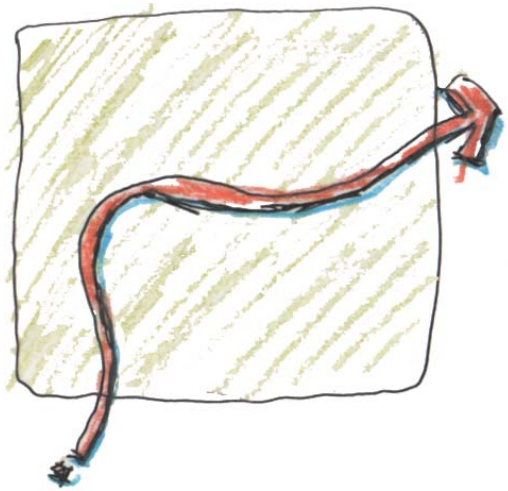


fig. 3b: Concept

fig. 3c: Land uses

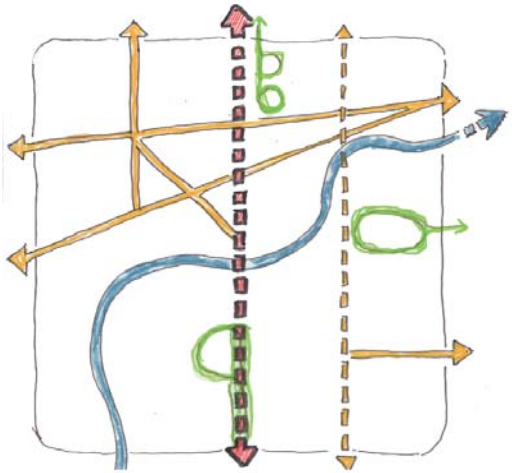


fig. 3d: Site circulation

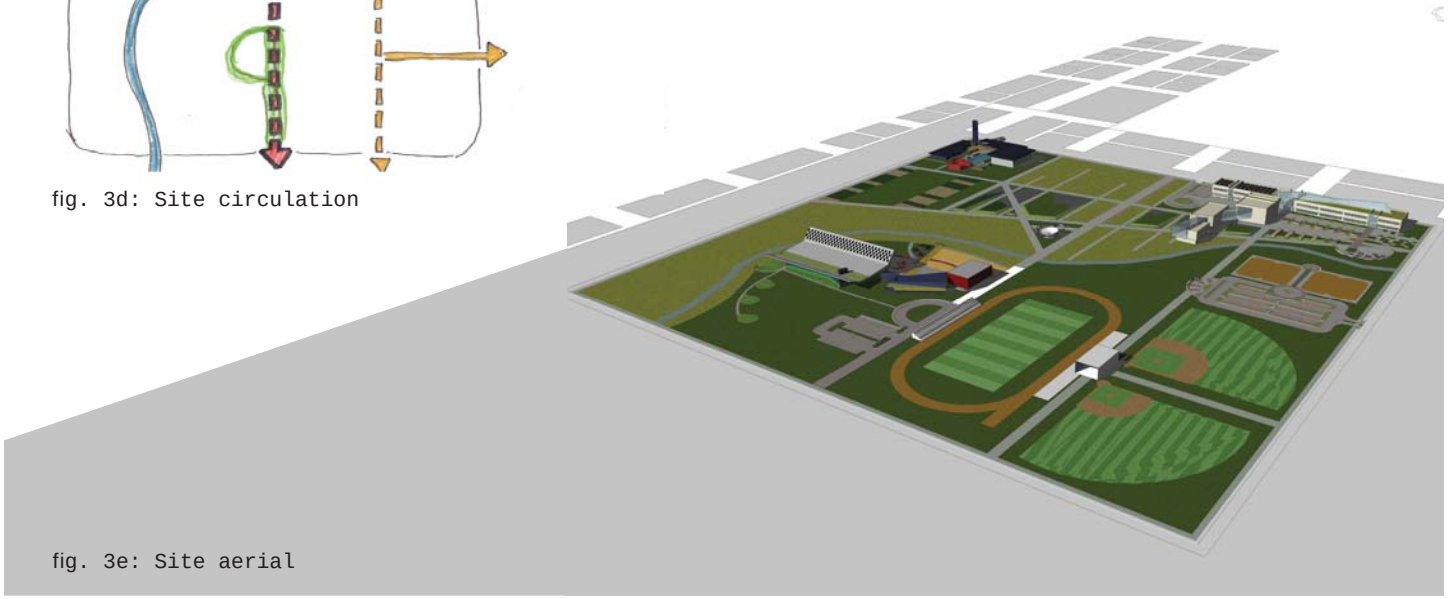


fig. 3e: Site aerial

fig. 3f: Typical stream section

The proposal for the campus focused around the low lying intermittent stream flowing through the site. This was viewed as a timeline, a path for the growth of education in Greensburg. Starting on the southern edge, the elementary school is located in a nook created by the stream, giving more privacy to the outdoor play grounds. As it moves northeast, the middle school and high school grow from its own “stream” like circulation core. On the eastern site border, a circular nodal point suggests an accomplished end.

The community center and field facilities are situated opposite each other, layering the public and private uses of each space. Several linear pedestrian paths direct circulation throughout the site, and allow low vehicular traffic volume, primarily for maintenance.

To announce the campus to the predominant Main Street, a significant focal point was necessary for the northwest corner of the site. A whisper turbine has been placed at the forefront of the campus, serving as the entry into the community center area.

community center

The Greensburg Community Center is a facility designed to be as flexible as the people of Greensburg have been throughout this catastrophic disaster. Similar to the Elementary School, multiple sustainable strategies were incorporated to minimize the buildings' environmental impact, maximize its economic contribution to offset energy costs, and optimize its potential uses for the community. In the first phase of the community center three structures are slated for implementation. These structures include an icon tower with an integrated wind turbine, and two multi-purpose buildings. The purpose for the tower is to both draw the public to the Community Center (and Education Campus as a whole) and to educate the public of Kansas' incredible wind energy production potential.

The reason for the openness of the complex's floor plan is to facilitate a broad variety of activities. Everything from bingo night to flea markets has been planned into the program of these two facilities. All of the walls facing the central plaza and pool court area have been made using glass garage doors; allowing for an even larger expansion of space for all of the various activities that may take place.

All of these facilities are centered around the Greensburg pool. This public pool is surrounded by open plaza space that can be used for sunning, snacking, or meeting with friends. The second phase of the site involves the integration of two more multipurpose facilities. These buildings include a medium sized banquet facility, and an additional gymnasium for the town's use. But the most important aspect of the project is its complete and holistic utilization of "green" technologies.

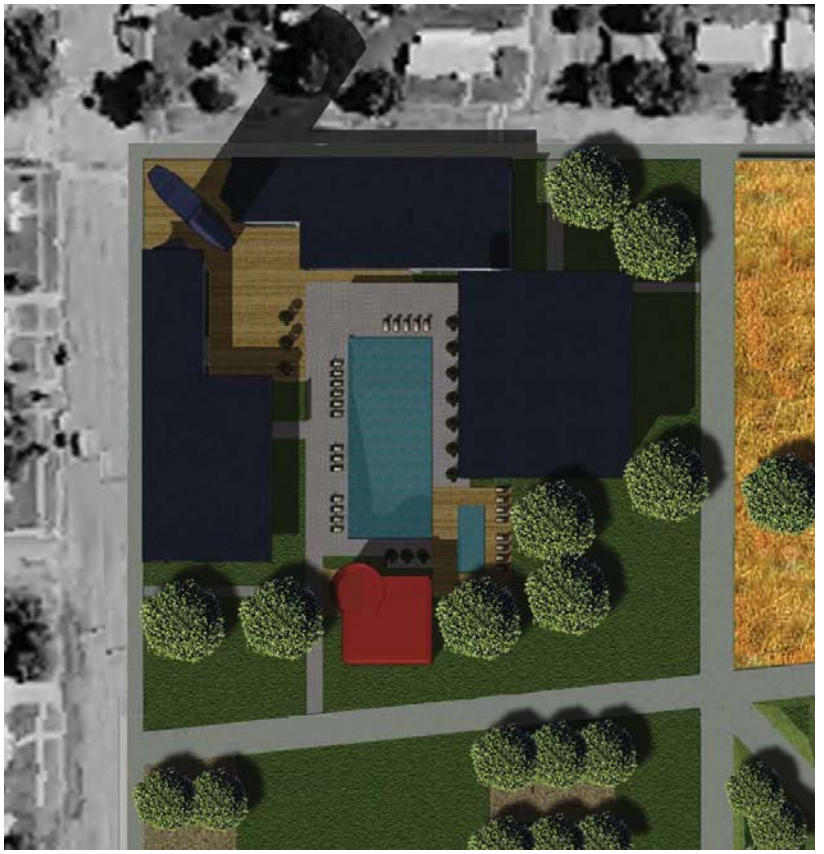


fig. 3g: Community center plan

This view looking north-west shows the pool complex and community center as seen from the lounge area. The icon tower creates a backdrop to the open plaza.

fig. 3h: Community center perspective

nature pavilion

The purpose of the nature center is to educate visitors about the natural prairie and surrounding landscape. It also serves as a pavilion for people to gather and spend time while using the facilities in the area. The design and placement of the center on the site connects those from the public and more private areas of the campus. It lies directly on the diagonal pathway, easily connecting it to the community center.

The nature center is cut into the ground in order to immerse the visitor into the natural landscape. The native prairie grasses are brought through the space to enhance this experience. Walls which hold informative signage are placed at distinct heights to give more privacy in the lower areas. Views are created in the gaps between walls to integrate the inner and surrounding areas of the center. A sculptural water catchment system filters rain into a tank, which is then stored and used to irrigate the surrounding green landscape.

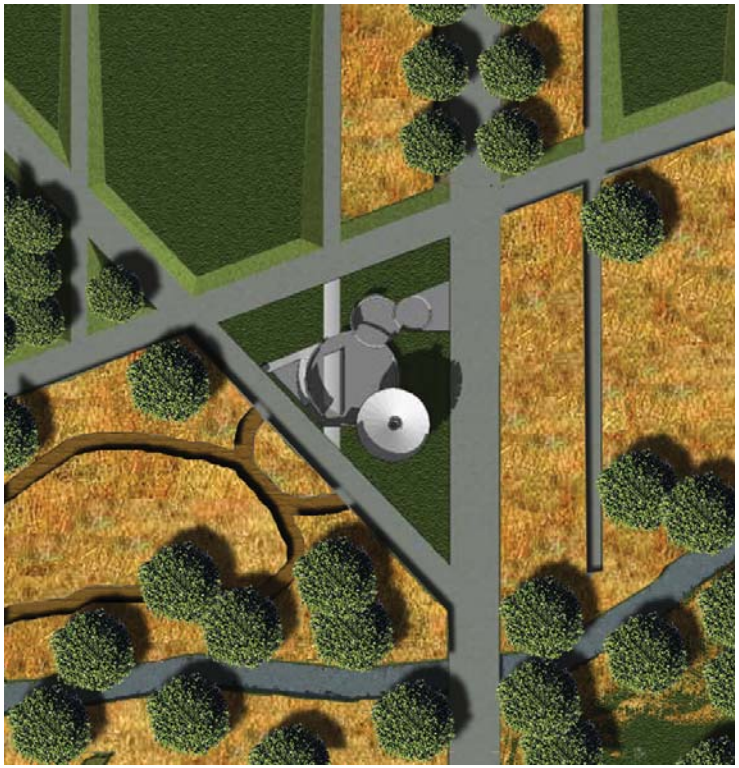


fig. 3i: Nature center plan

The nature pavilion serves as a triangulation point, integrating landscape with the built environment.

fig. 3j: Nature center perspective

elementary school

The Greensburg Elementary School is a state-of-the-art educational facility designed to create an environment for children between the grades of kindergarten to eighth grade, that is both creatively and intellectually invigorating. Throughout the planning process, all design decisions were checked against two criteria: sustainability and learning. The team's goal was to create an educational campus that was full of "green" learning opportunities. Solar arrays, rain catchment systems, maximized daylighting, a restored prairie, high sun-shaded south windows, energy efficient glass throughout the school, "wheat-board" siding on the exterior, etc... The aim is to teach Greensburg's youth of the importance of "sustainable" buildings. Science has shown us that we absorb and learn exponentially more during the childhood and adolescent years and a more important lesson could not be taught. Ours is an age of responsibility. The buildings should not only be self-sustaining [meaning they can supplement their own power and water], but also constructed with an increasingly minimal impact on our planet's depleting resources.

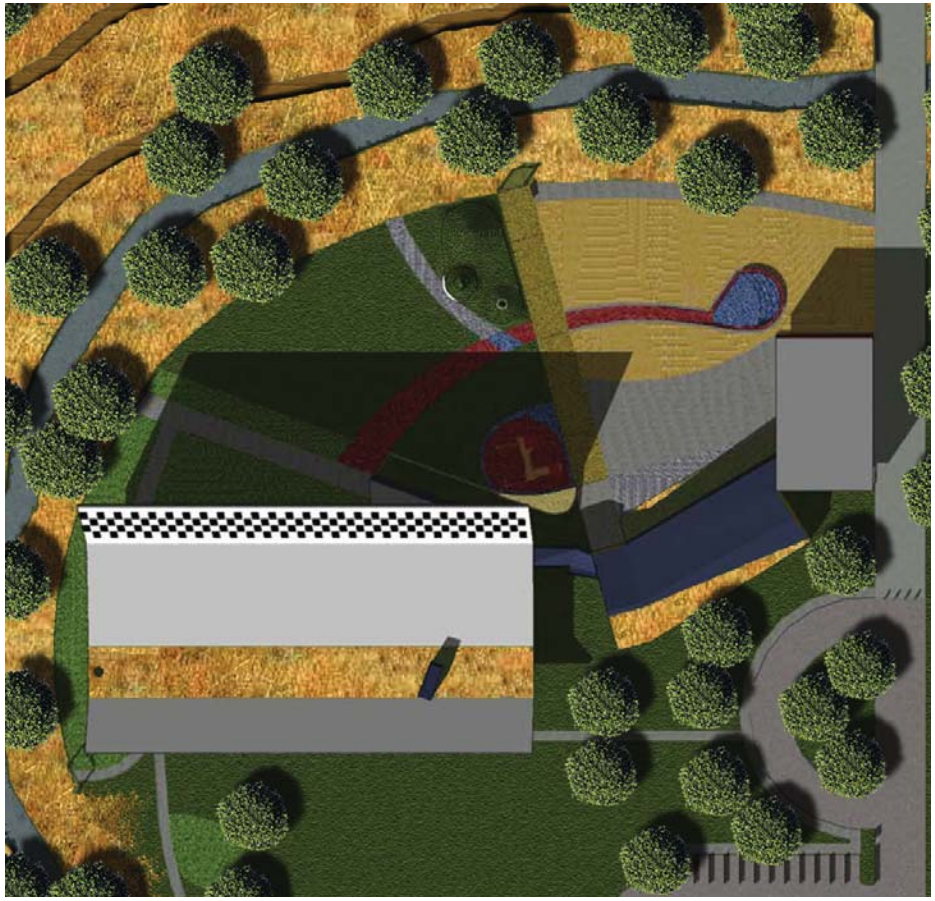


fig. 3k: Elementary school plan

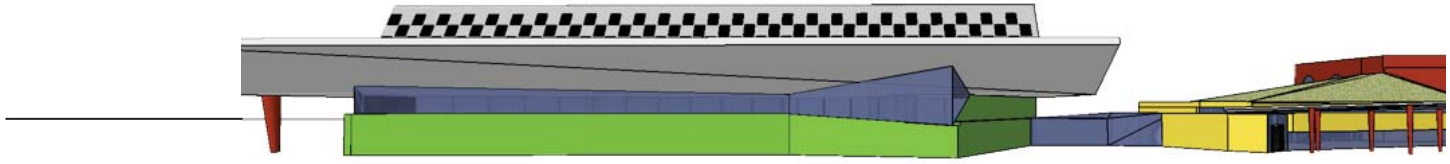


fig. 3l: South elevation

fig. 3m: East elevation

fig. 3n: Elementary school perspective

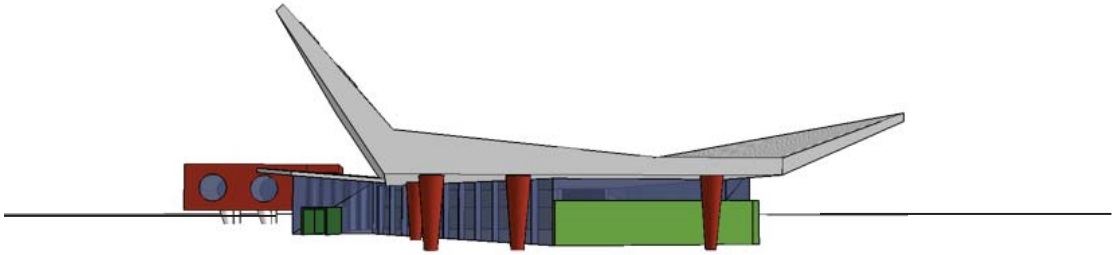


fig. 3o: West elevation

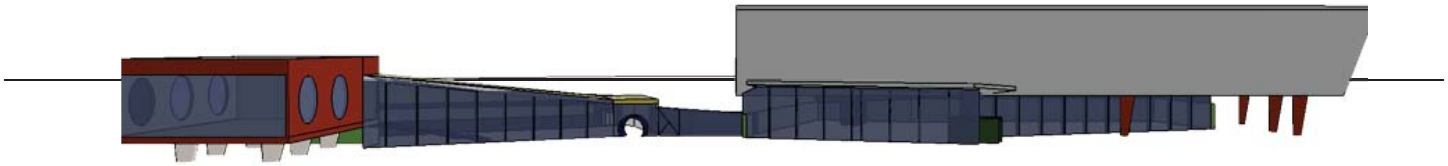


fig. 3p: North elevation

Learning is also integrated into the landscape that surrounds the elementary school. The school itself is oriented toward a bend in the existing intermittent stream which gives the school a sense of privacy and forms a somewhat enclosed area for school activities. North of the building, this open area facilitates: an outdoor amphitheatre, playground, play mounds, sandbox, hard play area, and an open turf area. A large “yardstick” pathway extends out from the building stamped with measurements so children can learn about various units of length. Teachers will be able to take children out beyond the intermittent stream where the elementary school connects to the public nature trail system. Below the school are three garden cloisters that take advantage of the site’s southern exposure. These spaces will be subdivided so that each class can have their own plot in which to plant. This is an opportunity for students to learn about plants and vegetables first hand.

secondary school

The secondary school is planned to be built in phases, expanding when necessary to facilitate the growing number of students. The first phase includes enough classroom space for the high school age children in Greensburg. A gymnasium and cafeteria/ student commons connect to the educational wing via a transparent circulation spine. This allows natural light to enter the space as well as directly connect it to the exterior environment. The second phase adds a larger classroom wing which then becomes primarily the high school. The first phase classrooms house the middle school as children from all of Kiowa County enter the Greensburg school system. Also within the later phase, an academic resource center with library space and several computer labs are added on the south side.

Several sustainable elements were included in the design of the building. All south side windows have adjustable sun shading devices to decrease the amount of solar heat gain. The first phase classroom wing has an array of solar panels on the roof that help offset energy costs. A green roof covers the second phase classroom wing, as well as parts of the gymnasium and academic resource spaces.

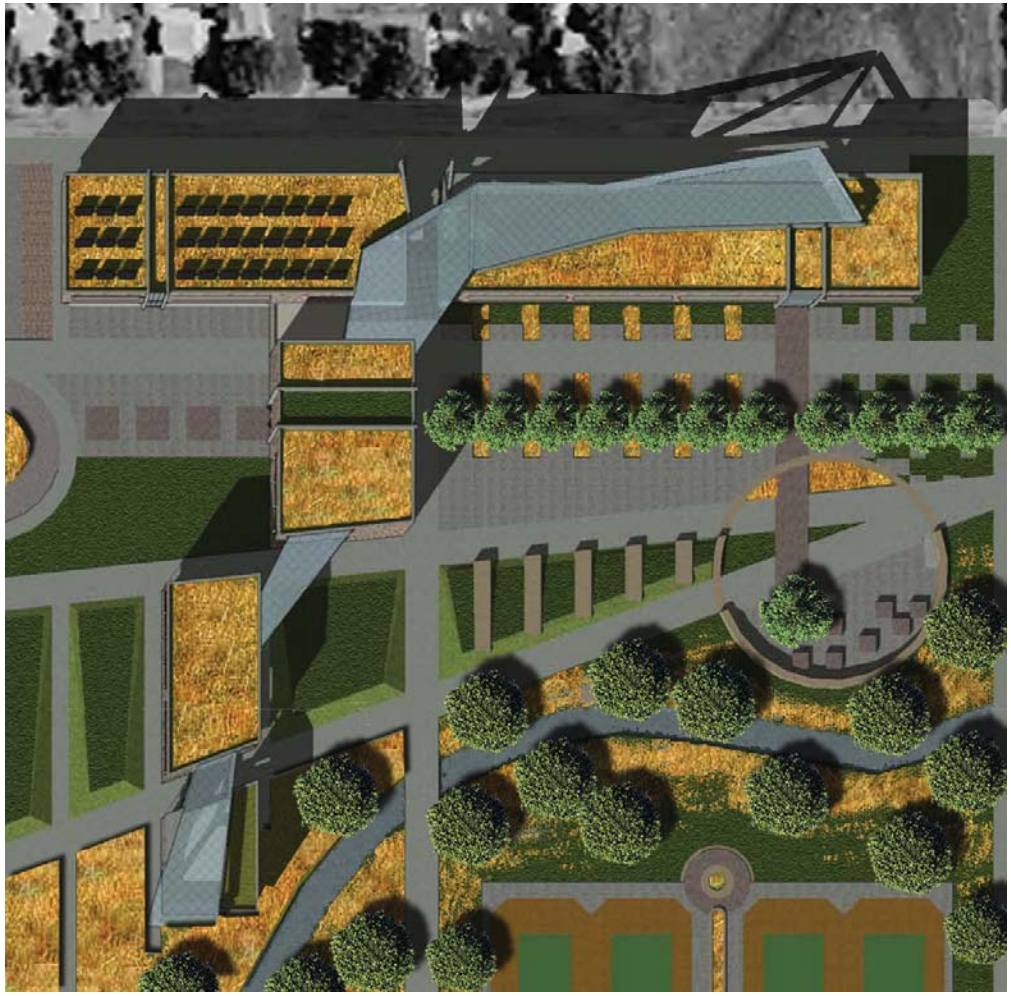


fig. 3q: Secondary school plan

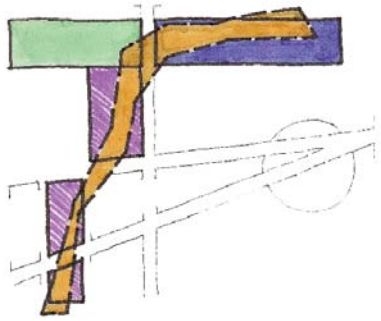


fig. 3r: Secondary school elements

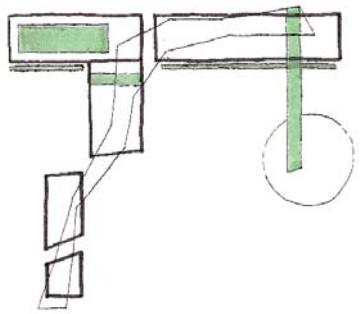


fig. 3s: Green strategies

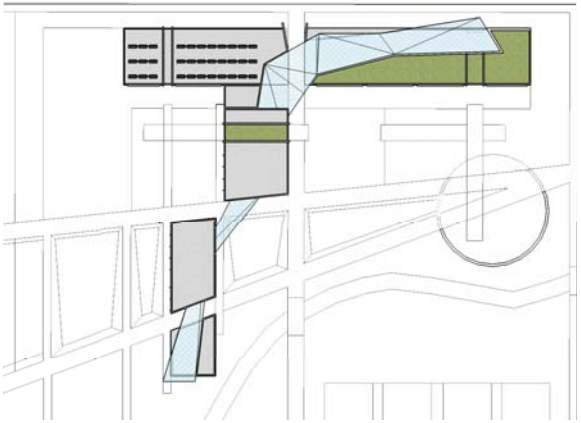


fig. 3t: Phase I secondary school plan

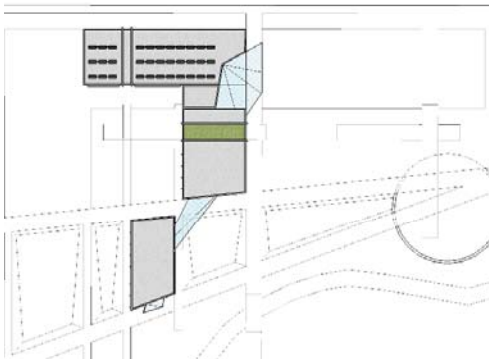


fig. 3u: Phase II secondary school plan

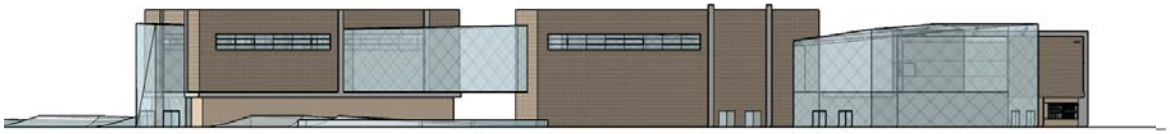


fig. 3v: Phase I East elevation

fig. 3w: Phase II East elevation

fig. 3x: Phase I North elevation

fig. 3y: Phase II North elevation

Integrated landscape elements form exterior courtyards and entry sequences. Sustainable features such as the solar array and green roof can be seen from an aerial view.

Overall, the large wedge space ending in the courtyard provides a simple, formal design solution that incorporates natural with traditional elements. Use of this order creates an inviting and comfortable space that provides opportunities for exploration.

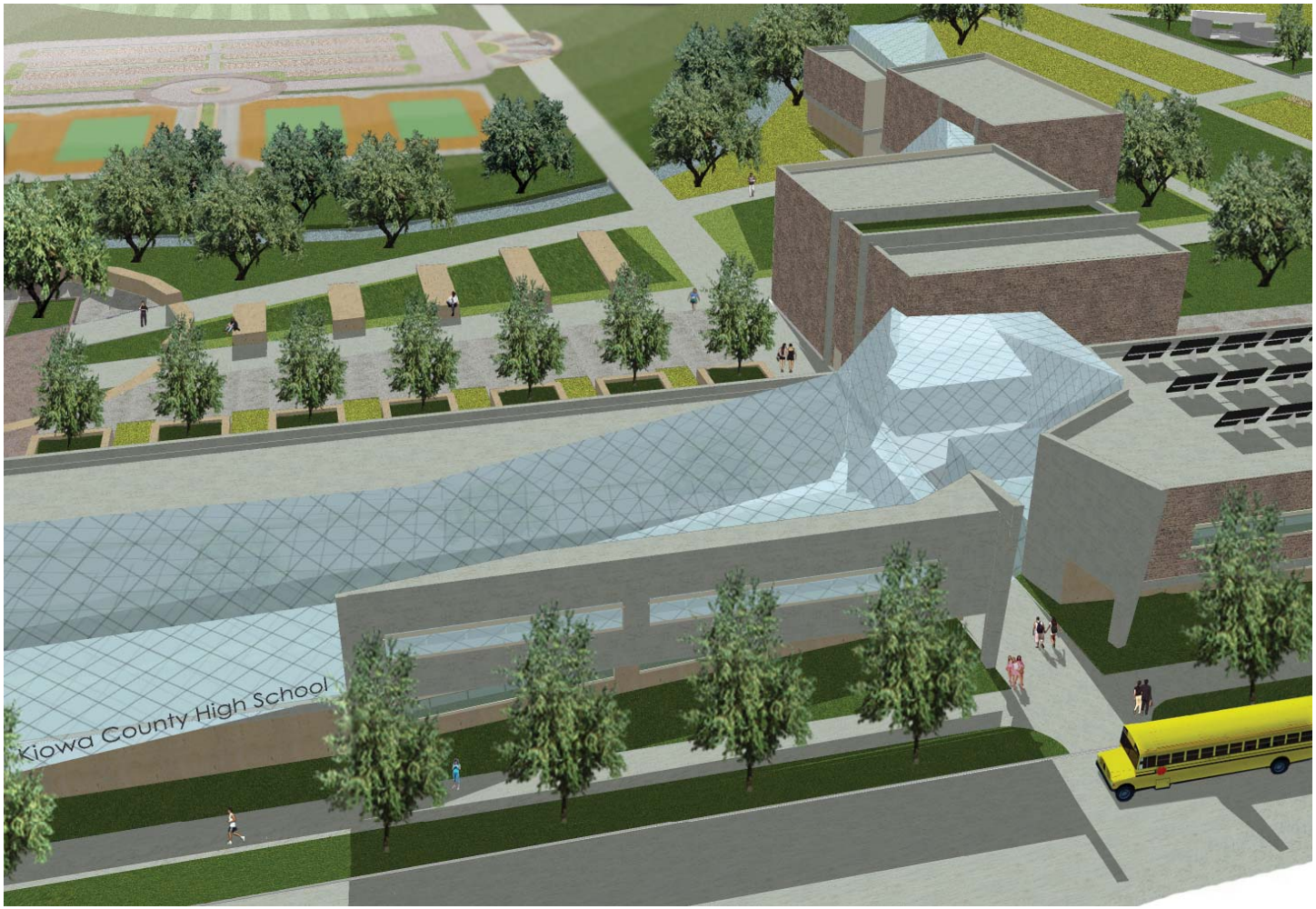


fig. 3z: Phase II secondary school perspective

fig. 3aa: Secondary school courtyard

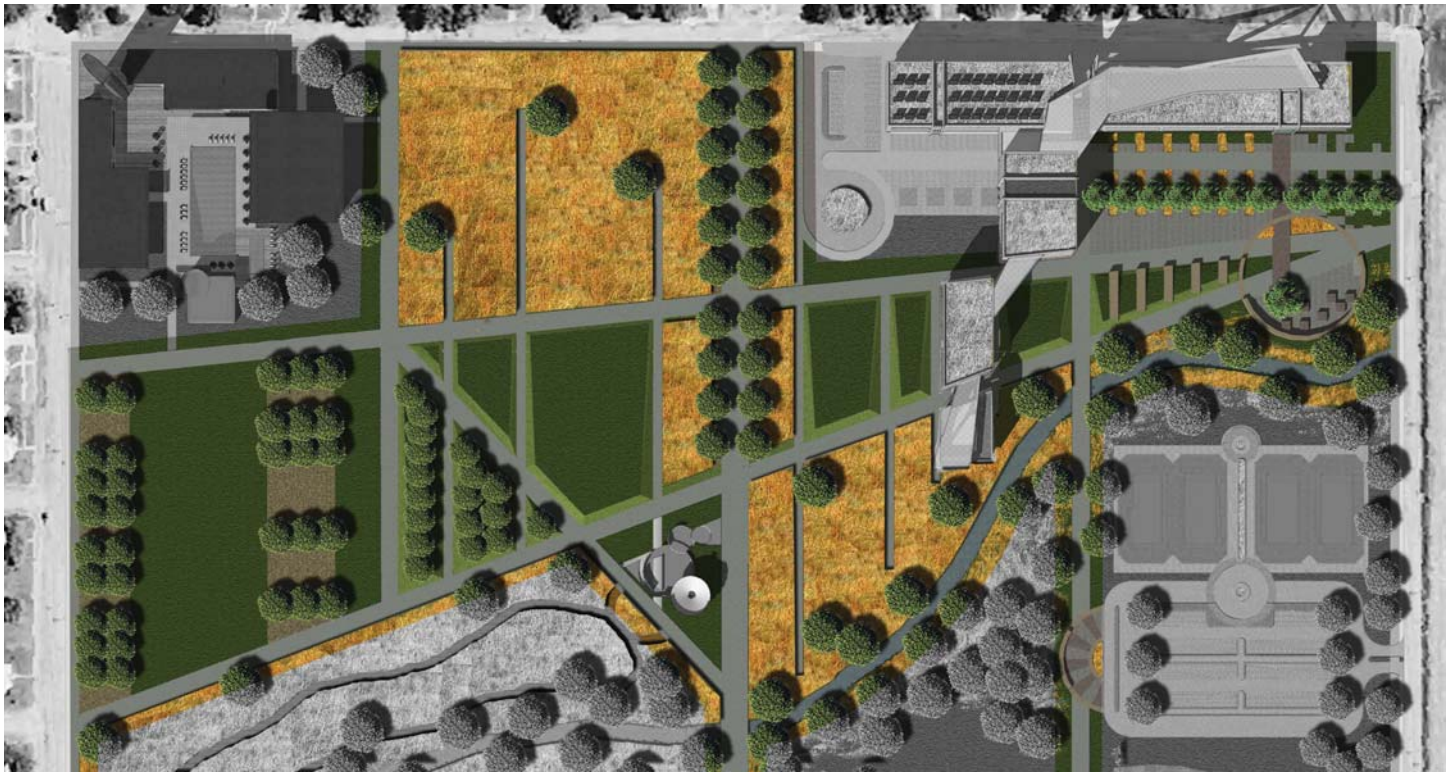


fig. 3bb: Defining landscape element

A design solution was created that would unite the public spaces of the site through transition to the private spaces. The concept created is a wedge shape that intersects the site with two of the vehicular corridors on the west, through the site to the destination of the learning timeline: the high school plaza and outdoor classroom/ symbolic space. The base of the wedge along the western site boundary is designed as a open park space with large turf spaces broken up by alternating pea gravel and red maple-planted areas. These are designed to break up the larger space and create a sight boundary from outside to inside the site. The remaining larger wedge space is divided along the northern to southern axis by alternating semi private spaces that form individual wedges, sloping upward. The individual wedge spaces provide a transition from the public to private by breaking up the view line and creating semi private spaces through the larger wedge shape. This space is bordered with native grass areas and narrow walkways into the native grass prairie. The walks provide opportunities for the public to explore the ecology and natural systems associated with a prairie ecosystem.

