



Greensburg
Sustainable Comprehensive Plan

05.19.08

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CITY OFFICIALS + STAFF

Mayor, Bob Dixon
Former Mayor, John Janssen

Councilman Brandon Hosheit
Councilman Gary Goodheart
Councilman Matt Christenson
Councilwoman Erica Goodman
Councilman Mark Trummel
Former Councilman Robert Mitchum
Former Councilman Bethel Thronesbery
Former Councilman Rex Butler

City Administrator, Steve Hewitt
Recovery Coordinator/Asst. City Administrator, Kim Alderfer
Planning and Zoning Administrator, Michael Gurnee, AICP
Treasurer, Pam Reves
Utilities Director, Mick Kendall
Street Department, Mike Hayes
Office Administrator, Stacy Barnes
Office Administrator, Christy Pyatt

PLANNING COMMISSION

Chairman, Alan Myers
Vice-Chairman, Gary Goodman
John Colclazier
Dana Maier
Mike Swigart
Secretary, Christy Pyatt

COMMUNITY RECOVERY ACTION TEAM

Tom Corns
Deborah Factor
Alexis Fleener
Randy Kelly
Kim McMurry
Ellen Peters
Carmen Stauth

STEERING COMMITTEE

Steve Dawson
Bob Dixon
Mike Estes
J. Wynn Fleener
Wylan Fleener
Kim Gamble
Marvin George
Erica Goodman
Darin Headrick
Mitzi Hesser
Steve Kirk
Dennis McKinney
Bob Moiser
Stan Robertson
Taylor Schmidt
Jonell Sirois
Conner Staats
Ray Stegman
Mary Sweet
Gene West
Harlin Yost
Christa Zapfe

PROJECT PARTNERS

GREENSBURG GREENTOWN

Daniel Wallach, Catherine Wallach, Allana Goodman

FEDERAL EMERGENCY MANAGEMENT AGENCY

Steve Castanar, Benjamin Alexander, Erin Miles, John Boyle

KANSAS COMMUNITIES

Terry Woodbury

KANSAS ENERGY OFFICE

Russ Rudy

KANSAS HOUSING RESOURCE CORPORATION

Catherine Couch

KANSAS SMALL BUSINESS DEVELOPMENT CENTER

Mark Buckley

NATIONAL RENEWABLE ENERGY LABORATORIES

Lynn Billman, Duncan Prael, John Holton, Tom Wind,
Gerry Harrow, Dale Osborn

PROFESSIONAL ENGINEERING CONSULTANTS, INC.

Tim Lenz

STATE OF KANSAS

Steve Weatherford, Governor's Liaison

THINKOUT STRATEGIC SOLUTIONS

Jeanette Siemens

USDA RURAL DEVELOPMENT

Chuck Banks, Tim Rogers, Gary Smith, Brandon Prough

U.S. ENVIRONMENTAL PROTECTION AGENCY

David Doyle, Chilton "Chet" McLaughlin

ARTISTS

Larry Schwarm, Photographer
Kevin Sink, Photographer

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INTRODUCTION

“There are some things you learn
best in calm, and some in storm.”

- WILLA CATHER, 1915



Photograph © Kevin Sink

INTRODUCTION

Out of crisis emerges opportunity, and as a community, Greensburg citizens believe they have the chance to build a stronger, thriving town. On May 4th, 2007, an EF-5 tornado hit Greensburg, a town of 1,389 in Southwestern Kansas. Over the last four decades this small rural farm town has been declining in population with a struggling economic base. In the wake of the disaster it became apparent that big changes would have to occur to sustain the town for future generations. The community set forth to rebuild a prosperous future through sustainable community design.

The immense challenges facing Greensburg's reconstruction and the desire to embrace common sense green solutions make it an ideal candidate to become a model sustainable rural community. Greensburg has the opportunity to repair the destruction with a balanced approach based on Kansas values and a promising new way of life. Greensburg can become a community with strong leaders who reach out to neighbors. A community where new businesses grow, a place

where sustainability is embraced and lessons learned bolster prosperity. To be successful in its efforts, Greensburg must be strategic about the way it invests in rebuilding.

This document is a guide for the many projects underway in Greensburg, including those that will develop over the next twenty years. If followed it will help the community become a socially, economically, and environmentally sustainable city. It is a document that emerged directly from the community and is representative of both the planning team's recommendations, the City's operational requirements and input from many stakeholder groups. This is not about disaster recovery but instead a strategy to benefit from an opportunity to build replicable systems capable of change from the ground up. This Sustainable Comprehensive Plan is a framework to ensure that Greensburg enjoys a socially vibrant, economically viable, and environmentally rich future.

CONCEPTION OF THE PLAN

On August 15th, 2007, the City of Greensburg adopted a Long-Term Community Recovery Plan that was prepared through the Federal Emergency Management Agency's (FEMA) Long-Term Community Recovery (LTCR) program. The LTCR plan was the culmination of a twelve-week process involving Steering Committee meetings, stakeholder interviews and discussions with citizens, civic groups, business owners, and local, state, and federal officials. The final Plan identified many important projects and their supporting federal and state funding mechanisms. The Sustainable Comprehensive Plan was one of the projects recommended. The project was listed with a high recovery value as it serves as a blueprint for redevelopment in Greensburg.

In addition to the direct recommendation for a Sustainable Comprehensive Plan, the LTCR Plan also served as a foundation for community input and support. The Vision and Goals defined in the LTCR Plan evolved through the Comprehensive Planning process and the revised version, included herein, will provide guidance to Greensburg's redevelopment over the next 20 years.

"Long-range planning does not deal with future decisions, but with the future of present decisions."

- PETER DRUCKER

WHY PLAN?

It is human nature to respond in survival mode after a devastating event like the tornado that struck Greensburg, destroying over 90 percent of the building stock. One needs shelter, electricity, food and water immediately. Despite the physical and psychological strain of the disaster, the people of Greensburg knew that in order to preserve the future of the town, they needed to step back and create a vision for rebuilding. That vision came in the form of a Comprehensive Planning Process, and below are the primary reasons why such plans are important to municipalities with large redevelopment efforts.

View the "big picture"

A community is like an organism and all the parts must work together in order to sustain the City's future. A Comprehensive Plan works to align city programs, projects and government in a synergistic relationship.

Coordinate local decision-making

Specific community goals in a Comprehensive Plan allow local decision makers to align around a city-wide vision and ensure that all projects are supported by the greater community.

Give guidance to landowners and developers

No one wants to build next to a vacant lot with an unknown future. Effective planning will give individual, commercial, and corporate investors the confidence to build in Greensburg.

Establish a sound basis in fact for decisions

The qualitative data incorporated into the Comprehensive Plan allows development decisions to be based on fact.

Involve a broad array of interests in discussions about the future

A Comprehensive Plan incorporates many different voices and a variety of interests which ensures that recommendations are well-rounded and all-inclusive. This allows the community to rebuild in a way that is appealing to all groups, new and old.

Build an informed constituency

The public process facilitated during the creation of a Comprehensive Plan builds a strong constituency for the ideas and recommendations of the plan. This ensures that development decisions based firmly in the goals of the Plan are supported by a large portion of the community stakeholders.



LONG-TERM COMMUNITY RECOVERY PLAN

GREENSBURG + KIOWA COUNTY, KANSAS
AUGUST 2007



HOW TO USE THE PLAN

This Sustainable Comprehensive Plan serves as the vision for redevelopment and future development in Greensburg. It should be used by the City Administration when discussing projects with private developers and by the City Planning Commission as a guide for refining the City's zoning codes and ordinances. Each new Council should be familiar with the Plan recommendations and community goals defined herein.

This Plan is applicable to every project in Greensburg. In fact, the vision and goals set by the community cannot be fully accomplished unless they guide new projects, new policy, and new programs city-wide. The ability of the City and other development institutions (county, educational, health, and federal) to accomplish this community vision is directly linked to the ultimate success of Greensburg. It is the responsibility of all involved to ensure future projects are consistent with the intent of the Plan.

IMPLEMENTATION PROJECT SHEETS

This Comprehensive Plan for Greensburg memorializes the hopes and dreams of the community and makes direct recommendations about turning the community's vision into reality. Many of the ideas in this Plan have already been implemented, and others have been set in motion, but some may not be realized for years to come. The plan is supported by implementation "project sheets," that suggest action steps, estimate costs, and identify project champions for many of the key plan recommendations. These project sheets should be used, amended, and/or expanded as plan recommendations become actual projects.

THE PLANNING PROCESS

The post-tornado redevelopment of Greensburg is probably the largest development project in the state of Kansas at this time. Because of the scale of the rebuilding effort, a broad and experienced team of federal agencies, private contractors and big-hearted volunteers have all made valuable contributions to a strategic redevelopment. Their tireless support is recorded across the plan.

THE TEAM

The City established a Planning Team to provide guidance and a strategic framework to lead development. The plan represents work being done by literally dozens of professionals from around the country. BNIM Architects and John Picard were retained by the City of Greensburg in October, 2007 to complete an expedited Sustainable Comprehensive Planning process. BNIM was brought in to facilitate community participation, conduct design analysis, coordinate planning and design recommendations and distill the team's findings into a legible Sustainable Comprehensive Plan. John Picard is playing a leadership role as advisor to the City and as the liaison to potential corporate partners.

From the start, Greensburg City staff was an integrated part of the planning team. They guided the work of the planners, informed the community and educated City officials and project teams about the plan and important next steps. City staff provided ongoing leadership in a time when strong direction was needed and acted as a constant advisor for the planning work.

The list of outside resources that contributed to this work is too lengthy to mention, but a few organizations deserve special recognition. FEMA's Long-Term Community Recovery

program helped establish a community process and jump-started redevelopment; the National Renewable Energy Laboratory's engineers and practitioners have developed studies for renewable energy options and provided ongoing efficiency advice in Greensburg. The USDA office of Rural Development served as general oversight of the process and their continued support and backing is critical to Greensburg's recovery. The Environmental Protection Agency (EPA) continues to give their time and expertise. The Kansas Corporation Commission, Kansas Energy Office, the Kansas Housing Resources Corporation, and the Governor's Office have given support, expertise and financial backing for Greensburg programs and projects. The not-for-profit, Greensburg GreenTown, has emerged as an on-the-ground resource for "Green" education and helped organize the community around the ideas of rebuilding green at a grassroots level. Their long-term involvement is important to the success and performance of sustainability in Greensburg. Finally, and perhaps most importantly, hundreds of citizen stakeholders gave their time and input to make this plan, a reflection of the community's goals and values. The planning team would like to specifically thank the citizens of Greensburg for providing the inspiration and direction of this plan.

THE COMMUNITY

The process of planning and the coming together to envision a common goal is often more valuable than the planning document itself. Public Involvement was at the heart of all planning work, the planning team incorporated public feedback into every step of the process.

Public Square Steering Committee

The Public Square Steering Committee was established directly following disaster designation in May, 2007 when Governor Kathleen Sebelius asked Kansas Communities LLC, directed by Terry Woodbury, to facilitate a “Public

Square” process to support long-term rebuilding and develop citizen leadership in Greensburg. Four sectors representing all aspects of the Community were created: Government, Business, Education, and Health and Human Services.

Due to the expedited time frame for the Sustainable Comprehensive Plan, it was important to recruit a group of informed citizens who could meet more frequently to discuss portions of the plan and help the team communicate with the broader community. The Recovery Action Team was created from a group of Steering Committee

members to serve this purpose, and met on a regular basis with the planning team throughout the first three months of the planning process.

In addition to this group the planning team also met regularly with the Kiowa County Business Redevelopment Group, City Staff, Greensburg GreenTown, the Planning Commission, and the City Council. In late December a large community meeting was held to vet the recommendations of the plan. This meeting had a great turn out of nearly 300 people who were invited to give their input on Phase 1 of the Plan. A second public meeting was held in early

February and had a similar turn out. In this meeting the community was invited to see how the plan was already influencing development decisions, see actual project progress, and witness the interest of corporate partners from across the country.

It is important to note that in several instances, redevelopment decisions had to be made as the Plan progressed. The ongoing and consistent support for the planning process allowed decisions to be made by consensus amongst City leadership, staff, citizens and advisors.



The community-wide update and Comprehensive Plan workshop had a great turnout of nearly 300 Greensburg citizens.

OUTCOME OF THE COMMUNITY PROCESS

The planning team learned a great deal about Greensburg from discussions with community members. Many of the concerns and issues will be covered in depth throughout this document, but a couple of recurring concerns are worth noting at this time because they set the tone for redevelopment.

The community is proud of the rural quality of Greensburg. They expect development projects to reflect the unassuming feel that they cherish. However, they understand that replicating exactly what they had before would be taking a step backward. Instead, the community sees the great opportunity presented by the disaster. They want to rebuild a progressive, inclusive town that provides jobs, education and recreation to attract and retain a young generation of Greensburg residents. Like generations of Greensburg citizens before, they want to leave a legacy for their grandchildren and serve as an example for the Midwestern towns of tomorrow.

It is important to note that every recommendation within the Plan came from the citizens of Greensburg. There are no recommendations that were not supported or promoted by the larger community. Of course there were differing opinions and life-perspectives on many issues, but often the

disagreements and challenges lifted the dialogue to a more thorough evaluation. The Sustainable Comprehensive Plan intends to synthesize the good advice into a comprehensive strategy for governing and rebuilding Greensburg.

Citizen groups are essential to the continued implementation of this Plan. It is vital that the Public Square Steering Committee, Business Redevelopment Group, Planning Commission, and City Council continue to meet regularly to uphold the community vision.



Community members discuss downtown with designers (**top**) and with the Kiowa County Redevelopment Group (**bottom**).

THE PROJECT PHASES

Due to the immediate needs of the community, the process for completing the Comprehensive Plan was compressed into two phases lasting 7 months. The work was done in two phases but upon completion the Sustainable Comprehensive Plan functions as a single document. Phase 1 presented the bones of the plan allowing many important projects to keep their momentum while simultaneously planning for the future. Phase 2 is intended to deal with ongoing discussions as well as the long-term issues needing attention.

PHASE 1

In phase 1, the planning team addressed the most pressing needs of the City. These included the creation of Greensburg Design Goals and Principles for Rebuilding, a conceptual design scheme for downtown, a future land use map, zoning refinements, infrastructure analysis, preliminary housing policy recommendations, conceptual streetscape design for signature streets, preliminary energy-efficiency and energy policy recommendations, a strategy for building a highly walkable community, and a conceptual parks and open-space layout.

In accordance to the State of Kansas statutory regulations for adoption of a Comprehensive Plan, Phase 1 of the

Greensburg plan was adopted by City Council on January 22, 2008 and served as the legal document for guiding redevelopment until it was replaced by the final Phase 2 document.

PHASE 2

Phase 2 started immediately upon the approval of the Phase 1 planning document. By building upon the areas that needed further exploration and analysis, the planning team continued engaging the community about issues surrounding housing, economic development, cultural resources (tourism), parks and recreation, energy and plan implementation. During Phase 2 the planning team simultaneously began guiding the implementation and enhanced the Phase 1 document with

additional analysis. At the completion of Phase 2 the Sustainable Comprehensive Plan was complete. When adopted, the Plan will serve as the legal document for Greensburg until it is updated or amended by City Council.

GREENSBURG SUSTAINABLE COMPREHENSIVE PLAN PROJECT PROCESS

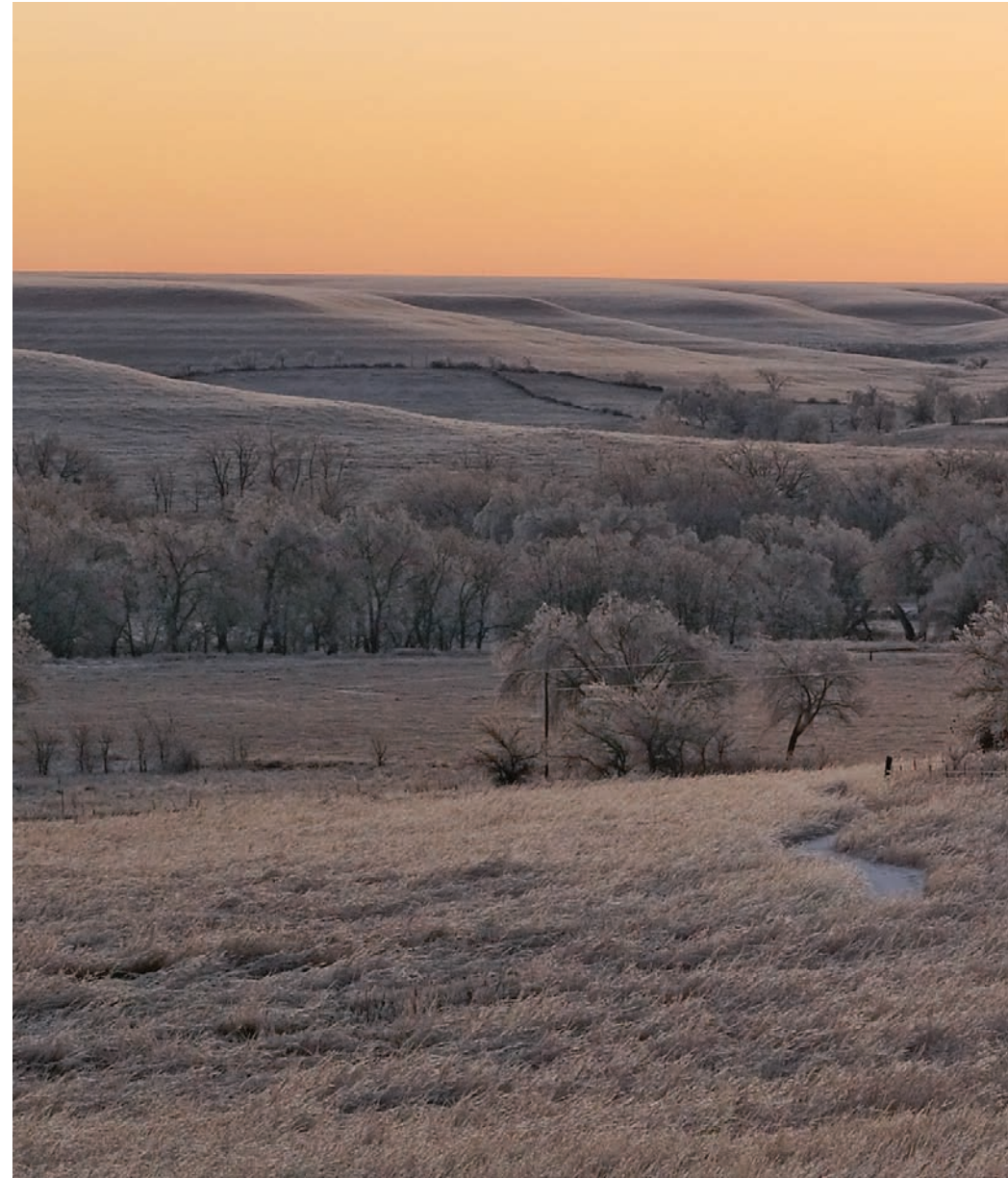


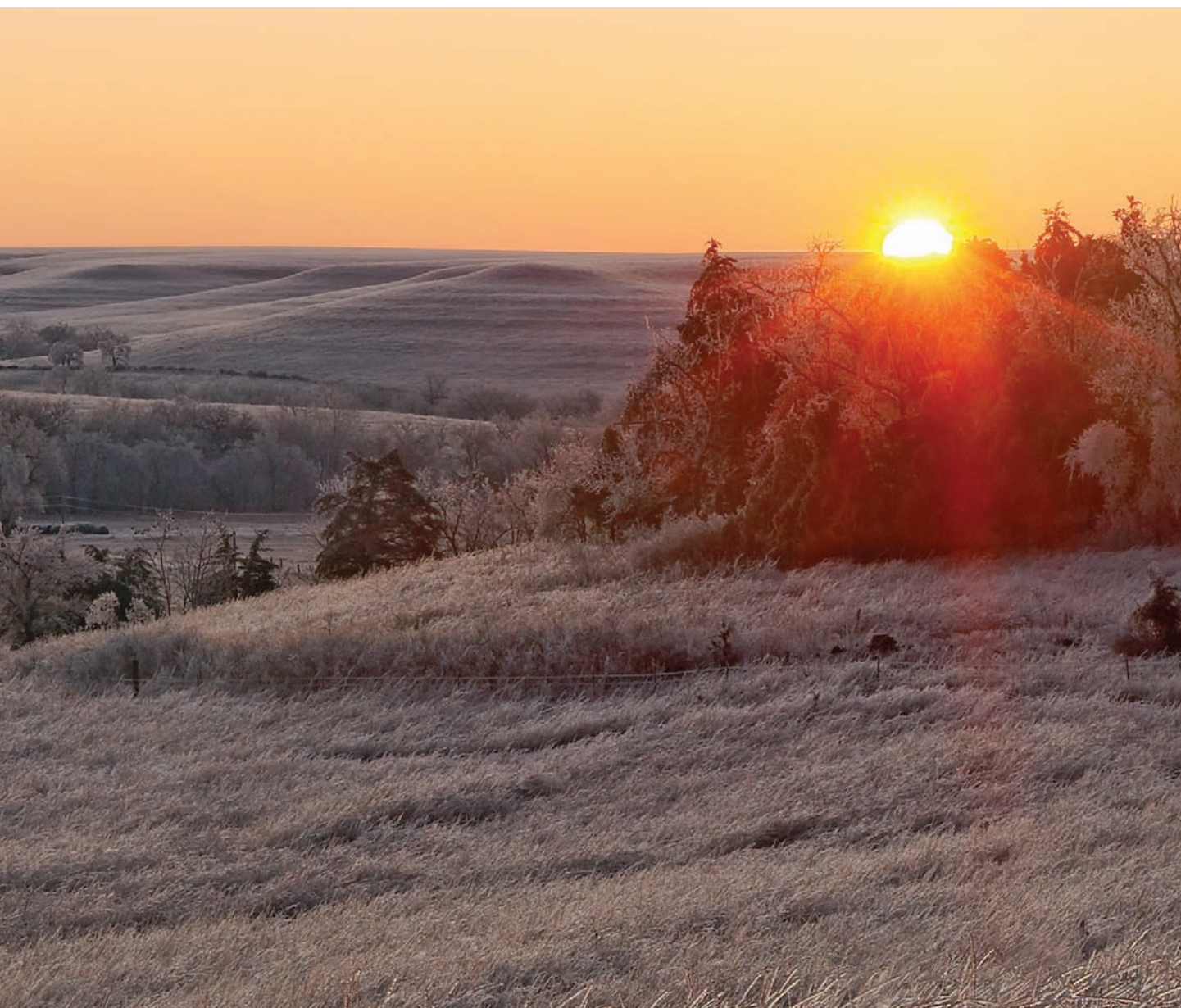
VISION + GOALS

A COMMON VISION; A SUSTAINABLE FUTURE

The root of sustainability is based in common Kansas values. A Kansan thinks in terms of generations and harbors a sincere belief that decisions should build strong communities for our children. We still believe in the power of community, and in our rural areas neighbors still gather at the coffee shop to talk about the issues of the day. A Kansan's character is rooted in the agricultural industry prominent in the region. We understand the natural systems that power a sustainable economy and know what it means to live off, and with, the land.

Although the May 2007 tornado left less than 10 percent of Greensburg's building stock standing, the storm ultimately united the community around a tenacious rebuilding effort. Within the first six months following the disaster, despite personal anguish and psychological distress, the community began envisioning its future. It was understood that without a common vision the goals for rebuilding could not be attained. Knowing that the endeavor to build a sustainable model rural community would require extensive coordination and alignment of hundreds of stakeholder organizations the community established a vision and goals to guide development. Every meeting and discussion about rebuilding dealt directly with the effort to become an economically, environmentally, and culturally sustainable town.





Photograph ©Kevin Sink

COMMUNITY VISION

As part of Greensburg's long-term recovery planning process, community members were asked to create a vision for the town's redevelopment. In a one-day Visioning Retreat, a group of citizens reflected on their experiences living in Greensburg and created a Community Vision that evolved into the following statement:

Blessed with a unique opportunity to create a strong community devoted to family, fostering business, working together for future generations.

At its heart, this vision is about constantly improving and strengthening community. It is a powerful statement that memorializes generational thinking as a guiding philosophy.



Using the Community Vision as a starting point 11 goals were identified to support the Vision. Plan recommendations were created to provide guidance on how to accomplish the community goals and vision.

COMMUNITY GOALS

The Vision statement was supported by a set of goals published in the Long-Term Community Recovery Plan. In order to memorialize all the good community input to date, and to continue integrating the Public Square Steering Committee, these goals were used as a foundation to guide the Sustainable Comprehensive Plan. Some goals were added, combined or cut to accurately reflect the rapidly developing consensus. These goals serve as a living document providing guiding principles for development. Accomplishing the community vision will require careful consideration of the connectedness and intent behind each goal.

COMMUNITY

A progressive community that offers urban services within the unassuming feel of a rural, Midwestern community.

FAMILY

A community that provides opportunities for its young people in the way of jobs, education and recreation as reasons to stay in Greensburg.

PROSPERITY

A community where entrepreneurial spirit, customer service, and a sustainable economy permeate the business sector and where residents, travelers, and tourists enjoy a full line of locally-owned businesses that provide jobs and services.

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.

AFFORDABILITY

An up-to-date, affordable rural community where housing plans and strategies incorporate energy-efficient design and materials and serve as a regional and national model for integrating residents of all ages and needs with services of all kinds.

GROWTH

A community that opens its doors to new residents and visitors without diminishing the values and lifestyles of its current residents.

RENEWAL

A community that makes proactive decisions that use this opportunity to reverse decline and build a progressive city with a strong future.

WATER

Treat each drop of water as a precious resource.

HEALTH

Improve quality of life by promoting a healthy and active lifestyle.

ENERGY

Promote a high level of efficiency in new construction and look to renewable options for generation.

WIND

Greensburg's vast wind resources are part of an emerging economy and should be harvested.

BUILT ENVIRONMENT

Build a town that encourages interaction between residents, welcomes guests and serves as a model community. New development should be durable, healthy, and efficient. City projects will lead the way by becoming examples of green practices that are built to last.

GREENSBURG'S BOTTOM LINE

A truly sustainable community is one that balances the economic, ecological and social impacts of development. In Greensburg protecting social equity and maintaining cultural heritage means establishing a framework for affordable, diverse housing, ensuring a mixed income range, and taking an inventory of the cultural qualities that made the town special. Incorporating ecological balance means continuing to remember the natural heritage of western Kansas, stewarding the Ogallala aquifer and realizing the inherent energy of the wind and the sun. When ecology and culture are balanced, there is an immense opportunity to capitalize on the economies they create. By restoring the native environmental systems and utilizing natural capital, Greensburg can create a vibrant, sustainable rural economy.

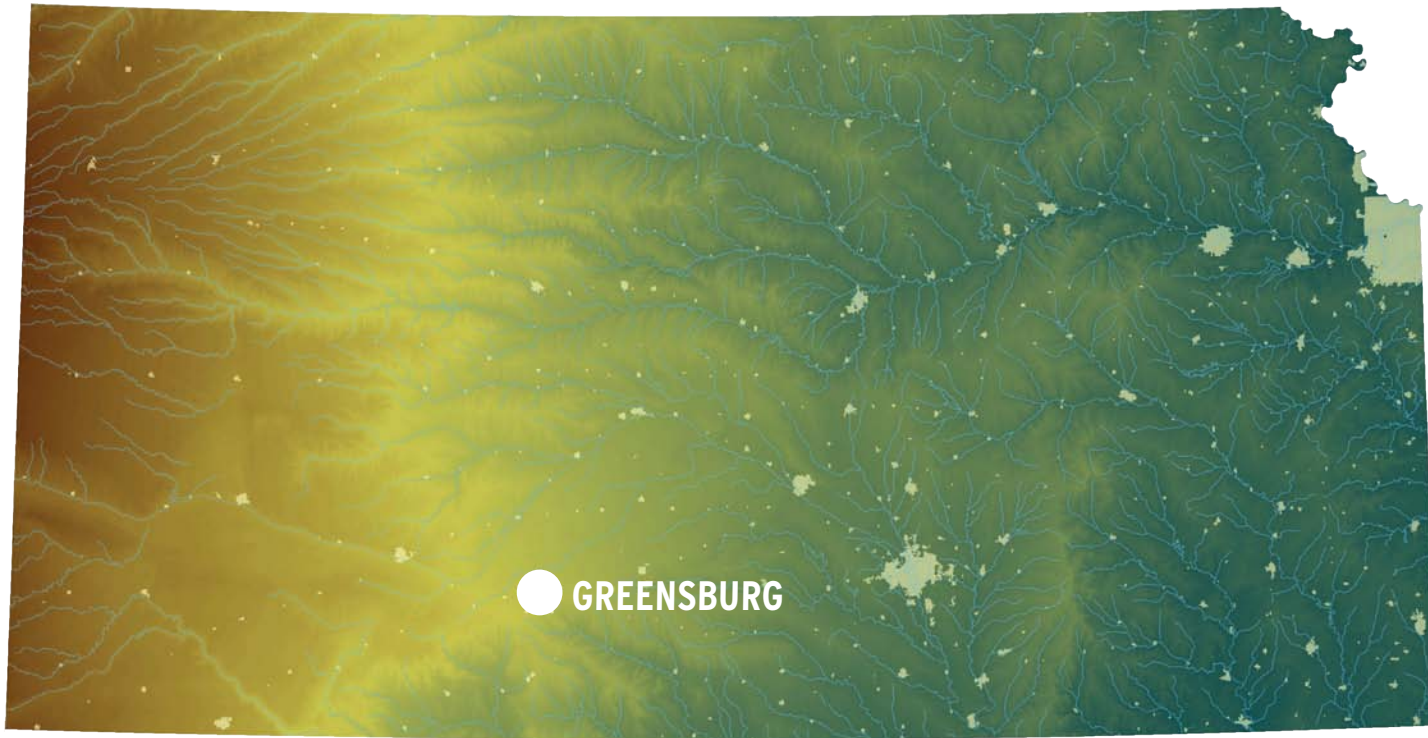
CREATING A REPLICABLE MODEL

Greensburg's progressive goals for rebuilding also represent an opportunity for other rural towns to better understand how a successful, sustainable economy is created. The planning team has heard from the community that it is important to make replicable decisions in Greensburg so successes can be shared with similar communities. This requires some extra diligence on the part of those rebuilding Greensburg. Not only must they record their path, but they must also be careful to make replicable decisions. The challenge is that Greensburg's efforts were prefaced by a devastating event, and the funding mechanisms and state and federal support are specific to a disaster response situation. Many towns that would like to follow Greensburg's model will likely not be in a designated disaster area, but should still be able to replicate many of the good decisions that make Greensburg a model. The process for implementing those decisions may differ, but the overall vision and action steps will be similar. As Greensburg becomes established, other rural communities will be able to use Greensburg as a model, learn from the failures, and capitalize on the successes.

MEASUREMENT AND RESEARCH

Sustainable community planning is a relatively young concept and there is little data to support or refute its claims. As one of few communities with the opportunity to do a complete overhaul of its infrastructure, buildings, and government, Greensburg is uniquely positioned to be a laboratory for research on sustainable design and community development. In addition, Greensburg is the first rural municipality to take on these aggressive goals, making it a one of a kind sustainable community. It is recommended that every entity involved in rebuilding take extra care to record successes and understand failures. In the coming years as Greensburg's rebuild becomes more and more substantial, there will be an opportunity to attract research entities in the way of resident programs, university partnerships, and even scientific studies. Careful record keeping will help attract these researchers to town.

COMMUNITY OVERVIEW



COMMUNITY HISTORY

Greensburg is located in the Southwest part of the state of Kansas. The town was incorporated as a third-class city and named the County Seat of Kiowa County in 1886. Since that time, the City and County's fate have been intertwined. The continued coordination between City and County is important to the rebuilding effort, and the inner workings of this relationship should be explored. It may be appropriate to consolidate city and county operations. Greensburg was established to support the country's thriving railroad industry and today the rail remains a potentially critical asset.

"We must adjust to changing times and still hold to unchanging principles."

- JIMMY CARTER



Historic post card of Greensburg's Main Street

DEMOGRAPHICS

POPULATION

Greensburg's population grew by nearly 500 percent in the early twentieth century, reaching its all-time high of nearly 2,000 people in 1960. Since that peak the town has experienced a slow decline. In 2006, the Census projection reported the population in Greensburg as just 1,389.

The future population of Greensburg is completely dependent on the speed and quality of the rebuilding effort. It is safe to assume that not all residents will return after a disaster of this scale. This does not mean, however, that Greensburg will experience a population decline in the long-term. New residents may be attracted because of the way the community chooses to rebuild, the resurgence of business and the opportunity to live in a community with new state of the art service and schools.

Based on projections by the Federal Emergency Management Agency (FEMA), the City of Greensburg should experience a steady increase in population with a reasonable expectation of reaching the pre-disaster population within five years. The

Year	Population
2006	1,389
2000	1,574
1990	1,792
1980	1,885
1970	1,907
1960	1,988
1950	1,723
1940	1,417
1930	1,338
1920	1,215
1910	1,199
1900	343

projected return rate of the Greensburg population is based on the level of damage and community response, and shows a 50 percent recovery of the former population in the next 18 months, 75 percent recovery in three years and 100 percent in five years. Where Greensburg's population will be in 20 years is a question of much debate and a favorite topic of prognostication around town. Based on the research gathered by the planning team and the indication of new industries taking an interest in Greensburg's sustainability goals, we believe that Greensburg can become one of the few rural communities able to gradually increase its population. To accomplish steady growth, city officials, county agencies, and the many active citizen groups will have to continue their intensive reconstruction and recruitment efforts. Most importantly, when making rebuilding decision, it will be critical to consider the impact of the project on the citizens of Greensburg today, the citizens that will be recruited to town, and the next generation of Greensburg residents.

AGE

According to the 2000 Census, the median age of residents in Greensburg was 45.6 years-of-age—more than ten years older than the overall median age in the United States. More than one fourth of Greensburg residents were over the age of 65, more than twice the national average. This data alone is good reason to expect a declining population, and it is anticipated that the population would have continued to decline over the next decade if big changes were not made. One of the principle rebuilding challenges will be to create a town that attracts people of all ages.

EDUCATION

Although a high percentage of residents (82.6%) over the age of 25 have a high school education, the town fell behind the national average of residents over 25 with a Bachelors degree or higher education (17.6%). This implies that a large majority of Greensburg high school students over the last decade have either finished high school to move directly into the work force, or gone to college and not returned to Greensburg upon graduation. It is important that Greensburg schools continue to foster an environment that prepares students for higher education. The Greensburg school system should be commended for its commitment to excellence and its recognition as a top performing school by the state of Kansas. One strategy for building upon this success would be to offer educational outreach opportunities on a continuing education basis. Furthermore, by offering continuing education opportunities, modern amenities, and new economies, Greensburg can encourage those who go elsewhere for college to ultimately return to Greensburg.

INCOME

The average per capita income in Greensburg was \$18,054 in 2000, just over 83 percent of the national average. Despite the low income of the town, few families were living below the poverty line (8.4%). It is mandatory that in the rebuilding process the City pay special attention to those individuals who need the most help. Job creation deserves particular attention.

ECONOMY

Kansas has a strong agricultural tradition that predates its statehood, and agriculture continues to be a significant contributor to the state's and Greensburg's economic well-being. Located in Southwestern Kansas, Greensburg is in the heart of agricultural production in the United States. According to the United States Department of Agriculture, Kiowa County's most prevalent crop was wheat in 2002, with a total of 55,749 acres harvested annually. Other crops grown in the area are corn, sorghum, forage, soybeans and cotton. Although many Greensburg citizens make a living in farming, they often have a second job when they are not planting, harvesting, or tending to their crop. Increasingly, as agricultural resources continue to provide raw materials for a broad range of nonfood products, such as chemicals,

fibers, construction materials, lubricants and fuels, developing and commercializing biobased and bioenergy products will provide new and expanded markets for Kansas' agricultural feedstock.

Other primary employers in Greensburg are the school, hospital and City and County government staff.

There is great opportunity for Greensburg to attract new green economies. The focus on building a "green" town has brought Greensburg a notoriety that should be leveraged as an economic development tool. Business' with a compatible mission should be targeted. Additionally space should be given at the Business Incubator for start-up "green collar" jobs.



Photo © Larry Schwarm

CULTURE AND TOURISM

Together, the Big Well and Pallasite Meteorite create a source of income, attraction, and pride for the City of Greensburg. This was a unique Kansas Tourism destination and it is important to memorialize this history.



The coop in Greensburg, November, 2007.

THE BIG WELL

The story of the World's Largest Hand-Dug Well began in the 1880s when both the Santa Fe and Rock Island railroads were laying tracks across the plains of Kansas. A large supply of water was needed for the steam locomotives and the growing population. The only means of getting clean, dependable water was to create a well. In 1887, The City of Greensburg granted a franchise for a water-works system, costing approximately \$45,000—a huge sum of money at the time.

Construction of the well was a magnificent work of pioneer ingenuity. Hired on a day-to-day basis for fifty cents a day, crews of twelve to fifteen farmers, cowboys, and other local men dug the well. These men quarried and hauled native stone in wagons from the Medicine River, twelve miles south of Greensburg.

When the well was completed in 1888, it was 109 feet deep and 32 feet in diameter, making it the largest hand dug well in the world. It served as the city's only water supply until 1932. The well was covered and opened as a tourist attraction in 1939. Since then, over 3 million people have visited the "Big Well," with nearly 40,000 visitors in 2006 alone. In 1972, the well was recorded into the National Register of Historic Places and in 2007 the Big Well was named one of Kansas' seven natural wonders.

Like many tourist destinations in small towns like Greensburg, the Big Well museum was operated and maintained by Greensburg residents. If groups called in advance they would have warm homemade snacks waiting for them. The Big Well is attractive because of its size and tie to pioneer history. People from all over the world signed the guest book at the Big Well Museum, and locals came generation after generation to share the story of the well with their children.

PALLASITE METEORITE

A sister attraction to the Big Well in Greensburg was the "World's largest Pallasite Meteorite." Half iron and half stone, the Pallasite Meteorite, or "Space Wanderer," previously on display in the Celestial Museum at the Big Well, was found on the Ellis Peck farm east of Greensburg by Mr. H. O. Stockwell of Hutchinson, Kansas, using a device similar to a mine detector.

After the May, 2007 tornado, the 1,000 lb. meteorite was initially reported missing, but was eventually found and is currently on tour as a temporary display in area museums. It will return to Greensburg when a new facility is completed.



This historic post card shows visitors enjoying the Big Well.

GREENSBURG RANGERS

Greensburg is home to the Greensburg Rangers, and the town takes great pride in its school's academic performance and sports teams. Before the tornado, the High School (9th -12th grade) employed twelve teachers and housed 117 students. The Delmer Day Elementary/Middle School employed twenty teachers and taught 198 students. The reopening of the school just three months after the disaster is a testament to the importance and weight it has in the community.



A historic Greensburg Rangers Pendant (**top**) and the Ranger's sign that survived the tornado in Davis Park (**bottom**).

NATURAL CONDITIONS

The scenic beauty, biological diversity, historic value, and cultural significance of the region surrounding Greensburg are a significant asset. As we have learned, the prairie, its inhabitants and larger economic forces are all part of the same system. Greensburg's culture and economy are directly affected by the natural systems of the region and this context should be considered in any new development project. The following page is a compilation of a few of the natural conditions that directly impact what goes on in Greensburg. Recognizing the significance of these forces is key to improving the performance of many city projects.