section four

highway 54 corridor

shandelle renyer

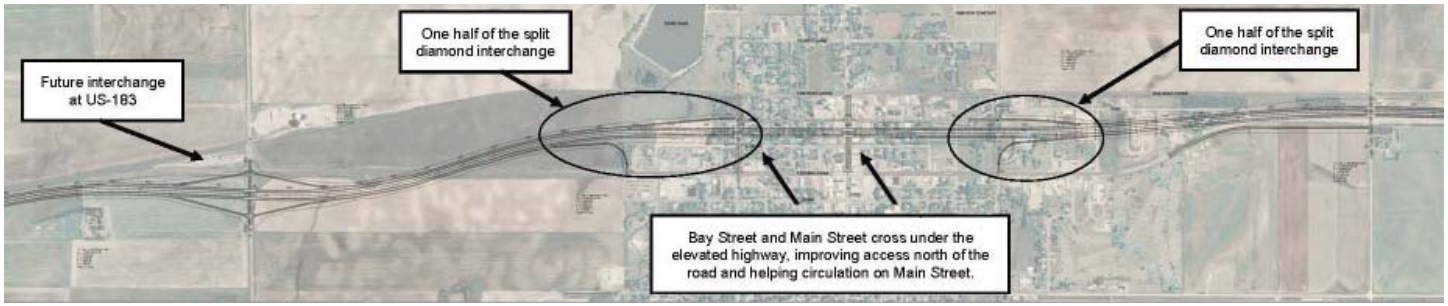


fig. 4a: KDOT highway 54 plan (www.ksdot.org)

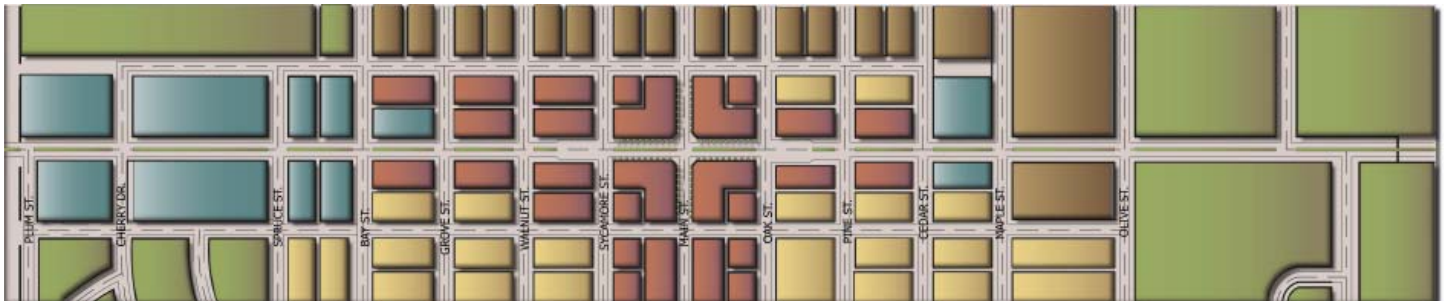
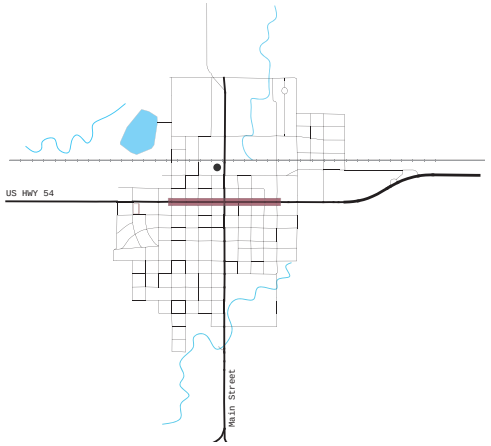


fig. 4b: Old highway 54 corridor

Legend:

- COMMERCIAL
- LIGHT INDUSTRIAL COMMERCIAL
- INDUSTRIAL
- RESIDENTIAL
- CROP LAND



Background

Recently KDOT (Kansas Department of Transportation) approved plans to relocate Highway 54 one block north of its current location . The new interstate-like highway will no longer pass through the town, but will become elevated with access to the North at Bay Street and Olive Street.

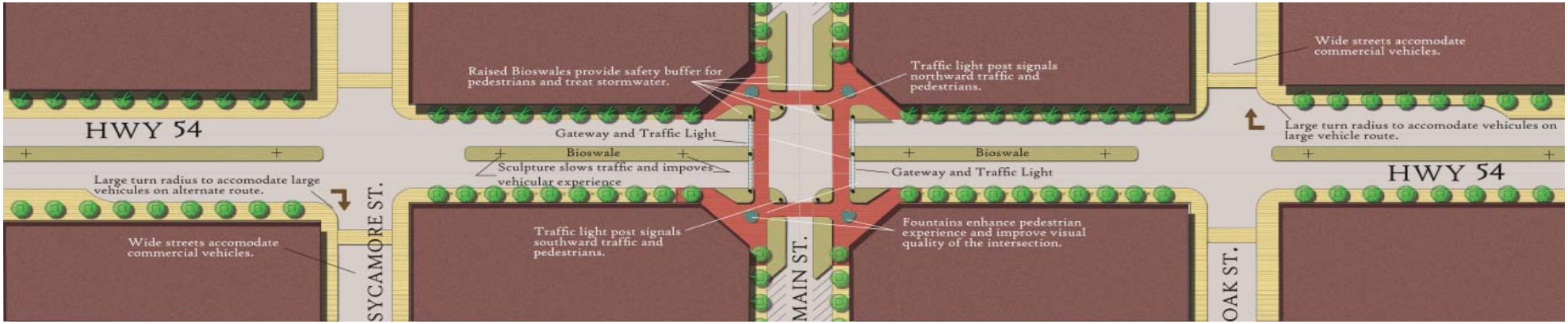


fig. 4c: Highway 54 corridor plan

Concept Statement

This design proposal focuses on the current Hwy 54 corridor as a welcoming entry to Greensburg. Special attention has been given to the gateway feature and pedestrian access at the intersection of Main Street and Hwy 54.

Goals

Slowing traffic with reduced speed limits, tasteful display of art in the boulevard bioswales, and a stop light at the intersection of Hwy 54 and Main Street will create a pedestrian friendly environment. Signage and locating “traveler oriented businesses” along Hwy 54 will help ensure the future economic growth of Greensburg. With the incorporation of tourist signage along Hwy 54, Greensburg will have the opportunity to attract highway traveler impulse stops, which will boost the local economy. Greensburg will be seen as a cultural gem along Hwy 54 with the incorporation of art and the gateway system along the corridor.

fig. 4d: Perspective at highway 54 & Main St. Pedestrians walk across the cross walk made of the same brick porous paving that exists at the sidewalk corners and are of a different color than the sidewalks to emphasize the intersection

fig. 4e: View approaching the intersection. From a distance this gateway feature appears to rotate as the driver moves towards it. Closer to the intersection the viewer realizes that the gateway is actually two separate pieces and encompasses traffic signals

Finally, the route of large vehicles and equipment, which are vital to the local economy, will have an easily accessible route that will not interfere with the new pedestrian scale of Main Street.

ADDITIONAL GOALS

In addition to meeting the design goals, this proposal also meets the new goals of the Steering Committee, Buisness Redevelopment Group, City Council and the Recovery Action Team set forth on October 23, 2007.

Water

Water, a precious resource, is collected in the boulevard bioswales and smaller bioswales along the sidewalks. These will serve to beautify the streets with native grasses and xeriscape, lowering the need for irrigation.

Health

The quality of life could greatly improve with the installation of pedestrian-safe walkways which could encourage residents to walk for pleasure and fitness.

Energy

Renewable energy is incorporated into the street light fixtures with the use of wind turbines and solar panels that can supply energy to operate the lights. Additionally, larger wind turbines are incorporated into the gateway and intersection feature to harvest and store energy. Finally, the sculpture located in the bioswales can consist of recycled materials, possibly, wreckage from the tornado, as a means of lowering energy consumption with the production of new materials.

Wind

Greensburg has a vast wind source and this is reflected in the gateway. Not only does the form represent the power of wind through a wind chime, power producing wind turbines are incorporated into the structure of the gateway and traffic light posts.

Built Environment

This design proposal seeks to encourage interaction between its residents with the implementation of local art and a pedestrian friendly environment, while greeting and enticing visitors to stop and spend time in Greensburg.

fig. 4f: Elevation detailing plantings, street trees, and vertical design elements

fig. 4g: Bricks recycled from the rubble of the tornado can be used as porous paving at the intersection of highway 54 and Main St.(Bricks)

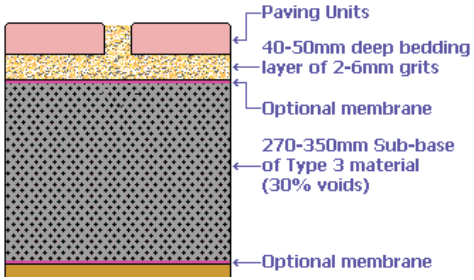


fig. 4h:
Detail of a typical porous paving system that can be incorporated into the crosswalk and sidewalk at the intersection of highway 54 and Main St.
(Porous Paving System)

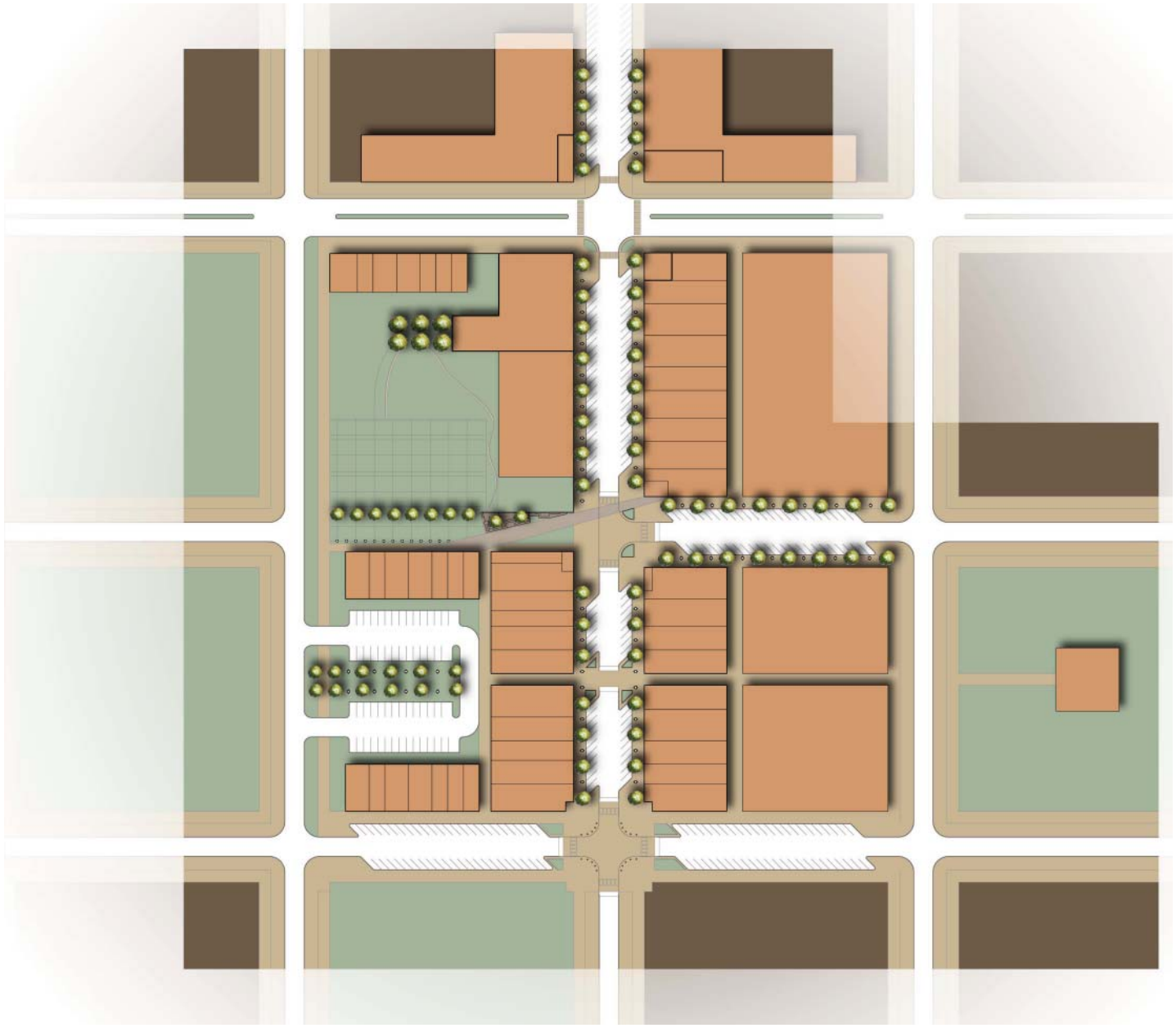
fig. 4i: This photoshop rendering shows the incorporation of native planting within a curb bioswale that will comprise the highway 54 boulevard. Stormwater enters the bioswale though the curb cut.

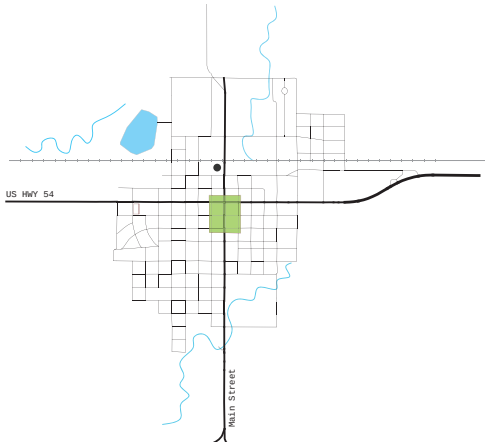
fig. 4j: Sculpture within the bioswale boulevard located on highway 54 can be made of recycled materials, such as rubble from the tornado as a means of saving energy and promoting the culture of Greensburg. (Recycled Metal Sculpture)

section five

downtown master plan

melody meek + brett rolfs + erin wages





Greensburg has been “blessed with a unique opportunity to create a strong community...” (Community vision statement from vision retreat, August 1, 2007.) Backed by strong community pride, the citizens and government officials have committed to rebuild their town green. This project proposes to begin with the heart of the city, developing downtown Greensburg as a sustainable district. This project is a rich mix of master planning and very specific design details that foster the design and implementation of sustainable building practices.

fig. 5a: Downtown master plan

5 Greensburg Goals

The five main goals developed in the Greensburg + Kiowa County Long-Term Community Recovery Plan (LTCRP) were emphasized throughout the design.

Water

A large focus was placed on water preservation and conservation by collecting usable rainwater from roofs and letting storm runoff filter through pervious paving and landscaping to replenish the aquifer below.

Health

Promoting a healthy and active lifestyle is important to improving the quality of life for a town as well as it citizens. The focus of the downtown is the pedestrian experience of walking down the street. Bike paths are provided as an alternate convenient means of transportation.

Energy

In the construction of downtown, it is important to have a high level of efficiency. This design encourages individuals who own the stores along Main Street to invest in solar and wind energy harvesting.

Wind

Greensburg has an abundance of wind which can be used to help create a more sustainable community. This can be done actively by generating power through rooftop wind turbines or passively by cooling spaces with stack and cross ventilation.

Community

The downtown area can be a great asset to Greensburg by creating a central space for the community to gather as well as providing an economic center for both the town and the county. Centers of activity are created around the intersections to highlight the life of the downtown as well as draw more people into the area. Buildings with space for both living and working keep people in the area all day and night, creating a more sustainable and welcoming environment. A pedestrian plaza at the center of downtown connects to the proposed farmer’s market area and provides a central space for community interaction.

fig. 5b: 1 - Green Planning - view down Main Street

fig. 5c: 2 - Green Streets – intersection of Main and Florida

fig. 5d: 3 - Green Experience – view of pedestrian center

3 Building Scales

These three scales contribute to a comprehensive downtown master plan to aid in the rebuilding process. To create a fluid design project, we have focused on three project scales:

1 – green planning – land use and building massing

2 - green streetscape – building details

3 - green experience – the pedestrian environment

Downtown Greensburg has a rich history, providing a center to the town. The legacy of businesses like the Twilight Theater and Hunter Drug Store emphasize the importance of downtown, while the world's largest hand-dug well provides a spark to the area. The downtown master plan for Greensburg provides a series of guidelines to create a lively small town atmosphere while focusing on the goals in the LTCRP. The intent of this project is not to identify specific buildings and their specific purpose or architecture, but to show how a sustainable downtown Greensburg could be developed.

The downtown of Greensburg has great potential to be a leader in green design. With an abundant supply of wind and sun, renewable energy options are fantastic for Greensburg. Implementing these sustainable ideas in a creative, non retrofitted way was of utmost importance to the design. Above all, the primary driving force of the design was the community and citizens for which it was designed. The design maintains the feeling of a Midwestern town while implementing the most current green technology.

1 - Green Planning

At its largest scale, the downtown green master plan creates an overlaying land use system (see fig. 5g) and building massing in and around downtown Greensburg. At this scale the primary design issue was concerned with locating various land use types in downtown Greensburg at ground level and above the ground plane. With the massing of buildings, a sustainable circulation path was created. This path allows pedestrians to navigate Greensburg by foot or bike instead of a vehicle.

fig. 5e: Green Planning – aerial perspective of Main Street

fig. 5f: Green Planning – plan

Connection

To reinforce the life of the community, the design strengthens pedestrian connections by developing axial relationships to:

City Park and the Big Well

Starting at the proposed farmer's market, a green corridor lines the back side of downtown to the City Park and the Big Well. This connection allows residents and visitors direct access to these places without having to travel the busy commercial side of Main Street.

Proposed pedestrian plaza

(farmer's market) In the center of downtown, a pedestrian plaza would provide a convenient central location for people to gather. This space could also be the host for the farmer's market on the weekends.

Existing courthouse

This pedestrian path cross the entire width of the downtown area allowing easy access to the courthouse and a visual reminder of this landmark.

Land Use

Creating a rich mixed use development is necessary to establish a successful downtown. This design provides retail space on the ground floor of all buildings adjacent to Main Street and allows the second story to be either retail or residential. This creates a sustainable built environment which allows people to work, play and live in the same area, creating a livelier environment. The primary types of land use which create a rich mixed use development are shown as:

- retail
- residential
- government
- parks

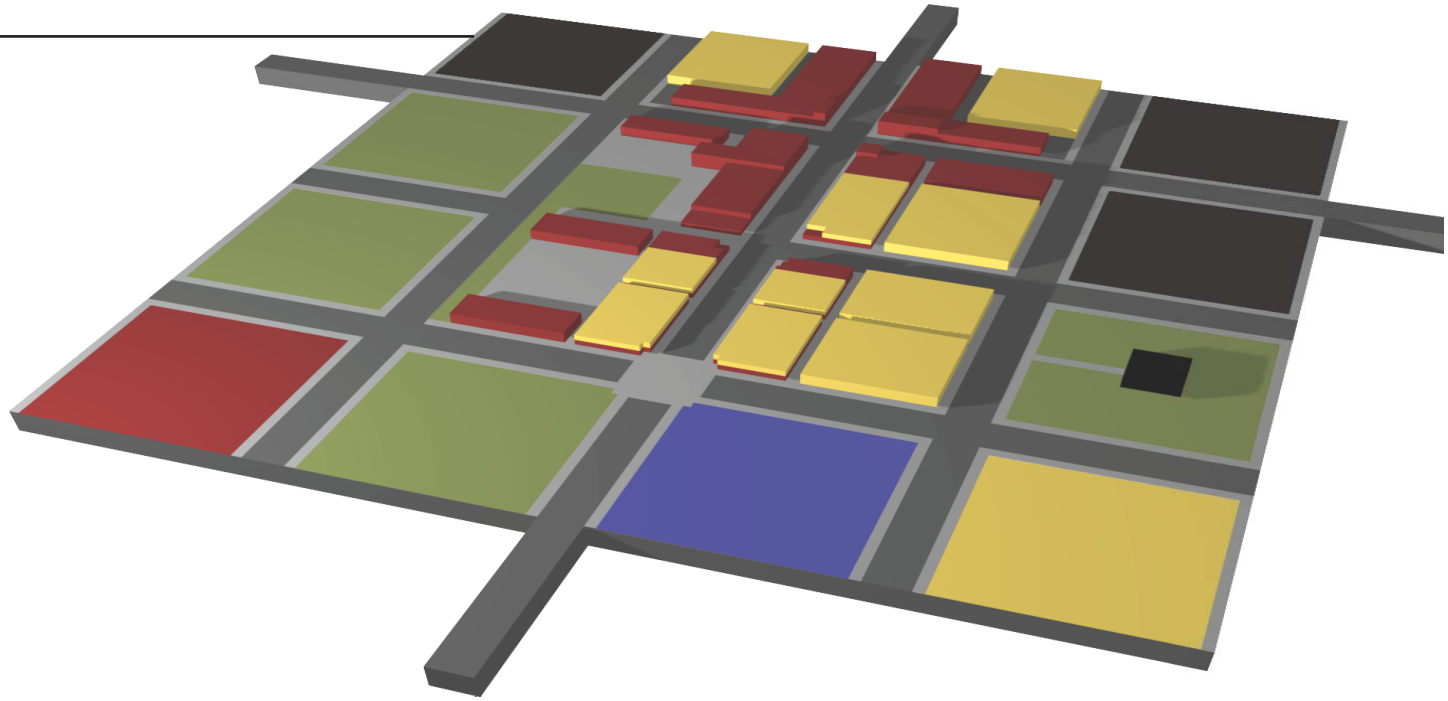


fig. 5g: Green Planning – land use diagram

Circulation

Sustainable development establishes the non-motorized connections of Greensburg as the primary sources of travel. This promotes a healthier lifestyle by giving people an alternative for driving. All circulation follows the existing road system in Greensburg, providing convenient connections for both residents and visitors.

- pedestrian
- bike
- vehicular

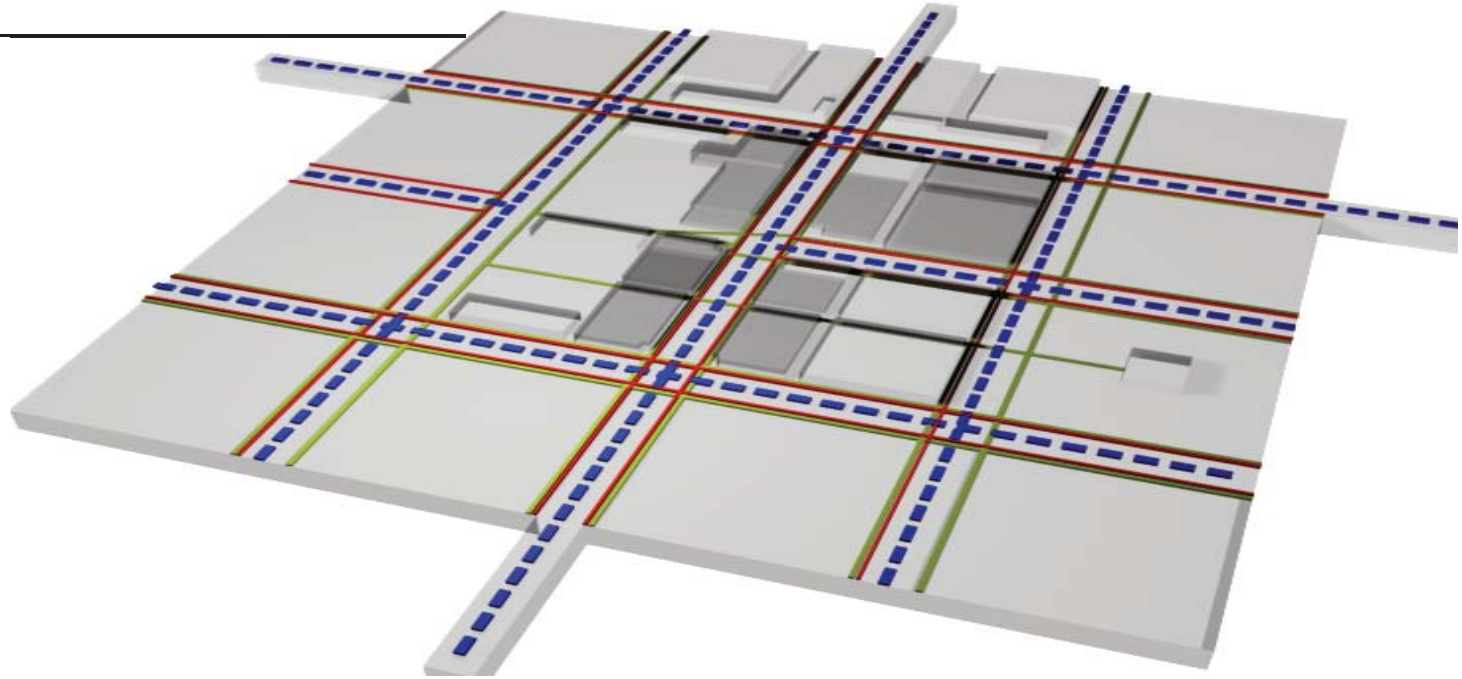


fig. 5h: Green Planning – circulation diagram

fig. 5i: Green Streets – intersection of Florida and Main

2 - Green Streetscape

This master plan scale addresses the proposed street layout and parking design as it relates to the pedestrian corridor and building designs. A variety of sustainable solar and wind systems were introduced to downtown Greensburg in the master plan. Other sustainable systems include: the use of native low water vegetation, solar-wind powered street lights, solar and wind energy generation, green roofs, rainwater harvesting, stack ventilation and day lighting. There was a focus on creating a comfortable walking environment by defining the pedestrian zone with landscaping and pervious paving and raising crosswalks to the level of the sidewalk, giving those on foot ownership of the street.

Focus

To create a strong community, people need places to gather. In view of that, centers of activity were created at the three main intersections by defining unique sets of buildings at the corners.

Highway 54

This major intersection is framed by 3 story buildings, providing a gateway to downtown.

Florida

This intersection is marked by joining the farmer’s market area with exterior spaces on the upper levels of the corner buildings, providing multiple levels of activity focused in one area.

Wisconsin

This intersection provides a ground level connection to the park through a raised intersection, providing a strong pedestrian connection to the circulation paths of the downtown area.

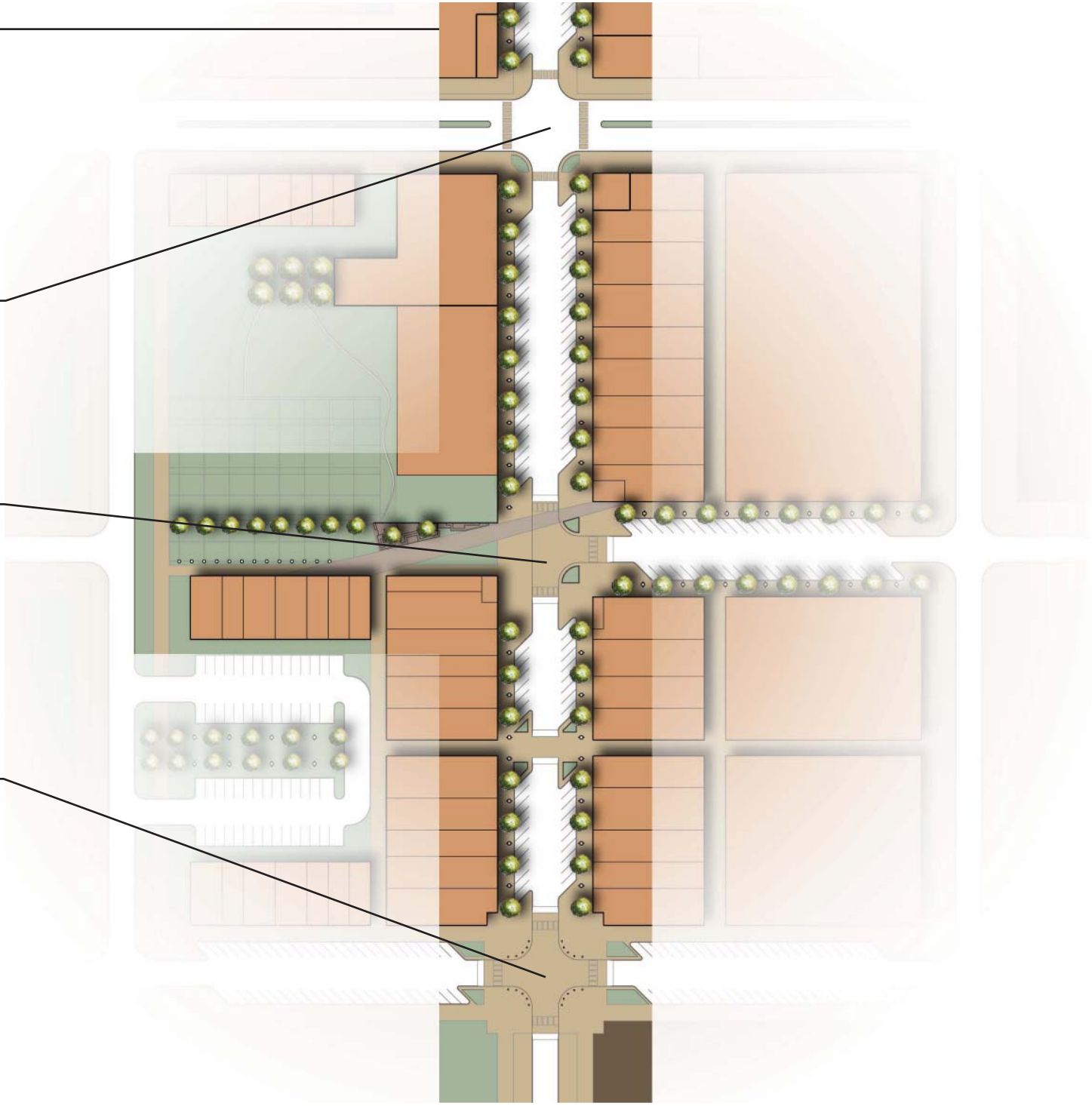


fig. 5j: Green Streets – plan

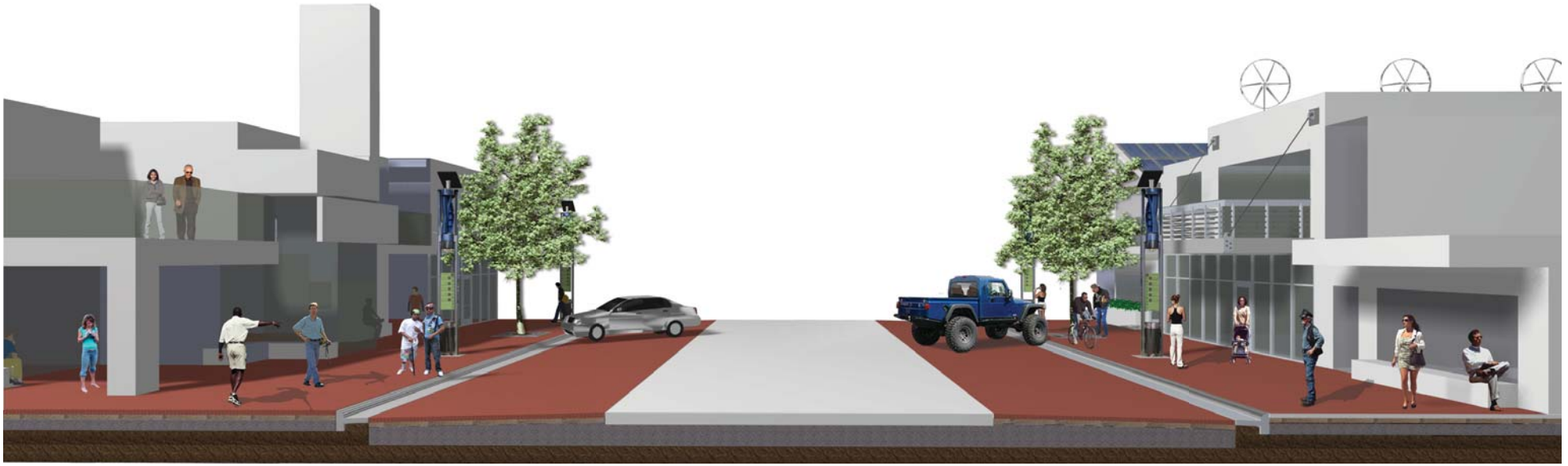


fig. 5k: Green Streets – street section

Solar Panels

Photo voltaic panels can be mounted directly on a south-facing angled roof or propped up by frames on a flat roof. Even a few panels can help provide clean, free energy to your home or business.

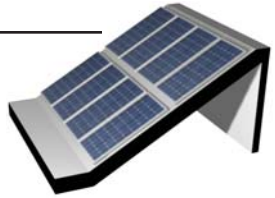


fig. 5l

Rain Water Collection

Precipitation can be collected off of any sloped roof and stored for later use. This runoff water (grey water) can then be used to irrigate the landscape.

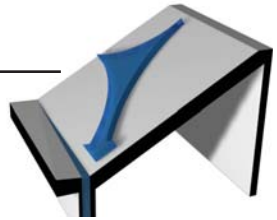


fig. 5m

Stack Ventilation

As air gets warmer, it rises to the highest point in a room. Stack ventilation uses this effect to naturally cool buildings by letting hot air out of a building through windows at the top of a space, pulling fresh cool air in through openings at ground level. This cools the building without using any energy!

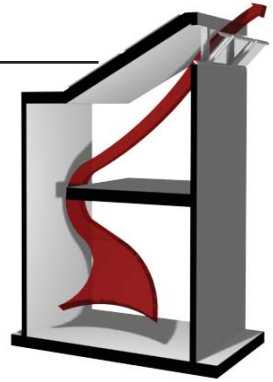


fig. 5n

North Daylight

Using natural daylight to light interior spaces is one of the easiest ways to save energy. Indirect northern light has the added benefit of providing light while adding very little heat to the space. A clerestory, or windows at the top of a wall, can provide light even if there are no opportunities to put a window at eye level.

fig. 5o

Green Roof

This is a thin layer of soil and low-maintenance vegetation covering a roof. It absorbs rain, reducing storm water runoff, and helps stabilize interior temperatures, reducing the amount of energy needed to heat and cool the space. It also extends the life of the roof and insulates from sound.

fig. 5p

Roof Garden

Exterior space can be created above a floor of a building by creating a roof garden. This is a green roof with added structure and a thicker layer of soil, permitting a greater variety of plants to grow as well as allowing residents, employees and their visitors to enjoy the added greenery.

fig. 5q

Rooftop Wind Energy

As we all know, Kansas has an abundance of wind. We can harness some of that energy to power our homes and businesses right from our rooftops. The ‘swift’ turbine at the right turns to face the wind – in good conditions, it can provide up to 80% of a home’s electricity.

fig. 5r

fig. 5s: Green Experience – pedestrian core

3 - Green Experience

A central core of downtown Greensburg was established as a major attraction for residents and tourists alike. The ‘center’ of downtown Greensburg was set at the intersection of Main Street and Florida Street with the relocation of the Twilight Theater and detailing of the farmers’ market area near the proposed business incubator. In order to demonstrate how sustainable systems can be implemented at a more specific and detailed scale several sustainable ideas are demonstrated here.

Farmer's Market

Apart from being a plaza lined with shops, the central core of downtown could house the farmer's market and other community events. Events such as these could draw more people into the downtown, strengthening the economy.

Multi-level Benches

This sitting area would be great for groups or individuals to sit in conversation or contemplation over lunch. Multiple levels allow for flexible uses – a bench could become a table or a stage if the need arises. People also tend to gravitate towards corners while sitting, making a bending seating area more attractive than benches spaced along a sidewalk.

Angled Pavement Pattern

The path crossing Florida is angled from the northeast corner to the businesses bordering the pedestrian plaza, creating a visual and physical connection across Main Street. The goal is to draw people walking down Main Street into the pedestrian core of downtown. The intersection is raised to provide a convenient and direct pedestrian connection.

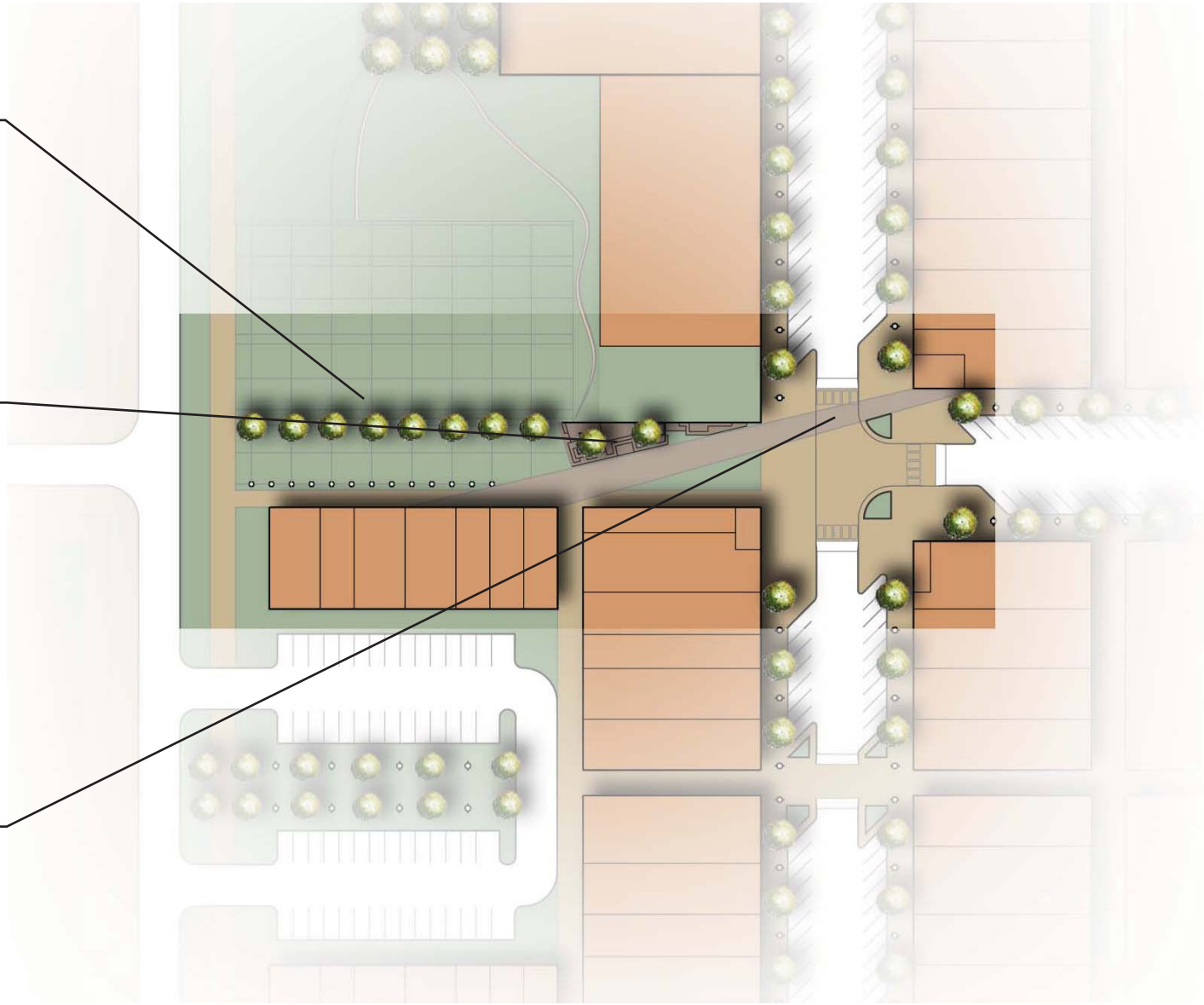


fig. 5t: Green Experience – core plan

fig. 5u: Section through Pedestrian Core and Main Street

Sustainable Light

Solar and wind energy can offer an unlimited supply of power to Greensburg. To demonstrate the use of solar and wind energy, a 100% sustainable street light was implemented in the downtown plan. This light requires no wires to install and will operate even if the city's power supply is disrupted.

fig. 5v

Bike Space

Located between the angled parking and pedestrian corridor, a bike path is designated specifically for those people who wish to travel the city via a bicycle, eliminating conflict with pedestrians or cars.

fig. 5w

Bending Seating

This type of seating allows groups of people to comfortably talk yet provides private nooks for those who'd like some time alone. Dual-purposed surfaces let a bench become a table or a stage if the need arises. Places like this can become community gathering places over time.

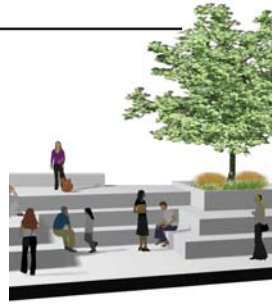


fig. 5x

Information Board

A central place to post information about events and news can stimulate community life and aid in the rebuilding process.

fig. 5y

Window/Wall Seat

Seating can be integrated into storefronts to provide a place to rest while shopping or a spot to have a snack, stimulating community interaction in the process. When established by windows, they create a stronger connection between interior and exterior spaces.

fig. 5z

Shelter on the Street

A covered walkway can protect pedestrians from rain and snow or provide welcome shade on a hot day. Awnings also help protect windows from the sun's rays, reducing cooling costs. They help define the pedestrian zone of the street, making walking to your destination a more enjoyable experience.

fig. 5aa

Tree Lighting

Small, low energy and powerful in-ground L. E. D. lights will help illuminate the night atmosphere in Greensburg. This type of lighting is non intrusive to pedestrian corridors and offers a more secure lighted environment for those people enjoying after hours activities.

fig. 5bb

Pervious Paving

A pervious paving system treats storm water runoff without the maintenance hassle of bio-swales or rain gardens. Water flows through the pervious pavers and is filtered by sand, crushed concrete and soil before recharging the natural groundwater systems.

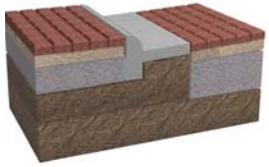
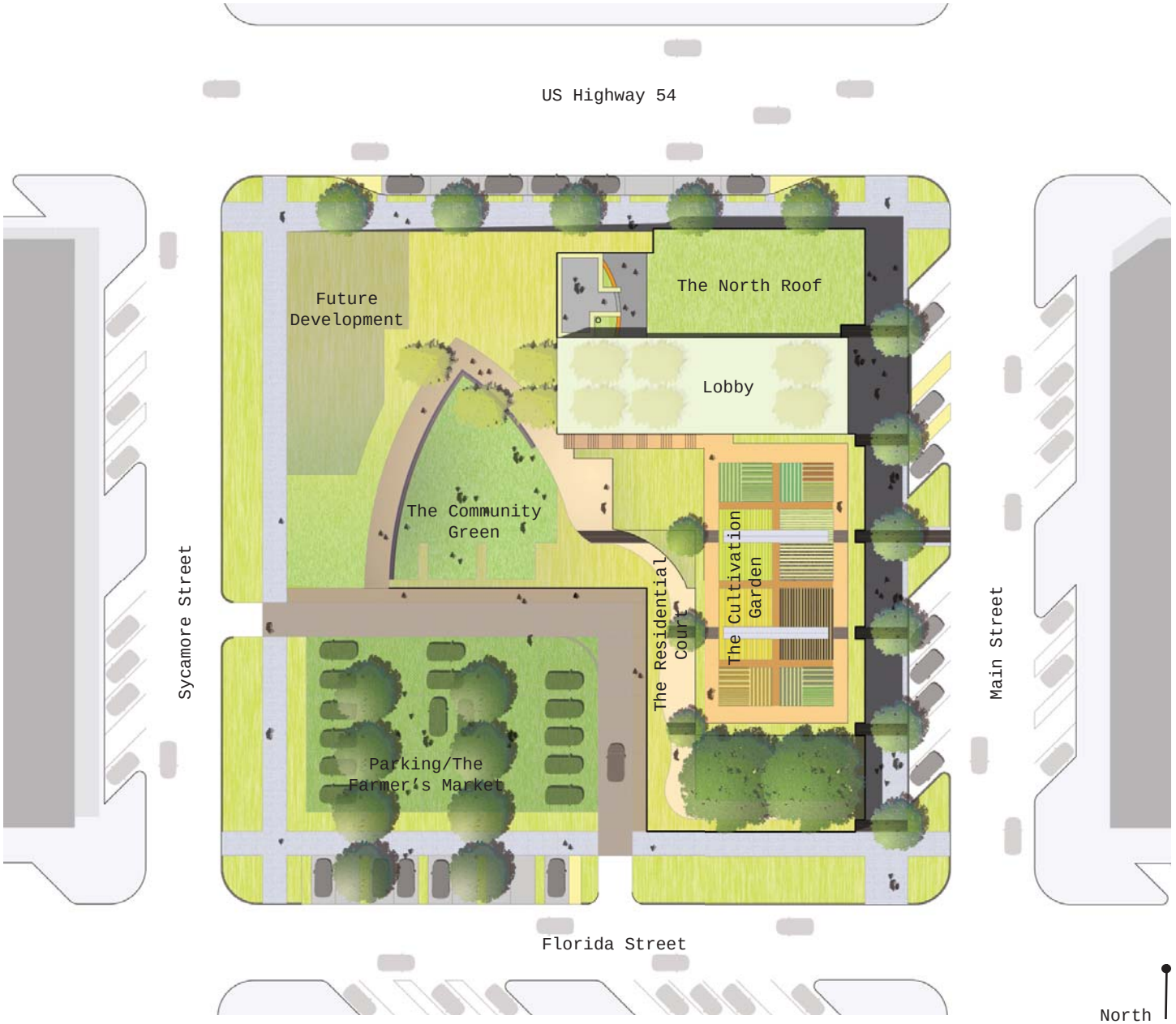


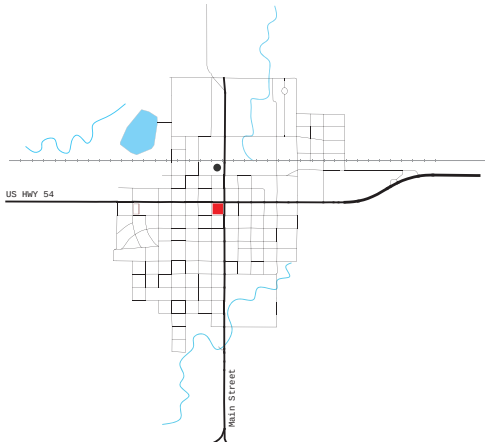
fig. 5cc

section six

downtown business incubator

ian scherling + jessica williams





As defined by the National Business Incubator Association:
v. 3. To encourage and assist entrepreneurship.

business incubator
n. 1. Organization that supports the entrepreneurial process, helping to increase survival rates for innovative startup companies. Entrepreneurs with feasible projects are selected and admitted into the incubators, where they are offered a specialized menu of support resources and services.

fig. 6a: Downtown Business Incubator - site plan

A business incubator provides a critical bridge to support small businesses in Greensburg while they recover from disaster or while they start up. This resource is essential to the long-term economic viability of these businesses. An incubator is designed to provide support for small or start-up businesses including space, managerial advice and technical guidance. Businesses typically stay in an incubator for two or three years at which time they are stable enough to move to their own space. Assistance incubators can provide includes:

1. Provision of low cost physical space (retail, offices, storage)
2. Management coaching (sustainable business practices)
3. Help in preparing an effective business plan
4. Administrative services
5. Technical Support
6. Business Networking
7. Advice on Intellectual property
8. Help in finding sources on financing

Being one of the first civic and economic sites built in the new Greensburg, the Business Incubator will be a primary community center for community gatherings and meeting opportunities as a conference center and restaurant will be located inside the Incubator. With these functions taking place

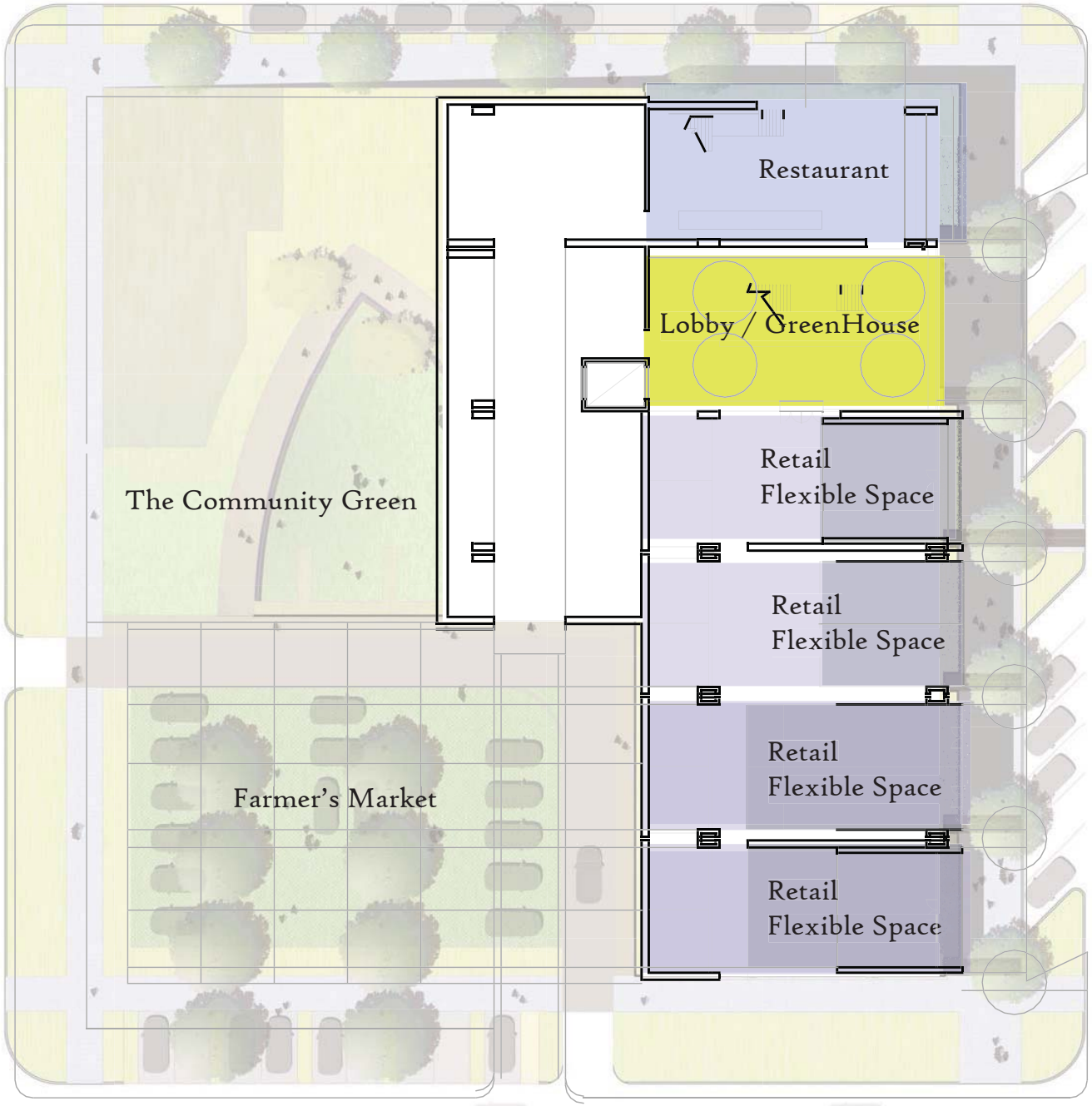


fig. 6b: Downtown Business Incubator - 1st floor plan

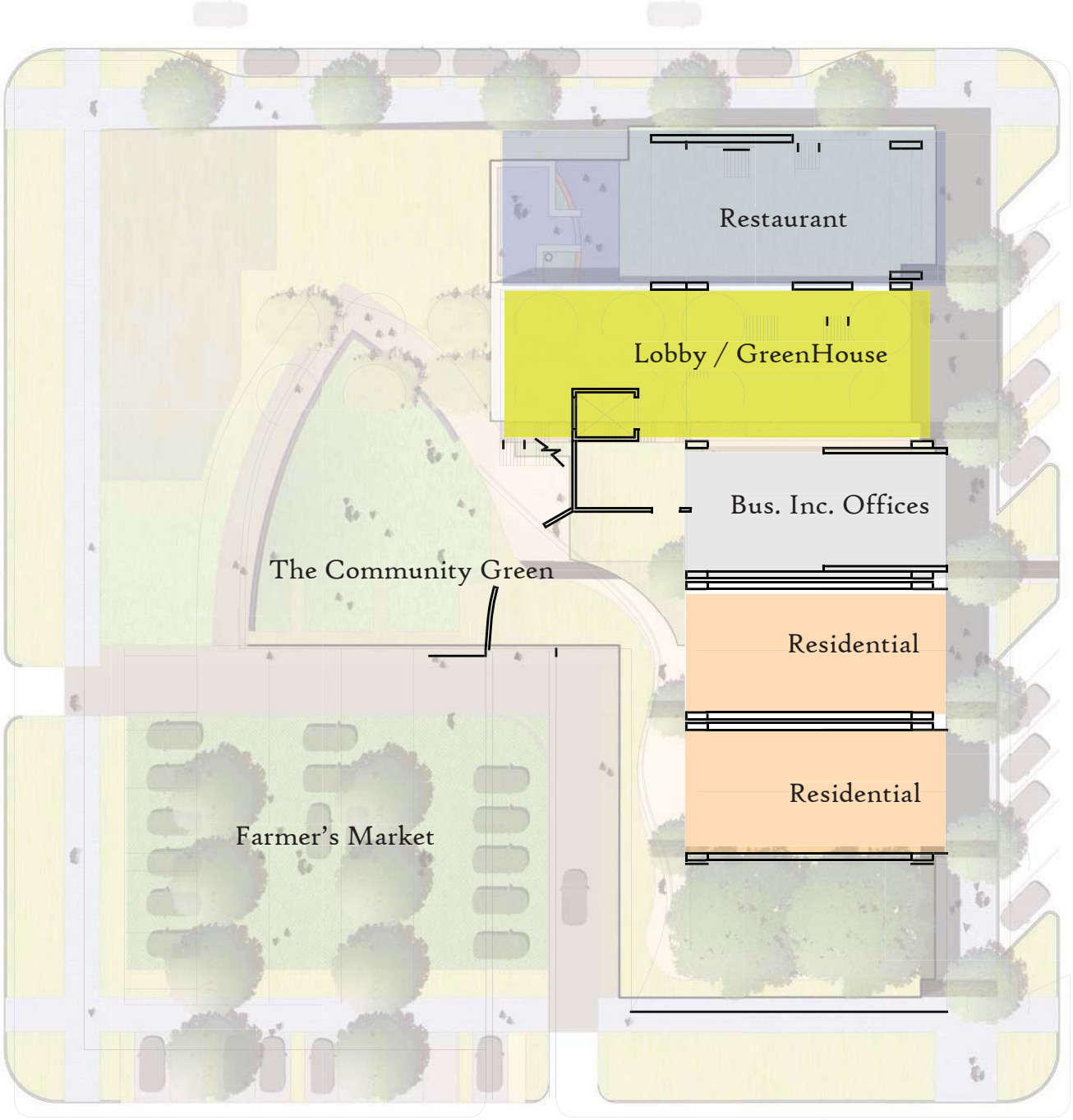


fig. 6c: Downtown Business Incubator – 2nd floor plan

inside the Incubator, along with retail, commercial, and residential opportunities, the Incubator's exterior, as well, serves as a public place where citizens can come together to enjoy the downtown environment – and a sustainable landscape through which people may be encouraged and inspired by ecological practices and harmony between architecture and landscape.

To incorporate sustainability along with safety (from another devastating tornado) the facility is thought of as being a building incubator as well as a business incubator. The Business Incubator is broken up into six equal, but separate structural bays (lining the west edge of Main Street). The front streetscape of the Business Incubator is a contemporary twist on the typical downtown facade. The main corner consists mostly of glass to provide a unique view for people passing along the highway. At the initial start-up point of the Business Incubator, the building is one facility. As businesses grow, they have the opportunity to purchase one of the bays which has the capability to become a separate building from the rest of the incubator. This flexibility and adaptability means the building can take on different functions and change with the development of Greensburg in the years following the rebuilding.

The “incubator” element is provided by the fact that the outer shell of the building is covered by the earth (through berming, earth-sheltered structure and green roofs). This creates a dynamic landscape integrated with the building. The landscape of the Incubator is of major importance to rebuilding the sociality and economy of Greensburg. The landscape will also be the catalyst for future environmental action and design implementation throughout the city. So, what should the landscape be? What should it look like? What ideas can citizens take from the landscape and implement in their own ways?

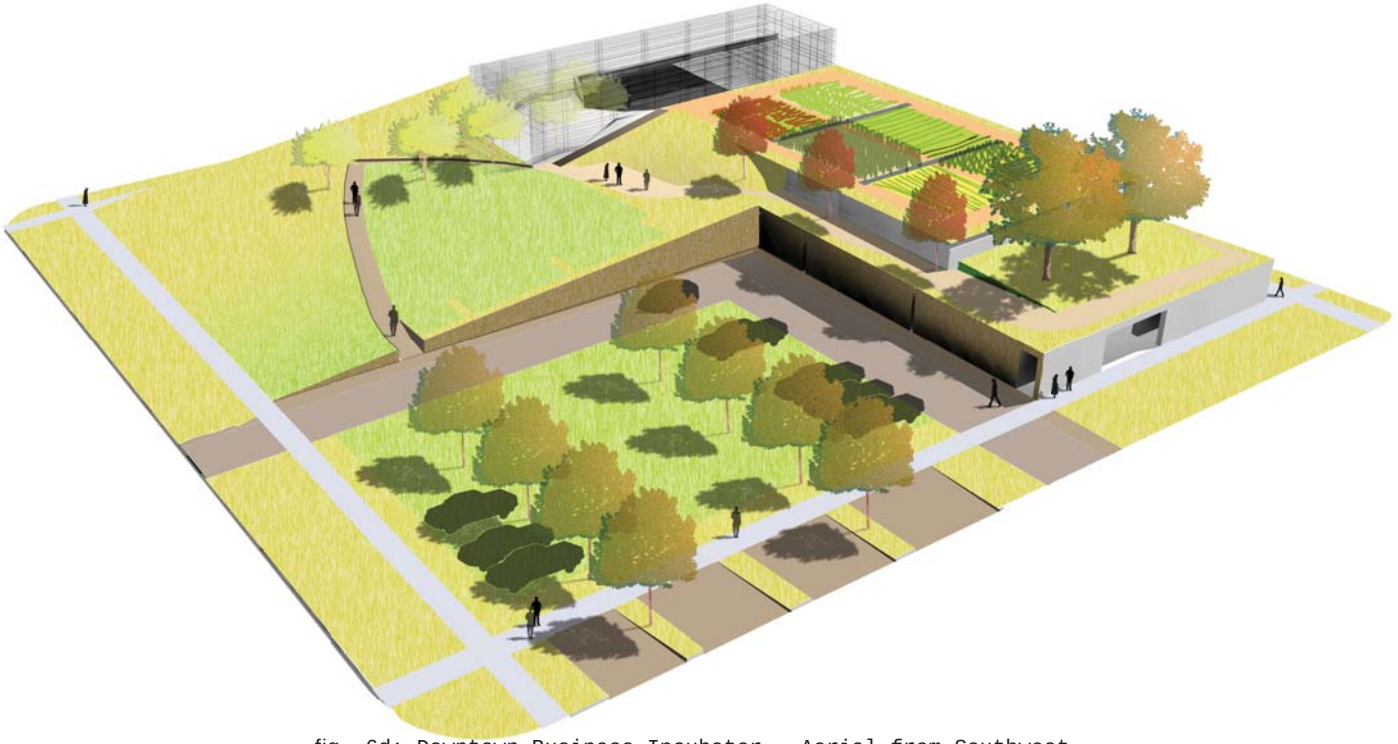


fig. 6d: Downtown Business Incubator – Aerial from Southwest

Sustainable Design Features

Earth-sheltered Design is the architectural practice of using earth against building walls for external thermal mass, to reduce heat loss, and to easily maintain a steady indoor air temperature.

Earth berming refers to earth piled up against exterior walls and packed, sloping down away from the house. The roof may, or may not be, fully earth covered, and windows/ openings may occur on one or more sides of the shelter. Due to the building being above grade, less moisture problems are associated with

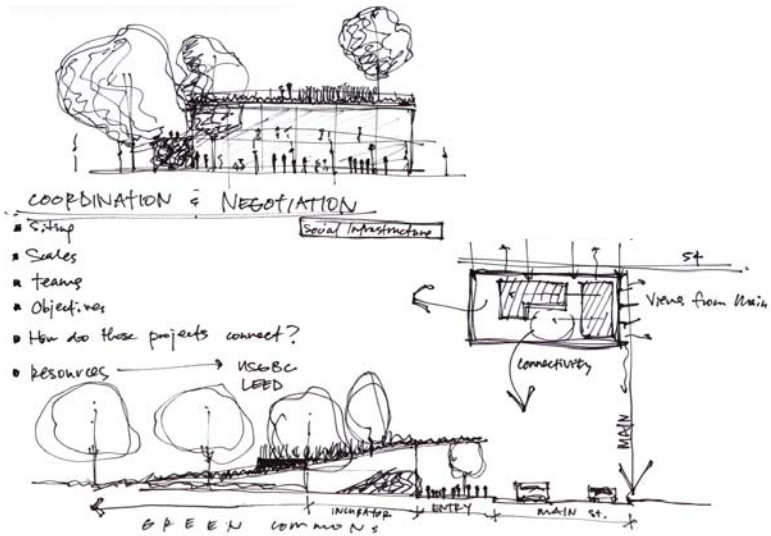


fig. 6e: Downtown Business Incubator – Concept sketches

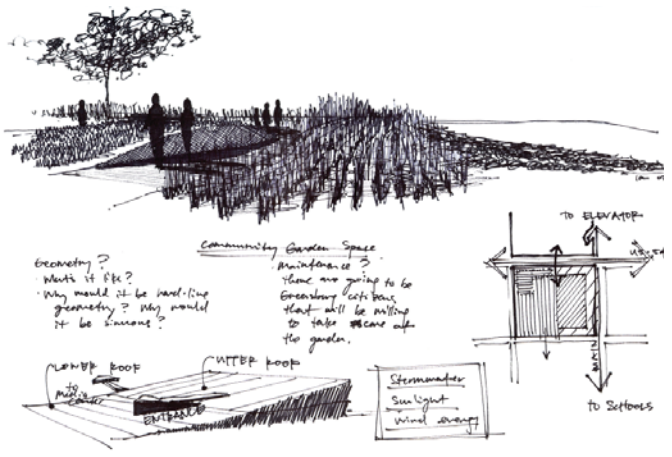


fig. 6f: Downtown Business Incubator – Concept sketches

fig. 6g: Downtown Business Incubator – Front view from Main Street

fig. 6h: Downtown Business Incubator – Lobby perspective + living machine

earth berming in comparison to underground/fully recessed construction.