There are many natural conditions that make Greensburg unique and each should be considered when making decisions about rebuilding in a sustainable manner:

- Greensburg lies near the center of the Rattlesnake Creek watershed and has an annual precipitation of approximately 22.35 inches.
- The Rattlesnake Creek watershed makes its way northeast from Greensburg, which means that responsible stormwater management in Greensburg has a positive effect on the downstream watershed

- Greensburg is in a cold, humid climate zone with temperatures ranging from very high summer heat to frigid winters.
- Greensburg is situated in one of the windiest parts of the United States, with consistently high wind speeds throughout the year. All of the natural conditions in Greensburg present opportunities for improved stormwater management, energy efficient buildings, and capitalizing on natural assets and are incorporated into this plan.

MAY 2007 TORNADO

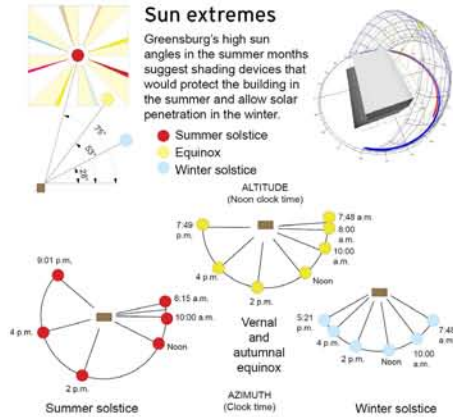
On May 4th 2007, at approximately 9:45pm an EF-5 tornado made its way through Greensburg. The tornado was estimated to be 1.7 miles wide and included 205 mile per hour winds. With more than 90% of the structures in town severely damaged or destroyed, Greensburg was soon after declared a national disaster area by President George W. Bush. Thanks to tornado warnings only ten lives were lost despite the near total destruction of the town.



GREENSBURG, KANSAS

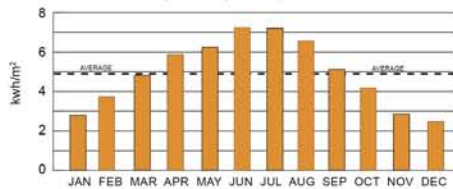
37.36 N LAT. 99.17 W LONG. ELEVATION 2,228'

SOLAR



Average daily horizontal solar insolation

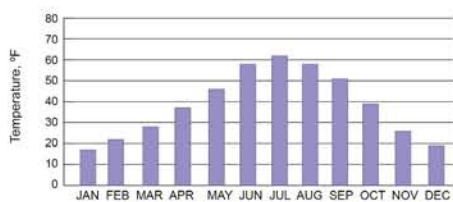
Amount of electromagnetic energy (solar radiation) incident on the surface of the earth. In Greensburg, May through September are the best months for effective solar collection but with the high annual average of 4.93 kWh/m², solar collection is good throughout the year.



MOISTURE

Average dew point

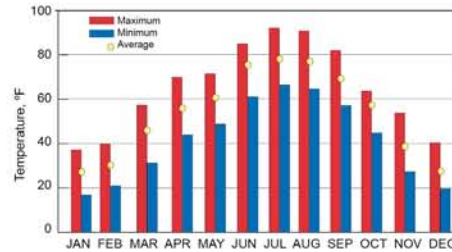
Envelope design should address condensation due to high humidity in the summer months. Winter months are relatively dry.



TEMPERATURE

Average minimum, maximum and monthly temperatures

Greensburg's is in a cold, humid climate zone. Temperatures vary from high summer temperatures in June, July and August to frigid numbers in December, January and February. The average diurnal swing is 24 degrees.

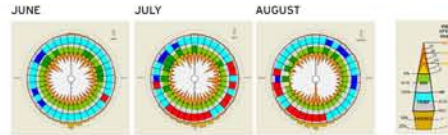


Heating and cooling degree days

Heating and cooling degree days are represented by units that represent one degree of difference between a given point (65°) in the mean daily outdoor temperature. Space heating is more of a concern than space cooling.

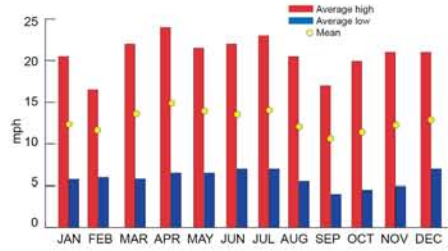


WIND



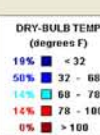
Average wind speed

Greensburg is situated in not only one of the windiest parts of Kansas but of the United States. Wind speed averages remain consistently high throughout the year but spring brings the highest gusts. The summer months of June, July and August, with south winds and comfortable temperatures, offer times when natural ventilation can be used to cool buildings and offer fresh air. Harvesting wind energy is a viable option.

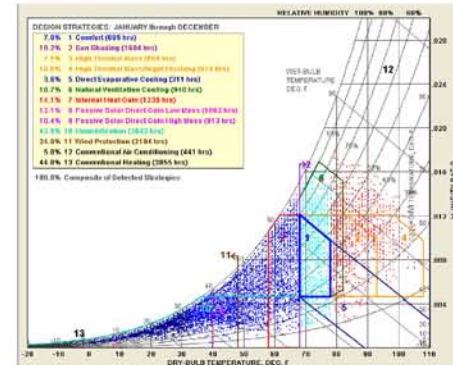


PSYCHROMETRIC DATA

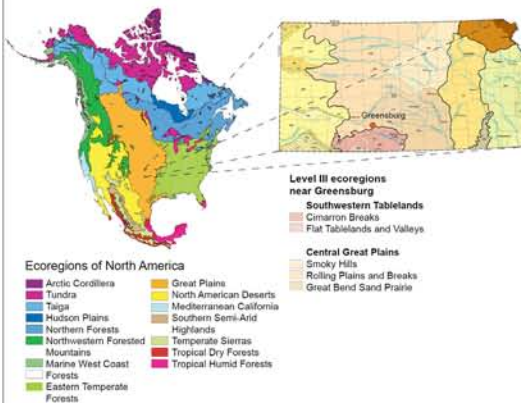
LEGEND



Humidification in dry winter months, wind protection and sunshading in summer are the top three strategies that will help achieve comfort in Greensburg.



ECOSYSTEMS



Indigenous plant and animal species

Forbs and Wildflowers Ashy Sunflower Black Eyed Susan Blanket Flower Butterfly Milkweed Compass Plant Plains Larkspur Heath Aster Hoary Puccoon Indian Paint Brush New England Aster Prairie Coneflower Curled Dock Purple Prairie Clover Rocky Mountain Zinnia Rose Verbena Spidevort Big Flower Coreopsis Wild Hyacinth White Beardtongue White Wild Indigo	Grasses and Sedges Big Bluestem Blue Grama Bottlebrush Sedge Buffalo Grass Burr Reed Sedge Bushes Sedge Canada Wild Rye Fox Sedge Great Plains Indian Grass Leavenworth's Sedge Little Bluestem Prairie Cordgrass Prairie Dropseed Porcupine Sedge Rattlesnake Grass Rice Cutgrass Side-Oats Grama Switch Grass Common Scouring Rush	Shrubs and Trees Aromatic Sumac Ash Black Jack Oak Bur Oak Chinquapin Oak Dogwood Eastern Cottonwood Hackberry Kentucky Coffee Tree Lead Plant New Jersey Tea Osage Orange Pawpaw Pin Oak Redbud Red Cedar Red Oak Sand Sagebrush Sycamore Wahoo Yucca	Wildlife American kestrel Armadillo Badger Beaver Black-billed magpie Black-tailed prairie dog Bobcat Collared lizard Coyote Great Plains toad Kangaroo rat Lesser prairie chicken Mule deer Northern flicker Northern otter Prairie leopard frog Porcupine Prairie lizard Pronthorn antelope Red-headed woodpecker Roadrunner Swainson's hawk Taratula Texas horned lizard Thirteen-lined ground squirrel Western kingbird Western rattlesnake White-tailed deer Wild turkey
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Climatology Data

BNM Architects / Elements
106 W. 14th St.
Suite 200
Kansas City, MO
64105
October 2007

SOLAR: Photostations in the Built Environment, DOE/GO-10067-436, Sept 1997 U. S. Department of Energy and National Renewable Energy Laboratory
TEMPERATURE, WIND: <http://www.weatherbase.com/weather/weatherall.php3?w=013227&user=sun&u=1>

RAIN: <http://www.nrcsl.nasa.gov/csl/climate/climateinfo/summary.php>
PSYCHROMETRIC: WeatherMaster, V1.0, Nov 29 1999 U.S. Department of Energy, Sustainable Buildings Industries Council, and National Renewable Energy Laboratory (NREL)
ECOSYSTEMS: Chapin, F.S., Klein, B.A., Menck, J.M., Foss, T.L., and Murray, E.O. 2004. Ecore-

gions of Nebraska and Kansas (color poster with map, descriptive text, summary tables, and photographs). Reston, Virginia, U.S. Geological Survey
WIND: Climatic Atlas of the United States, 1993, U. S. Department of Commerce, National Oceanic and Atmospheric Administration, and National Environmental Satellite, Data, and Information Service

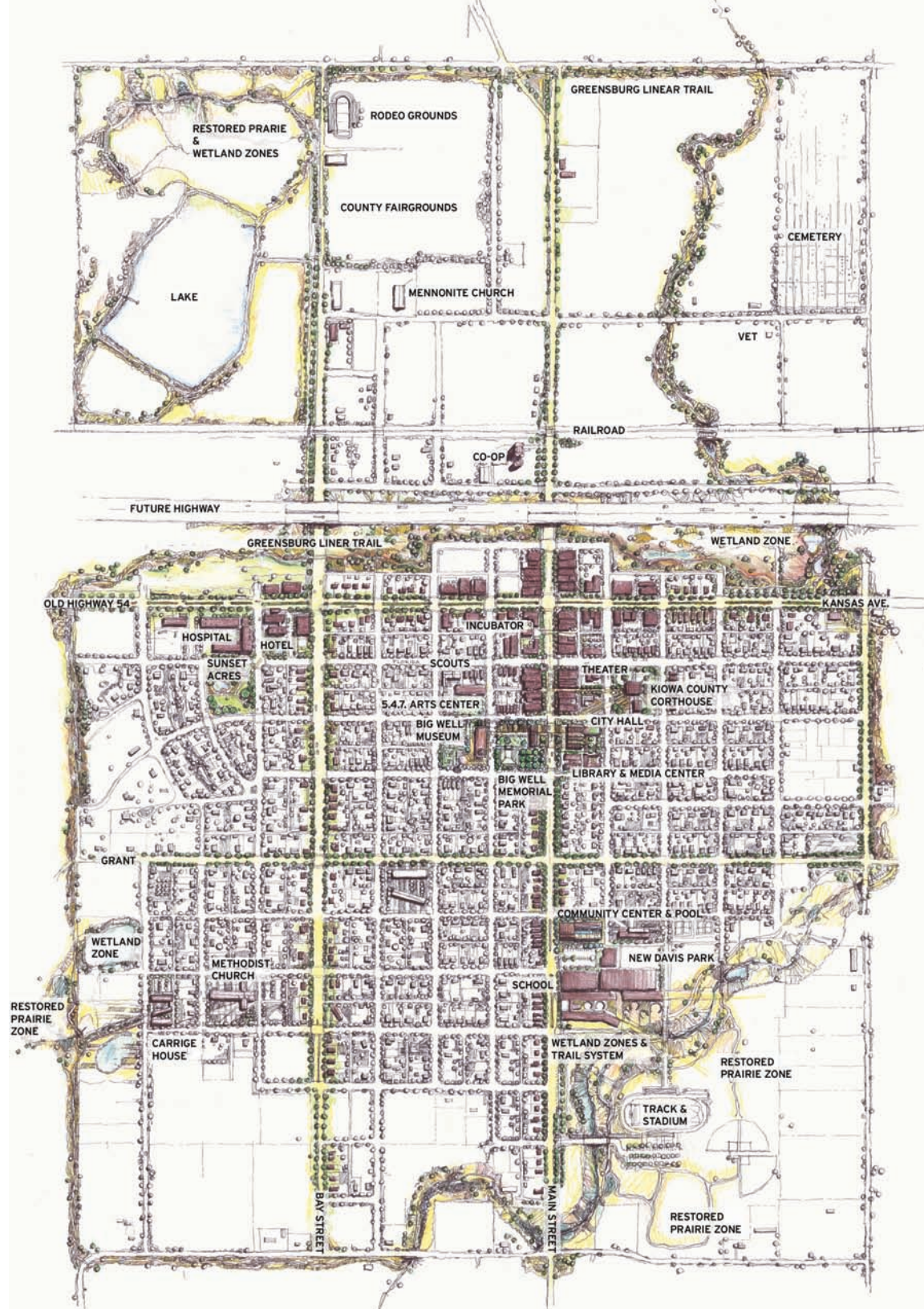


www.bnm.com ELEMENTS

See the Community Atlas for a larger print.

THE PLAN

DOWNTOWN
WALKABILITY
BUILT ENVIRONMENT
HAZARD MITIGATION
ECONOMIC DEVELOPMENT
ENERGY
TRANSPORTATION
CARBON
HOUSING
PARKS + GREEN CORRIDORS
INFRASTRUCTURE
FUTURE LAND USE





CO-OP

FUTURE OVERPASS

RESTORED PRAIRIE

HIGHWAY 54

INCUBATOR

DOWNTOWN CORE

KIOWA COUNTY
COURTHOUSE

5.4.7 ART CENTER

MAIN STREET

CITY HALL

BIG WELL MUSEUM

CREEK

BIG WELL

AMPHITHEATER

MEMORIAL PARK

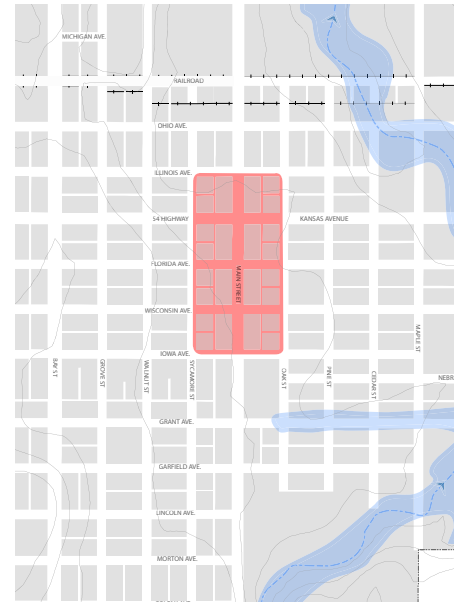
DOWNTOWN

“A great city is not to be
confounded with a populous one”
- ARISTOTLE

DOWNTOWN

The Downtown Core is the social and economic engine that will drive long-term redevelopment. It is envisioned as the heart of the town; a vibrant, pedestrian-oriented central district that defines the character and spirit of Greensburg.

The issues and questions surrounding downtown redevelopment made it the top priority and community working groups spent the first four weeks of the planning process focusing on downtown so that businesses could begin building back as soon as possible. Through this examination many important aspects were discussed: overall downtown layout, building setbacks and massing, street width and sidewalk width, sustainable features, streetscape design, the promotion of walkability and a mixture of uses.



Greensburg’s downtown core is comprised of eight blocks surrounding the Main Street corridor and bounded by Illinois Avenue on the north, Iowa Avenue to the south, Sycamore on the west and Oak on the east. From the beginning of the Sustainable Comprehensive Planning process, the community was heavily involved in evaluating potential scenarios.

LAYOUT

Three scenarios for the downtown layout were discussed and the design team helped present the pros and cons of each. **Scheme 1** maintained the pre-tornado property lines and building set backs, but added some streetscape amenities such as street trees, traffic calming bump-outs that could contain rain gardens, pocket parks between buildings, and a 6 (six) foot increased sidewalk width to allow a planted amenity zone.

Advantages:

- Most advantageous for pedestrian activity
- Creates the most connected downtown core
- Provides the fewest obstacles to redevelopment

Disadvantages:

- Similar to traditional downtown layouts

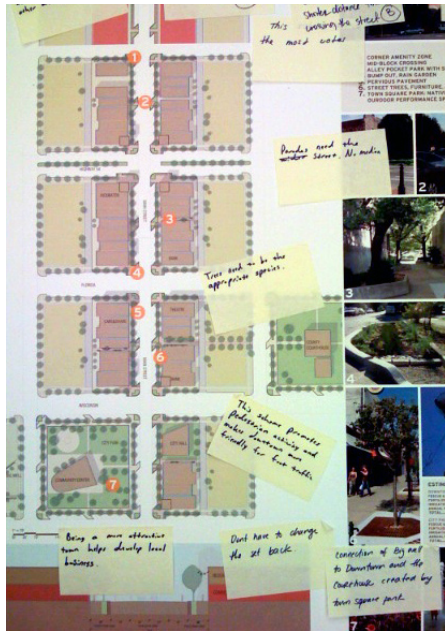
Scheme 2 showed only a slight variation from scheme 1. It maintained the pre-tornado property lines and setbacks, as well as the streetscape amenities, however, this scheme included a 10 foot planted median down the center of Main Street. The groups who discussed this scheme talked about the advantages and disadvantages of placing a median on Main Street:

Advantages:

- Provides an attractive amenity to the town
- Creates a place for pedestrians to stop half way across the street
- Could be used to filter and clean runoff from the street

Disadvantages:

- Median creates a visual and physical barrier between the store fronts on either side of the street
- Median adds cost to the streetscape project
- Median limits the areas where pedestrians can cross the street
- Annual community parades would be inhibited by the median



Scheme 3 included a large, block wide, central park space. By moving the businesses on the west side of Main Street to the west side of Sycamore, an approximately 300 foot wide park amenity was added to downtown. The following Pros and Cons for the block-wide green were discussed:

Advantages:

- Provides a large new amenity for the town
- Creates an image of Greensburg as "green"
- Sets Greensburg's downtown apart from other rural downtowns
- Opportunities for stormwater management practices within the park

Disadvantages:

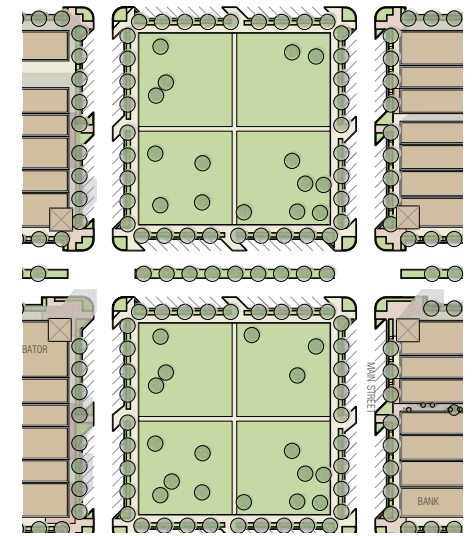
- The distance between businesses on either side of the business district was prohibitive
- The maintenance costs for such a large park space are prohibitive
- Reduced the sense of visibility on Main Street
- Bifurcates the economic development relationships in downtown
- Creates hardship for business owners to relocate their property
- Slows rebuilding process



Scheme 1



Scheme 2

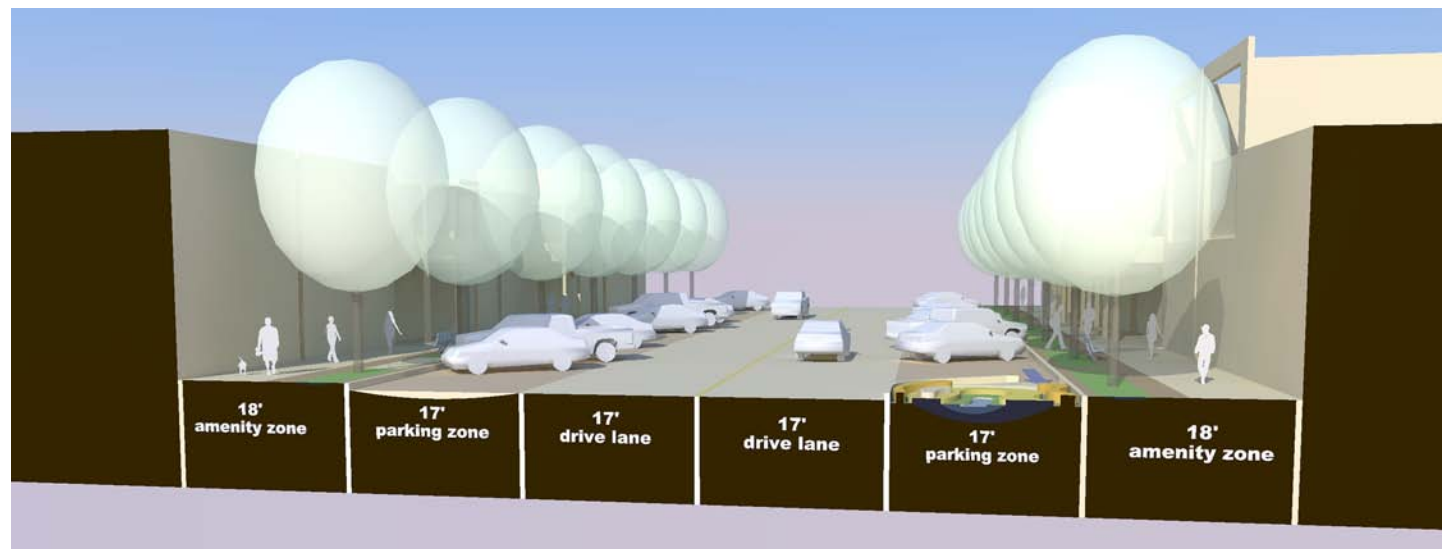


Scheme 3

The community groups weighed the advantages and disadvantages and ultimately chose scheme 1 for the downtown layout. Both the Median and the Block-wide green had too many disadvantages to warrant including them in the downtown design. The ability to use pre-tornado setbacks, design innovative stormwater filtration systems, and allow business to begin building immediately were perhaps the most important qualities of Scheme 1.