Benefits of Earth-Sheltered Design

- -Taking advantage of the earth as a thermal mass efficient energy use
- -Offering extra protection from the natural elements
- -Future Protection from storms
- -$$$ energy savings decreases energy needs by 90%
- -Providing substantial privacy only the public spaces are above ground
- -Efficient use of land in urban settings strong integration of landscape / building
- -Shelters have low maintenance requirements saves time and $$

Because the earth is bermed up around the first and most of the second floor of the Business Incubator, this allows for geothermal heating and cooling.

A geothermal heat pump system is a heating and/or an air conditioning system that uses the Earth’s ability to store heat in the ground. This system will take advantage of a land mass as a heat exchanger to either heat or cool a building structure (depending on the time of year). These systems operate

on a very simple premise; the ground, below the frost line, stays at approximately 50 °F (10 °C) year round and a water-source heat pump uses that available heat in the winter and puts heat back into the ground in the summer. A geothermal system differs from a conventional furnace or boiler by its ability to transfer heat versus the standard method of producing the heat. As energy costs continue to rise and pollution concerns continue to be a hot topic, geothermal systems may hold a solution to both of these concerns.

A Geothermal Heat Pump can be placed quite inexpensively into the Business Incubator within the earth berm created. Horizontal Geothermal Heat pumps are less expensive than vertical because they do not require digging deep into the earth, but rather use the earth adjacent to the building, if the land is available.

Flexibility for change within the six structural bays is one of the defining elements within the Business Incubator. Because the Business Incubator is helping businesses start up, there needs to be adequate flexible space for businesses to change and grow. These large structural bays allow for free standing walls and partitions to be placed around the space for the businesses to begin defining their own spaces.

Restaurant

The anchor of the Business Incubator is an established Full-Service Restaurant to draw people into the Business Incubator. The restaurant spans the full two stories, with operable/large ”garage door” windows to create an open-air environment during the warm months. Open-aired indoor seating creates a strong connection to the outdoor environment, and to people passing by along adjacent US Highway 54. The restaurant will hopefully become a destination for the surrounding community, as well as Greensburg to enjoy.

The Restaurant’s roof is divided into two parts – the restaurant patio and the extensive green roof. The restaurant patio is just that, an outdoor sitting area for patrons of the Incubator’s restaurant, located in the corner of the Incubator which faces US Highway 54. A single dogwood punctuates the mostly paved space and provides an adequate amount of shade to the patio. This will create an engaging environment and a unique dining experience where you can watch the sunset from the roof, watch people play on the lawn, or enjoy people driving and shopping on Main Street.

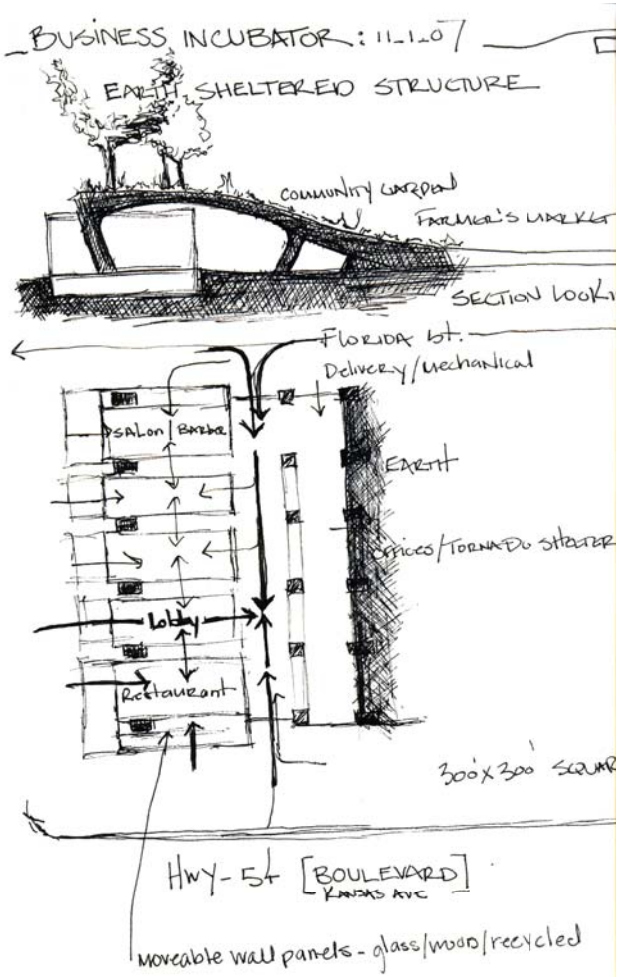


fig. 6i: Downtown Business Incubator – Concept sketches

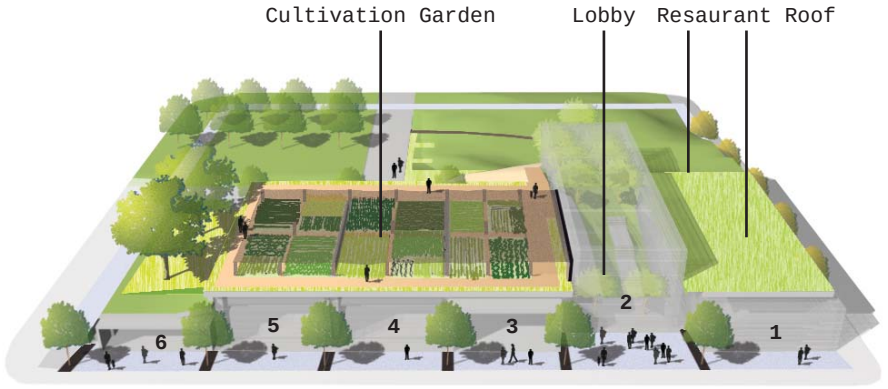


fig. 6j: Downtown Business Incubator – Front aerial

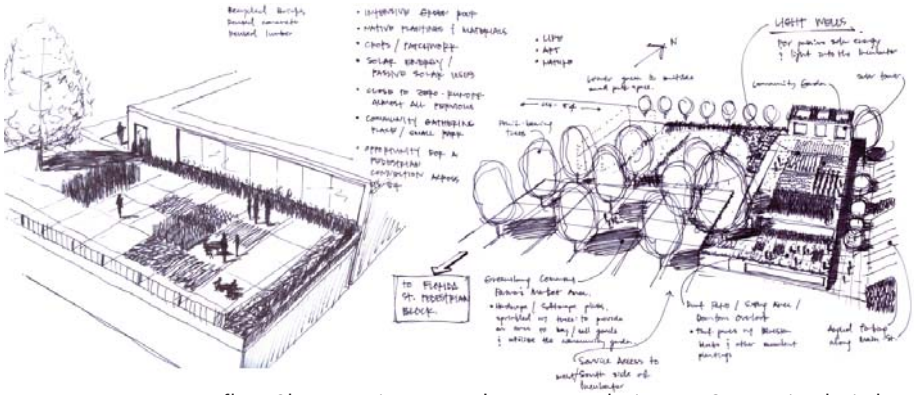


fig. 6k: Downtown Business Incubator – Concept sketches

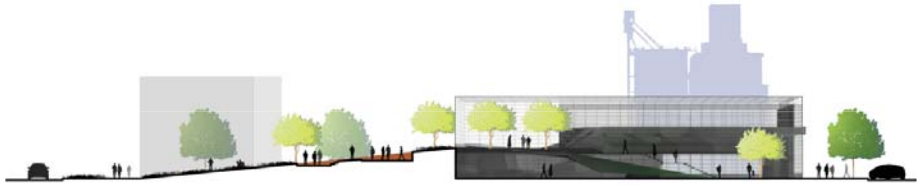


fig. 6l: Downtown Business Incubator – Section through lobby

fig. 6m: Downtown Business Incubator – Section through apartment

Lobby

The Lobby serves as an educational center to learn about sustainable design and sustainable business practices. This is where the connection to the green roof and the landscape happens within the building. The lobby acts as a greenhouse which incorporates plants and trees growing within the three-story atrium space. The landscape is pulled inside the Lobby through a Living Machine. The trees pump fresh oxygen into the Business Incubator.

Living Machines are a form of biological wastewater treatment designed to mimic the cleansing functions of wetlands. In temperate climates, the system of tanks, pipes and filters is housed in a greenhouse to raise the temperature, and thus the rate of biological activity (hence why the living machine is housed in the lobby/ greenhouse).

A space for residents to gather for aerobics, children's ballet and dance classes, karate, etc. is located in a studio setting as well as 5-7 flexible retail spaces with movable walls for easy business growth.

2nd Level

Business Incubator Offices include a Conference Room, Small Meeting Rooms, and Offices for the organization of the Business Incubator to provide management support for the start-up businesses. Restrooms, a small kitchenette, storage, and a comfortable waiting area are also located in the Incubator.

4 Residential Apartments can be purchased or rented by individuals starting their own business within the incubator, as well as any resident within Greensburg, existing or future.

Atop the first story roof is a private, gated court for residents of the Incubator. This court wraps around the Incubator from the west to the south and gives users a gentle, quiet place to enjoy the outdoors without having to wade around the general public. The west portion of the Residential Court serves as an open air hallway from which residents can access their apartments. There is a boundary of native grasses and shrubs along with a railing on the western edge of the court while a trio of red maples is planted atop the roof, near the building's edge. Moving to the south, the "hallway" opens up into a manicured lawn. This lawn is an area to sit and enjoy the shade of two larger oak trees. These trees not only give much needed shade to a sun-drenched roof, but provide a partial wind-break for the Cultivation Garden on the second story roof.

3rd Level

Consisting of fruits, vegetables, and herbs, the Cultivation Garden is a place where citizens and even businesses (restaurants) of Greensburg may purchase a garden plot and grow a diverse variety of edible plants. Maintenance of the garden could be provided by an individual or group of responsible and knowledgeable citizens that could give their time and energy to create a wonderful and productive garden for Greensburg. The garden atop the second story is divided into three main growing areas, the limits of each being defined by a pervious walkway, light-wells, and five foot vertical posts. The light-wells are translucent glass and serve as a means to naturally lighting the apartments. The vertical posts are stone and act as a support for a retractable hail and snow cover that can be accessed from the northern portion of the garden and moved over the entire garden. During the winter, plants can be moved to the three story lobby of the Downtown Business Incubator which, with its glass facade and controlled temperature, is capable of housing a variety of crops.

Streetscape

The streetscape of the Downtown Business Incubator block is characterized by native vegetation, pervious parking stalls, and pervious sidewalks. Each of these elements is carefully designed with the architecture, using regulating lines to create a recognizable repetition that harmonizes with the design of the Incubator itself. In front of the Incubator are lines of pervious paving that extend from the structure lines of the building and serve not only to allow runoff water to permeate into the ground, but also to delineate the six bays of the Incubator various commercial and retail uses will occupy. These lines will also house grates for the street trees along Main Street. Between the streets and sidewalk is a depressed buffer of native grasses and perennials which will serve as a means to creatively and handsomely collect excess storm water runoff. The sidewalk surrounding the Incubator is a high-quality, recycled material – perhaps brick, stone, or a low-cost paver.

Located on the southwest quarter of the Incubator block, the Farmers Market serves not only as a community gathering place, but also a parking lot for the Incubator's residents and

fig. 6n: Downtown Business Incubator – Farmer's market sketch

fig. 6o: Downtown Business Incubator – View from Main Street and Highway 54

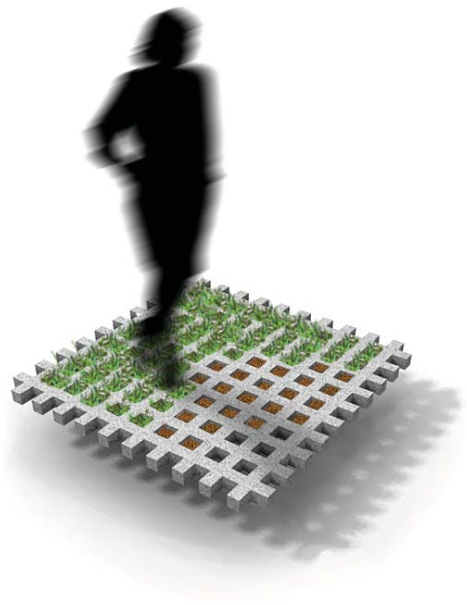


fig. 6p: Downtown Business Incubator – Turf block paver

fig. 6q: Downtown Business Incubator – Intensive green roof layers

entrepreneurs. Surrounded by a service and utility alley – also paved with a structurally resilient pervious material – the turf-block paved area is a public space that could be open each weekend to a community Farmers Market or other community events. Two lines of native trees help shade the Market and provide a designed connection to Florida Street and the nine parking spots to the south as well as the large, sloping Community Green to the north. These tree lines, along with a strip of pavers along the same line, delineate the three parking bays from the two access roads within the Market.

The Incubator's Community Green is a sloped (8.3%) blend of unmanicured native grasses and trimmed lawn carved by a pervious paved sloping (5%) walkway which allows access to the intensive green roof of the Incubator. Bounding the Farmers Market is a buffer of taller native vegetation and a railing which prevents people from leaping from the roof to the ground. The sloped lawn is intended to be an area of relaxation and casual gathering. For instance, a movie screen and projector could be positioned to show an outdoor movie. There is also the potential for new commercial development fronting the west side of the block to be phased into the design. This development could create a permanent surface on which movies or other media could be projected.

Planted around the walkway and marching into the main lobby of the Incubator are two rows of trimmed and manicured trees. These trees, possibly dogwoods, are a representation of and memorial to the hundreds of trees destroyed by the tornado.

A business hub, such as Greensburg's new Downtown Business Incubator, should first serve the community by being just that – a hub; a nucleus for prospective businesses to generate enough income to branch out from the Incubator and thrive on their own. But what else should a Business Incubator be? And not just a Business Incubator, but Greensburg's Business Incubator? The Downtown Business Incubator will be a catalyst development for Greensburg and will be a place that citizens can look to for inspiration and direction as they implement sustainable solutions to their homes or businesses. The Incubator's landscape provides a functional, infrastructural, and aesthetic design where Greensburg can come together as a community to rebuild their city.

section seven

big well tourism center

kevin kroen + malcolm watkins

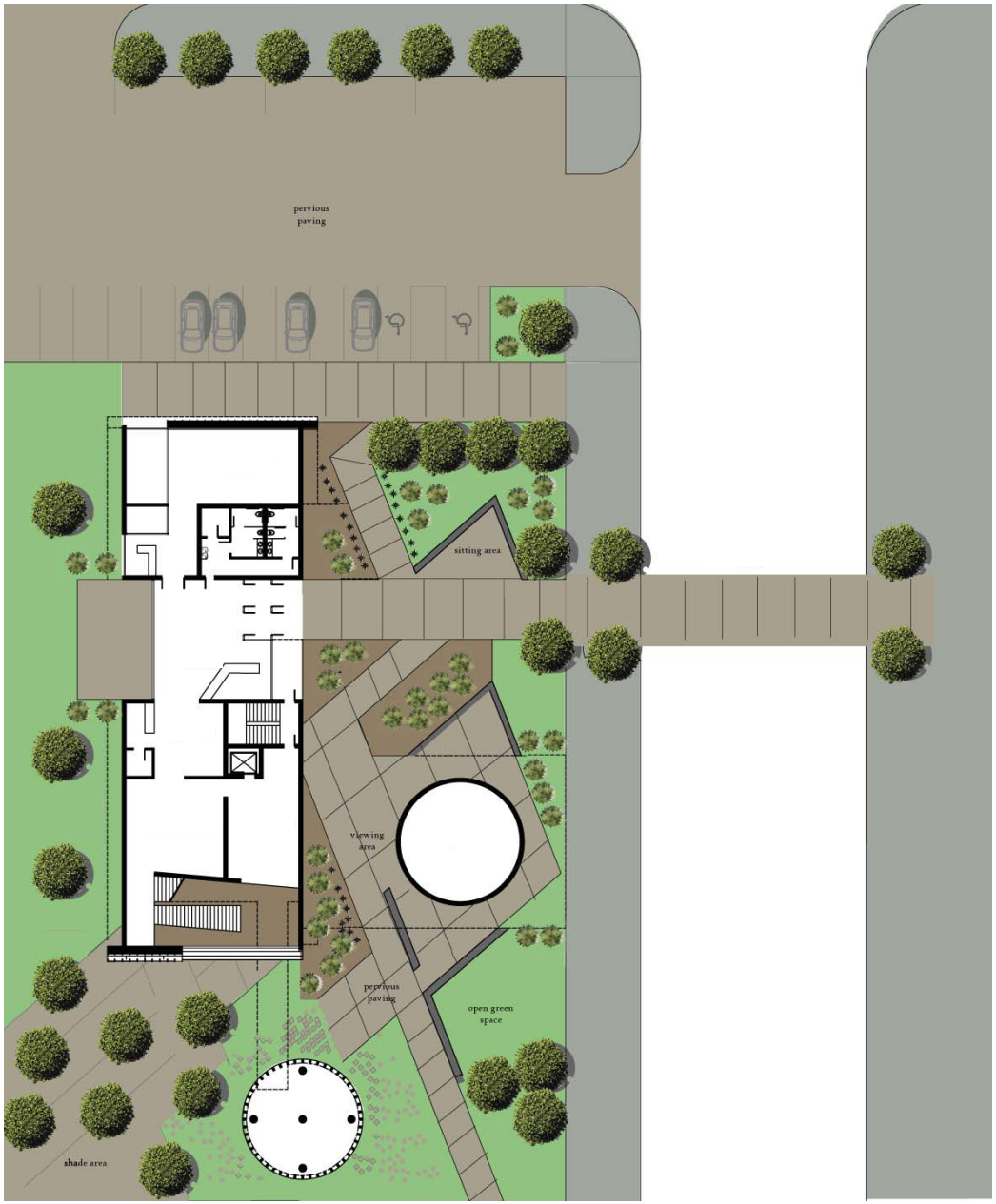
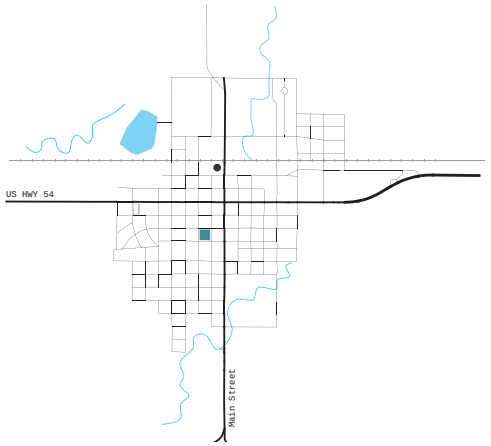


fig. 7a: Big Well Tourism Center master plan



Project Introduction

The Big Well Tourism Center was identified in the Long-Term Community Recovery Plan (LTCRP) as having a high recovery value. Before the tornado the big well attracted more than 40,000 visitors to the city of Greensburg each year. The project will re-establish the pallasite meteorite display as well as expand with the addition of a tornado museum.

Program Imperatives

Development of the east half of the block that contains the big well site

Re-establish the Kansas Tourism Center (LTCRP)

Rebuild the big well viewing station and gift shop (LTCRP)

Re-establish the celestial Exhibition (LTCRP)

Use of wind turbines and solar panels to power the building

Addition of a tornado museum

Rebuild the Greensburg water tower

Addition of RV parking

fig. 7b: Aerial view from the corner of Wisconsin and Sycamore

fig. 7c: Street view from the intersection of Wisconsin and Sycamore

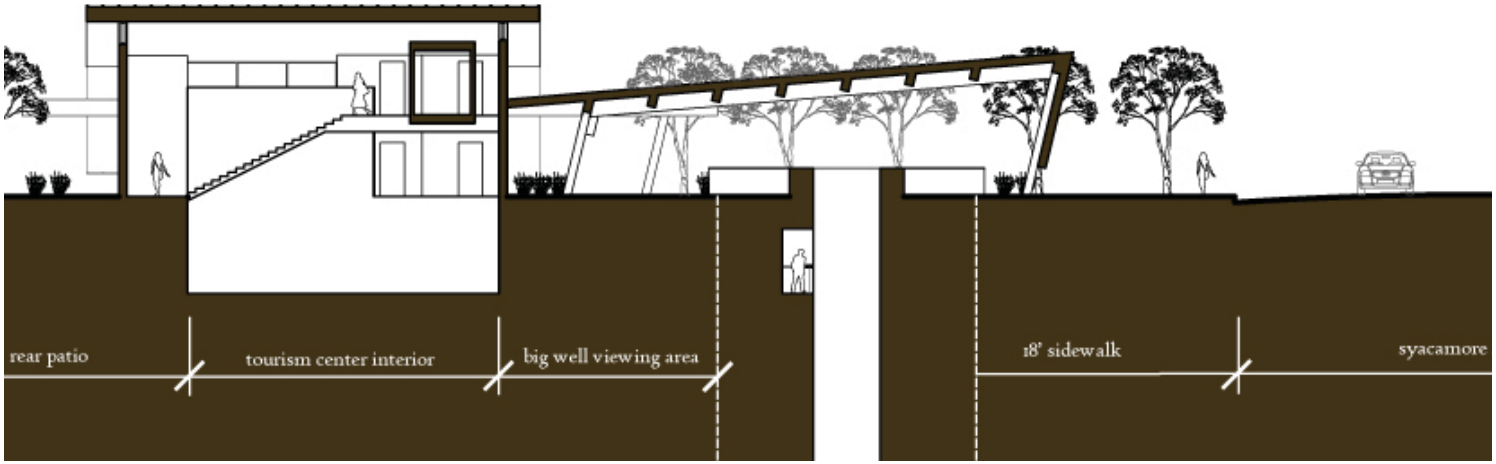


fig. 7d: Section cut through tourism center and the big well

Concept Description

The concept for the big well tourism center is to express the relationship between the two main elements of the project: the 109 ft. deep big well and the 109 ft. tall tornado museum, located in the space surrounding the water tower to the south of the building. The connection between the above ground (tower) and below ground (well) is expressed through the way in which each piece is entered. To access the well you must enter into a tunnel and to enter the tower you travel through a bridge that is connected to the tourism building. The space where these connections occur is a three story volume inside the tourist center where the well and tower are each accessed.

The tornado museum expresses the vast destruction that was caused by the tornado. The cladding/skin starts solid at the base then as it goes up the tower it gradually becomes lighter and lighter until at the top, there are only pieces of the structure left. The holes in the skin are used to direct views towards important elements of the city. This tower also serves as Greensburg's new water tower.

fig. 7e: Big well viewing area

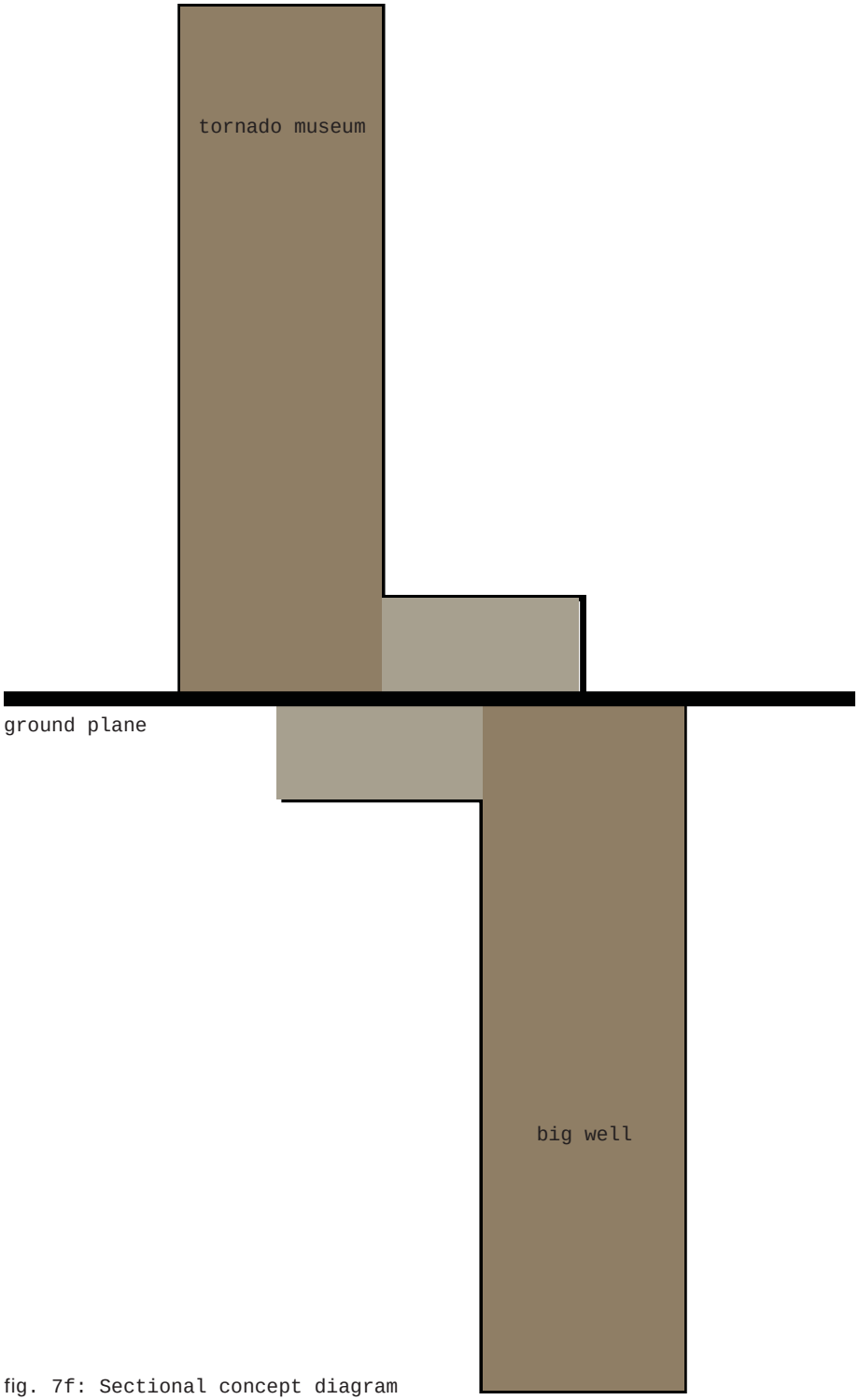


fig. 7f: Sectional concept diagram

The Big Well Tourism Center Plaza is designed to reflect the architectural form of the tourism building. The design of the plaza concentrates on the circulation of tourists. The entry is visually connected to the central city park through the use of street trees. The American Elm trees frame the view from the entry into the park. This connection is to emphasize the walkabilty of Greensburg.

The entry experience begins at the drop off point on Sycamore Street. Entering the plaza, the tourists are provided with an area to sit. The seat walls are built into the berm where Elms, native grasses, and day lilies are planted. The entry experience splits at the over hang to guide the tourists into the building or to the new viewing platform. The path to the left which provides access to the new viewing platform for the well has proposed transparent cover that provides the tourists with a view down the well and the opportunity to see the open green space that allows the visitor to view the entirety of the tornado museum from the exterior.

The space around the tornado museum is an open green space which allows people to relax. The scattered pavers symbolize the destruction from the tornado. They begin at the base of the tornado museum, and progressively get tighter and more orderly symbolizing the rebuilding process that is occurring in the town.

The bosque of trees on the southwest portion of the site provides a quiet area away from the well for the tourist to read or have personal reflection. The trees provide shade from the sun and give the tourists a new experience not had on the rest of the site.

Sustainability Features

The design goals for the big well tourism center are focused on creating a unique tourist experience that showcases important area icons while still addressing sustainability and other priorities spelled out in the Long-Term Community Recovery Plan. The center incorporates specific features to address resource utilization and other important environmental concerns.

Water
The conservation of water is of great importance to the city of Greensburg. This is addressed with the use of a green roof, rainwater collection for irrigation and pervious paving to help facilitate on-site water retention.

Health
Operable windows are used to allow for natural ventilation to increase the air quality within big well tourism center. Also the windows are placed to allow for the most natural light without overheating the space.

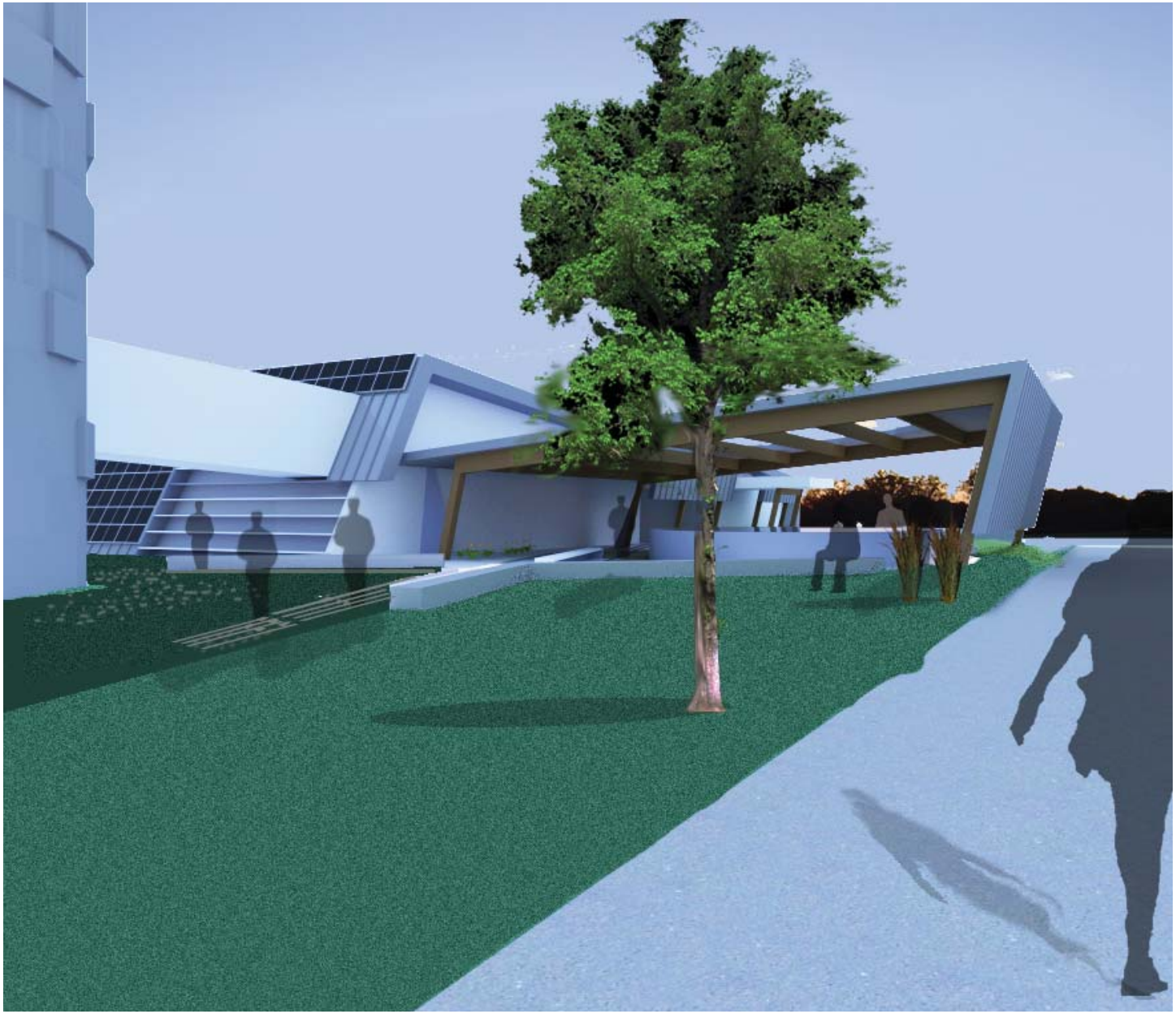


fig. 7g: View of Southwest corner

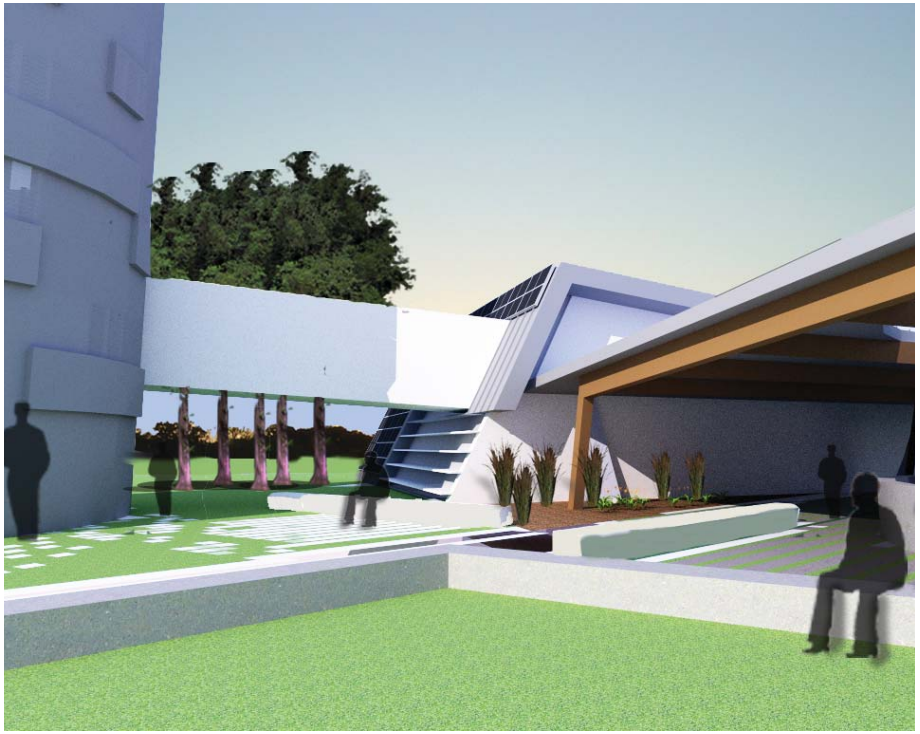


fig. 7h: Open green space

Energy
The use of structural insulating panels instead of traditional stud framing allows for a much higher insulating value which lowers the heating and cooling load for the building. Multiple renewable energy sources are utilized with this project. Solar panels are integrated into the south façade of the building and vertical wind turbines are mounted on the top of the tornado museum.