This rendering is representative of scenario 1. A 6 foot planted zone is added to the sidewalk.



This section of main street illustrates the dimensions recommended by Scheme 1. Six feet were added to the sidewalk width on both sides of the street with the intention to include a generous landscaped area and amenity zone. Each of the two drive lanes are 17 feet and angled parking is 17 feet long by 10 feet wide.

MATERIAL AND DESIGN

In great towns and cities, architecture is a source of civic pride. It is Greensburg's goal that the Built Environment should be "durable, healthy and efficient," and all of these qualities should be a priority when planning building projects for downtown. The structures that defined Greensburg's downtown before the tornado were built to last by Greensburg settlers, and the city was proud of that heritage. It is important that the downtown be rebuilt from materials, and in an architectural style, that the City will be proud of for the next 100 years. Downtown buildings should be beautiful, healthy environments for users, designed to take advantage of natural day lighting and ventilation. They should be energy efficient and low maintenance to help sustain businesses over the long-term.



Another important feature of the architecture in successful downtowns is that a high percentage of the ground floor is transparent. This allows pedestrians and passing vehicles to see the goods and activity inside of businesses along Main Street.

With its LEED Platinum resolution, (see energy section) the City has resolved to achieve a level of excellence beyond that of any other city in the United States. It is recommended that whenever possible businesses in downtown follow the city's lead and incorporate the U.S. Green Building Council's LEED rating system into their design.

ARCHITECTURAL CHARACTER

In the same way that clothing represents an individual's personality and lifestyle, the architectural character of buildings in downtown Greensburg will define the businesses that inhabit them, and reflect the overall qualities of the town. In discussions with citizens regarding the architectural style for the future, a few key points emerged:

- Buildings should not be homogeneous. Avoiding a strip mall or planned development feel, the individual businesses should have distinct character.
- Buildings in downtown should be made from quality materials that are durable and do not become blighted over a short period of time.

- Architecture can be contemporary and elegant, but needs also to be warm and inviting.

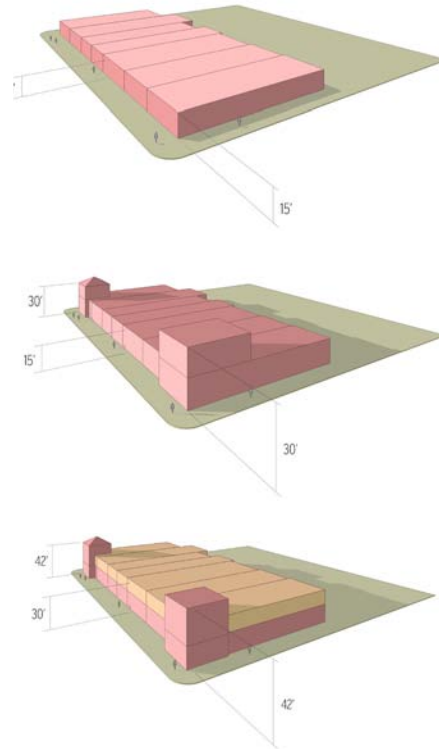
It is recommended that the City complete detailed Architectural Design Guidelines for downtown. The creation of Guidelines should involve a public process where these ideas are fully vetted with the Business Redevelopment Group, the Public Square Steering Committee, the Planning Commission, the general public, and the City Council. The guidelines should use this plan as a framework.



MASSING

Buildings do not just enclose indoor environments; they are the objects that define the outdoor environment and should be strategically positioned to create outdoor space. Building mass can be placed to create gateways into districts or placed in open space, like the Kiowa County Courthouse, to express their importance.

Moving building frontage up to the sidewalk in downtown districts creates a “street wall” that encloses and focuses street and sidewalk activity. Stakeholder groups met on many occasions to discuss their preference for the building height in downtown. By analyzing massing diagrams and comparative renderings they decided that two story buildings help create a more rich downtown character and are encouraged. It was also determined that two or three story buildings on corners in downtown are important for creating a sense of place in Greensburg. If building projects located on the corner lots in Greensburg cannot afford a two or three story building they should build to a standard that would allow a second and/or third floor to be added in the future. Whenever possible, codes and zoning should reflect and influence this quality.



CREATING ENERGY AND ACTIVITY

Great downtowns support a wide variety of uses and it is this diversity that makes them exciting, active places. An array of businesses that provide basic needs for the community and facilitate pedestrian activity should be encouraged along with residential uses.

Residential development is an increasingly prominent part of downtown redevelopment. Lofts, condos, and live/work scenarios often do well in downtown areas and could provide Greensburg with a more consistent street life and sustainable economy. This type of living is attractive to a young demographic and will help attract new talent. A diversity of housing types is an important technique to maximize the community’s appeal to all ages.

BUSINESSES IN DOWNTOWN

The type of businesses that will develop in downtown Greensburg are what make it truly unique. Local economies are vital to the success of rural towns and Greensburg needs to encourage and incentivize local business owners to rebuild in downtown. It is also important to locate as many activity generators as possible in downtown. For instance restaurants, libraries, resource centers, retail stores, schools, city hall, and banks are all appropriate businesses for the main street corridor. Businesses that do not see consistent activity throughout the day, or that require a large amount of property, should be discouraged from building in downtown. These businesses could include storage facilities, car dealerships, car washes, or gas stations. It is recommended that City zoning regulations be amended to restrict inappropriate downtown businesses.



This drawing looks south down Main Street and shows the visual benefits of 2-3 story buildings in downtown.

“The street is a spatial entity and not the residue between buildings”

- UNKNOWN

STREETSCAPE

The Downtown Core will be the most vital, and most visible, pedestrian district in Greensburg, so it is important that the streetscape design communicate and enhance that character. A streetscape with generous sidewalks, attractive lighting, street trees and other plantings, and a variety of street furniture will provide a welcome atmosphere for pedestrians and serve as visual cues about the larger environment and how it is used. Stormwater best management practices (BMPs) and native plantings should be integrated into the landscaping to provide an amenity that also displays Greensburg’s sustainable vision. It is recommended that the City complete a detailed streetscape design that incorporates the sustainable techniques discussed in this plan.



This rain garden captures runoff from the street and uses it to irrigate the plantings.

TREES & PLANTINGS

Streetscape plantings in Greensburg are part of a larger green infrastructure formed by the parks and green corridor network. Streetscape plantings serve many purposes. They enhance the pedestrian and vehicular corridor aesthetically but can also have enormous environmental benefits. Incorporating street trees in downtown can provide a 5-15 degree heat differential on sidewalks making the space more comfortable for pedestrians and increasing the life of concrete and asphalt pavement. Trees also reduce the negative health effects of tail pipe emissions, and have even been shown to reduce blood pressure by improving overall emotional health. Community groups also came to a consensus that street trees were an important amenity to include in the streetscape.

Tree species in Downtown should be carefully selected for desired qualities. They should incorporate native species that require little irrigation. Street trees should be selected based on growth patterns and ease of maintenance. They should be placed and pruned such that they do not obstruct business signs or store fronts. Trees with higher branches, attractive fall color, and no fruit are recommended. A list of appropriate plantings is included in the appendix.



TRAFFIC CALMING

Vibrant commercial districts have a healthy mix of pedestrian and vehicular activity. Though the urge to firmly separate these activities is strong, in great civic districts these uses often overlap.

Pedestrians should not feel that one side of the street is isolated from the other and should feel safe crossing the street downtown. Implementing traffic calming techniques in the downtown core will create a safer more connected pedestrian environment without impeding vehicular movement. Slightly more narrow driving lanes, corner bulb-outs and clearly marked pedestrian crosswalks will slow traffic and increase pedestrian safety.

Vehicles should be welcome in the downtown district, at appropriate speeds. Slowing traffic with regulatory speeds, and the traffic calming techniques discussed above ensure a safe pedestrian experience, and slower moving vehicles are able to see into the shops bringing business to the district.



SIGNAGE

Beyond advertising commercial uses, signs act as a navigational system for people finding their way around Greensburg. Signage in Greensburg should adhere to the community goal of being a charming, Midwestern town.

Signage should be clear, attractive and apparent but not overwhelming. Pedestrian scaled signage should be encouraged in the Downtown Core. Sign materials should be complimentary and consistent with architectural materials.

It is recommended that the city adopt a sign ordinance that allows individual expression and adequate advertising for businesses, but that ensures downtown maintains its rural charm.



PARKING

The general consensus among the community was that on-street parking was preferred to surface lots. On-street parking is convenient because it is located closer to storefronts and it enriches downtown by focusing pedestrian activity on the sidewalk. Surface parking lots increase the amount of impervious surfaces and stormwater runoff. They also create gaps in the urban fabric, counteracting the massing strategies that define the downtown corridor.

Greenburg is at a great advantage because all of the Downtown Core's parking needs can be met with on-street parking. Angle and parallel parking stalls

should be incorporated into the streetscape design for all streets in the Downtown Core, and surface lots should be strongly discouraged.

Developing the downtown core will not happen overnight, it will be a process of gradually and strategically rebuilding the fabric of Greensburg over the next decade. However, it is important that downtown reflects the town's goal of being a progressive yet unassuming community from the start. The first moves will be the most visible, and incorporating a mixture of uses is imperative to the successful implementation of a mixed-use downtown.



Angled parking stalls lining Main street on either side have a depth of 17 feet and a width of 10 feet, large enough to accommodate larger pickup trucks. The abundance of on-street parking stalls and the proximity of these stalls to storefronts eliminates the need for surface parking lots in the downtown core.

WALKABILITY

“Life takes place on foot.”

- JAN GEHL



WALKABILITY

The desire to create a walkable community was clear from Greensburg’s residents. It helps create the small town feel that was cherished for generations in Greensburg. For over 150 years, children walked to and from school and residents enjoyed chance meetings on short trips to the grocer. This is one of many important qualities to retain through the rebuilding process. In addition to supporting the desired character for Greensburg, walkability also has positive health implications. Over the last 50 years, our increased dependency on automobiles has had detrimental health affects, and creating a walkable community makes for a healthier Greensburg population.

Streetscape amenities, parks and trails, compact development, and connected public facilities are all important to the creation of a walkable community. Because of its small size, Greensburg has the potential to become even more walkable with minimal changes.

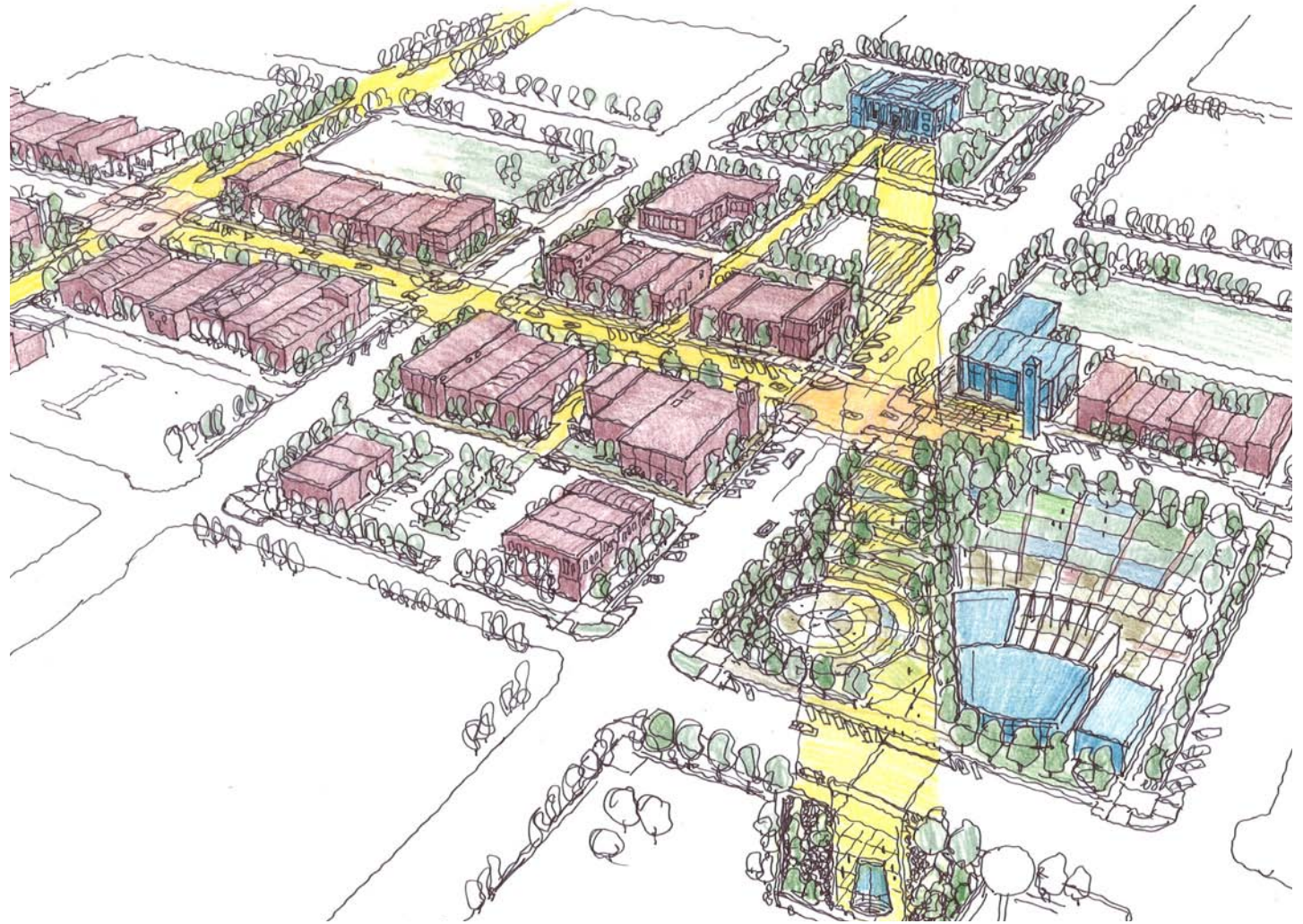
PLACEMENT OF AMENITIES AND PUBLIC BUILDINGS

Throughout the planning process, one theme came up again and again: Greensburg’s civic and commercial amenities need to be connected visually and physically. Community is created when people can meet and relate to each other in public spaces, which is more likely to happen in a place that has a compact mix of connected activities. Great care was taken to ensure that related projects are either combined or located within close proximity. The Big Well, the Kiowa County Courthouse, the new City Hall, the school and the potential site for the Downtown Park are all within a short walk from downtown. Buildings in downtown are placed close to the street and designed to encourage walking. Other future projects shall follow this pattern.

A common metric for walkable proximity is the 1/4 mile radius which represents a five minute walking distance. Greensburg is at an advantage because the majority of the city is contained within one square mile. This means that one can walk across town at a comfortable pace in just 20 minutes. The City should continue to encourage appropriate new commercial projects to locate within 1/4 mile of downtown.



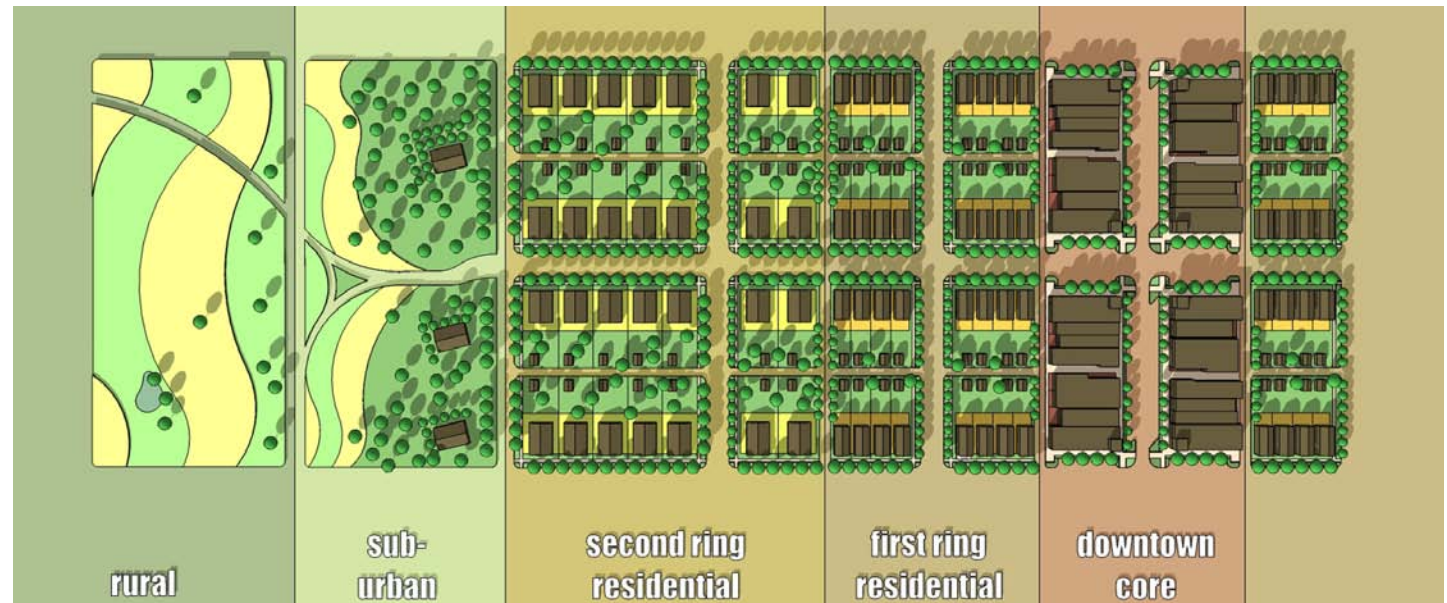
The radius of this circle is 1/4th of a mile, which is about a five minute walk; walking across the circle would take about ten minutes.



RESIDENTIAL DENSITY

Simply being able to walk from one amenity to another does not necessarily make a community walkable. It is also important that a large percentage of residents can easily walk from their homes to the downtown core and other amenities, greatly reducing the need to drive across town. Compact residential development in and around the downtown core will encourage community interaction and enhance the viability and sustainability of adjacent businesses and civic services.

The Transect concept can be applied to illustrate how this residential density is achieved. Buildings in the Downtown Core can incorporate residential units in upper floors. Medium density units like row houses and semi-detached houses can be located on the blocks adjacent to downtown, and lower density or even suburban houses fill in the second and third rings of development. One advantage for Greensburg is that its size allows for a great diversity of housing densities and scales that are all located within, or very near, a five minute walk to downtown.



Although Greensburg is a small town, there is still an infrastructure of a subtle transect. Parcels near the Main Street Core are smaller than those on the periphery of town.

TRAIL NETWORKS AND STREETSCAPE AMENITIES

The proximity of amenities to housing is important when creating a walkable community, but the pedestrian corridors that connect these uses are just as important. Some of these corridors are major streets and some are alleys or trails on the periphery of town, but they all must work together to create a city-wide connective tissue.

SIDEWALKS

Sidewalks act as linkages that carry and distribute pedestrian traffic through Greensburg, and should make non-motorized transportation safe, easy, and enjoyable. Street trees or other plantings, adequate lighting, and street furniture can promote pedestrian use and better connect amenities. Pedestrian comfort is enhanced by on-street parking where parked cars act as buffers between vehicles and pedestrians. It is important to reduce the speed of motorized traffic in commercial districts and around the school to ensure safety.

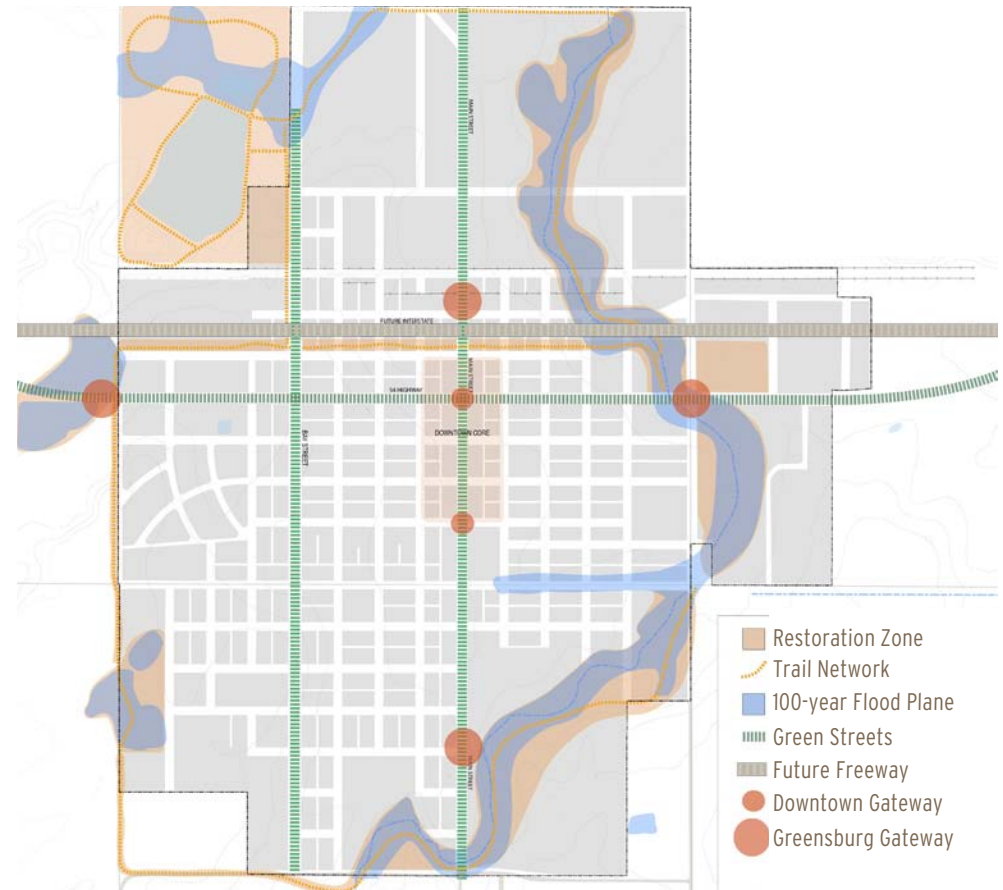
It is recommended that the City adopt streetscape standards that create walkable and bikeable streets and pass citywide speed limit regulations appropriate for pedestrian safety in different areas of town.

TRAILS AND PARKS

The City-wide parks and trail networks should flow gracefully into the manicured pedestrian streetscapes, allowing those using the trail system for recreation to also have access to other amenities. Open space in the form of neighborhood parks or larger city parks should also be linked. Detail about how to link pedestrian amenities in Greensburg are given in the Parks section of this Plan.



Linking the major streetscape arteries with the trail network would allow those children who live more than 1/4 mile away to bike safely to and from school.



BUILT ENVIRONMENT

“We shape our buildings, then our buildings shape us.”

- WINSTON CHURCHILL

BUILT ENVIRONMENT

Greensburg's built environment is its most permanent, lasting investment and symbolizes the community's goal of being a sustainable model for other communities. The planning and design of a community's buildings and infrastructure have dramatic impacts on its inhabitants and have the potential to improve health, to attract new residents, and to support a robust economy. Greensburg's new built environment will be in harmony with existing natural systems and will support a human settlement of lasting beauty. Greensburg citizens understand that the opportunity to “do it right” is now. It is clear that new building projects should be thought of as 100-year decisions. Cheap materials and construction practices that do not stand the test of time have no place in Greensburg's future.

Innovations in sustainable design offer new opportunities to improve the performance of the built environment. It is possible to build new homes, schools and businesses that consume far fewer resources, increase productivity and improve human health. Many of these green strategies can be accomplished for no cost premium and virtually all have rapid economic paybacks. In communities where people are more stable and less likely to make

frequent moves, the benefits of more efficient, healthy and durable buildings can be enormous. For residents on fixed incomes, this provides a great and direct advantage. It is important that the community is educated about available incentives and opportunities that will lead to better long-term decisions.



The entry building at the Kansas City Zoo exposes the durability of materials and incorporates natural lighting to reduce the need for electric sources. Photo by Mike Sinclair

GREEN BUILDING AND ECONOMIC DEVELOPMENT

New building techniques require trained builders and creative thinking. Many new businesses exist that can feed the vision of a sustainable rural town, and the communities that embrace new market opportunities will lead their peers. By developing new sustainable materials and technologies, rural communities also have the potential to attract scientific researchers and entrepreneurial manufacturers. It is important that Greensburg sets high building standards and attracts new building economies that support the community goals. The training and exploration that will occur with the crafts people at work in Greensburg will likely be an exportable skill.



PUBLIC PROJECTS LEAD THE WAY

In Greensburg, City projects will serve as examples of the highest level of sustainability in the built environment. Many cities have found that when publicly funded projects are highly sustainable, private investors often follow and even exceed expectations. At the adoption of this plan, the Greensburg City leadership has already demonstrated its high commitment within the built environment. On December 17, 2007 the City Council passed a resolution requiring all publicly funded City buildings over 4,000 square feet to be built to the U.S. Green Building Council's LEED Platinum certification level and reduce energy consumption by 42 percent over standard buildings. By adhering to LEED Platinum requirements, these projects will teach the community and visitors about the systems used to create highly sustainable buildings. Greensburg is the first community in the world to adopt a LEED Platinum resolution. By setting this example, the City is leading its residents, business owners and all of rural America in sustainable design.

There are many benefits of the City choosing to set such a standard for sustainable design. Some of the most significant are:

- Affirmation of the City's commitment to becoming a model sustainable community
- Serving as an example for private sector building projects
- Increased value, marketability and economic growth possibilities for the City
- Reduction in energy consumption and utility costs
- Mitigation of health risks such as asthma
- Increased worker productivity and student performance
- Improved overall environmental performance
- Validation by way of a third-party verification system (LEED)

CITY PROJECTS UNDERWAY

GREENSBURG SCHOOLS

The School District is currently in the process of redesigning and rebuilding all of its facilities in an expeditious and sustainable manner. In its quest to embrace the spirit of its community, the School District is developing new educational and public-use facilities that will accommodate and enhance its educational mission at the highest level possible. The school facilities include: Pre-K, Elementary, Middle and High Schools; a Media Center; a Distance Learning Center; Science Labs; Main and Auxiliary Gymnasiums; an Art/Music Wing; a Weather Lab and Greenhouse; and a Cafeteria and Kitchen. Rather than focusing on low first-cost buildings, the District is developing facilities that will be a source of pride and bring value to the community for decades to come. They are transforming a short-term bottom-line approach with a long-view, integrated triple-bottom-line philosophy, balancing economics, social welfare and the environment.

DOWNTOWN STREETScape

The downtown streetscape design balances the need for development with design strategies, systems and materials that decrease maintenance, energy use and environmental impact. A wind turbine near City Hall and Memorial Park will generate power for high-efficiency street lights. Concrete will include fly ash, a by-product of coal-fired power plants, and benches will be milled from reclaimed wood. In response to Greensburg's anticipated growth, the streetscape design will provide ample sidewalk space, an environment conducive to downtown living and effective automobile circulation.



The School facilities are on track to achieve LEED Platinum certification.



The downtown streetscape will incorporate stormwater management strategies based on natural systems.



As the first LEED Platinum City Hall project in the United States, Greensburg City Hall will incorporate a philosophy that will look to reduce consumption at every level, reuse, recycle and clean its waste, and generate clean power for the community.

CITY HALL

Greensburg City Hall will be the symbol of the town's vitality and leadership behind the community's goals. The building will reflect Greensburg's character and represent the vision of becoming a model sustainable community where social, environmental and economic concerns are held in equal balance. The building will house the City's administrative offices and council chambers, which will also serve as a public gathering place for town meetings and municipal court sessions. At the front of the building, a vertical axis wind turbine will draw attention to the significance of city government and the goals for a more sustainable Greensburg.

BIG WELL AND WEATHER MUSEUM

The Big Well and Weather Museum will celebrate Greensburg, the Big Well, and the weather of the area. The museum is conceived as a place to learn about Greensburg's history and will be a demonstrative instrument that serves to educate visitors about the potentials of environmentally restorative architecture.

The Big Well, "The World's Largest Hand Dug Well," has long been the primary historical marker for the City of Greensburg, attracting nearly 40,000 visitors annually prior to the 2007 tornado. At one time, the well was the primary source for water in Greensburg. The well has a direct link to the threatened Ogallala aquifer and could serve as a valuable research tool for understanding the increasing pressure being placed on the region's water supply.

BUSINESS INCUBATOR

The purpose of the Business Incubator building is to provide start-up space for small businesses to grow for a limited period of time at attractive rental rates until they can relocate or build a larger facility. New start-up small businesses would then take up residence in the Business Incubator and the process begins again. This facility of approximately 9,300 square feet will be located at the northeast corner of Kansas Avenue (U.S. 54) and Main Street. The Incubator is comprised of five retail shops located on the first floor and nine professional service offices on the second floor. A storm shelter will also be constructed within the facility.

The Business Incubator was funded by a partnership between SunChips® and USDA Rural Development.

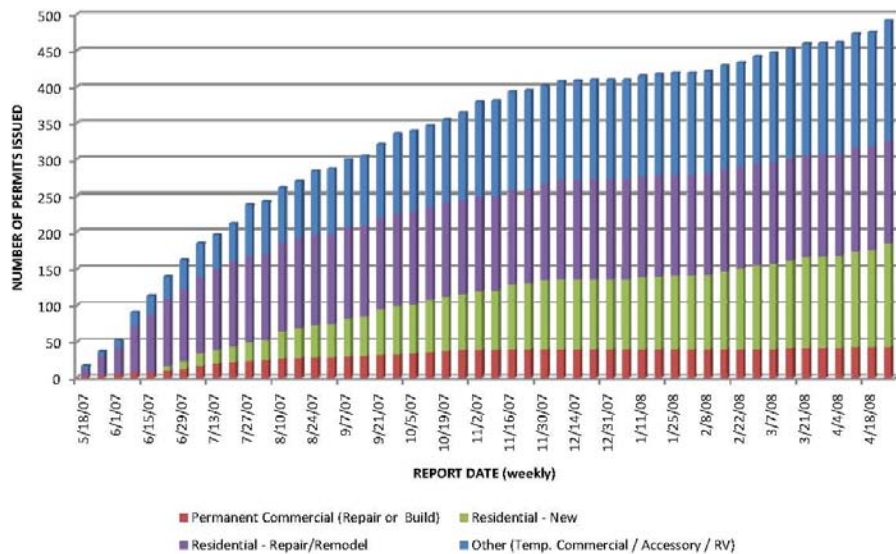


The Big Well Museum will be designed to educate residents and visitors how to conscientiously conserve, clean and use water as a resource.

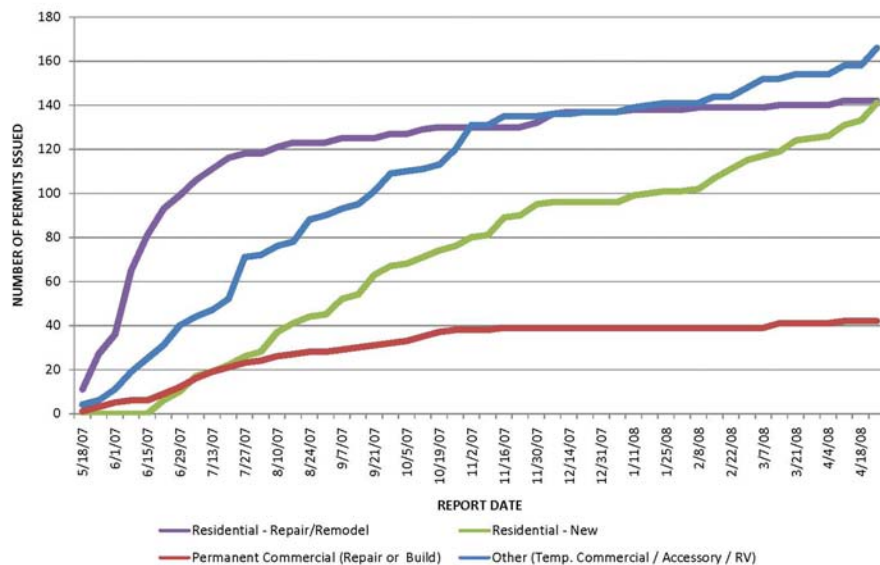


The Business Incubator is tracking LEED Platinum certification by making use of key energy-efficient technologies and water reuse systems.

Building Permit Record (cumulative) Greensburg, Kansas



Building Permit Record Greensburg, Kansas



CURRENT PACE OF REBUILDING

Although the initial wave of residential rebuilding efforts got off to a slow start, the pace is picking up. More and more housing permits are being pulled and financing is being sought. It is expected that homebuilding will happen in a few "waves": the initial wave occurred in the Fall of 2007, the second is underway in Spring 2008 and it is expected that another surge will happen when FEMA

housing is no longer available, sometime at the end of 2008. At that time, many larger projects in Greensburg will likely have been designed and beginning construction.



Home construction in Greensburg in January 2008.

CHALLENGES TO REACHING SUSTAINABILITY GOALS

Establishing a sustainably built environment in Greensburg is not without its challenges. Although projects will strive to push the limits of sustainable techniques, we cannot enter the rebuilding process blind to the obstacles that could keep us from reaching our goals. Some of the foreseen bumps in the road include:

- Limited housing available for a workforce in Greensburg
- Limited availability of contractors within a reasonable distance
- Limited availability of contractors and designers with sustainable design experience
- Finding sustainable materials locally
- The need to rebuild many buildings in a very short time frame
- Possible higher first costs with higher tech strategies

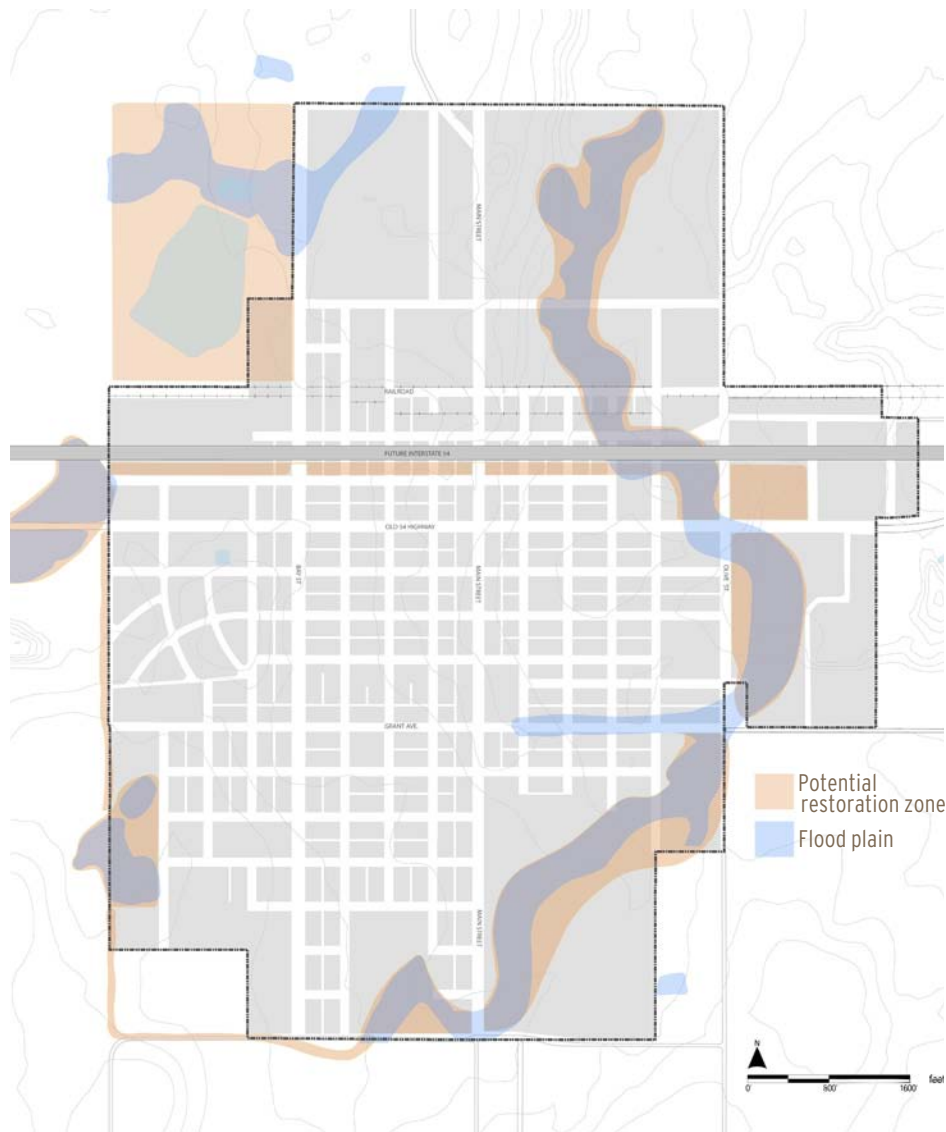
EDUCATION

One important aspect of a successful green building economy is education. Residential, commercial and industrial projects must match the high standards set by the City and its citizens. In addition, programs should be created to help educate local architects, engineers, contractors and material providers about the strategies and benefits of green building. Educational materials might include general information about green building strategies, tax incentives for green building practices, continuing education courses for design professionals, and information about green materials, local products and regional suppliers. Some important programs that have helped other cities succeed are:

- Green building website
- Green building resource center
- Continuing education opportunities for local designers and builders
- Financial incentives or tax abatements for green features
- On-going education and outreach by an entity like Greensburg GreenTown



The Missouri Department of Conservation's Anita B. Gorman Conservation Discovery Center in Kansas City, Missouri utilizes natural daylight, reclaimed materials and low-VOC indoor materials to reach a high level of sustainable design.