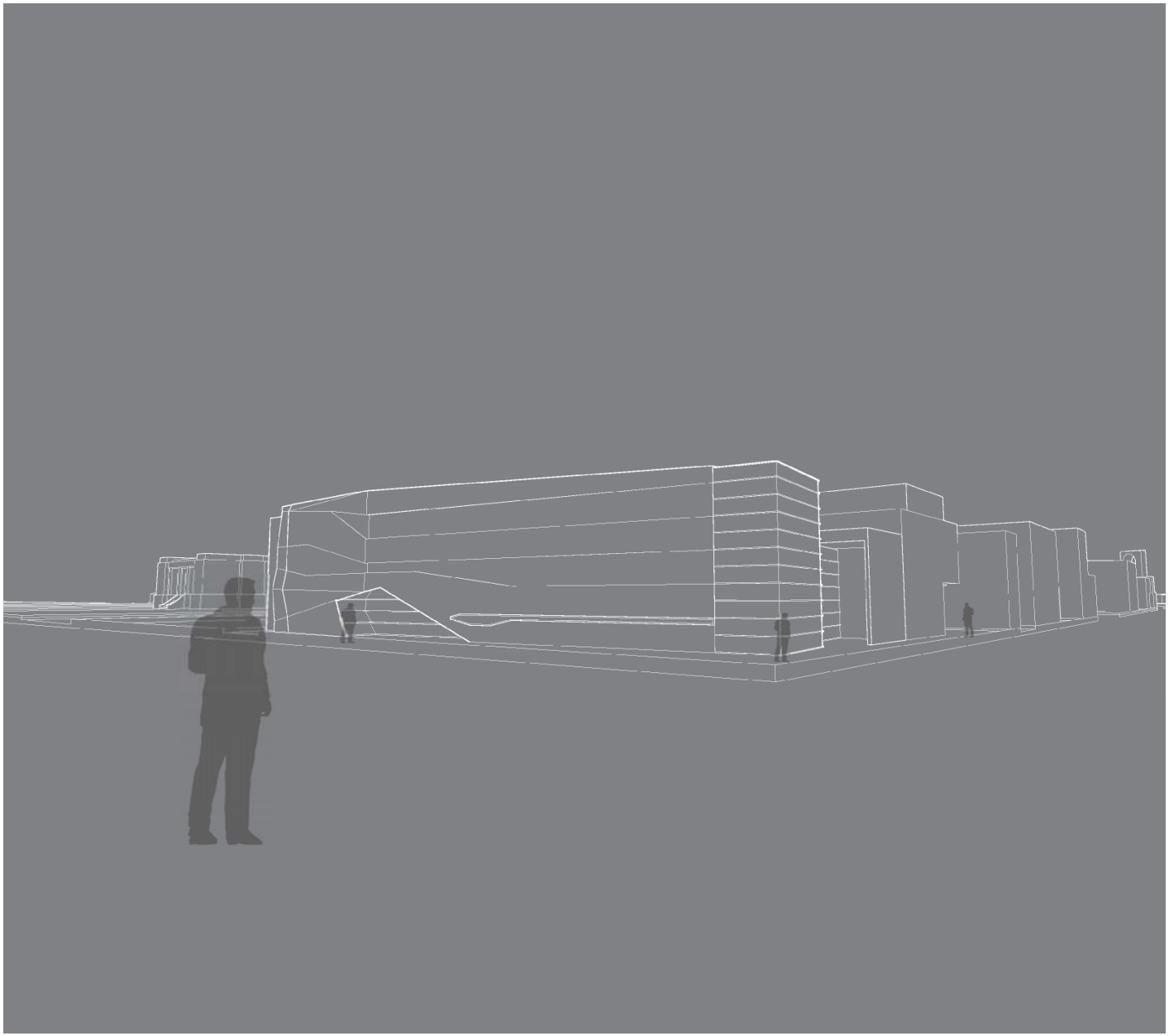
Wind
As stated above, vertical wind turbines located on top of the tornado museum are used to harness wind power. These wind turbines are noise and vibration-free, safe for birds, and low maintenance, with no ice buildup. Also, this type of turbine can harness winds from all directions and at all speeds above 10mph.

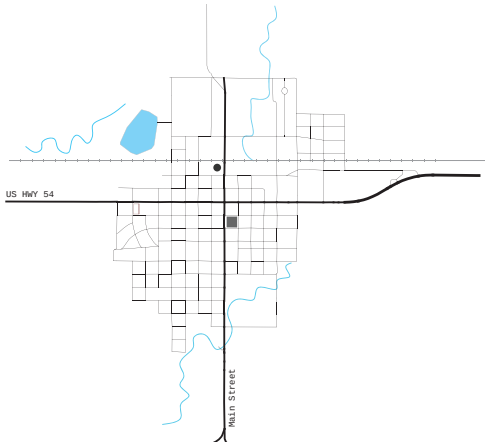
Built Environment
The tourism center has a heavy timber and poured-in-place concrete structure. These are durable yet environmentally friendly materials. The timber can be recycled from another building or obtained through certified harvesting methods and the concrete can utilize coal fly-ash, which is a by-product from coal fired power plants. Outdoor spaces encourage people to continuously use the space. Also the paths from the site connect to the public square across the street to allow for better pedestrian access.

section eight

media center

collin curry





Greensburg 2 has cleaned up the debris and is busy rebuilding a new sustainable community.

Brick by brick, the town of Greensburg, Kansas, has begun to rebuild itself into a new sustainable community. Currently, a weekly newspaper is inadequate in providing up-to-date information. Greensburg is to develop and implement an effective, community-wide, multimedia communication center where they will provide an internet-based rural community communications system that will harbor current news and information twenty-four hours a day, seven days a week. Access will be reached through the means of a wireless internet based technology that will solve the community's communication problems.

fig. 8a: Media Center master plan

Located in the central business district of Greensburg, the media center is triangulated between the existing grain elevator, the courthouse and the big well tourist center. (fig 8b)

The media center is composed of four integral programs within the community that deal with the vital technological rebuilding of the community. The media center will be the hub of a wireless station in which residents can receive real-time broadcasts of community television and radio news. The television station will air live broadcast as well as record podcasts for viewers to watch if missed. The center will also house the personnel who are responsible for the extensive up-to-date web site that provides the residents with current news and information.(fig-8d)

The center will also provide a Greensburg branch of the Kiowa County Library. This technological digital library can be accessed 24 hours a day.

The vision would focus on digital and print information services, creating a community center for information, education, children's library services, and recreational reading. (fig. 8c)

A museum within the building will provide an interactive experience of short video clips that will provide guests with a walkthrough which tells the story of Greensburg before and after the tornado of May 4th, 2007.

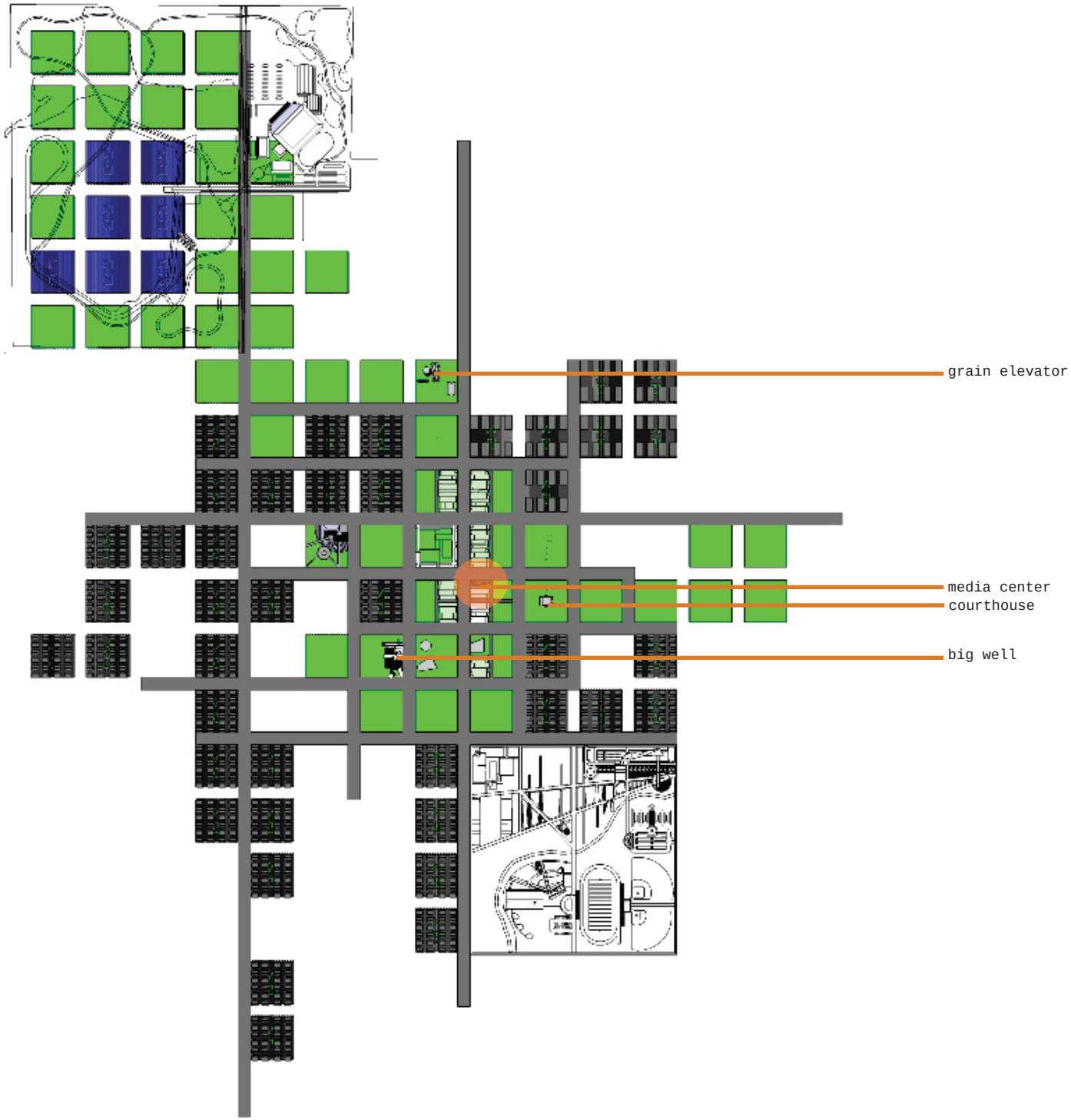


fig. 8b: Site master plan

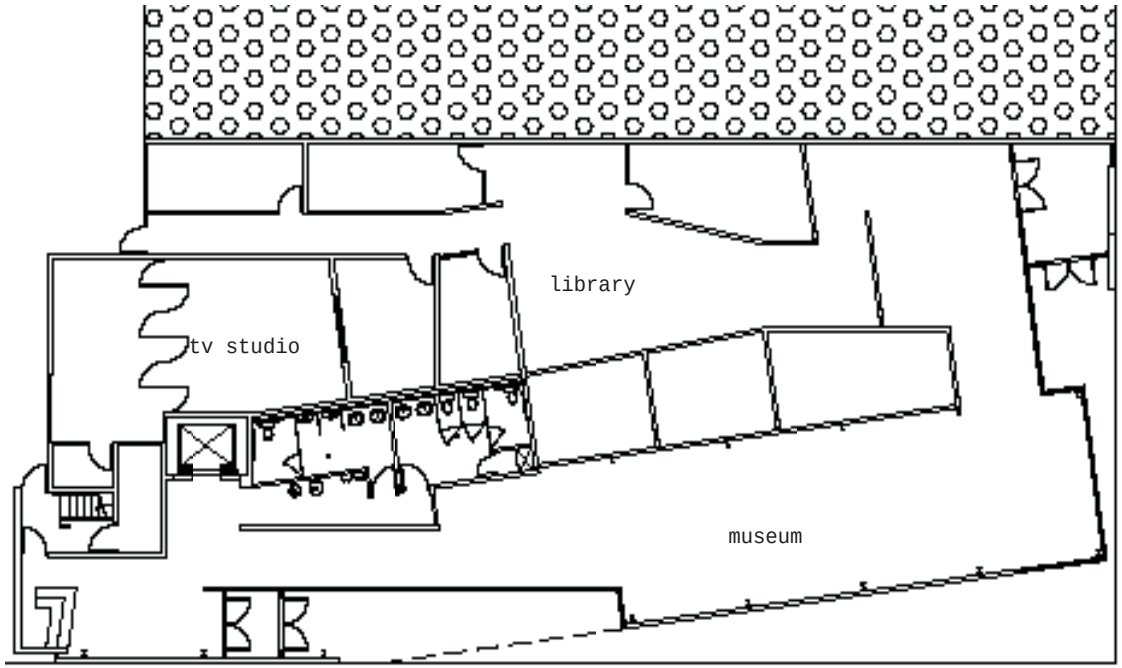


fig. 8c: First floor plan

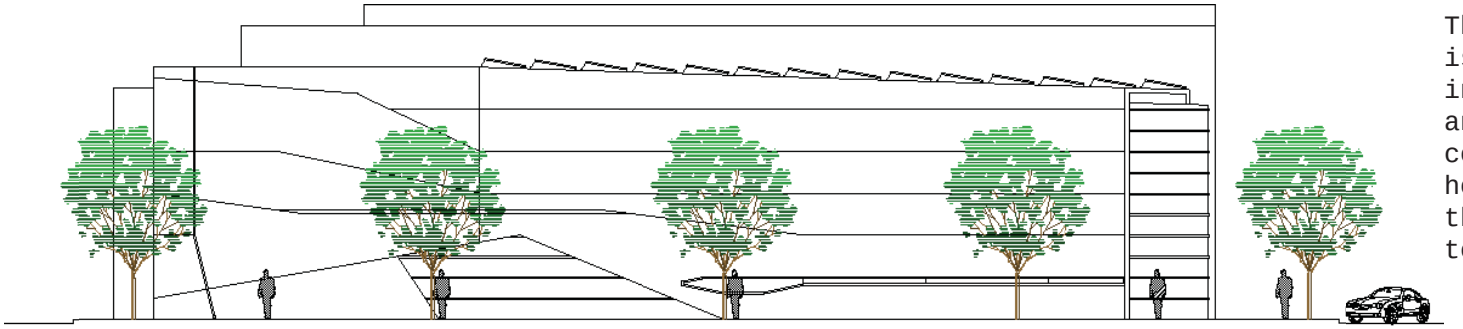


fig. 8d: North elevation

The museum would create an experience that would be similar to walking into a movie presented in six or seven two-minute chapters on a series of screens that tells Greensburg's story as the visitor walks through the sequential multimedia exhibits. The multimedia nature of the exhibits means that the museum also can have a very effective Internet presence ... which makes it available to the world.

As the new public technological icon of Greensburg, the media center provides innovative tectonic constructional systems which are accredited by the LEED building process. Solar panels cover fifty percent of the roof's surface providing the media center with an alternative energy solution, while the other fifty percent of the roof area is covered with a permeable green roof substrate that reduces rain water drainage as well as reducing internal heat loads inside the building. The integrated tectonic solution provides a didactic building showing construction alternatives that can be achieved.

The goal of the media center is to provide a hub where information will be concentrated and distributed to members of the community inventing the model of how small communities can better their communication skills and technologies.

section nine

green park development + greensburg's green

andrew becker + jacob henley

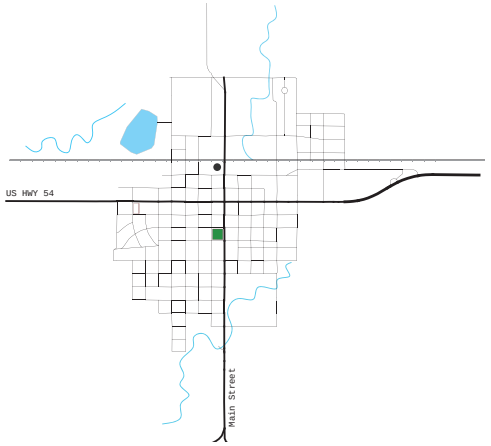


fig. 9a: Landscape example by landscape architect Dan Kiley. (Kiley, D.)

Conceptual Framework

As Greensburg rebuilds it has made a dedication to do so in a sustainable way. This approach considers not just energy, but water, health and lifestyle. This project deals with development of the town square in a way to allow for a vital park, remembrance of the tragedy, and flexibility into the future. In order to make an appropriate park, first the surrounding edges and paths were studied to help define the interior space. Their was also a clear stated desire to maintain a visual link between the courthouse and the hand dug well. Specifically, this proposal deals with the mixed use buildings to the north of the site, the row houses to the south of the site, maintaining and enhancing the path between the two afore mentioned landmarks, park pavilions, the housing resource center, the tornado monument, and the temporary worker structures.

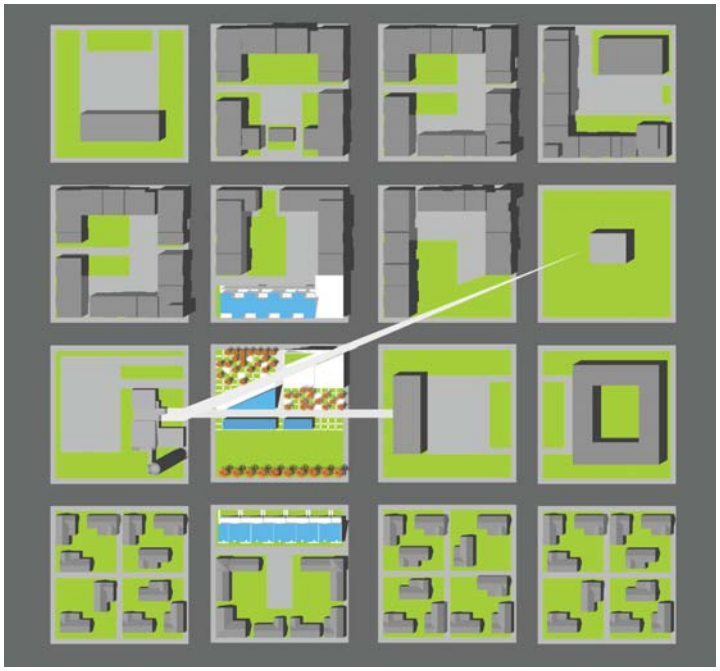


fig. 9b

Phase I

a. pavilion + temporary housing
b. memorial + public gallery
c. housing resource center

Phase II

d. mixed use buildings

Phase III

e. row housing

Phase IV

f. pavilion amphitheater
g. the “green”

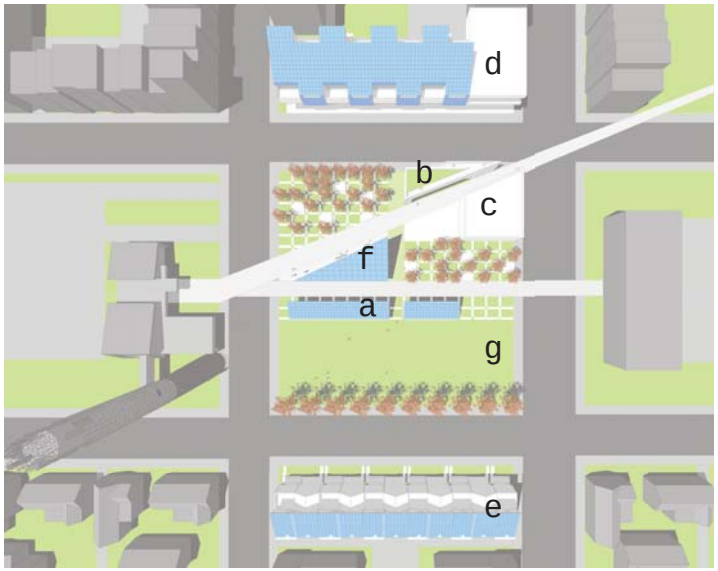


fig. 9c

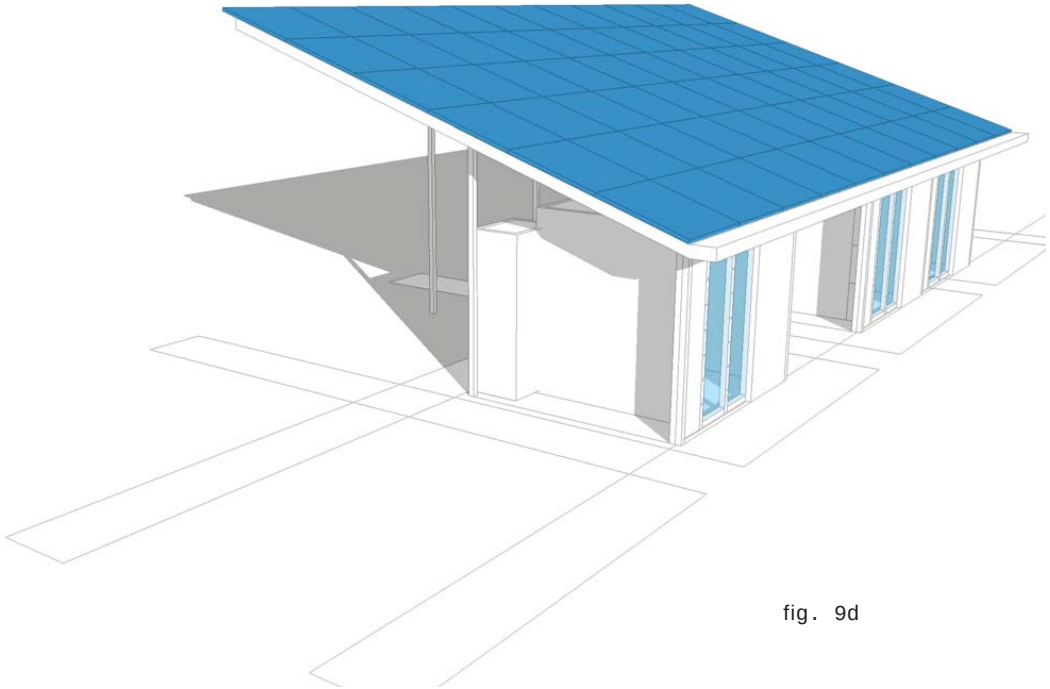


fig. 9d

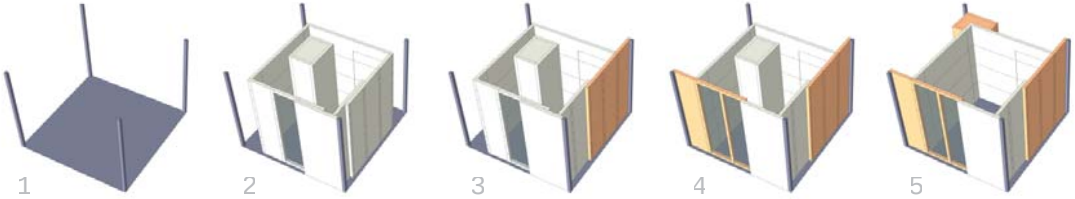


fig. 9e: cube assembly diagrams

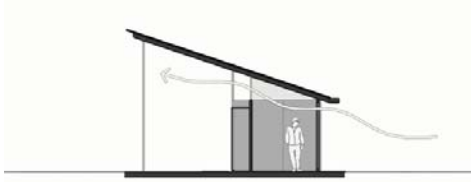


fig 9f: wind diagram

fig. 9g: water collection diagram

Phase I

Temporary Worker housing +
Pavilion Structures

A solar pavilion (fig.9d) would be established which temporary cubes could then tie into. Because the pavilion is anchored to the earth, the partitions would be very lightweight and removed when unneeded. This installation would serve as a display for the townspeople symbolizing the idea of the city growing from the inside out. These cubes could later serve as kiosks if desired.

Cube Assembly Procedure

1. the pavilion bay is empty
2. the cube is placed in the bay and anchored to the first column (fig.9e [2])
3. panel is slid into place and fastened to a column (orange panel fig.9e [3])
4. second panel is slid into place and fastened to a column (orange panel fig.9e [4])
5. storage locker is removed from the living area and fastened to the fourth column (highlighted orange fig.9e [5])

Green Principles

Solar Production - The permanent pavilion would produce solar power throughout the year

Wind Usage (fig.9f) - Wind would be allowed to flow through the temporary housing on hot days and shut off during cold times

Water Collection (fig.9g) - The water shed from the solar pavilion would be collected for use in watering park vegetation

Phase I

greensburg memorial +
public gallery +
housing resource center

Greensburg Memorial Roof Garden (fig.9h [a])
Exterior roof garden open to the public and visitors of the park. Stair access on the north side of the gallery structure leads you up to this emotionally and spatially defined plane. The walkway on the southern edge of the roof allows for clear views of the city axis defined by the parks path. On this plane families will gather to remember those lost and look towards a new future for Greensburg.

Public Art + Community gallery (fig.9h [b])
Completely free public access to sustainable exhibits hosted by the adjacent housing resource center, as well as art displayed by local artists, school children, or private collectors.

Housing Resource Center (fig.9h [c])
A “one-stop shop” for information & resources regarding sustainable building & housing.
Includes: offices, public+private conference rooms, library & exterior “green” gallery

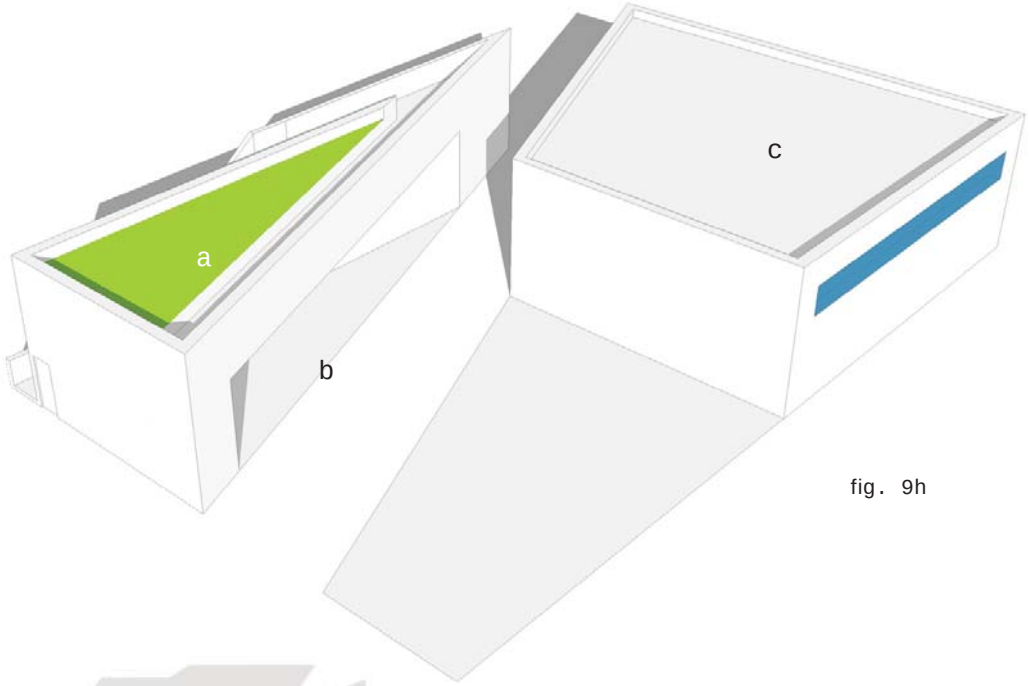


fig. 9h


2nd

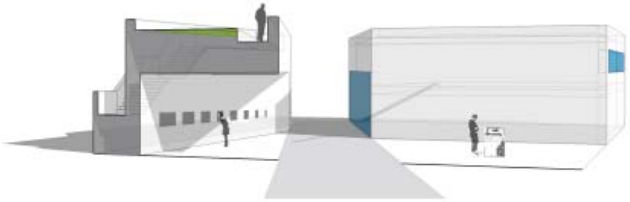


fig. 9i [a] & [b]: section through memorial

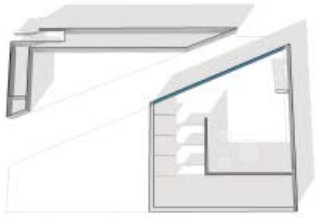

1st

fig. 9j: floor plans

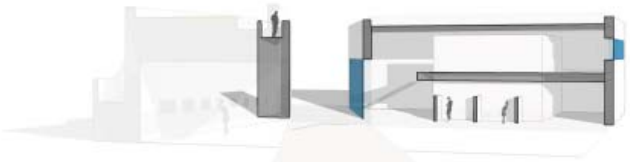


fig. 9k: section through h.r.c.


fig. 9l: view though h.r.c.

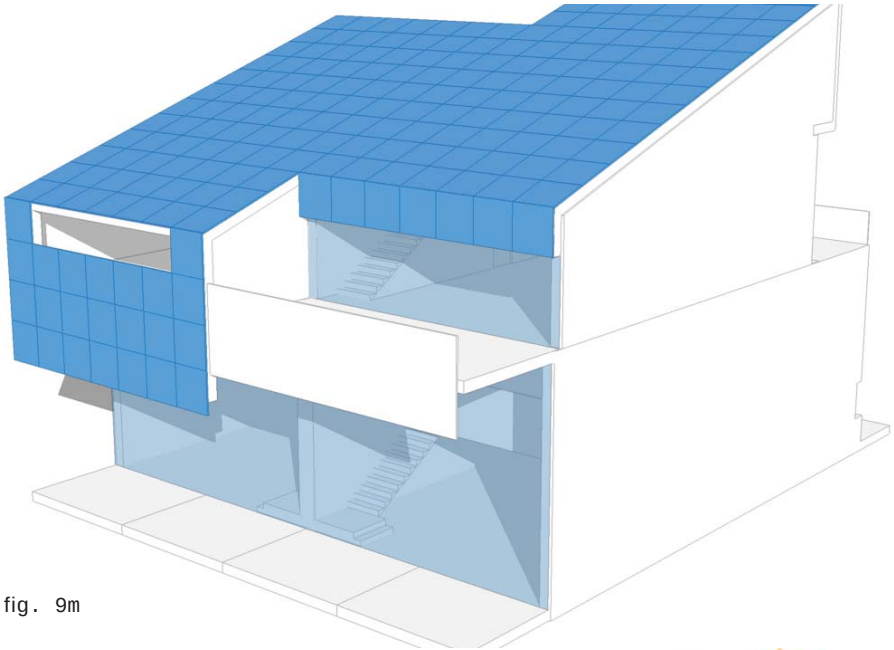


fig. 9m

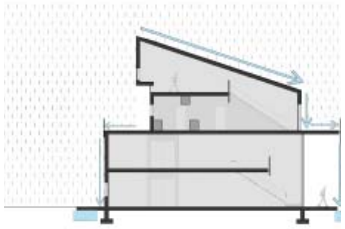


fig. 9n: water collection diagram

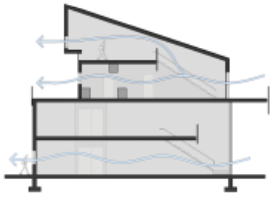


fig. 9o: wind diagram

fig. 9p: energy diagram

fig. 9q: perspective of mixed use buildings

Phase II

Mixed Use + Community

Mixed Use Buildings (fig.9m)line the northern edge of the Green. these structures “turn the corner” of the preceding retail stores on main street and give the park a good boundary to the north. the lower level retail shops are capped with loft-style dwellings above

Community
To enhance a sense of community, porches and balconies are located on the south park side, or above the common circulation on the north side. The large covered retail circulation on the south side could easily have tables for shoppers to sit and eat while watching the activities of the park across the street.