Map of Greensburg showing floodplain and other sensitive areas.

DETAILED SITE INVENTORY + ANALYSIS PRIOR TO DEVELOPMENT

Suitability studies are important for the sustainability of a project because they ensure we understand the impacts a development will have on a site. They help assure that a project fits into a wider, more regional concept or plan and does not compromise future restoration efforts.

The inventory and analysis help to prevent incorrect uses for the land and help the city identify the most sustainable use for it. It makes no sense to build a house on land that floods regularly, for example. There is also little logic in building a wild game reserve in a location without wild game, or build a wetland in an area that receives little to no water. To determine how best to use the land that is dedicated to the Parks Department, the City shall require a detailed inventory and site analysis prior to the area's development regardless of whether the development is to be for a building, a formal park, or even a restoration area.

Site inventory and analysis will support the community's goal to balance the need for growth with the maintenance and improvement of the environment.

SUSTAINABLE DESIGN AND CONSTRUCTION

In order for Greensburg to meet its goals for being a model community, buildings designed and built in the area shall fall within the guidelines of a sustainable master plan, fostering a walkable mixed-use community. They should also be efficient, “right-sized” lasting structures. Each project’s design and building teams must be willing to analyze the City’s design guidelines. They should also have experience with sustainable site and building design or be willing to collaborate with a sustainable design consultant. Requests for Proposals (RFPs) for architects, engineers and contractors shall incorporate language requiring sustainable design and construction experience.

Building projects in Greensburg shall strive to be healthy, efficient, safe and beautiful structures. The overall design of buildings shall be sensitive to the impacts of the climate on their interior environments. All materials considered shall be judged on their durability, source location, content (from toxicity to recyclability) and maintenance requirements. Most importantly, each building, its systems, materials, structure and architectural style shall be designed and built to last 100 years or more.



(Top) Some homes in Greensburg are choosing to use SIP panels to better insulate their homes. **(Bottom)** Some common durable building materials include brick, limestone and wood, when used appropriately and with quality detailing and design. Concrete and steel are other durable materials often incorporated into building projects.

SUSTAINABLE MATERIALS

Sustainable materials reduce the negative impacts of their manufacturing and transport on the environment and the economy. If lumber forested in virgin forests is compared to lumber forested from managed forests, the lumber from the managed forest would be considered more sustainable. However, locally harvested lumber would be considered more sustainable than lumber harvested outside the region. So sustainable materials can gain their designation based on the raw material used, the method of manufacturing and packaging, or from the location it is manufactured.

The use of sustainable materials is just as applicable for the parks and open spaces of Greensburg as it is for any other built project in the town. Any time materials are used in a park, from the trees planted to the mowers that cut the grass, a decision is made about which product, out of the many options, is the most responsible. It should be a priority of the Parks Department to study a variety of options when making choices about materials to ensure truly sustainable products are used whenever possible.

Recycled and Reclaimed

Recycled materials are made from previously used materials, ranging from direct reuse to new materials that include reprocessed components. Reclaimed bricks can be immediately reused while playground equipment may be made from reprocessed rubber from old tires.

Following this standard will allow the Parks Department to follow the environmental goal that the city's residents set. It will allow the City to make sure its impact on the environment is as minimal as possible.

Construction re-use facilities such as Habitat ReStore and websites such as PlanetReuse.com help builders and owners source reused construction materials.

Local and Regional

Local materials refer specifically to materials produced in or near the City of Greensburg. Because it is often impossible to access products that are 100% produced or manufactured in Greensburg, local materials may also refer to products that have some part of their production tied to the City. Traditionally, the definition of regional materials extends the local definition beyond the limits of the city up to a five hundred mile radius.

Local and regional products are considered more sustainable than foreign products because they take less energy to product and transport, thereby having a lower carbon footprint, or a reduced negative impact on the environment. Not only might local materials cost less for the consumer, but the money that is spent pays local wages, which in turn pay local mortgages, utility bills and taxes.

The use of local materials and products helps to create the type of renewal, growth and prosperity that the Greensburg residents set out in their community goals. By using local and regional products, the city is able to help reverse the historic decline of the town by incentivizing new business that strengthen and grow the local economy.

SAMPLE STRATEGIES

The following principles and techniques can be used as a guide for improving the durability, quality and energy-efficiency of building and parks/openspace projects at every scale. Alongside the U.S. Green Building Council's LEED rating system tool, these parameters have been identified as a starting point for understanding how to obtain a high level of sustainability in Greensburg's built environment.

Healthy Indoor Environments

- Building designs shall incorporate daylighting strategies for occupied areas to reduce reliance on electrical lighting and to strengthen a connection to the outdoors.
- Interior materials, including flooring, paints and sealers, furniture, etc., shall contain low toxicity levels.
- Operable windows shall be incorporated where appropriate to allow fresh air circulation and encourage occupant control and comfort.

Building Performance

- When appropriate, buildings shall be built to last 100 years.
- An educational program for building owners and occupants shall be developed to learn about the operations and maintenance of high-efficiency systems to maximize building performance.
- Building design shall be responsive to and work in harmony with Greensburg's climate and natural systems.
- Use of Energy Star high-efficiency appliances shall be encouraged.
- Residential projects shall be encouraged to follow green guidelines established by the City.

Leading with City Projects

- By resolution all City projects shall be built to LEED Platinum standards.
- City projects shall be located in a way that fosters a sustainable, walkable

community founded around a civic core.

- Sustainable features shall be visible to educate residents, business owners and visitors about efficient building systems.

Reflect Regional Influences

- Develop architectural guidelines for the downtown area that are rooted in a local aesthetic, but influenced by contemporary design and sustainable innovation.
- Site and building design shall embrace the community goal to treat each drop of water as a precious resource through reduced use and stewardship.
- All building projects shall be "right sized"- large enough to accommodate the intended program and with flexibility in mind.
- When possible, building materials shall reflect locally harvested and/or manufactured goods.



Off-the-grid green construction trailers are one example of innovations possible within the sustainable construction sphere. This trailer will be used by McCownGordon Construction, general contractors for the new Greensburg school projects.

HAZARD MITIGATION



The first tornado captured by the NSSL doppler radar and NSSL chase personnel. Courtesy of NOAA, Union City Oklahoma. (1973)

KANSAS WEATHER

From “The Wizard of Oz” to its booming wind farms, Kansas is known for its windy weather. Western Kansas sits in the middle of the infamous region of the United States known as Tornado Alley. While tornadoes can occur anywhere, anytime, Tornado Alley is the region of the nation that receives the highest frequency of tornadoes. Because of the relatively flat topography in the region, cold dry air from Canada often meets with warm tropical air from the Gulf, capable of creating funnel clouds. In Kansas, tornado season is typically between April and June, Kansas receives an average of 47 tornadoes annually.

Fortunately, during the May 4th, 2007 tornado, the town received some advanced warning, and most residents were able to find proper shelter. However, tornadoes can strike with little warning and it is imperative that the City of Greensburg and its residents do all they can to prepare for hazardous weather events.

REGIONAL STORMS

It is important to understand the science behind the storms that threaten our buildings and our cities so we can be properly prepared and rebuild Greensburg in the most responsible way possible.

TORNADOS

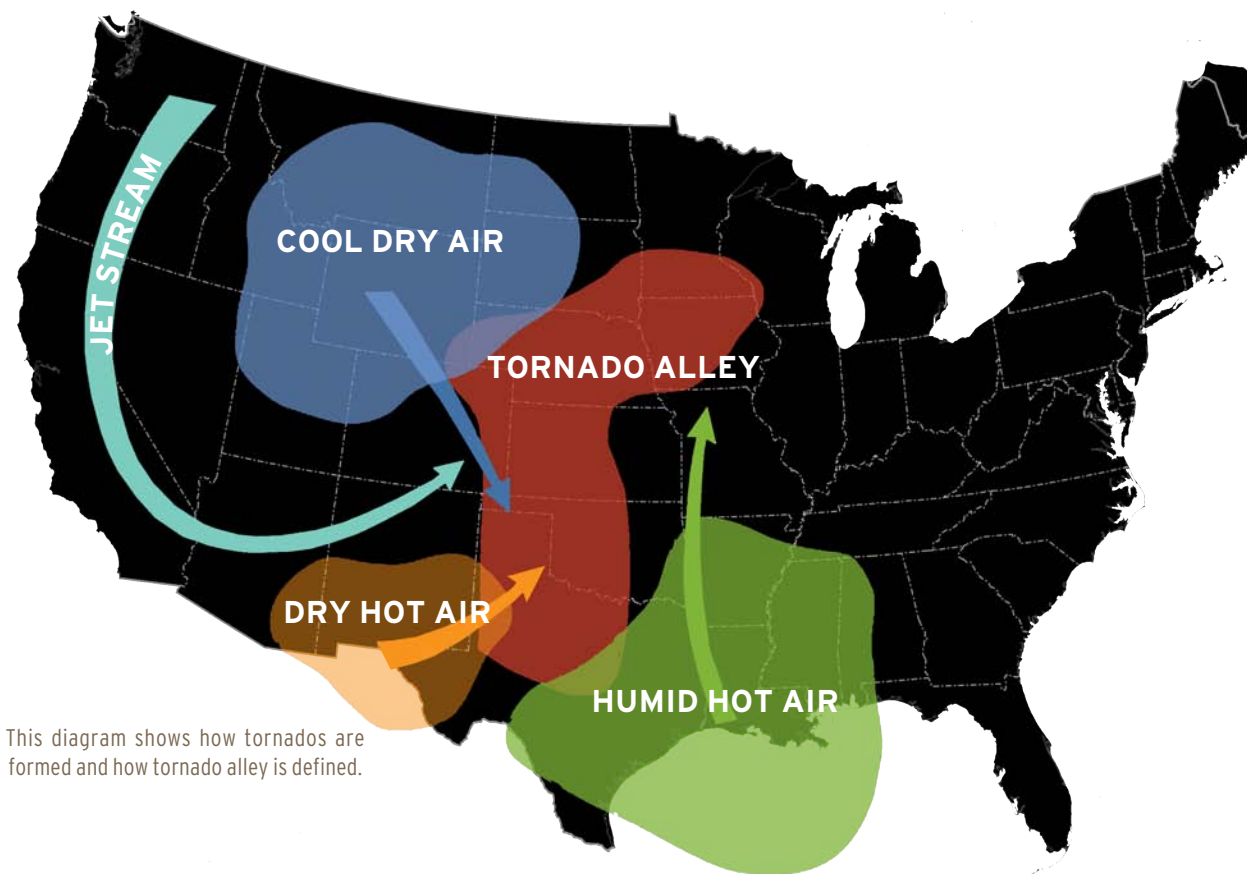
Tornados are rotating columns of air that extend from a thunderstorm and often touch the ground. They are created when warm, moist air mixes with cool dry air and have been known to create strange, erratic phenomena.

The Fujita Scale was developed in 1971 by Dr. T. Theodore Fujita. The scale compares the estimated wind velocity with the corresponding amount of suspected damage to give a tornado a ranking. The scale was amended in 2006 to include a wider range of building types and affects to vegetation. The revised Enhanced Fujita scale measures five classifications of tornados with increasing magnitude from an EF0-EF5. The 2007 Greensburg tornado is the only EF-5 tornado reported to date. The tornado was rated EF-5 because of the wind speed and extend of damage. Homes were ripped from their foundations, steel reinforced concrete and brick structures were badly damaged and trees were striped of bark by 200+ mph winds.

THUNDERSTORMS AND OTHER HIGH WIND STORMS

Tornados are not the only type of damaging winds reported in Tornado Alley. In fact, tornados are rare compared with other high wind storms. In 2007, there were 400 severe weather reports for damaging wind in Kansas alone. It is important to remember that wind damage can come from any high wind event and, in most years, thunderstorms actually cause

more damage than tornados. Objects like trees, barns, outbuildings, vehicles, and power lines/poles can be toppled or destroyed, and roofs, windows, and homes can be damaged as wind speeds increase.



This diagram shows how tornados are formed and how tornado alley is defined.

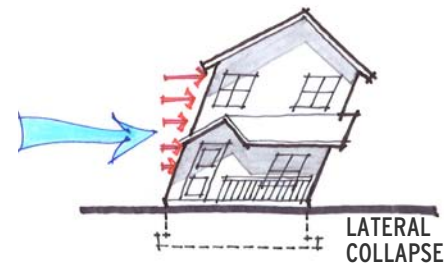
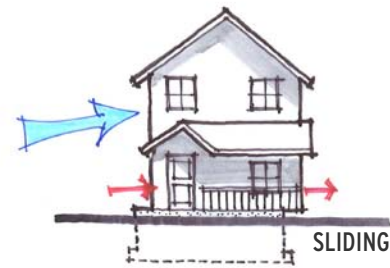
IMPACTS OF HIGH WINDS + TORNADOS

An obstruction, such as a house, in the path of a tornado causes the winds to slow down and change direction. This change increases pressure on parts of the house, and the combination of increased pressures and fluctuating wind speeds creates stresses that frequently cause structural failures.

STRUCTURES AND PROPERTY

Structures can be damaged by sliding, overturning, material failure, or lateral collapse or by flying debris carried by extreme winds. Wind pressure can also affect a structure by pushing walls, doors, and windows inward or creating suction that pulls building components and surfaces outward. Damage can be minimal with broken windows and damaged roofs, or extreme, causing the entire structure to fail.

Unfortunately, even residential and commercial structures that are built to code are susceptible to damage and there is no such thing as a tornado-proof building. Understanding how wind storms and tornados affect structures will help us improve our building techniques and help build a stronger Greensburg.



VEGETATION

High winds may cause smaller plants and crops to become uprooted, lodged, or broken and can break tree limbs, strip bark, or even push full grown trees to the ground. Crops, including corn, are especially vulnerable to high winds because these tall plants are easily uprooted. When choosing ornamental plantings, Greensburg can decrease the amount of vegetation damage by using native species that are more wind tolerant.



UTILITIES

Historically, falling trees are a primary cause of power outages. Windstorms, including severe thunderstorms, can cause flying debris and downed utility lines. Tree limbs breaking in winds of only 45 mph can be thrown over 75 feet. Overhead power lines can be damaged even in relatively minor windstorms. Because of the frequency of damaging high winds in and around Greensburg, it is recommended that the City create a plan for burying power lines to reduce possible damage and frequency of power outages.



CRITICAL SERVICES

Critical facilities are those that provide the basic services necessary for running the community. Examples of critical services include the police station, fire station, hospital, shelters, etc. For the safety of residents, these facilities and their services need to be functional after a hazardous weather event. While hazardous weather will create obstacles to the smooth running of these facilities, one of the best ways to maintain operations during and after a storm is to make sure they still have power. Backup generators should be required for critical facilities and should be tested regularly as part of a preparedness plan.



PREPAREDNESS

Most Kansas families and communities have experienced numerous tornado watches and warnings in their lifetimes. Kansas school children are all familiar with the tornado drills that begin in early March. Although we all feel prepared for a tornado event, it is important to continue and enhance our good practices.

Public education is vital in preparing citizens to respond properly to weather threats. An educated public is more likely to take steps to receive weather warnings, recognize potentially threatening weather situations and act appropriately.

STORM READY COUNTYWIDE PLAN

It is recommended that the City of Greensburg develop a plan in conjunction with the County that adheres to the National Weather Service's StormReady requirements. By following the NWS program, Kiowa County can be certified as StormReady, demonstrating to existing and future residents and businesses that the County takes public safety seriously.

Becoming a Storm Ready Town

StormReady is a voluntary program sponsored by the National Weather Service that prepares communities for severe weather through advanced planning education and awareness. As of April 2008, 20 counties and two communities in Kansas participate in this program. Each of these communities decided to take the voluntary action laid out in the StormReady Program to better protect their residents during extreme weather.

Although many of the following components may already be incorporated into the City's preparedness plan, it is recommended that the City review its procedures with the county and volunteer as an official StormReady County.

StormReady Program Components:

- **Create a Warning point and/or an Emergency Operations Center and set their activation procedures.** A good place to set this up would be the police or fire station. It is necessary to ensure that an individual acts as the Emergency Management Director who receives severe weather updates and passes them along to the National Weather Service and other local warning points/emergency operation centers.
- **Set up multiple ways of receiving information in severe weather.** Make sure that the warning Point/ Emergency Operations Center is able to receive updates on the weather via radio, television and internet access to local radar.
- **Create a system and plan for local warning dissemination.** For the city of Greensburg, this could be as simple as locating NOAA tone radios in certain city buildings; however, it

could also include control of television audio and video overrides, as well as local outdoor emergency sirens. Any warning system will have to have a plan that explains when it should be used and how it should be tested and maintained to make sure that it is ready for use in an emergency.

- **Complete a minimum of one community outreach program** every year to keep citizens up to date and prepared to deal with hazardous weather.

More information about the StormReady Program can be found at www.stormready.noaa.gov/

INDIVIDUAL PLANNING

Every home and business owner should have an emergency action plan in place. Any resident of western Kansas should understand what to do, whether they are at home, work, school or outdoors.





It is best to have one plan if you need to stay inside, a second if you can't stay inside, and a third if you need to leave the neighborhood. In addition to being prepared before and during a tornado or severe storm, it is important for you and your family to be aware of the threats still present after a storm has passed. Listen to the radio for information and instructions. Use a flashlight to inspect your home for damage. Do not use candles at any time. Watch out for fallen power lines and stay out of damaged areas, and make sure that you do not re-enter structures that may be unsafe.

The City should help educate the community on the components of a successful plan:

- Know the warning signs: what the difference is between a warning and a watch and how will the City alert citizens if things are getting progressively worse.
- Know the safe places to go in your home in case of any type of emergency.
- Know where public storm shelters are located throughout town.

- Create a disaster supply kit and keep it up to date.
- Practice your plan regularly, especially during the tornado season.
- Maintain safety after a storm.

Make sure you have prepared a Disaster Supply Kit of items necessary for taking care of yourself and your family for a few days. According to the Red Cross these kits should include:

- A First aid kit and essential medications
- Canned food and can opener
- Three gallons of bottled water per person
- Protective clothing, bedding, or sleeping bags
- Battery-powered radio, flashlight, and extra batteries
- Special items for infant, elderly, or disabled family members
- Written instructions on how to turn off electricity, gas, and water if authorities advise you to do so (Remember, you'll need a professional to turn natural gas service back on)

Safe Places to Go

- City storm shelter
- Safe room
- Basement or other Underground shelter
- Small interior room (bathroom, closet or hallway) on the lowest floor, and under a sturdy piece of furniture.

EDUCATION AND TRAINING

STORM SPOTTER TRAINING

One of the most effective ways for residents to become knowledgeable about severe weather warning signs is to attend a training seminar on severe weather. The National Weather Service in Dodge City provides storm identification training sessions each spring typically from February to April. This training is free and open for anyone to attend. These classes cover how to identify severe weather and the dangers associated with various type of storms.

To check the schedule for storm spotter training sessions, check online at www.crh.noaa.gov/ddc/spottertalks.php

VOLUNTEER STORM SPOTTER

Residents who have attended the severe weather sessions can choose to become more actively involved in protecting the City's residents by volunteering as an official National Weather Service Severe Storm Spotter. These Storm Spotters are responsible for keeping an eye on the weather and calling in the warning signs for hazardous weather or any instances of severe weather. It is recommended that Greensburg train and certify at least one National Weather Service volunteer spotter.

For basic information on becoming a spotter and for online storm spotter pre training go to:

- www.srh.noaa.gov/oun/skywarn/spotterhelp.php
- www.srh.noaa.gov/meg/presentations/severeStormSpotting/index.html



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NOAA NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
UNITED STATES DEPARTMENT OF COMMERCE

BUILDING PRACTICES

Greensburg has an opportunity to redefine what it will look like as its residents choose how to rebuild their homes and businesses. While this is happening, Greensburg has a responsibility to make sure that the structures that are rebuilt are safer than the ones that were destroyed in the May 2007 tornado. One way for the city to increase the safety level of structures is to look at revising the City building codes.

Houses built to the current building code's standards will produce reasonable wind resistant structures, which will stand up fine under average wind events. However, considering Greensburg's location in Tornado Alley,

a strong case can be made for making small changes to the building code that would strengthen structures, assuring they hold up better even during severe wind events.

As a resource for investigating how the City can improve its building codes, the City should reference "The Windstorm Mitigation Manual for Light frame Construction" which is attached in the appendix. The manual provides individuals knowledge on how wind affects structures, and what they could do in the construction of their building that would help strengthen them against negative forces of the wind.



A storm cellar in Greensburg likely protected citizens through many storm events.

STORM SHELTERS

Storm Shelters and basements saved hundreds of lives when Greensburg was hit by the tornado and they should be strongly encouraged by the City in all new structures built in town. By installing safe rooms, basements or other underground shelters, Greensburg will be a safe place despite the threatening weather of the region.

Safe rooms are reinforced concrete structures designed specifically to withstand the fury of hazardous weather and are usually incorporated into residential structures. Far better than a wood framed interior room, these structures are designed with especially thick, windowless concrete walls and ceilings, so that they can provide security and piece of mind for residents during a storm. Residents who are able to do so should construct residential safe rooms according to the guidelines laid out in FEMA's publication, "Taking Shelter From the Storm: Building a Safe Room Inside Your House," included in the appendix.

Although safe rooms are great methods of protection, basements and storm cellars have also been protecting lives for decades and are viable, safe tornado refuges. They can be shared between neighbors to save costs and can accommodate more individuals at one time. Many Greensburg residents are eligible for FEMA funding for safe rooms and enhanced garage doors.

Even residents with appropriate shelter may not be home when hazardous weather strikes. In order to properly protect its citizens, the City should charge itself with building storm shelters that are able to take in large portions of the city's residents during hazardous weather events. These structures should be easy to access and locate, and should be strategically placed throughout town so people can get to them in a quick and efficient manner during an emergency. These structures should be built to the standards laid out in the "FEMA Publication Design and Construction Guidance for Community Shelters" which we have also included in the appendix.

ECONOMIC DEVELOPMENT

“In the not-too-distant future, all development will be green. Developers, builders and buyers will discover that green not only enhances their pocketbooks, but also their health and the quality of their lives. The developers who grasp this first will have an edge in a massive, emerging market.”

- WILLIAM S. BECKER, U.S. DEPARTMENT OF ENERGY

ECONOMIC DEVELOPMENT

Prior to the tornado, Greensburg was facing disinvestment and a steadily declining population. Without a dramatic shift, the fortune of the community was very much in doubt. Many rural communities across the country are facing a similar economic, long-term crisis. How can we reverse the population decline of our heartland, and what is possible in a state with bountiful renewable resources, a direct connection to the land, and a history of strong action? It is the hope and belief of the team and community that by rebuilding sustainably, Greensburg can reverse these trends and create a prosperous future. We believe that Greensburg is on the precipice of a shift toward the recovery of small town vitality and can serve as a new model for sustainable rural prosperity.

Ultimately, the sustainability of Greensburg relies on the ability to bring new high-quality jobs to town. The vision of a green Greensburg provides a significant competitive advantage. The available resources, amenities and clean energy resources that are planned for Greensburg create a host of potential economic development opportunities. Crafts people, manufacturing, research, and product design are all business types that could emerge alongside a shift toward sustainable thinking. Coordinating and stimulating these business types will

create healthy commerce and pay dividends toward the long-term economic health of the region. A strong economy will also protect the current reinvestment and add momentum to the vision of a completely rebuilt community.



Photograph ©Kevin Sink

THE BUSINESS SURVEY

A survey was created and shared with the business community in Greensburg as part of the Sustainable Comprehensive Plan work. The results should not be taken as statistical certainty, but there were some interesting findings that can guide business development in the coming months.

When asked to rank in order of importance (1-7) the components needed to support local businesses: (retention), the average response was:

A growing population	2.6
Access to employees	2.7
Short-term business subsidies	3.8
Infrastructure improvements	3.8
Highway Access	4.1
An Attractive Downtown	4.4
Availability of excellent web access	6.3

When asked to rank in order of importance (1-7) the best strategies for creating new businesses and jobs in town: (attraction), the average response was:

Leveraging the green reputation of Greensburg	2.6
Access to Employees	2.9
A growing population	3.0
Infrastructure improvements	4.4
Highway Access	4.5
An Attractive Downtown	4.8
Availability of excellent web access	5.8



A state-of-the-art school was noted as an important tool for economic development by the citizens who responded to the business survey

Clearly there are commonalities between retention and attraction of businesses, and it is also clear that there is a fair amount of confidence that the current strategy for rebuilding will be an asset when attracting the right kind of new opportunities to town.

The survey was also open for written comments, and commonalities emerged as assets that should be leveraged to attract new development:

- The new reputation of the community as a green town
- The work ethic of local people
- A new and innovative downtown
- A state-of-the-art school

When asked to list businesses that residents felt should be recruited to town, answers included:

- Pharmacy
- Full Grocery Store
- Hardware / Lawn and garden
- Soda Fountain
- Coffee Shop
- Green Supplies
- Restaurant
- Theater

Many of these amenities are already being rebuilt and within the next 12 months, half of the businesses listed above will exist in Greensburg.

There were also a few suggestions in the survey about needed focus in the coming months:

- There is growing momentum behind the rebuild and it is imperative to use that leverage to bring new employment to town in the near-term
- Market Greensburg more efficiently to entrepreneurs, incentives should be used as a tool
- The Downtown Guidelines should be made mandatory

When asked to rank the impact and likelihood of types of business that would be most beneficial to Greensburg, the surveys ranked “sustainable manufacturing, eco-industrial, and green collar jobs” as the most impactful.

This feedback is consistent with what we heard from other residents and with what the planning team witnessed firsthand. In order to nurture a growing population, improve access to employees, and build businesses listed as crucial to the success of Greensburg, it will require the implementation of many of the ideas in this plan and the strengthening of the local economy. We believe this is possible by focusing on growth in three distinct sectors: sustainable manufacturing and start-ups, an expanded tourism industry and small scale commercial.

APPROPRIATE INDUSTRIES

For 150 years, Kansas farmers have worked their fields and fed the country. They understand what it means to care for the land. They are close to the natural systems that power a sustainable economy and conscientious about how human actions affect those systems over time. Greensburg is in a position to leverage that knowledge and use it as a competitive advantage in a potentially enormous new sector of the American economy. Greensburg should encourage and recruit industries that are in line with the local agricultural economy, build up its tourist trade and reputation, and bring in manufacturing partners that can use available materials and the City's reputation as a springboard for creating a strong economy.

ECONOMIC DEVELOPMENT THROUGH SUSTAINABLE RESOURCES

By providing clean carbon-free energy to its current and future citizens and businesses, and by creating an attractive community built around energy efficiency, healthy lifestyles, and durability, Greensburg will be an ideal location for emerging economies. To attract and retain potential businesses and the workforce to support them, it is important to develop a workable clean energy solution, encourage city-wide efficiency efforts, and promote quality new development that embraces good urban and neighborhood design. Enough

progress has been made in these areas such that it is appropriate to integrate a significant business recruitment strategy into recovery work. A comprehensive Economic Development Plan is an important aspect of sustainable economies and it is recommended that Greensburg complete a detailed plan within a year of adopting this plan.

MANUFACTURING AND SUSTAINABLE STARTUPS

New industries will be attracted to Greensburg because of the availability of agricultural wastes, byproducts, consumer products, and the proximity of an active rail line. For instance, new fuel industries could set up a supply chain by which they purchase the agricultural waste from corn or wheat farming to

produce alternative fuels such as biomass or biofuel. This creates a byproduct synergy whereby one industry's waste becomes another industry's product. Not only does this model enhance the existing farm economy and reinforce the town's goals for becoming a sustainable model, but it also creates jobs that are appropriate for the existing population.

Some of the existing partners that are actively investigating a future in Greensburg include a new biodiesel plant, several sustainable building material manufacturers, and an emerging technology center that uses municipal waste as fuel and produces sustainable products.





This Universal Fibers carpet manufacturing plant is a partner with Interface and recycles used carpet into new fiber.

“Design for sustainability means fostering innovation - not just in products and services but in work methods, behaviours and business processes.”

- JOHN THACKARA

ECO-INDUSTRIAL PARK

There has been growing interest over the last few months in the development of a business, industrial and manufacturing park to create substantial new jobs for Greensburg. In this model, complimentary businesses with operating principles that align with the community vision would locate near each other in a synergistic relationship. Potential partners have already stepped forward and the refinement and implementation of this park is of utmost importance. These projects represent hundreds of potential jobs, and it is within the realm of possibility that the Eco-Industrial Park would become the largest employer in the area.

To promote the success of this innovative strategy, the City will continue to need support from the USDA and the State of Kansas. There are many potential programs that would incent development. It is recommended that the City continue to investigate the applicability of the Kansas Enterprise Zone, Kansas Economic Opportunity Initiative Fund, Community Development Block Grants, and the full host of state and federal incentives.

A KANSAS ENTERPRISE ZONE

There are many incentive packages that need to be investigated to best advance Greensburg's economic potential. One particularly interesting option would be to create an Enterprise Zone. The Kansas Department of Commerce describes the program as being “designed to encourage businesses to create new jobs.” Enterprise Zone incentives are available to qualified businesses throughout Kansas, based on the location of the facility, the type of facility (manufacturing, non-manufacturing, or retail), the capital investment made, and the number of jobs created. A sales tax exemption is available on materials, equipment, and services purchased when building, expanding, or renovating a business facility. State income tax credits are available for job creation and capital investment. Earned credits may be used to offset up to 100 percent of a company's annual state income tax liability.” The potential to blend the incentives of an enterprise zone with the potential for an eco-industrial park might provide the catalyst to bring major employers to Greensburg.

AIRPORT

The current Greensburg Airport is an underutilized and undersized grass landing strip immediately east and adjacent to town. Only a couple of people use the current strip. In the long-term, the current alignment may even be effected by the elevation of Highway 54 as it runs through town. Because the current location is not conducive to an expanded runway and because the City currently owns the land, the airport represents an opportunity to provide land to new Greensburg businesses in a very short time. This site, which is close to Highway 54 and proximate to the rail line, is already served by City utilities. We believe that this property could be better utilized to advance immediate economic development opportunities.

Simultaneously, the FAA should be contacted to begin the feasibility study and planning for the future airport site. In the long term, a growing economic engine in Greensburg would justify the relocation of the airport and the eventual expansion.



The Paul Windle municipal Field presents both an immediate and future opportunity for economic development.

STIMULATE GREENSBURG'S TOURISM INDUSTRY

Tourism is an important economic driver in Greensburg. An estimated 40,000 tourists from all over the world visited Greensburg in 2006. The world's largest hand dug well, a pallasite meteorite weighing in at approximately 1,000 pounds, the historic County Courthouse and the Kiowa County Historical Museum represent the foundation for Greensburg's existing tourism industry. These historic Kansas destinations brought passers-by to Greensburg who in turn fed the local economy. It is well established that effective tourism components enhance any economic development strategy and the tourism industry is integral to providing local shops with successful living-wage employment, increasing median income, and even attracting new residents. It is the opinion of the planning team that the community's green vision will create significant new tourism opportunities and positively impact Greensburg's economy.

The community's effort to rebuild Greensburg green is creating opportunities for a new tourism industry centered on sustainable living. It is recommended that the City of Greensburg, with the help of a citizen led Tourism Committee, create a Comprehensive Tourism Plan as part of an overall economic development strategy. The plan should identify specific goals, facilitate partnerships with county and state

tourism entities, and integrate old and new tourist attractions. At this point it is reasonable to expect a dramatically improved and consistent tourism industry if the current momentum continues.

CREATING A TOURISM PLAN SETTING GOALS

The primary goal for tourism development is typically to increase the number of tourists, the length of their stay, and the dollar amount they spend in town. The goal in Greensburg is to create a consistent and authentic tourism strategy based on enhancing past attractions and building upon the many demonstrations of sustainable living currently under way. Everything from green building practices, energy generation, native landscape restoration, recycling programs, and sustainable education programs should be included as components in the overall tourism strategy. Each additional green building, program and initiative greatly enhances the effectiveness of Greensburg's tourism potential.

DEFINING THE BASELINE

First, some important baselines must be identified. Defining the market for Greensburg tourism--how far visitors travel to get to Greensburg, are they driving through or staying the night, and what is the interest of visitors--will allow appropriate goals to be set. Once the baseline is understood, the community can decide how to best expand their market and enhance their offerings to

better serve customers. Establishing the baseline also allows for successes to be celebrated and for shortcomings to be realized.

REACHING THE GOALS

A few important considerations for enhancing tourism in Greensburg have already been set in place. The community realizes the importance of maintaining physical and visual connections between the Big Well, County Courthouse and downtown district with pedestrian friendly streetscapes. This encourages tourists to visit their attractions of choice and spend an afternoon shopping at local stores and

eating in neighborhood restaurants. It is recommended that a number of bed and breakfasts or hotels be located within a few blocks of this central location to make the overnight visitors' experience as pleasant and convenient as possible.



The 5.4.7 Arts Center will be an important part of Greensburg's new tourism strategy. This facility will draw interest for its arts programming, contemporary design and sustainability.

PROPOSED TOURISM MAP



-  1. Business Incubator
-  2. Main Street Streetscape
-  3. Theater
-  4. City Hall
-  5. Kiowa County Courthouse
-  6. Farmer's market
-  7. Memorial Park
-  8. Big Well Museum
-  9. 5-4-7 Art Center
-  10. Restored native landscape zone
-  11. Greensburg trail network
-  12. Kiowa County Fairgrounds
-  13. Greensburg School
-  14. The Chain of Homes / Model Green Bed and Breakfasts
-  15. Wind Turbines
-  16. CO-OP
-  17. Hospital

DEFINING THE COMPONENTS OF THE TOURISM SYSTEM

Defining the components of the tourism system in Greensburg will help connect and enhance the overall effectiveness of the plan. Below we have identified some of the historic and the new opportunities for economic development through tourism.

GREENSBURG'S HISTORIC TOURIST DESTINATIONS

Together, the Big Well and Pallasite Meteorite create a source of income, attraction and pride for the City of Greensburg. These were unique Kansas destinations and it is important to rebuild a tourism infrastructure that supports and enhances their history. The Big Well Museum is currently operating in a temporary facility while the permanent facility is being designed to meet LEED Platinum requirements. The Kiowa County Historical Museum and the County Courthouse are also highlights on the visitor's tour of Greensburg. The Kiowa County fairgrounds, the Kansas State Fishing Lake, associated trail networks and the local Co-op should all be integrated into an overall strategy.

This proposed future tourism map for Greensburg shows both historic and future tourism destinations.

NEW TOURISM OPPORTUNITIES

In addition to the existing destinations in Greensburg, many new and unexplored opportunities exist for stronger links and additional venues. Greensburg is the first of its kind, sustainable model community and is well positioned to capitalize on this good decision making. Eco-tourism and sustainable agri-tourism are two new, yet growing industries. As Greensburg's goals are realized, the town may also become a destination for scientists and academics interested in researching the sustainable technologies as well as community and building design implemented into the town.

One particular tourism growth sector for Greensburg is in the convention and business retreat sector. We have already seen interest in bringing significant numbers of conventioners to Greensburg to witness the ongoing transformation and to learn about sustainable building techniques. These visitors are ideal because of their interest in the community and because they will be staying in town for extended periods helping to infuse dollars into the local economy. The new school will be an ideal location for potential convention and educational sessions. Those excellent facilities will be largely vacant in the summer and perfect for eco-tourists interested in Greensburg's network of sustainable learning opportunities.

Small towns are desperate for the attention Greensburg continues to garner, and there is no other community in the Country that has had as much attention in the last year. It is important to note that this attention is no longer about the tornado but rather about the way Greensburg is recovering. This is the inspiration created by Greensburg and there is no doubt that if the progress continues, precious national attention will continue to stoke an expanded tourism industry.

ECO-TOURISM

Eco-Tourism is a form of tourism that is currently considered the fastest growing market in the tourism industry. Eco-tourism venues often use locations and facilities to demonstrate sustainable living while simultaneously reducing environmental impacts and enhancing the culture of the area. There are many different types of eco-tourism, and it appears that Greensburg could be one of the first rural destinations for those who want to learn more about sustainable community living. The features that define Greensburg as a sustainable model community and should be incorporated into the eco-tourism strategy include:

Sustainable Buildings + Building Features

Greensburg will be home to the first handful of LEED Platinum buildings in the State of Kansas. At the time of this Plan, approximately 30 buildings in the public, commercial, non-profit, and multi-unit residential sectors have committed to incorporating sustainable techniques equivalent to LEED certification. These "Green" Buildings should be marked on tourist maps and individual buildings should organize a schedule of tours where visitors can learn about the different sustainable design techniques unutilized in each LEED Platinum building.

The New Greensburg School

As one of the most sustainable schools in the country, USD 422 is well positioned to capitalize on the tourism industry, and its location on Main Street is a huge asset. The schools daylit classrooms and state-of-the-art facilities will not only improve student performance but could double as convention meeting space.

Energy Efficient Homes + GreenTown Chain of Homes

A large number of new homes in Greensburg are incorporating energy efficiency into their designs, and it is recommended that an annual "green" homes tour be created to showcase how sustainable design can be affordable, accessible and stylistically diverse. In addition, Greensburg GreenTown has embarked on a project to build a dozen

"model homes" each with different green building techniques. Not only should these buildings be included into a tourism plan, but they will likely operate as bed and breakfasts and are great attractions for overnight stays.

Trail Network and City Parks

The city-wide trail, which will also acts as stormwater management system is another important component of the overall tourism plan. Visitors will be able to enjoy a spring day and learn about the native landscape and regional watershed.



Like Spearville Kansas, (above) Greensburg could create an energy supply that is also becomes a tourist icon.

The streetscape designs and park systems connect landmarks and icons throughout town. They will provide recreational amenities and additional opportunities for restoration projects.

Renewable Energy Generation

It is expected that a wide range of renewable energy sources will be visible throughout Greensburg, from large-scale wind turbines to small, individual applications. As tourists walk or drive through town, these features should be made available and supported by informational signage or other printed materials.

AGRI-TOURISM

Greensburg has the opportunity to further expand the eco-tourism industry with an agri-tourism plan. Agri-tourism is an industry based on real life farming or ranching professionals and is attractive to people interested in experiencing rural life and understanding how food is produced. Agri-tourism presents an opportunity to simultaneously take advantage of the rural culture, farming economy and Greensburg's new sustainability initiative. Area farmers or ranchers who partake in the green vision by incorporating organic practices, sustainable water management, etc. are positioned to attract this new type of tourist. To aid this work, the Kansas Commerce Department has a no-interest loan program available to develop agri-tourism opportunities.

THE BIG WELL MUSEUM

The new Big Well Museum will be an ideal location to interpret the sustainability initiatives being implemented across town. The facility can also make a direct connection to the aquifer and be used to explain water conservation and the history of the local economy.

The EF-5 tornado that hit Greensburg in 2007 might be considered by some as an anomaly, but in the area known as Tornado Alley its magnitude was the only thing unusual about it. Greensburg has an opportunity to teach visitors what it is like to live in Tornado Alley and educate residents and tourists about the local climate and the science of tornados. A weather museum has been suggested as an addition to the Big Well Museum and is recommended.



Combining restored ecosystems with the citywide trail will allow tourists to enjoy biking and bird watching.