Green Principles

Solar Production (fig.9p) - The buildings are lined with solar panels and would produce solar power throughout the year

Water Collection (fig.9n) - The water shed from these buildings would be collected for use in watering associated vegetation

Wind Usage (fig.9o) - Wind would be allowed to flow through the lofts and retail on hot days and shut off during cold times

Energy Conservation - The buildings allow sunlight in during winter and block it during summer. By sharing walls the buildings conserve energy loss throughout the year.

Phase III

Permanent
Row Housing

Row Housing (fig.9r) lines the southern edge of the Green. They also form a solid edge condition for the park. These dwellings showcase sustainable design features.

Community
A sense of community was played up by locating porches and balconies on the north park side. Residents could enjoy watching those play in the park. Parents could easily and frequently take their children to the park right across the street and enjoy the open green space with their community.

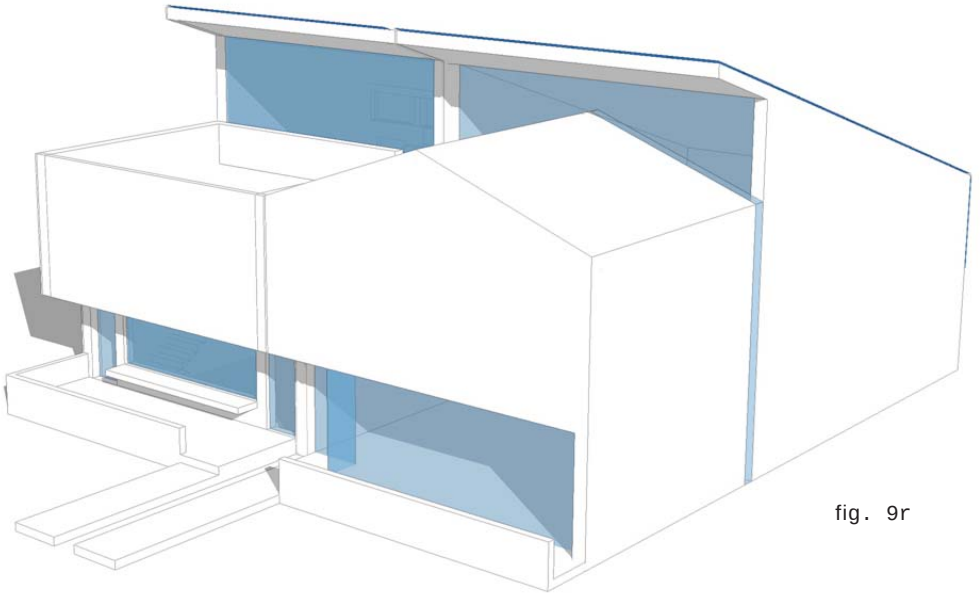


fig. 9r

Green Principles

Solar Production (fig. 9u) - The buildings are lined with solar panels and would produce solar power throughout the year

Water Collection (fig. 9s) - The water shed from these buildings would be collected for use in watering associated vegetation

Wind Usage (fig. 9t) - Wind would be allowed to flow through the dwellings on hot days and shut off during cold times

Energy Conservation - The buildings allow sunlight in during winter and block it during summer. By sharing walls the houses conserve energy loss throughout the year

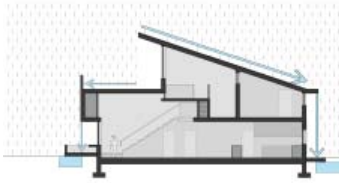


fig. 9s: water collection diagram

fig. 9t: wind diagram

fig. 9u: energy diagram

fig. v: perspective of row houses

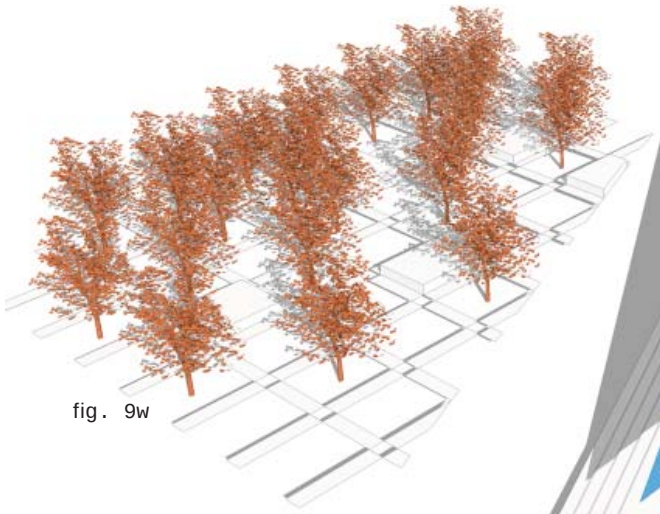


fig. 9w

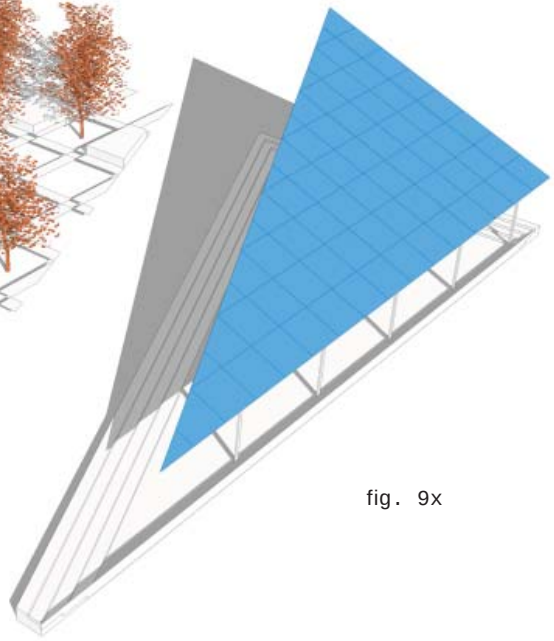


fig. 9x

fig. 9y: view on hardscaping (Kiley, D.)

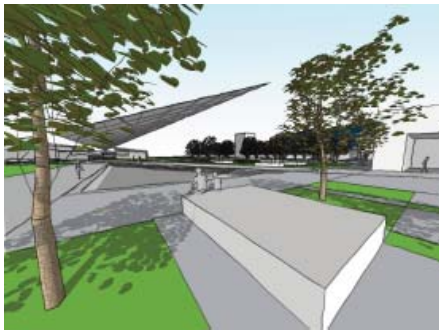


fig. 9z: view towards amphitheater

Phase IV

Public Pavilion + Amphitheater + Hardscaping

Amphitheater (fig.9x) - This pavilion can host a multitude of public functions including performances, meetings, and family gatherings. It's roof will provide solar power.

Hardscaping (fig.9w) - Will accentuate the main axis of the Green. The two axes of the site converge at the entrance of the Greensburg Well creating the wedge shapes exemplified in the pavilion's form.

Community
This area will be a great asset for the community. It will be a wonderful spot to gather and be entertained by the arts. It can also be an area for tourists to take a lunch break after visiting the well. The paths that cut the form lead to important town buildings and offer the visitor a chance to stand at the intersection of the two paths and take in important icons of Greensburg.

Green Principles

Solar Production - The pavilion's solar paneled skin would produce solar power throughout the year. The structure would also provide shade during the summer and allow sun in during the winter

Water Collection - The water shed from the pavilion would be collected for use in watering associated vegetation. Also, permeable pavers would allow rain to filter into the ground

section ten

sustainability center + park

julianne rader + adrienne stolwyk

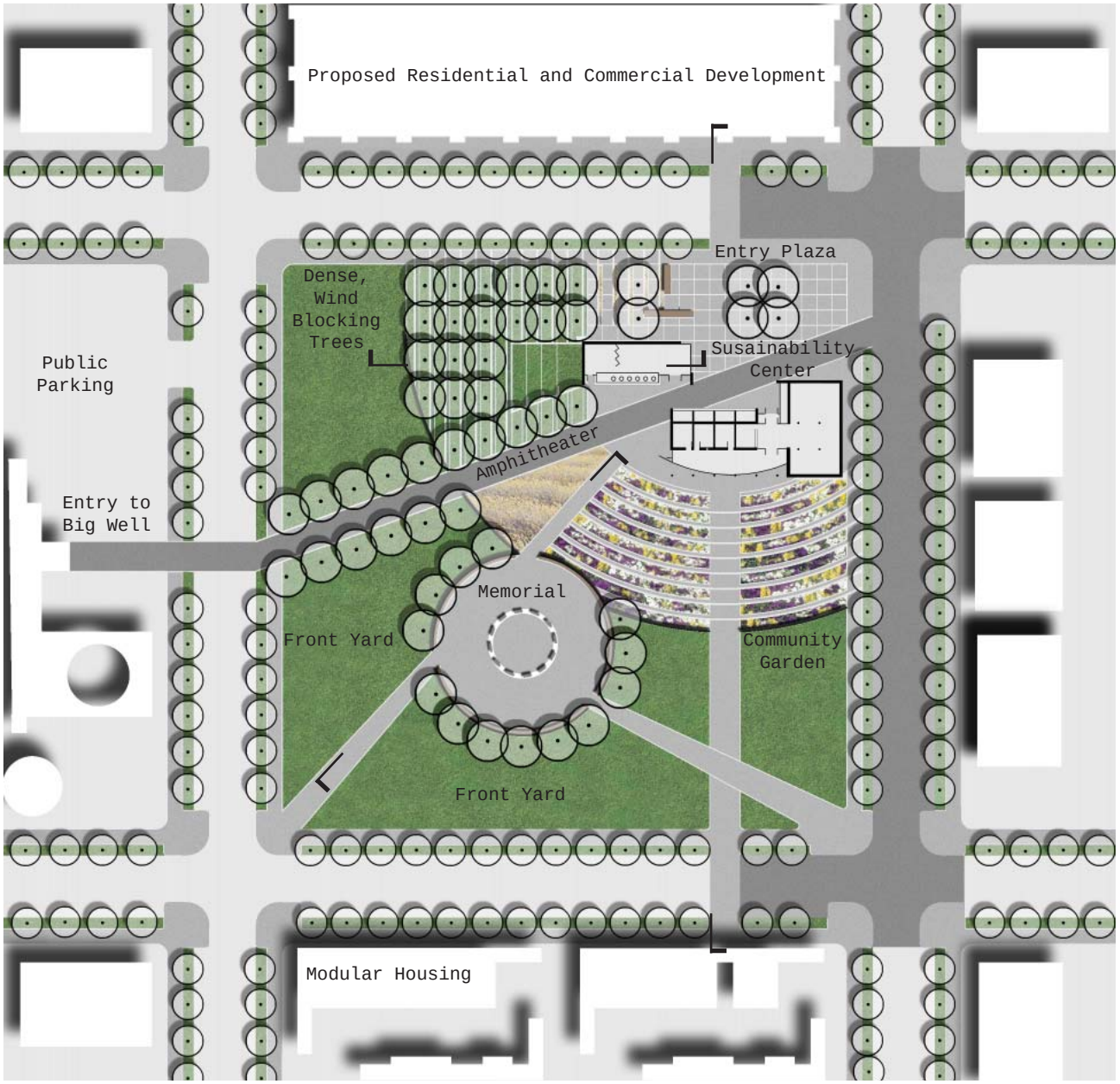
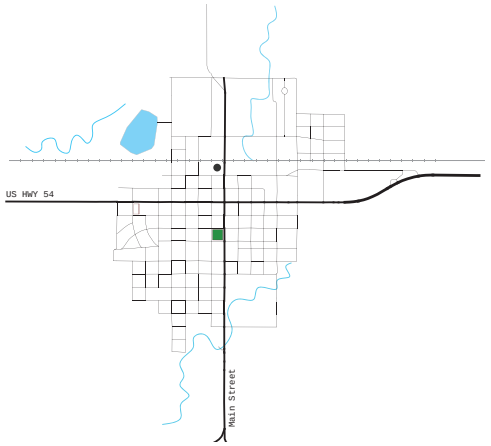


fig. 10a: Sustainability Center and Park master plan



This very public project seeks to rebuild sustainably, while providing a place for community education, recreation and contemplation. Located on the block just East of the Big Well, this proposed design combines three significant rebuilding endeavors set forth in the Long-Term Community Recovery Plan.

Looking to the future, the northeast corner of the block contains a Sustainability Center to help educate the public so future structures can be energy efficient, environmentally sensitive, and life-enhancing. The Center is placed in a public park, designed for the day to day use and enjoyment of

Greensburg residents. The final major element on the block remembers the past with the creation of a memorial to commemorate the loss wrought on the community by the forces of nature.

Public Park Space

The exterior spaces are intended to serve as extensions of the ideas and program elements proposed in the Sustainability Center, which is discussed later, and include:

Amphitheater
Space for outdoor education adjacent to classrooms

Community Gardens
Irrigated by water channels that collect stormwater runoff

Tornado Memorial
Space for remembrance and reflection

“Front Yard”
Open spaces for housing complexes to North and South of the park

Connections
Both visual and pedestrian to the courthouse and Big Well

Sustainable Construction and Design Features
Permeable paving
Native plants and grasses
Storm water collection
Plantings to optimize passive heating and cooling

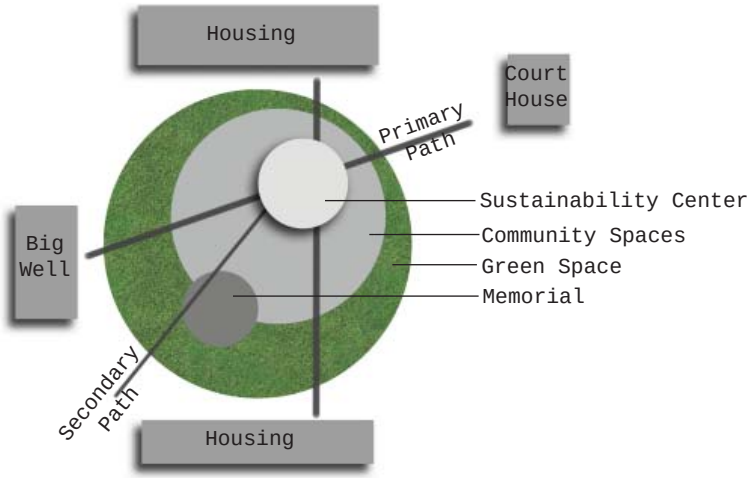


fig. 10b: Site organization diagram


fig. 10c: E-W section through classrooms and amphitheater looking North


fig. 10d: N-S section looking East

fig. 10e: Southwest entry plaza, sustainability center, and community gardens

The landscape aims to create a variety of uses for citizens of Greensburg: places for remembrance, education, recreation and interconnection. As a symbol of unity and also a reference to the agrarian surroundings of Greensburg, the landscape design integrates several circular patterns. A circulation path intersects the memorial along its west side and leads visitors to the Sustainability Center. Here concentric rings of community garden spaces radiate from the greenhouse on the south side of the structure. The rings of community gardens also include grates which collect water from the adjacent sidewalk. These irrigation grates, along with permeable paving, native plantings, and plantings to block strong breezes, serve as examples of sustainable practices that home and business owners may incorporate into their properties. Finally, because the site lies between the two public structures that survived the tornado, the Big Well and the courthouse, the landscape seeks to link these landmarks with a clear line of site and direct circulation path.

Tornado Memorial

In the less active corner away from Main Street lies the tornado memorial, as called for in the Long-Term Community Recovery Plan. It consists of two circular areas, both depressed three feet below ground. Twelve stone markers are located within the innermost ring, recognizing the twelve individuals who lost their lives in the tragedy. These two depressed circular areas are intended to create a private, inwardly focused area for residents to reflect on the tragedy.

fig. 10f: Memorial in the evening

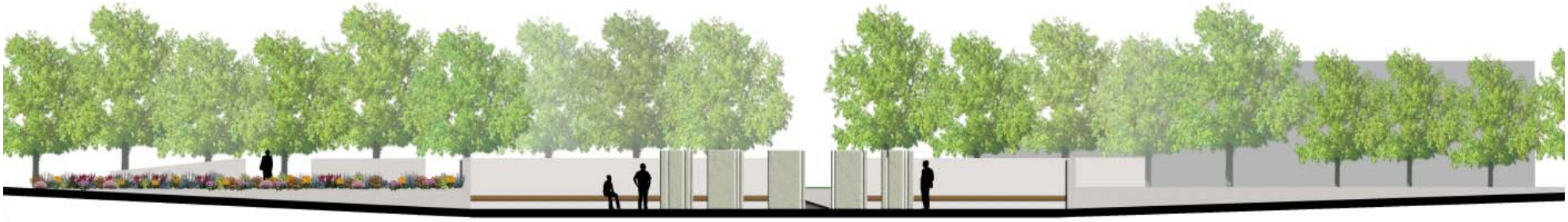


fig. 10g: Section through memorial looking Southeast

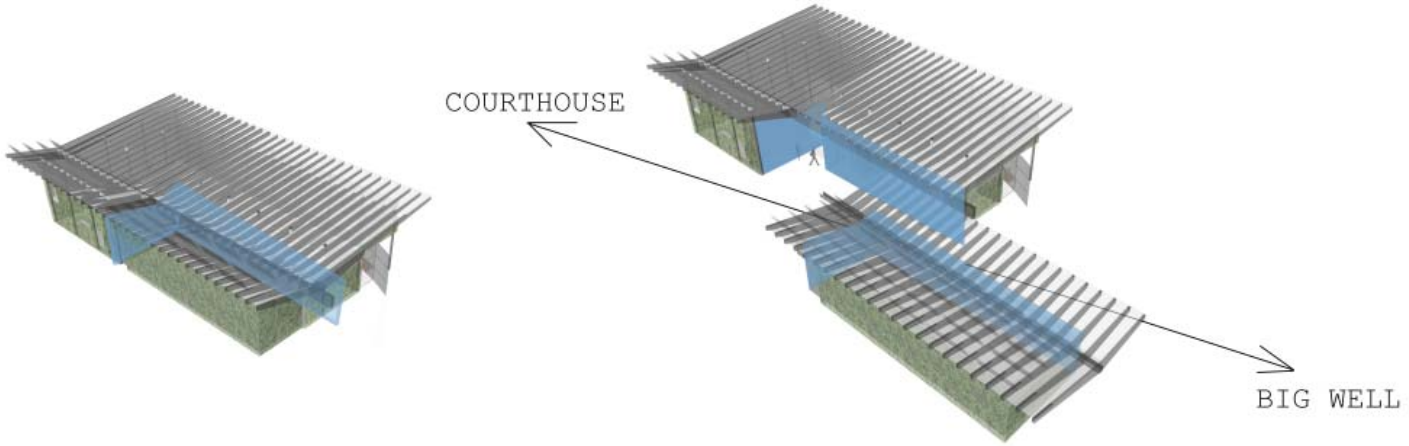


fig. 10h: Diagram of how the sustainability center is divided in order to exhibit mechanical equipment

fig. 10i: Sustainability center with views of the living walls and system displays

Sustainability Center

In order to fulfill its mission to educate the public on “green” building techniques and practices, the Sustainability Center seeks to not only embody environmentally friendly design, but to be a visual resource to all those interested in sustainable building systems. The building demonstrates a variety of passive systems and green materials, such as: passive solar gain, rain collection from roofs, “living” green walls, and Structural Insulating Panels (SIPs). The design also specifies a number of sustainable mechanical systems, such as: geothermal heat pumps, photovoltaic panels, a living machine, energy efficient heating, ventilation and AC systems. Because these mechanical systems can be difficult to understand, they have been placed behind glass panels so that they may be observed as they operate. This way, at any time of day, those who might be walking through the public site can observe and begin to understand the green building principles used in the building. Also, this allows the building to serve as a large-scale demonstration of sustainable practices.

The center includes the following program elements:

Classroom Spaces
2 classrooms that can be opened into one larger space

Office Spaces
Shared office spaces for part and full-time employees of the Sustainable Development Resource Office, Housing Resource Office, and the Business Development Assistance Office

Green Building Reference Library
A place for the community to research green materials and technologies, and look at examples of materials

Public Greenhouse
Year-round gardening spaces for community gardens

Restrooms

Conference Room
A place for small home and business owners to meet with resource office employees privately

Sustainable construction and materials
Rainwater collection and grey water recycling in a living machine
Building orientation to optimize passive solar heating and cooling
Sustainable active systems: geothermal heat pumps, photovoltaic panels, energy efficient heating, ventilation and air conditioning systems

The greenhouse on the south side of the Sustainability Center helps the keep the building more energy efficient, thus reducing demands on the environment. Heat from the sun warms the thermal mass wall within the greenhouse. The stored heat is then radiated into the occupied spaces of the building. Concrete, glass bottles filled with sand, rocks, and rammed earth, or barrels filled with water are all examples of thermal mass materials.

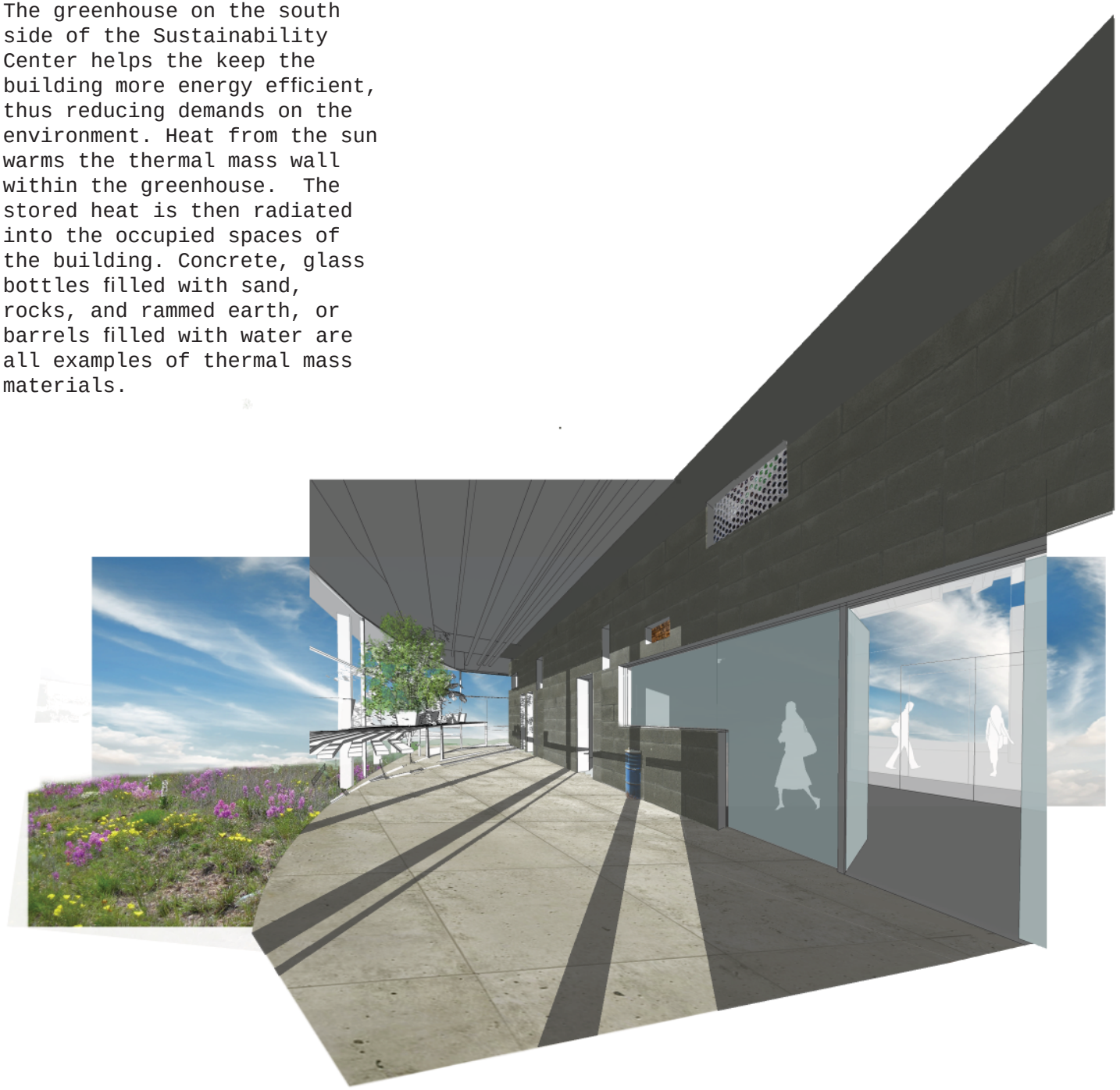


fig. 10j: Perspective of community greenhouse

fig. 10k: Example of a living wall, as seen in fig. 10i (Extensive Green Roofs in London)

fig. 10l: Stormwater irrigation grates, as proposed in the community garden (Cedar River Watershed Education Center)

fig. 10m: Example of native Kansas plants, as seen in the proposed community garden (Haddock, M)

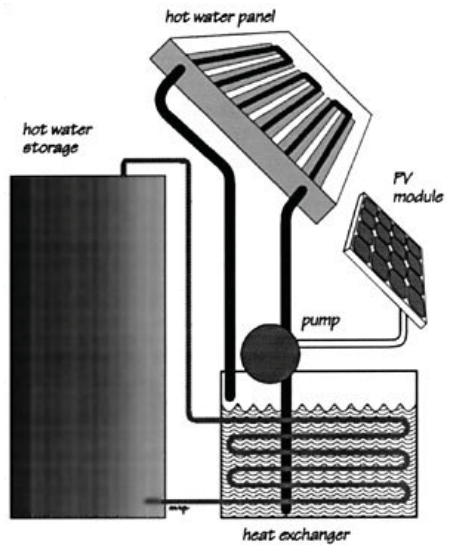


fig. 10n: Example of a solar hot water heater (SunMaxx Solar Online Tools and Information)

fig. 10o: Example of a living system, as proposed in the sustainability center (Todd, J)

fig. 10p: Example of passive solar heating and proper building orientation, as implemented with the sustainability center (Ramsey, M)

Lastly, the adjacent images show built examples of some of the sustainable practices proposed for the design.

Figure 10k shows a built example of a living wall, as proposed on the facades of the Sustainability Center. This feature is not only attractive, but also helps to further insulate the building.

Figure 10l shows a rain irrigation system, similar to that proposed within the park space. In both instances, water runs either off the building or off the pavement into grates which distribute the water to plant materials, such as the native plants shown in Figure 10m.

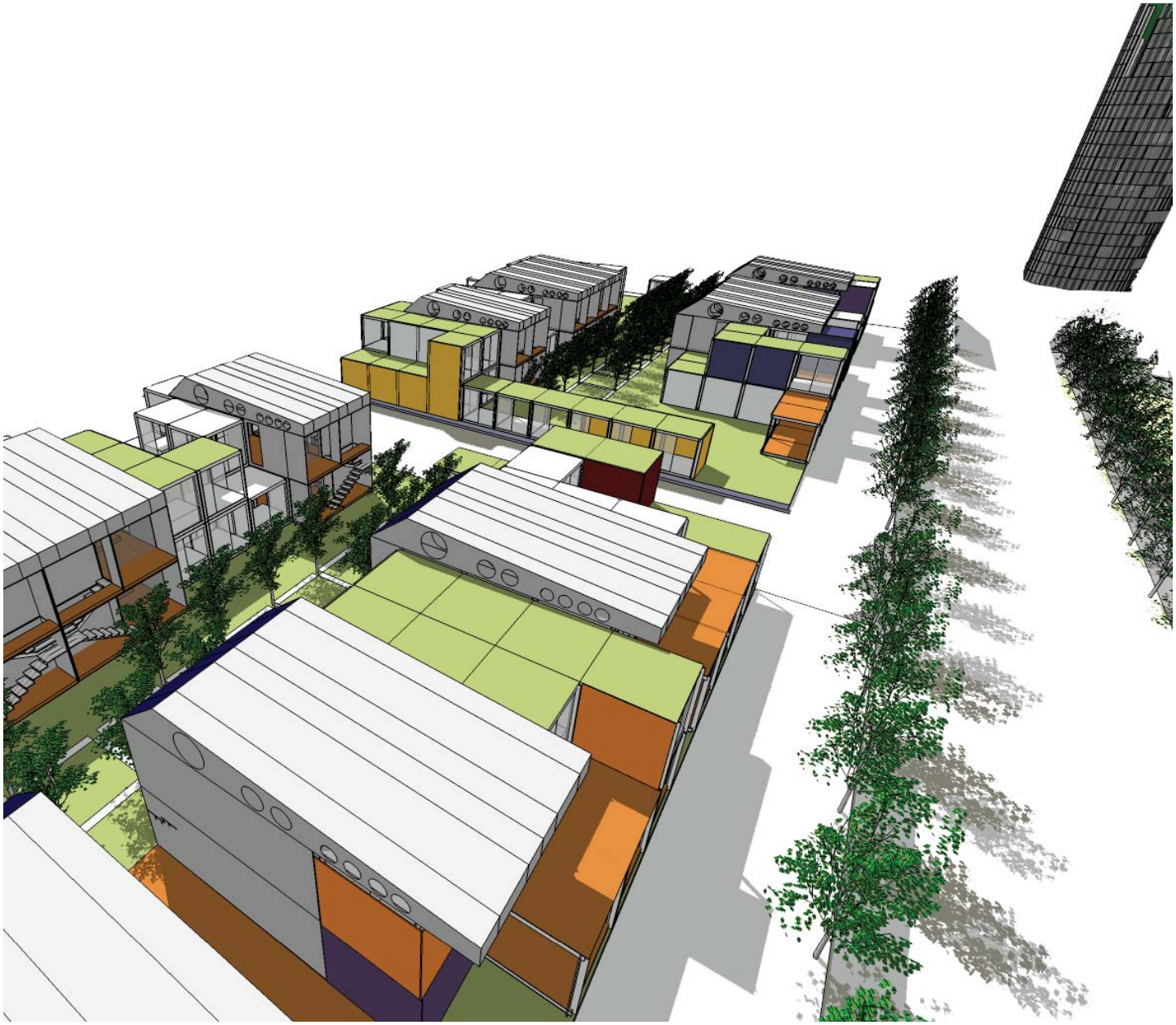
Figures 10n and 10o depict examples of sustainable systems proposed for the Sustainability Center. Both of these systems would be found in the glass encased, mechanical display areas, as diagramed in figure 10h.

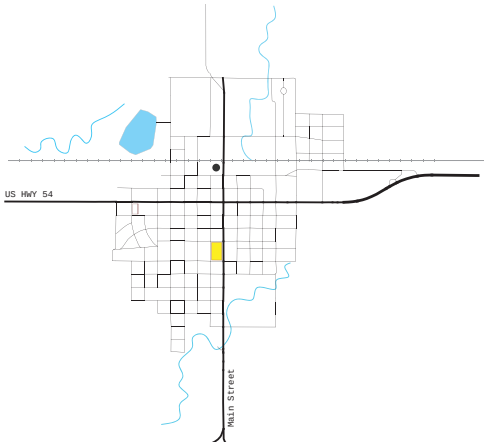
Finally, figure 10p shows a constructed example of a house oriented so that it receives optimum solar gain. In the northern hemisphere, the best orientation for buildings is to place them so that the long axis runs east to west. This allows for maximum solar gain on the south side, which can passively heat structures and lower energy bills.

section eleven

modular transitional housing

skyler bonser





The current solution for post-disaster housing and rebuilding are several temporary structures that are eventually replaced by permanent buildings and taken away, some never to be used again. There are a few major flaws with this system; the temporary residential housing, FEMA trailers, are made for one-time use by one resident that hopefully doesn't have it for very long. There is also permanent infrastructure created around the temporary buildings that may not be suitable for what the town needs when it is rebuilt. Finally, there is nowhere to house the people that it will undoubtedly take to bring the physical community back into existence.

fig. 11a: modular transitional housing

How can we change the current situation of constant replacement and creation of waste into a more sustainable system of reuse? A system of housing methods can be used in which the replacement is not the building itself, but the use and number of people in the residence. We can drastically diminish the amount of waste we create by transitioning from a single structure that can house several people, whether families or construction workers (fig. 11a), to a residence that houses a single family. This kind of gradual change can be accomplished by using modular transitional housing, a method in which new homes and communities are allowed to grow from a simple starting point in order to save the time, trouble, and material involved in manufacturing several temporary shelters (fig. 11b).

Proposed Growth Process:
1. modular pieces shipped in containers

2. “clusters” created and arranged

3. “clusters” densely occupied by:
  families/residents
  construction workers

4. temporary users move out as community rebuilds

5. “cluster” transitions to single residences
  single family rental units
  bed & breakfast hotel

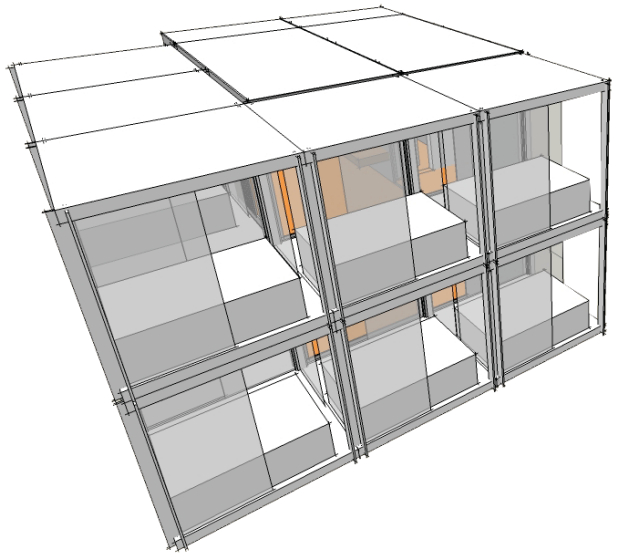


fig. 11b: single “cluster”

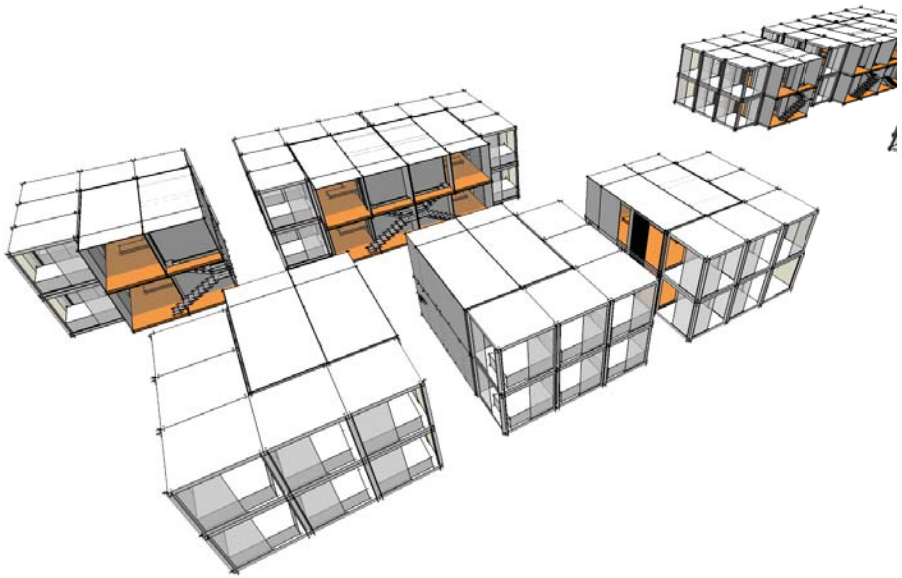


fig. 11c: worker communities made out of several clusters

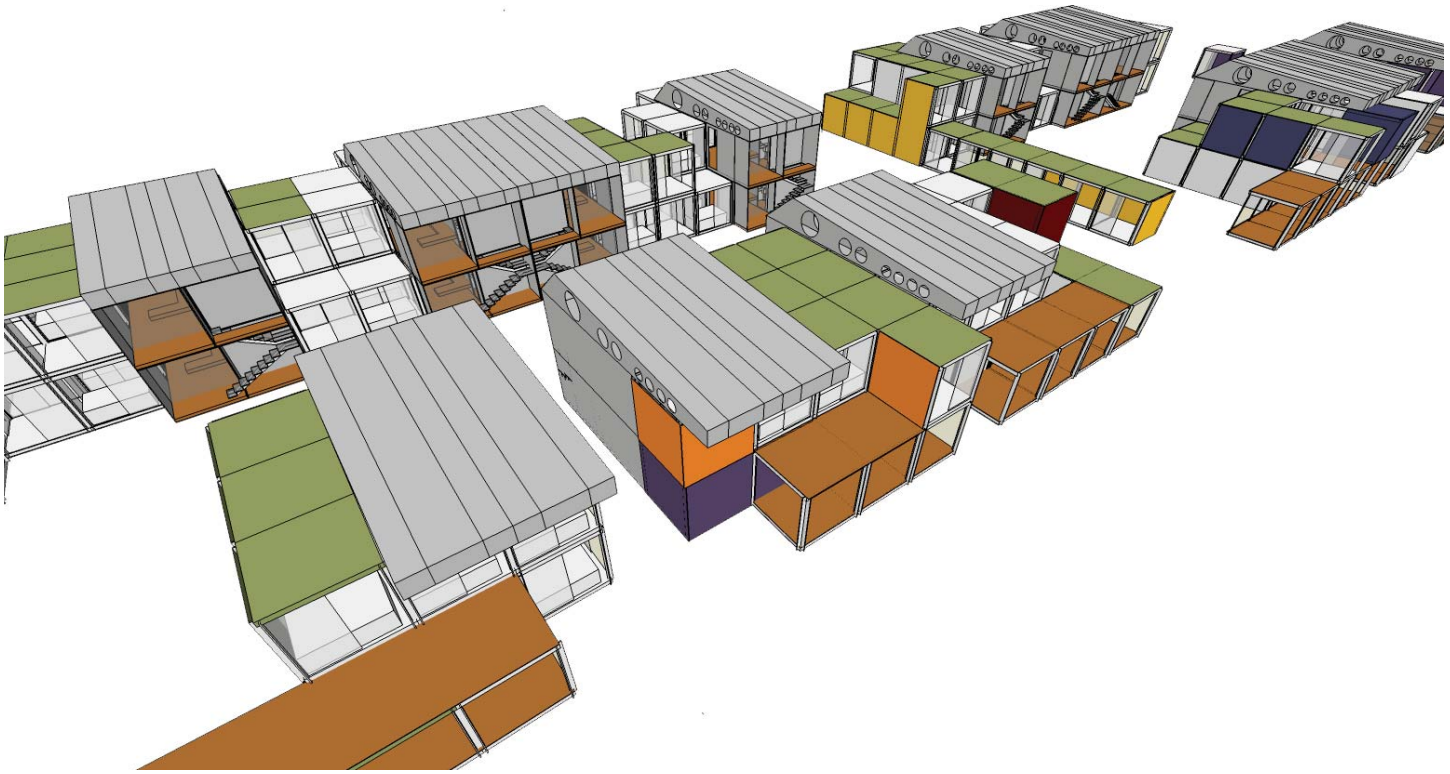


fig. 11d: community transition from worker shelter to permanent residence

The physical rebuilding of a community is a top priority after every disastrous situation. Creating places for the rebuilders to live during the reconstruction is vital for the commencement of construction. The clusters created by the modules can be used to house those construction workers for a time. As the community is reestablished, the “clusters” have the ability to transition from densely occupied worker/ community shelters to single family residences, apartments, or bed and breakfast rooms, which will finally function as a community within a community (fig. 11d).

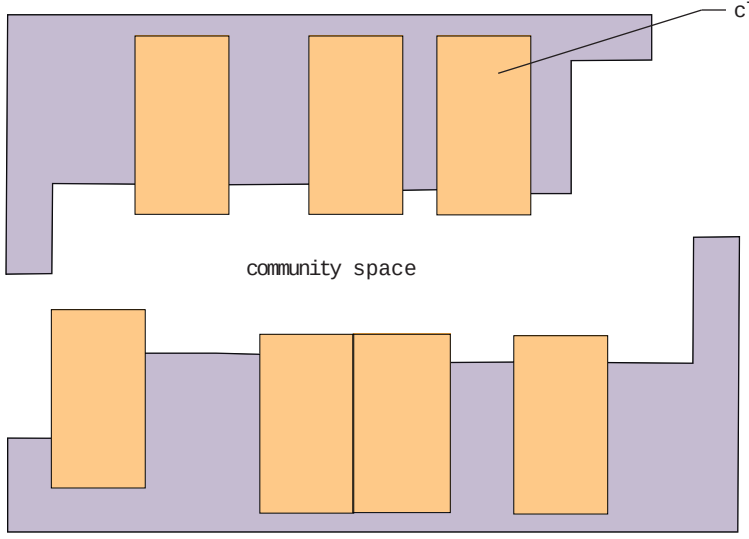


fig. 11e: arrangement of clusters for community space

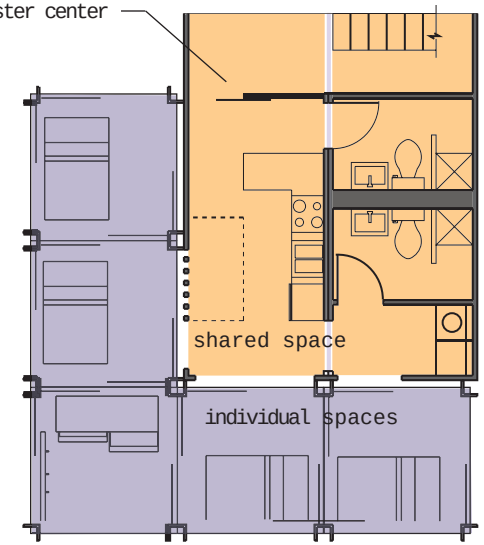


fig. 11e: phase I plan

Utilizing Shared space on a community scale (fig. 11d) and on a single “cluster” scale (fig. 11e) allows for more dense occupancy of the area.

In the final form that the residences take, the buildings will border the sidewalk with a veranda, formed by the addition of modules, which can be partitioned or shared by occupants depending on need; this allows a closer relationship with the town while retaining privacy (fig. 11f). The shared courtyard will provide a semi-private green space to sit outside and relax (fig. 11g), while the park across the street can act as a communal front yard.

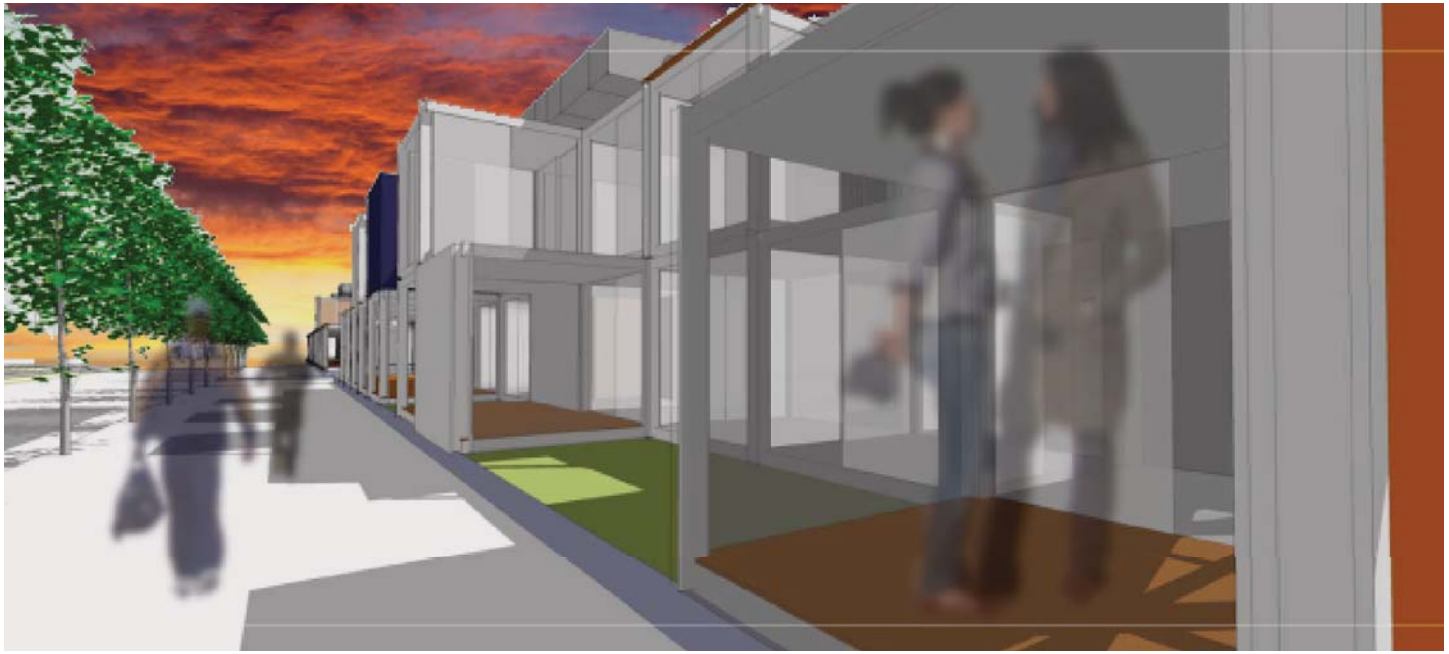


fig. 11f: relationship to sidewalk

fig. 11g: shared courtyard allows for semi-private green space

fig. 11h: individual facades give character

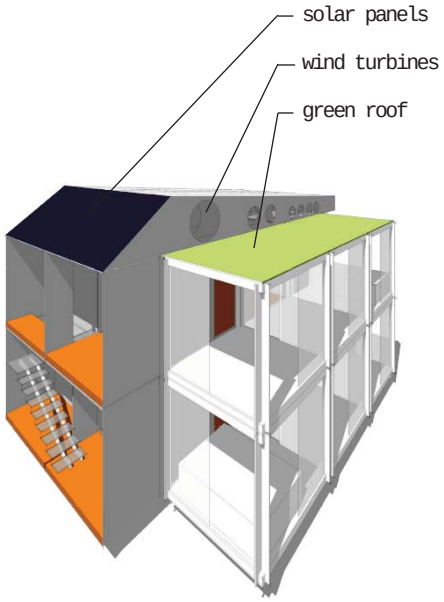


fig. 11i: green additions

fig. 11j: interior

The final transformation of the “clusters” in to residences is marked by the addition of the final pieces that give each individual unit its own character. Panels will be attached to the outside of the structure to begin with; these panels can range in variety from anything from a living wall to glazing, allowing personalization to each individual residence (fig. 11h).

The second exterior addition that will mark the completion of the community being rebuilt will be the features that will keep the residences sustainable for years to come. By adding a roof that has a solar array and small wind catchment devices, the buildings can begin to generate at least some of their own power. To help cut energy costs, green roofs can also be used on top of all modules (fig. 11i); this can also give opportunities for upper level occupants to have a private yard of their own.

On the interior, each home has a flexible layout, allowed by using sliding partitions which are incorporated in to each module from the beginning of use. These partitions can be removed entirely, replaced by an interior wall, or kept for day-to-day flexibility (fig. 11j).

section twelve

transition relief housing

clemente jaquez-herrera

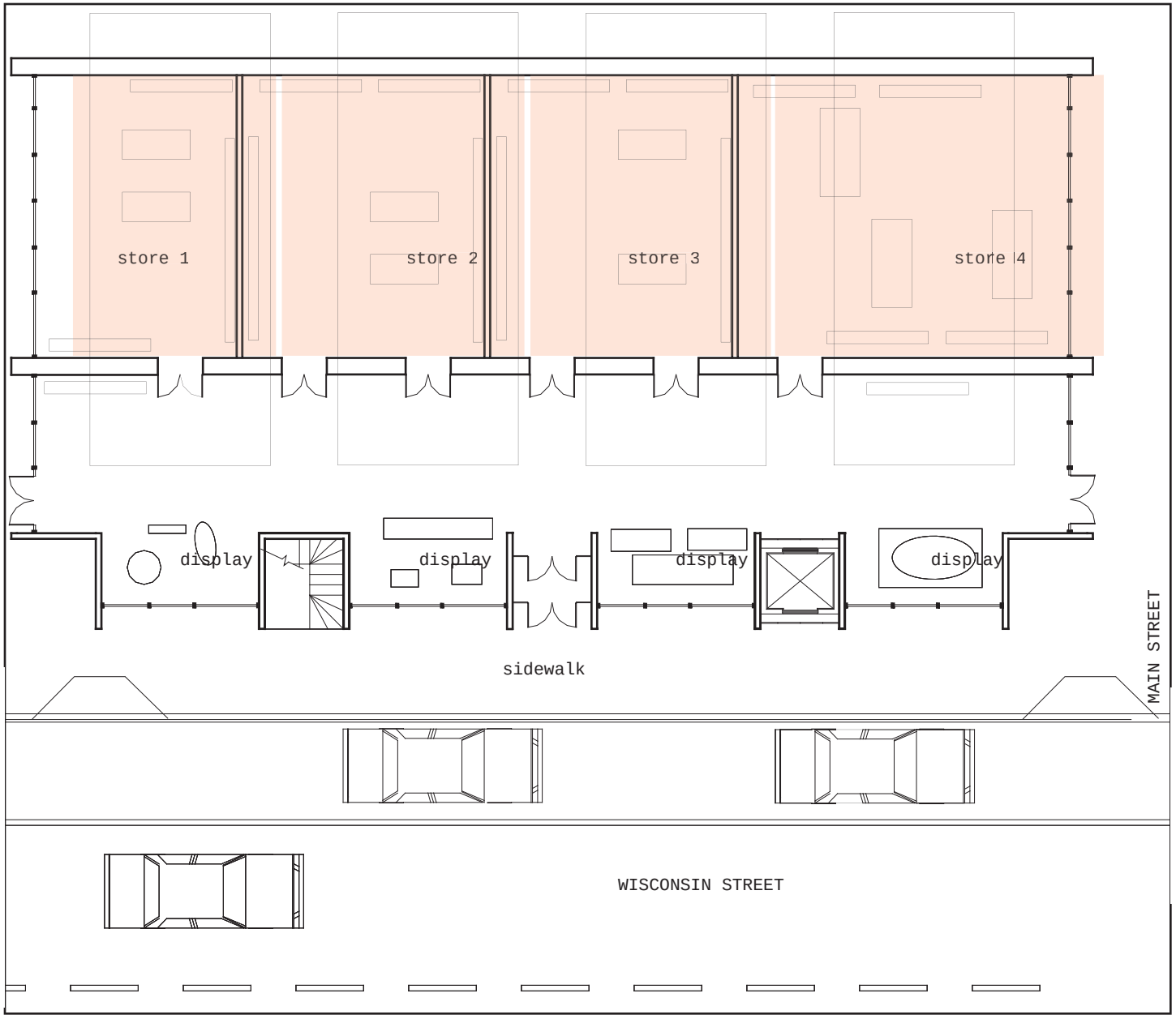
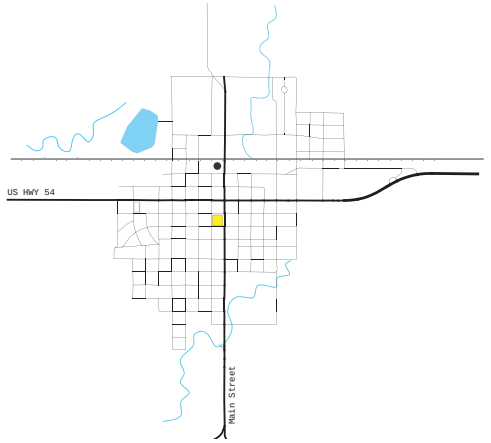


fig. 12a: Mix-Use Development - first floor
scale 3/32″ = 1′-0″



A critical need for the town of Greensburg is creating a quality of life that will promote the local businesses and attract residents. Through the development of businesses and residences in one structure we start to promote this quality of life.

This design will meet the immediate needs of Greensburg while investing in a development that will grow over time. The schematic design is a two-story space intended to provide commercial areas on the bottom floor and residential spaces on the top.

The main design is based upon modularity and quick erectable structures.

The sketch in figure 12b denotes the idea of a modular home that is capable of pulling apart once it is in place. It can also be closed for easy transportation.

The sketch in figure 12c, denotes a modularity of homes that can be placed one alongside the other in order to form a greater community.

In figure 12e, we find the sketch that gives rise to this concept and design. This concept is based on the creation of communities through “Building Blocks”. These building blocks will be shipping containers that are readibly available in the United States. In fig. 12e, the building blocks rest on two bearing walls, and the blocks themselves act as trusses.

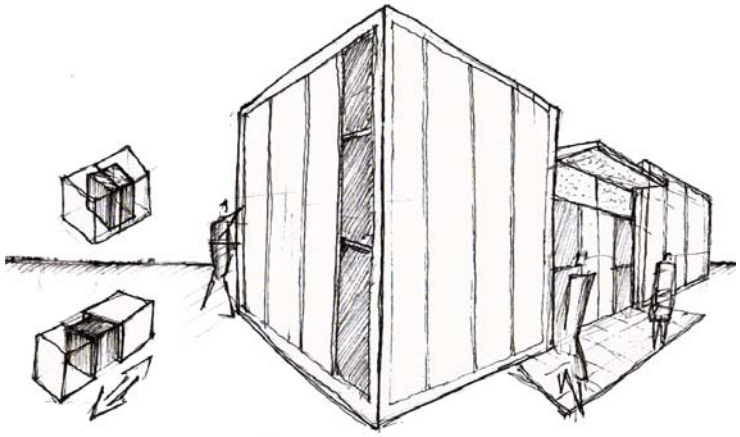


fig. 12b: Preliminary sketch 1 - transportable and flexible unit

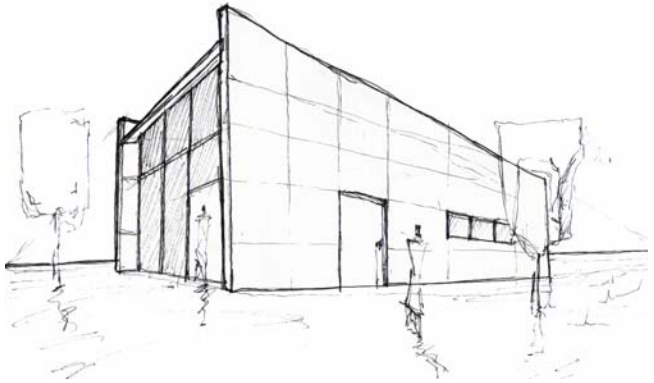


fig. 12c: Preliminary sketch 3 - expandable unit

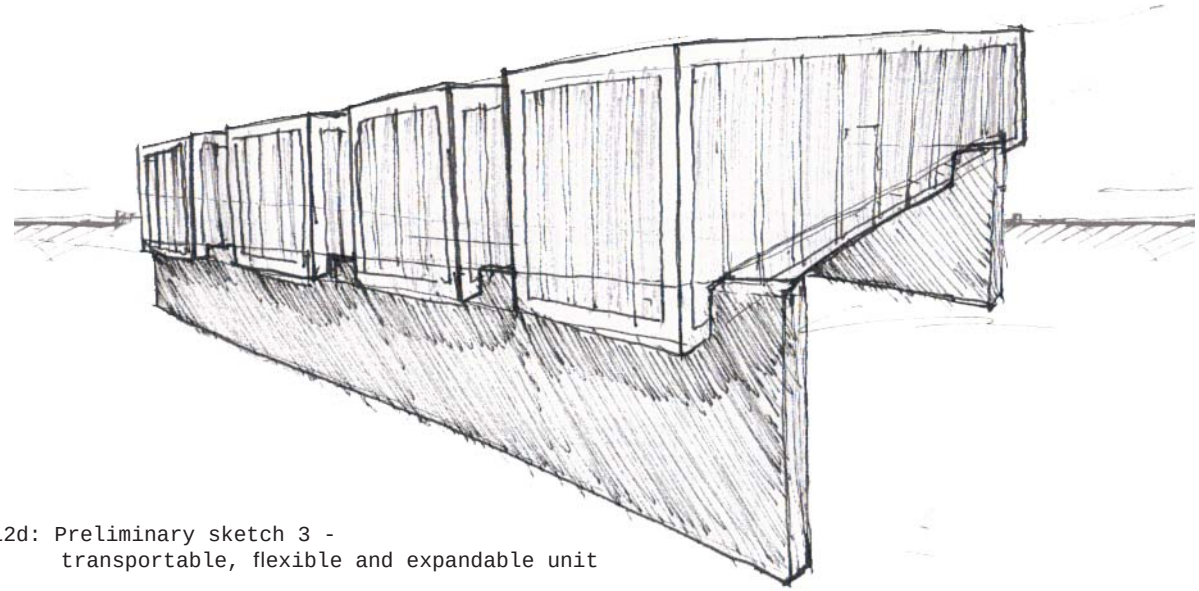


fig. 12d: Preliminary sketch 3 - transportable, flexible and expandable unit

Room Legend

1 private garden
2 storage
3 bedroom
4 living
5 restroom
6 dining
7 mechanical room
8 shared terrace- main circu-
9 elevator
10 stair

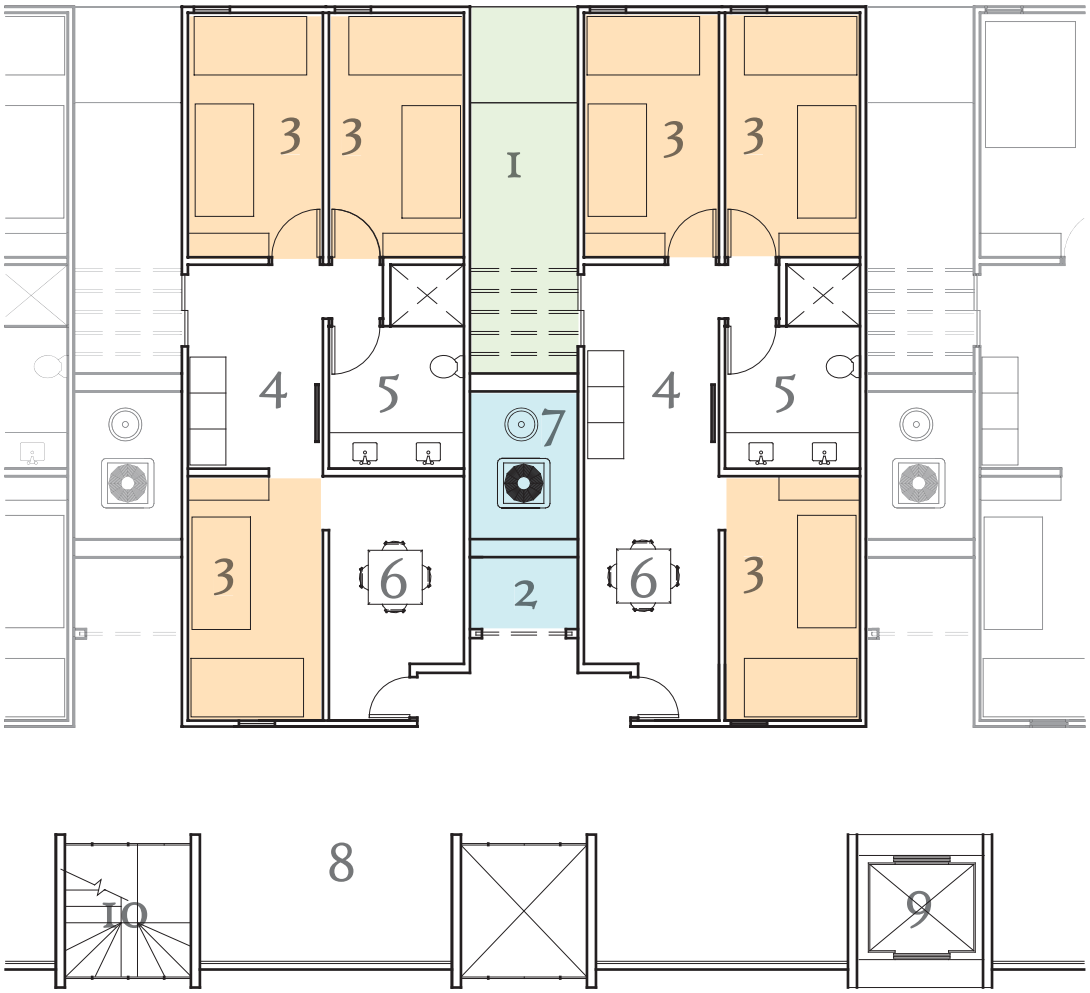


fig. 12e: Phase I - three bedroom dwelling.
Second floor - scale 3/32″ = 1’-0″

The design implementation will work in two phases.

In the first phase of this project that residence areas will house workers and owners of commercial areas. These first users of the residential areas will be some of the first to establish the social and economic infrastructure of Greensburg. The spaces of residence will provide minimum commodities, because it is intended that these spaces will not be used for long. In this phase, no kitchen was included because it is intended that workers will eat at a communal space elsewhere. Also in this phase there is the development of the public and private terraces as demonstrated in fig. 12o. In the public terrace, all residents can collaborate and socialize alongside a scenic view towards the city’s park. (see fig. 12p)

The main structure of this building is explained in fig. 12f-i. It will consist of shipping containers that will be considered the “building blocks” of this community.

These building blocks will be recycled shipping containers. The blocks are very rigid in structure and can withstand high winds. There are certain limitations to room arrangements, such as division of spaces at the ensemble of two units. However, because of their adaptability these blocks can be stacked or placed side-by-side in order to form a larger complex, such as the one proposed in this design.

Over time, permanent citizens will start to reside in these units. The units will start to allow expansions and allow the addition of other needs such as the kitchen and a defined dining area. The kitchen and dining areas will vary in concerns in response to orientation and key entry points. The private garden and balcony will start to formulate a stronger connection with the units. (see fig. 12p)

The units in this phase, fig. 12j, can accomodate a small family in a two bedroom dwelling.

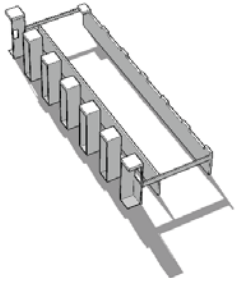


fig. 12f: Basic structure - building blocks and bearing walls

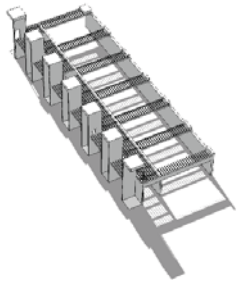


fig. 12g: Basic structure with secondary secondary structure

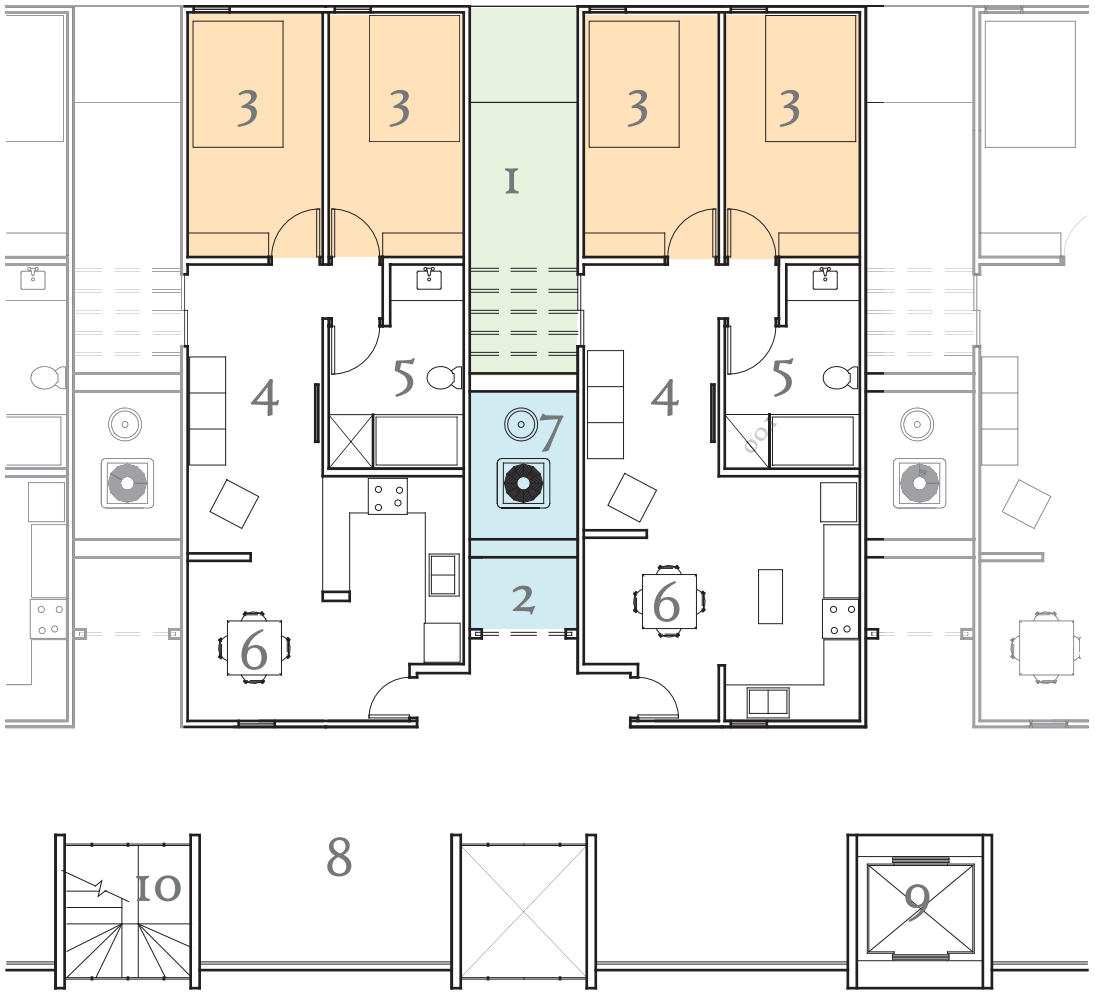


fig. 12j: Phase II - Two bedroom dwelling.
Second Floor - scale 3/32″ = 1′-0″

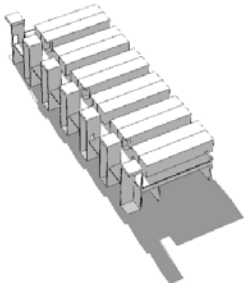


fig. 12h: Building blocks are placed on top of structural frame

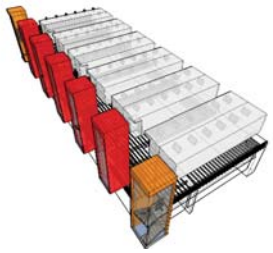


fig. 12i: Utilities and other materials are assembled

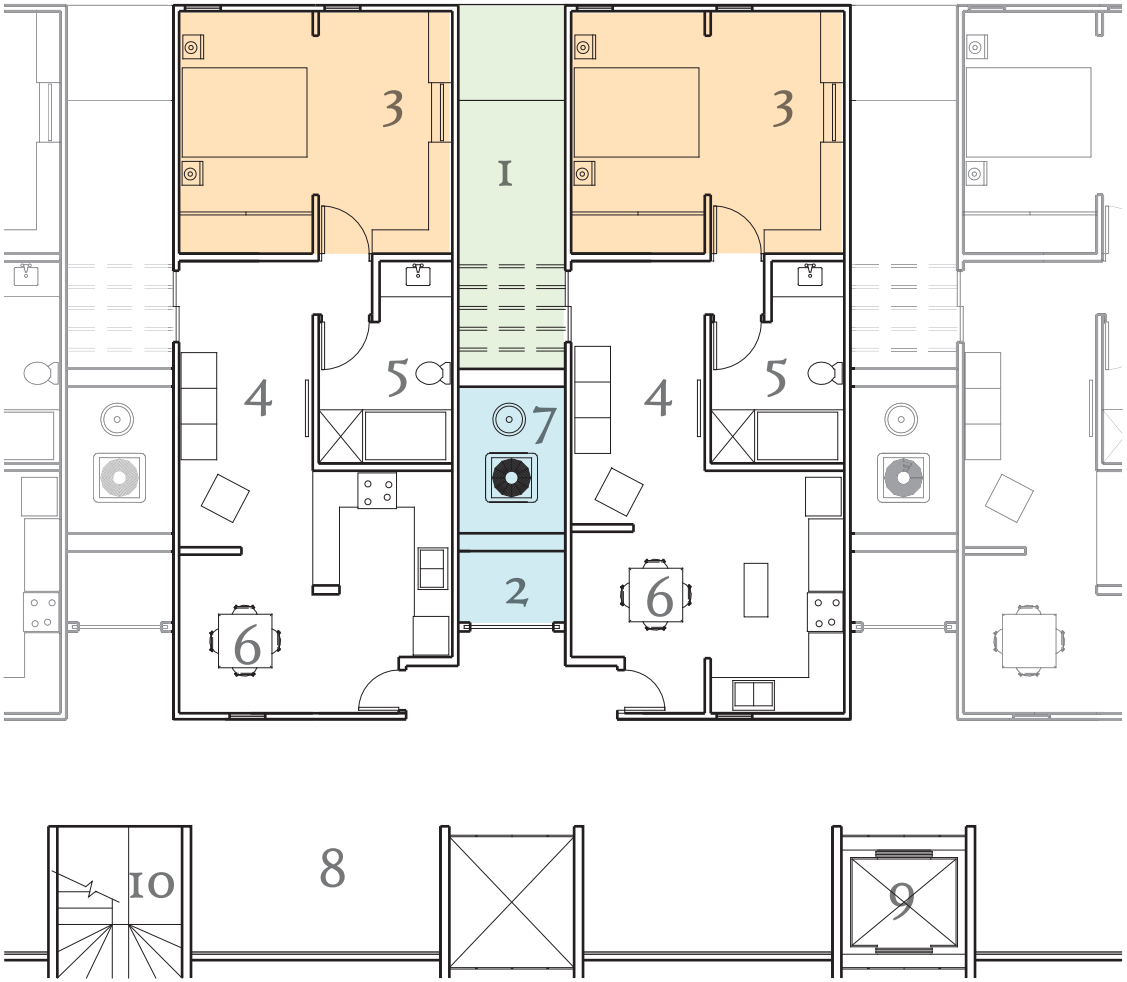


fig. 12k: Phase II - One bedroom dwelling.
Second Floor - scale 3/32″ = 1′-0″

In this phase, we start to see how the unit is flexible enough to accomodate either a family or in this case, a single individual or a couple.

At this point we can start to see the benefits of the arrangement of the building blocks. Every space at which the units meet serves a function towards the units. The mechanical spaces and storage are located between every unit. The concentration of the mechanical equipment minimizes energy loss. By putting the mechanical equipment between units, the design maximizes space inside the units and reduces the number of punctures and alterations to the units. At the same time, the mechanical space divides the corridors in order to provides the private spaces for the gardens as seen in fig. 12p.

The garden areas will also serve as key points for water collection from the metal roofs of the units.

Room Legend

1 private garden
2 storage
3 bedroom
4 living
5 restroom
6 dining
7 mechanical room
8 shared terrace
9 elevator
10 stair

On the top floor, residence areas are set back from the front façade, creating an area of balcony that will be used as common areas and circulation space between residences.

This design sets up vendors in an open atmosphere, where customers are invited to view the retail areas. It is intended that these units will take advantage of natural cooling and heating, the towers help dissipate heat from the building. Also solar panels will be mounted on top of the residential units.

The façade at the bottom level provides the opportunity for exhibition and display of products as seen in fig. 12n. Building blocks will also be used as Tower-entrances as seen in fig. 12m. These colorful towers will become light-boxes during the night, so that the experience of the users and residents is heightened by the visual interest.

The idea of privacy and relationship was a main consideration of this design. In fig. 12n we clearly see how the stratification of spaces breaks down the scale of the building and allows residents and businesses to relate to their surroudings. Terraces provide an open view to the park, and stores connect to the people at the fore-front.

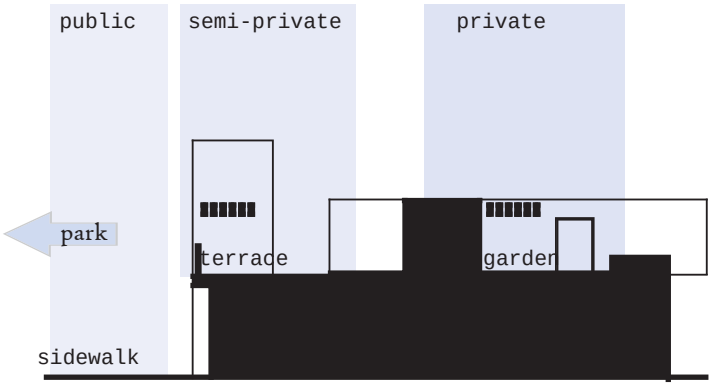


fig. 12l: Sectional hierarchy


fig. 12m: Light towers at night

fig. 12n: View of residential balconies and commercial stores

fig. 12o: View at private garden

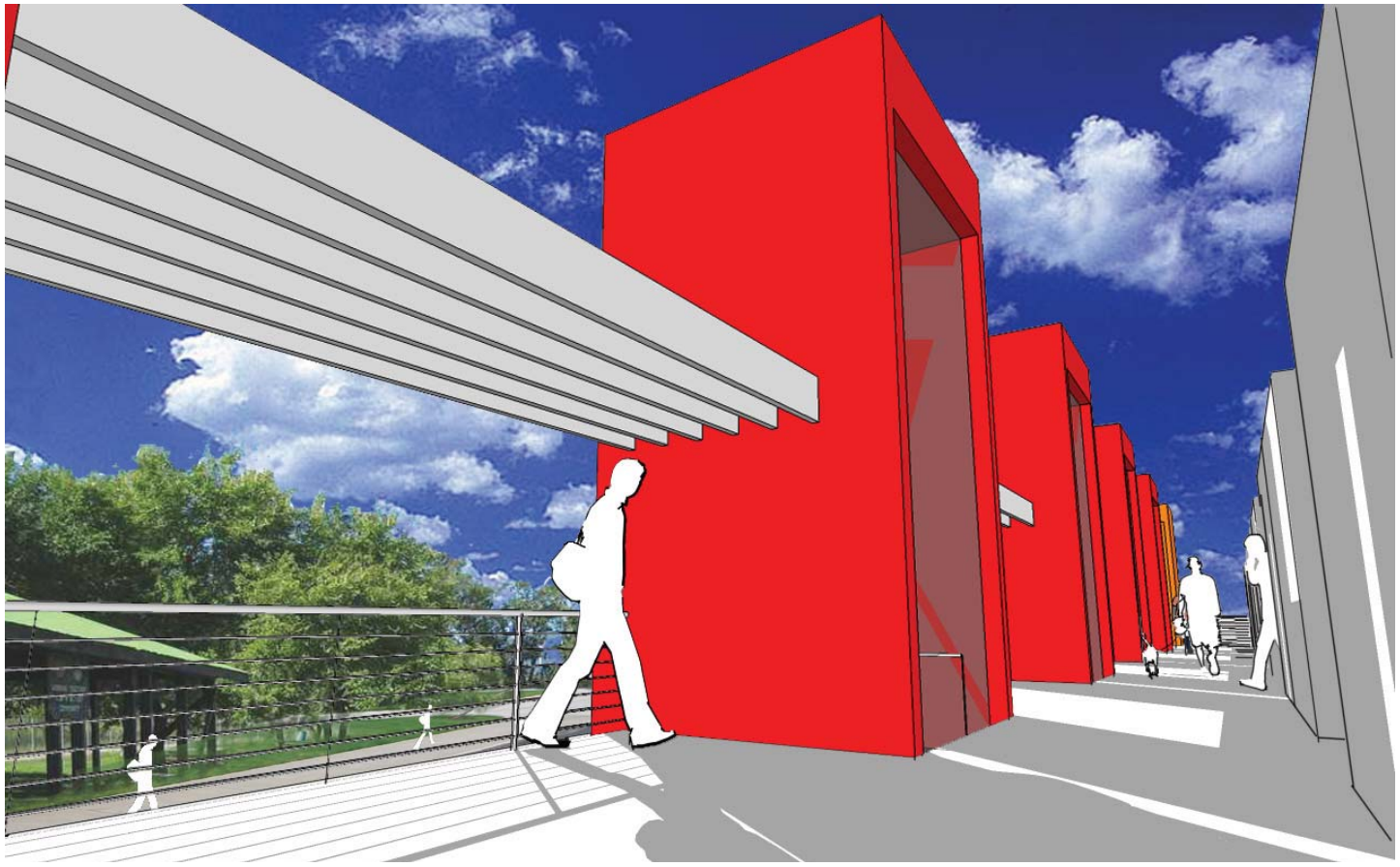


fig. 12p: View at residential terraces

While it was important that this design bring the community together through a shared space, as in fig. 12p, it was also equally important to provide the residents a private area that could be completely their own. the image in fig. 12o demonstrates a typical garden space provided for each unit.

The terraces on the second floor provide a variety of functions for the complex.
1. Allows easy circulation between residential units.
2. The terrace forms small areas for social gatherings
3. Terraces provide a social atmosphere of sharing and collaboration.
4. The location provides residents a scenic view of the park across the street

The design of this Mix-Use Development will add to the social and economic fabric of Greensburg, by first promoting a working infrastructure for residents and workers, next by allowing a transition of shifting populations and third by allowing the flexibility of the design to meet the needs of future residents through flexible space arrangements.

section thirteen

civic + residential streetscape

lindsey richardson

fig. 13a: Pedestrian connection (The Woodlands, Texas)

fig. 13b: Raingarden example (Conservations on the Environment: 10,000 Raingardens)

fig. 13c: Vegetated swale example (Urban Conservation Photo Gallery)

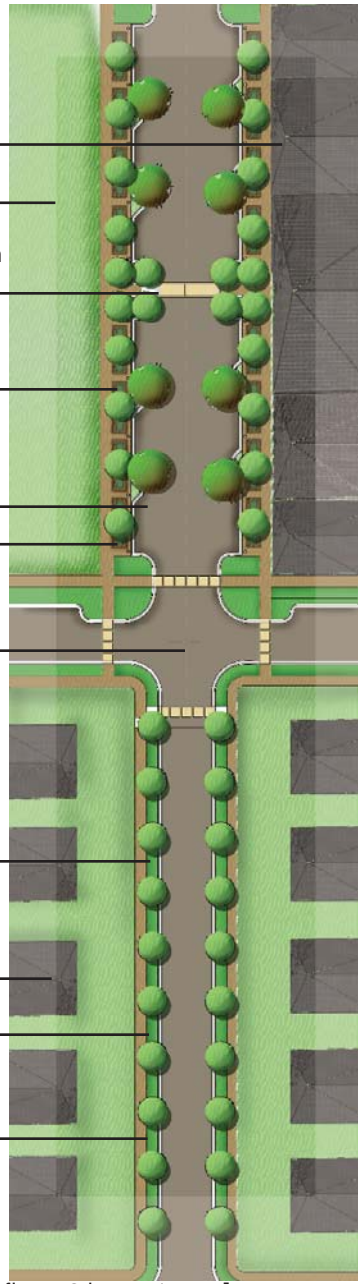
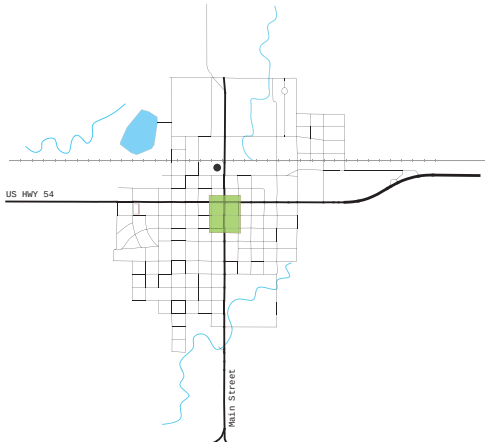


fig. 13d: Master Plan



The goal of the civic + residential streetscape design is to create a fluent transition between downtown into the residential neighborhoods of Greensburg. This particular project delineates 3 street types that together make up a street typology for the city of Greensburg. Type 1 Streetscape (fig. 13d) was designed for the downtown civic block. Type 2 streetscape (fig. 13f) was designed as a transition from downtown into residential neighborhoods. Type 3 streetscape (fig. 13i) was tailored specifically to the residential areas. The master plan for the civic + residential streetscape (fig. 13d) was designed to provide the citizens of Greensburg

with an attractive, safe, and sustainable streetscape environment. The master plan delineates the characteristics of the project, as explained in an earlier section.

Type 1 Streetscape was designed for the civic block of downtown Greensburg. The purpose of this design was to maintain Greensburg's small town feel but create a more modern and sustainable environment. A goal of this design was to keep the streetscape as pedestrian friendly as possible. Although the streetscape is 86 feet in length, vegetated buffers in the form of raingardens were placed along the walkways to protect pedestrians from vehicular spaces. Angled parking was incorporated for easy vehicular access and parking.

Type 2 streetscape(fig. 13g) was designed as a transition from downtown into the residential areas of Greensburg. This particular streetscape creates a fluent transition from a public area into more private spaces. Vegetated buffers were placed between pedestrian and vehicular spaces to create a safer and visually pleasing environment.

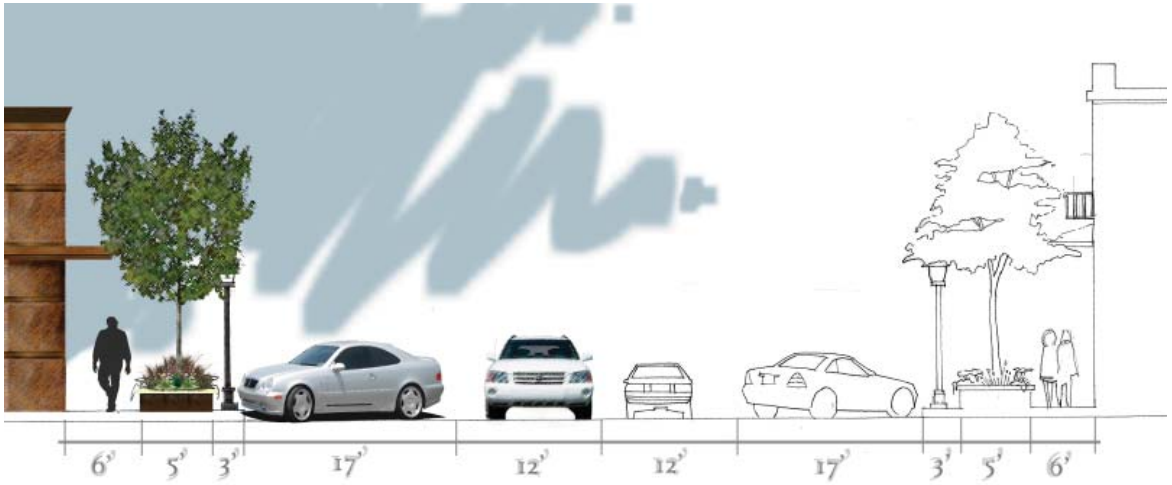


fig. 13e: Type 1 streetscape section

fig. 13f: Type 1 streetscape perspective

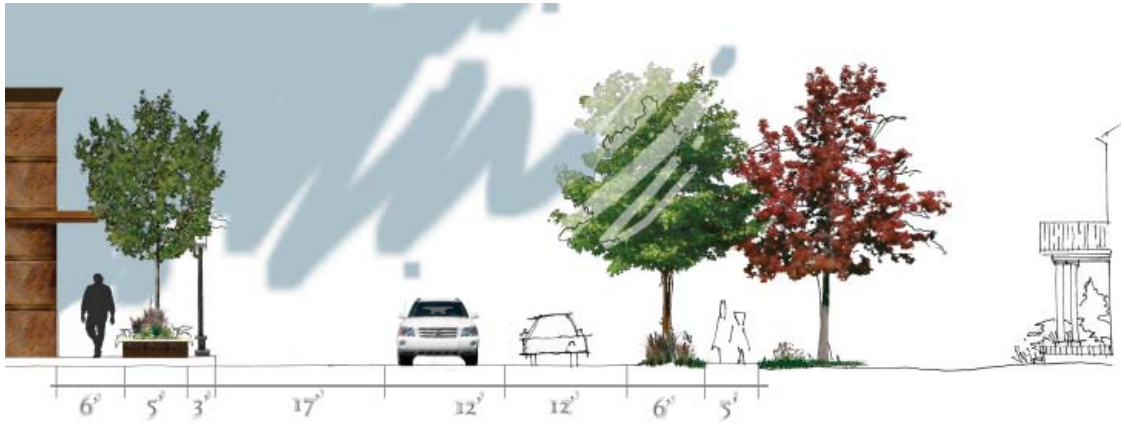


fig. 13g: Type 2 streetscape section

fig. 13h: Raingarden detail

There are two areas of sustainable stormwater practices incorporated into this project. The first is through a series of raingardens along the civic streetscape in downtown Greensburg (fig. 13h) and vegetated swales (fig. 13i) along the residential streets. The raingardens are located on Main Street in Downtown Greensburg along the front of the civic buildings of Greensburg. Each raingarden is typically 22 feet in length and 2 feet high. These raingardens catch and retain stormwater runoff that drains from the road into the raingardens through covered grates. (fig. 13h) As the runoff is captured, it infiltrates back into the ground and waters the vegetation inside the raingarden. Through the use of these sustainable practices, little irrigation is required for these raingardens. The scale and sizes of the street improvements help to create a visually pleasing sustainable streetscape environment for the citizens of Greensburg. The edges of the raingarden should serve as shaded seating for the public. There are six vertical grates incorporated into each raingarden allowing for drainage pickup from the street. The grates allow for the public to be able to visualize the purpose of the raingarden.

Type 3 Streetscape is to be used as a catalyst for residential streets throughout the city of Greensburg. The residential streetscape is 52 feet in width from right-of-way to right-of-way. The streetscape includes a 30 foot road with an 11 foot easement on each side of the street. The easement includes a 6 foot natural drainage swale and a 5 foot pedestrian sidewalk. The drainage swale acts as collector for runoff from residential streets as well as a buffer between the road and the sidewalk for a safer pedestrian experience. The vegetated swale is used to capture stormwater runoff and percolate it back into the soil as well as water the native vegetation that occurs within these swales. Due to the dry nature of the area only native plants should be used in the swales along the roadways. The sustainable vegetated swales help with stormwater management but also create a pleasing aesthetic to the homes in the residential neighborhood.

Together these three street types create a streetscape typology that can easily be implemented to create a sustainable and visually pleasing environment for the citizens of Greensburg, Kansas.

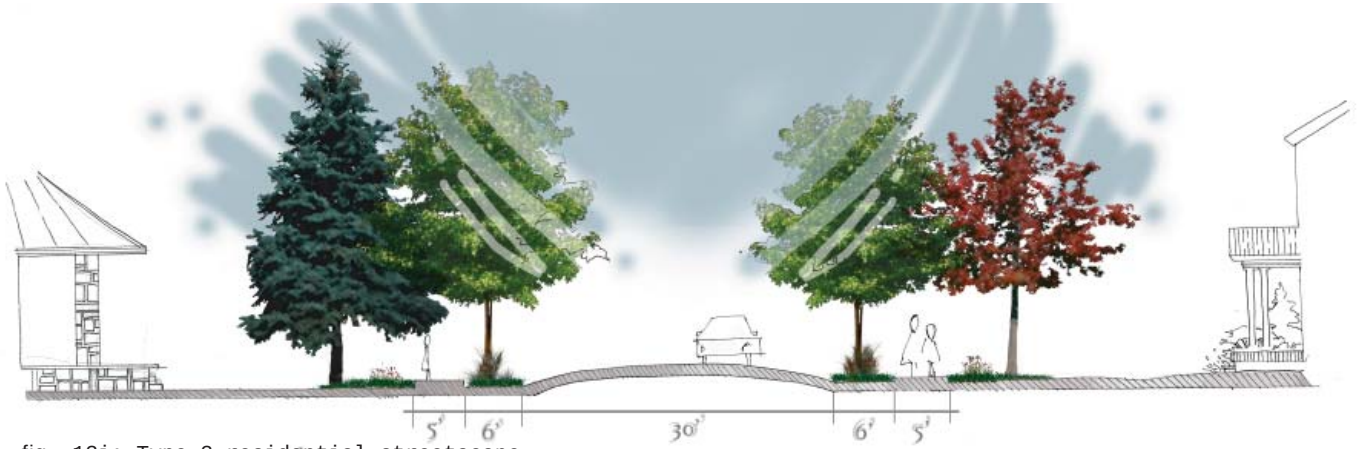


fig. 13i: Type 3 residential streetscape


fig. 13j: Residential streetscape perspective

project acknowledgements

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Thanks also to Doug Mann and Richard Cybulski from HNTB Corporation in Dallas. They reviewed student projects in progress with encouragement and praise. HNTB sponsored the gallery opening reception, helping us welcome the public to view the show of student work.

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additional information

Individual Residential Rebuilding Efforts

It is understood that most homes in Greensburg will need to be rebuilt. In addition to the work contained in this document, there is a student-authored document that addresses the idea that residential rebuilding in an energy efficient manner will have both short-term and long-term benefits for the owners and the community. This document, “Greensburg Green: Design Strategies for a Progressive Community,” is written for home builders as they consider each step of designing and building an energy efficient home and site. It was authored by Sally Maddock, 5th year Architecture Student and Kelsey Kern, 4th year Landscape Architecture Student in the College of Architecture, Planning and Design at Kansas State University, December 2007. It is printed and available for viewing at the gallery show in Pratt, and will be located on the http://www.greensburgks.org/ website by late December 2007.

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illustration index

section 1

section 2

section 3

fig. 3f: josh lamartina
fig. 3g: josh lamartina + geoffrey van de riet + aaron vanderpool + laura wilke
fig. 3h: josh lamartina
fig. 3i: geoffrey van de riet
fig. 3j: josh lamartina + laura wilke
fig. 3k: geoffrey van de riet
fig. 3l: aaron vanderpool
fig. 3m: aaron vanderpool
fig. 3n: josh lamartina + aaron vanderpool
fig. 3o: aaron vanderpool
fig. 3p: aaron vanderpool
fig. 3q: josh lamartina + geoffrey van de riet + aaron vanderpool + laura wilke
fig. 3r: laura wilke
fig. 3s: laura wilke
fig. 3t: laura wilke
fig. 3u: laura wilke
fig. 3v: laura wilke
fig. 3w: laura wilke
fig. 3x: laura wilke
fig. 3y: laura wilke
fig. 3z: josh lamartina + geoffrey van de riet + aaron vanderpool + laura wilke
fig. 3aa: geoffrey van de riet + laura wilke
fig. 3bb: josh lamartina + geoffrey van de riet + aaron vanderpool + laura wilke

section 4

fig. 4b: shandelle renyer
fig. 4c: shandelle renyer
fig. 4d: shandelle renyer
fig. 4e: shandelle renyer
fig. 4f: shandelle renyer

section 5

fig. 5a: melody meeks + brett rolfs + erin wages
fig. 5b: melody meeks + brett rolfs + erin wages
fig. 5c: melody meeks + brett rolfs + erin wages
fig. 5d: melody meeks + brett rolfs + erin wages
fig. 5e: melody meeks + brett rolfs + erin wages
fig. 5f: melody meeks + brett rolfs + erin wages
fig. 5g: melody meeks + brett rolfs + erin wages
fig. 5h: melody meeks + brett rolfs + erin wages
fig. 5i: melody meeks + brett rolfs + erin wages
fig. 5j: melody meeks + brett rolfs + erin wages
fig. 5k: melody meeks + brett rolfs + erin wages

fig. 5l: melody meeks + brett rolfs + erin wages
fig. 5m: melody meeks + brett rolfs + erin wages
fig. 5n: melody meeks + brett rolfs + erin wages
fig. 5o: melody meeks + brett rolfs + erin wages
fig. 5p: melody meeks + brett rolfs + erin wages
fig. 5q: melody meeks + brett rolfs + erin wages
fig. 5r: melody meeks + brett rolfs + erin wages
fig. 5s: melody meeks + brett rolfs + erin wages
fig. 5t: melody meeks + brett rolfs + erin wages
fig. 5u: melody meeks + brett rolfs + erin wages
fig. 5v: melody meeks + brett rolfs + erin wages
fig. 5w: melody meeks + brett rolfs + erin wages
fig. 5x: melody meeks + brett rolfs + erin wages
fig. 5y: melody meeks + brett rolfs + erin wages
fig. 5z: melody meeks + brett rolfs + erin wages
fig. 5aa: melody meeks + brett rolfs + erin wages
fig. 5bb: melody meeks + brett rolfs + erin wages
fig. 5cc: melody meeks + brett rolfs + erin wages

section 6

fig. 6a: ian scherling
fig. 6b: ian scherling + jessica williams
fig. 6c: ian scherling + jessica williams
fig. 6d: ian scherling
fig. 6e: ian scherling
fig. 6f: ian scherling
fig. 6g: jessica williams
fig. 6h: jessica williams
fig. 6i: jessica williams
fig. 6j: ian scherling + jessica williams
fig. 6k: ian scherling
fig. 6l: ian scherling + jessica williams
fig. 6m: ian scherling + jessica williams
fig. 6n: ian scherling
fig. 6o: jessica williams
fig. 6p: ian scherling + jessica williams
fig. 6q: ian scherling + jessica williams

section 7

fig. 7a: kevin kroen + malcolm watkins
fig. 7b: kevin kroen + malcolm watkins
fig. 7c: kevin kroen + malcolm watkins
fig. 7d: kevin kroen + malcolm watkins

fig. 7e: kevin kroen + malcolm watkins
fig. 7f: kevin kroen + malcolm watkins
fig. 7g: kevin kroen + malcolm watkins
fig. 7h: kevin kroen + malcolm watkins

section 8

fig. 8a: collin curry
fig. 8b: collin curry
fig. 8c: collin curry
fig. 8d: collin curry

section 9

fig. 9b: andrew becker + jacob henley
fig. 9c: andrew becker + jacob henley
fig. 9d: andrew becker + jacob henley
fig. 9e: andrew becker + jacob henley
fig. 9f: andrew becker + jacob henley
fig. 9g: andrew becker + jacob henley
fig. 9h: andrew becker + jacob henley
fig. 9i: andrew becker + jacob henley
fig. 9j: andrew becker + jacob henley
fig. 9k: andrew becker + jacob henley
fig. 9l: andrew becker + jacob henley
fig. 9m: andrew becker + jacob henley
fig. 9n: andrew becker + jacob henley
fig. 9o: andrew becker + jacob henley
fig. 9p: andrew becker + jacob henley
fig. 9q: andrew becker + jacob henley
fig. 9r: andrew becker + jacob henley
fig. 9s: andrew becker + jacob henley
fig. 9t: andrew becker + jacob henley
fig. 9u: andrew becker + jacob henley
fig. 9v: andrew becker + jacob henley
fig. 9w: andrew becker + jacob henley
fig. 9x: andrew becker + jacob henley
fig. 9y: andrew becker + jacob henley
fig. 9z: andrew becker + jacob henley

section 10

fig. 10a: julianne rader + adrienne stolwyk
fig. 10b: julianne rader
fig. 10c: julianne rader + adrienne stolwyk

fig. 10d: julianne rader + adrienne stolwyk
fig. 10e: julianne rader + adrienne stolwyk
fig. 10f: julianne rader
fig. 10g: julianne rader
fig. 10h: adrienne stolwyk
fig. 10i: adrienne stolwyk
fig. 10j: adrienne stolwyk

section 11

fig. 11a: skyler bonser
fig. 11b: skyler bonser
fig. 11c: skyler bonser
fig. 11d: skyler bonser
fig. 11e: skyler bonser
fig. 11f: skyler bonser
fig. 11g: skyler bonser
fig. 11h: skyler bonser
fig. 11i: skyler bonser
fig. 11j: skyler bonser

section 12

fig. 12a: clemente jaquez-herrera
fig. 12b: clemente jaquez-herrera
fig. 12c: clemente jaquez-herrera
fig. 12d: clemente jaquez-herrera
fig. 12e: clemente jaquez-herrera
fig. 12f: clemente jaquez-herrera
fig. 12g: clemente jaquez-herrera
fig. 12h: clemente jaquez-herrera
fig. 12i: clemente jaquez-herrera
fig. 12j: clemente jaquez-herrera
fig. 12k: clemente jaquez-herrera
fig. 12l: clemente jaquez-herrera
fig. 12m: clemente jaquez-herrera
fig. 12n: clemente jaquez-herrera
fig. 12o: clemente jaquez-herrera
fig. 12p: clemente jaquez-herrera

section 13

fig. 13d: lindsey richardson
fig. 13e: lindsey richardson

fig. 13f: lindsey richardson
fig. 13g: lindsey richardson
fig. 13h: lindsey richardson
fig. 13i: lindsey richardson
fig. 13j: lindsey richardson


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