RESEARCH LABORATORY

Not very many towns have succeeded in creating a truly sustainable community, one that is fueled by 100 percent renewable energy, greatly reduces its carbon footprint, and supports a rural economy and small town culture. Greensburg will be the first of its kind and will serve as a laboratory for those interested in repeating the successes. It is recommended that the Eco-Tourism and sustainable Agri-Tourism Plan consider integrating the infrastructure to support visiting scientists, economist, and others interested in studying Greensburg's achievements.



CREATING PARTNERSHIPS

There are many formal tourism advisors throughout Kiowa County and the state of Kansas that are available to advertise and support Greensburg's tourism industry. They offer workshops, business plans, and provide online web links. It is recommended that the tourism plan include a strategy for participating in local and state organizations and explore the possibility of becoming a member of a national tourism group. Some potential organizations include:

- State and County Tourism Partners
- Travel Industry Association of Kansas
- KS Department of Commerce and Housing
- Kansas Visitors Guide
- Sights of Kansas
- South Central Kansas Tourism Region



Image © Kevin Sink

Farmers and Ranchers often expand their livelihood to include agri-tourism industries. People travel from all over the world to experience ranching, farming, native vegetation/restoration and a rural lifestyle.

REESTABLISHING LOCAL BUSINESSES AND PROMOTING NEW SMALL SCALE COMMERCIAL OPERATIONS

Many local businesses are already up and running and others are on their way back. Unfortunately, some businesses seem to be in a “wait and see” pattern. Efforts are currently underway by all sides to encourage businesses to get back to work and for employers to reinvest in Greensburg. This effort is yielding benefits, but now is the time to further ramp up that work. There is incredible momentum in Greensburg and it is impossible to know how long it will last. Now is the time to orchestrate a significant recruitment campaign. With the business incubator only months away and Greensburg on the minds of investors and entrepreneurs around the country, there will not likely be a better time to demonstrate how Greensburg is the right fit for both old and new businesses. This effort need not focus solely on large employers. Small, savvy businesses can do just as much to develop Greensburg’s economic engine and innovative capacity.

To capitalize on business development opportunities, it is recommended that:

- A sustained recruitment campaign is initiated.
- The City or an Economic Development Committee establish a revolving loan fund. These dollars would be used to provide monies to bridge the start-up costs for new businesses. The USDA is a potential partner in this fund.
- Create a Land Bank. Vacant properties or key development parcels should be acquired by the City of Greensburg.
- All available incentives are compiled and made flexible so they can be tailored for individual interest.
- A professional recruitment pamphlet be developed that lists reasons for locating in Greensburg.
- A search for a permanent Economic Development Director to replace the temporary role being filled by Jeannette Seimens be initiated.



The Kiowa County Redevelopment Group meets bi-weekly and is attended by business owners throughout the region.

SOME POTENTIAL GRANT AND LOAN OPPORTUNITIES FOR LOCAL BUSINESSES INCLUDE:

State of Kansas Programs

- The Kansas Community Entrepreneurship Fund provides capital to entrepreneurs from rural and low-income communities.
- The Kansas Downtown Redevelopment Act encourages the rehabilitation and use of real property located in downtown areas that have become vacant or minimally utilized, and to assist in the development and redevelopment of eligible areas.
- The Enterprise Facilitation Program supports the expansion of the success currently being experienced by the existing Enterprise Facilitation Boards throughout the State of Kansas.
- The Angel Investment Tax credit Act will provide tax incentives for business persons to not only invest in Kansas start-ups, but also to serve as advisors to such companies.
- Great Plains Revolving Loan Program
- Loan money available for purchasing land and buildings, construction costs, startup costs, refinancing, and inventory.

USDA programs:

- Rural Business Opportunity Grant - The RBOG program promotes sustainable economic development in rural communities with exceptional needs through the provision of training and technical assistance for business development, entrepreneurs, and economic development officials and to assist with economic development planning.
- Rural Cooperative Development Grants - these grants are used to establish and operate centers for cooperative development for the purpose of improving the economic condition of rural areas through the development of new cooperatives and improving operations of existing cooperatives.
- Renewable Energy Systems and Energy Efficiency Improvements Grants and Guaranteed Loans - to purchase renewable energy systems and make energy efficiency improvements for agriculture producers and rural small businesses. Funding is available in the form of grants, guaranteed loans, and combined guaranteed loans and grant applications.

- USDA Business and Industry (B&I) Guaranteed Loan Program - Loan money available for purchasing land and buildings, construction costs, startup capital, and debt refinancing.
- Rural Business Enterprise Grant Program - The RBEG program provides grants for rural projects that finance and facilitate development of small and emerging rural businesses help fund distance learning networks, and help fund employment related adult education programs.

Small Business Administration programs:

- SBA 7 (a) Guaranteed Loan Program and Community Express Guaranteed Loan Program - Loan money available for purchasing land and buildings, construction costs, startup costs, refinancing, and inventory.
- SBA 504 Loan Program - Loan money available for purchasing land, buildings and construction costs.
- SBA Express Guaranteed and Patriot Express Loan Programs - Loan money available for revolving lines of credit and long term loans

The Business Restoration Assistance Program

The 2007 Kansas Legislature established the Kiowa County business restoration

assistance program for the purpose of assisting businesses that were in operation in Kiowa County and damaged by the tornado and other severe weather in Kansas on May 4, 2007.

The business restoration assistance program includes:

- Investment Assistance Grant - A grant of up to 10% of qualifying investment made to rebuild or replace a business facility in Kiowa County and the business machinery and equipment of a business that has been damaged or destroyed by the tornado or other severe weather that occurred on May 4, 2007
- Job Restoration Assistance - A grant of up to \$3,500 per qualifying job to a business damaged by the tornado and severe weather on May 4, 2007 that fills an employment position in Kiowa County, Kansas.
- Sales Tax Exemption- A sales tax exemption is available for those businesses in Kiowa County that were damaged as a result of the tornado and other severe weather on May 4, 2007. This sales tax exemption will exempt all construction, reconstruction, materials and machinery and equipment to be incorporated into the business facility.

ROLES IN ECONOMIC DEVELOPMENT

One of the most overlooked but critically important economic development tools is an active and involved community. The Greensburg business group is an ideal partner in this work. There is no better business recruitment technique than an active, intelligent, targeted business community that can be used to identify opportunities, build partnerships, and speak to the community's strengths. Fortunately, Greensburg's business sector is well organized, intelligent and mobilized. The need for economic development and the understanding of the need for proactive attention are well understood from both the governmental and private side. It will take seamless cooperation and a tight working relationship between the community and its leaders to resurrect local businesses and to recruit the kinds of job creating industries that appear to be showing interest in Greensburg.

The following list of roles is intended to help establish the ways in which available resources can be best utilized.

THE CITY OF GREENSBURG

It will be the City's task to actively facilitate the recruitment and establishment of previously existing and potential new businesses. They will also be responsible for making sure that the most promising leads are properly followed and matched with local business leaders that can act as a recruiting tool.

KIOWA COUNTY

The impacts of new job opportunities and community amenities will be shared by the City and the County. There is a good chance that several large potential employers will be locating outside of the existing city limits; coordination and cooperation with Kiowa County is paramount. By continuing to support the momentum in Greensburg and by rapidly responding to, and even recruiting potential partners, Kiowa County stands to gain significant new employment opportunities. The City and County will need to continue tight coordination.

THE KIOWA COUNTY CHAMBER OF COMMERCE

Since the tornado, the Greensburg Chamber of Commerce re-organized into a Countywide Chamber focused on being an advocate for countywide businesses. The Chamber hopes to offer promotion of local business as well as appropriate education. The Chamber is currently being assisted by Economic Development Director Jeanette Siemens whose help is funded for one more year. The Economic Development Director functions as a liaison between the city, county and local businesses.

THE GREENSBURG SMALL BUSINESS DEVELOPMENT CENTER

The SBDC helps entrepreneurs and small business owners start and grow their businesses through professional consulting, training, and resources. The center combines the resources of professional staff, the state's educational institutions, the private sector, and government to provide high quality, one-on-one business management consulting, education programs, and practical information. This service is invaluable to small start-up businesses and residents interested in building a business are strongly encouraged to take advantage of this service. Mark Buckley will be filling this role in Greensburg for another year.

THE KIOWA COUNTY REDEVELOPMENT GROUP (BUSINESS DEVELOPMENT GROUP)

The KCRG is an exemplary community group with strong ties to Greensburg and significant involvement in this Plan and the ongoing redevelopment in the county and within Greensburg. They are a committee of the Chamber of Commerce and also sit on the city-wide steering committee. They have weighed in on many strategic planning decisions and will in many ways be responsible for providing citizen support for the Sustainable Comprehensive Plan. This group is an excellent resource to help understand the needs of existing business owners and is also extremely useful in recruiting new industries to town.

THE KIOWA COUNTY ECONOMIC DEVELOPMENT AUTHORITY

Recently the City Council heard a proposal for the establishment of an Economic Development Authority. This agency would represent the entire County and could establish the revolving loan fund, provide business education, and actively recruit new industry to the County. This agency would be a permanent institution and continue on after the sunset of assistance from the KSBDC and the current Economic Development Director.

ENERGY

“Energy and persistence alter all things.”

- BENJAMIN FRANKLIN

ENERGY

Carbon emissions and energy independence are arguably the most important issues facing our society. Our modern lifestyle requires a constant supply of energy. Unfortunately, our means of power production threatens the stability of the economy and the natural balance of the ecosystem. As a country, we are moving toward a lean carbon economy, and from this it will be possible for our rural communities to tap their immense wind, solar, and biomass resources to become the nation's largest energy producers. Not only do these resources provide new jobs and stabilize the cost of energy, but they also provide cleaner air and cleaner water. There is little doubt that renewable energy is a potential boon for many small towns. The current energy landscape is rapidly changing and Greensburg is well suited to capitalize on the shift.

Working in conjunction with the National Renewable Energy Laboratory (NREL), community stakeholders, and City staff, the planning team has seen a growing appetite for renewable energy generation and a genuine interest in improving the energy efficiency of new structures. This is in no small part due to the hard work of the City leadership, NREL's on-the-ground presence, and Greensburg GreenTown's ongoing efforts. It should also be noted that

much of the technical reporting included in this section comes directly from the National Renewable Energy Laboratory's diligent work and their final reports, “Near-Term Energy Strategy Recommendations Volumes I and II,” available in the appendix of this Plan.

A COMPREHENSIVE STRATEGY

A comprehensive energy strategy for Greensburg requires a two-pronged approach focusing first on energy efficiency to reduce demand as much as possible and then on energy generation. Only when the town is operating at optimal efficiency and is being powered by a sustainable energy source will Greensburg's energy future be secure.

Much work has been done on both sides of this equation and many successes should be noted.

- NREL assisted dozens of home owners and builders, businesses and public projects to improve the energy efficiency of new buildings.
- The City is currently working with NREL and Maxon on many policy initiatives including a strategy by which the town will be powered by 100 percent renewable sources.
- The City Council resolved that public projects will be built to the U.S. Green Building Council's LEED Platinum standards and achieve 42 percent energy efficiency above code, a level not yet committed by any other city in the country.
- Greensburg GreenTown continues to offer education to the community regarding the benefits of sustainable living and support the City's progressive goals.



A wind farm in the rural town of Conception, Missouri

ENERGY EFFICIENCY

Because of the large number of new buildings being constructed in Greensburg, there is an opportunity to greatly improve the overall energy efficiency, thus reducing the required base load and monthly energy bills. There are many ways for the City to encourage high efficiency building practices and both grassroots and leadership efforts must be active for the community to meet its goals. The following targets were identified because they are achievable, cost effective, and do not require on-site renewable generation. They can be achieved with a simple, prescriptive set of recommendations such as ASHRAE's Advanced Energy Design Guidelines (www.ashrae.org/aedg). The science at the time of this plan shows that anything above these targets would require building energy modeling and further analysis to ensure the level of savings is being met within a reasonable cost. As technologies and understanding progress these targets could increase.



The National Renewable Energy Laboratory (NREL) has been an invaluable resource for Greensburg's energy initiatives. They have completed extensive reports that should be reference throughout the rebuilding process.

In January, 2008, the City of Greensburg established progressive energy efficiency requirements on its City facilities by adopting a resolution requiring LEED Platinum design for new City-owned buildings. The resolution identifies a target efficiency of 42 percent above code for these projects. It is recommended that similar targets be formally suggested for all building projects in town. With the help of NREL scientists and other consultants the following target efficiencies for residential projects and for commercial buildings have been identified.



The Alison Home in Greensburg is built from Insulated Concrete Forms (ICF) and is 58 percent more efficient than residential building codes dictate, it easily meets the recommended residential efficiency target.

Residential Efficiency Target

The City should formally recommend that individual homeowners and/or residential developers use an integrated design approach to achieve at least 40 percent energy savings relative to current building code.

Commercial Efficiency Target

Commercial buildings include non-profit and non-city-owned public buildings. A formal policy recommendation made by the City for commercial building efficiencies should suggest that such projects utilize an integrated design approach to achieve at least 30 percent energy savings above current building code requirements.

Citywide Targets

Because of the lack of pre-tornado data and the inability to predict the rate of growth and future industry in Greensburg, it is nearly impossible to create an appropriate citywide target for energy efficiency. However, it is recommended that the City create a framework for tracking energy use that will allow future targets to be set. By tracking and recording the impact of energy efficiency the town's successes can be celebrated, and annual targets can be created and continually improved.



Solar panels can be added to further decrease energy use.

MEETING THE TARGETS

There are thousands of techniques that can be used to increase energy efficiency in residential and commercial buildings. Think first of proper building orientation to take advantage of daylighting and climactic conditions. Design and construction of a well-insulated and thoroughly air-sealed building envelope provides one of the most cost-effective strategies, while passive solar design and appropriate thermal mass can further reduce energy demand. Installation of efficient HVAC systems compliment these strategies. Further integration of an energy efficient building might include an efficient domestic hot water system, well-controlled fluorescent lighting and the use of Energy Star appliances. Only after these techniques have been applied should on-site renewable and high-tech solutions be considered. It has been shown that the suggested targets can easily be met through application of basic efficiency strategies, often times at no cost increase to the project.

In order for these suggested citywide targets to be met, they must be supported by continued community education programs, and policy initiatives.



A number of resource fairs and workshops were held in Greensburg to educate residents and builders about energy efficiency and available financial resources. The above pictures are courtesy of NREL and were taken at the Green Day event in March, 2008.

Education

The City of Greensburg is well positioned to continue to educate Greensburg citizens of all ages about sustainable design and energy efficiency. From a grassroots, word-of-mouth, approach, to hosting national conferences, workshops, and seminars it is recommended that the city integrate energy efficiency into an overall sustainability education program.

Over the last year, many workshops have taken place in Greensburg to educate citizens and contractors on the benefits and processes for building in an energy efficient manner. As many of the federal, state and private consultants who were offering these programs begin to leave the area, Greensburg will need to continue their good work. Greensburg GreenTown, or a similar or community organization is well positioned to continue seeking out these education opportunities for the town as well as publicizing regional conferences and seminars of interest.

Energy efficiency and renewable energy educational materials should also be readily accessible in both hard copy and digital format. An-on-the ground source for information tailored for builders and

building owners as well as an in-depth digital library that is accessible from the City's website will enhance the grassroots efforts and supplement other education initiatives. Many resources have already been compiled, and should be made available through a non-profit or at the local library or school. Because the field of sustainable design and community planning is growing and evolving rapidly it is important that Greensburg's sustainable resource library be kept up-to-date by qualified personnel. This library may become the centerpiece for future research as Greensburg becomes a laboratory of green design.

It is also recommended that energy efficiency be included in the K-12 curriculum for the Greensburg USD 422 school district. The administration is currently working with outside consultants to develop a sustainable curriculum for the school and energy efficiency and renewable sources will certainly be part of that program. Newly trained teachers will help educate the broader community, and could be part of a strong distance learning initiative.

Policy Refinements

Because a municipality's policies for permitting, zoning and ordinances can often inhibit building owners from incorporating energy efficiency strategies and renewable generation options, it is recommended that the City incorporate appropriate improvements to their codes, zoning, and ordinances as well as the permitting process for new structures.

It is recommended that the City explore ways that the permitting process can be used to incentivize and educate the community about energy efficiency and sustainable design. One possible way to encourage green building practices and educate builders about optimal strategies is through a two-phase

permitting process. During the first project review phase, the plans would be reviewed by a Green Rater or other educated design professional who would make recommendations for improving energy efficiency to meet the defined targets, responsible materials selection, and other sustainable design features. There is currently money available from the state of Kansas to pay Bryan Wendland, a nearby certified rater to preform the review. Based on professional feedback, the owner and their project team can then decide on the recommendations they do or do not want to integrate and alter their plans accordingly. After a prescribed waiting period the project can then be resubmitted for its permit. Additionally, projects who reach the

City's recommended energy efficiency targets at the first design review should be offered expedited permits to proceed with work. This is a means for the city to educate project teams and incentivize sustainable design and energy efficiency.

The City is also in the process of approving a group of important policy documents that will incentivize the use of individual renewable resources. A solar and wind ordinance, a net metering agreement, and an interconnection agreement are all on the City Council's drawing board. Wind and solar ordinances are created to ensure that individual buildings are allowed to properly install appropriate wind and solar renewable energy

sources. The ordinances include guidelines for setbacks, solar and wind access, noise disturbance and safety issues related to each renewable technology. The net billing and interconnection agreements are designed to incentivize the use of renewable energy by allowing individual energy customers to receive credit for the excess energy they produce. In addition, the City may need to monitor solar access, to ensure that individuals adopting solar panels will not have them shaded by a neighbor in the future. A solar access ordinance is one way to monitor this. These are all important policy documents that should be implemented and amended as technologies change.



FEASIBILITY OF SMALL-SCALE RENEWABLES

As recorded in the NREL Wind Report, Solar Report and Integrated Energy Strategy, many renewable sources are feasible in the Greensburg area. The primary principle for reviewing the feasibility of individual renewable sources is to balance the initial costs, actual efficiencies, lifespan cost benefit and maturity of the technology. According to NREL data, private and public entities should consider generating their own electricity via individual wind turbines where sufficient space is available. Solar panels may also be considered, but should be approached cautiously due to their high initial costs. Biomass applications, especially agricultural wastes, may be considered for thermal heating so long as they use commercially proven equipment. Ground source heating and cooling is appropriate, but often has a high initial cost. Solar hot water systems should be approached cautiously. These systems must be carefully designed and installed and are often not cost effective compared to high-efficiency conventional or tankless water heaters. Users with the largest energy needs may also want to consider the latest advances in fuel cell technology, some of which can be powered by wind.



These small turbines installed at the 5-4-7 Art Center in Greensburg enhance the building with renewable on-site energy and are quiet to prevent disturbing the neighbors.

CITY WIDE ENERGY GENERATION ***PRE-TORNADO POWER SUPPLY***

The City of Greensburg acts as a municipal utility and owned the electricity distribution lines within the community before they were largely destroyed. The City purchased electricity under a ten-year, co-generation agreement with Mid-Kansas Electric Company and its affiliates, who in March 2008 offered a generation mix of approximately 90 percent fossil fuels and 10 percent wind energy. The City had approximately 1,000 customers at the time of the tornado, including residents and commercial facilities. Customers purchased energy at between 12-13 cents/kilowatt hour. With a population of approximately 1,400, the City consumed a base load of 2.7 megawatts (MW) and a peak load of 4.3 MW. The City also owned and operated a power plant and substation with five Fairbanks dual-fuel (natural gas and diesel) generators with a total of 6.5 MW capacity that helped meet peak demand and provided back up power in the case of an outage.

POST-TORNADO POWER SUPPLY

Immediately following the tornado, FEMA provided emergency generators and other support. Mid-Kansas Electric assisted in providing limited power very quickly. As of December 1st, 2007, the City replaced the distribution lines, a \$10 million project, with assistance from FEMA and the State of Kansas.

As of March 2008, the City decided to work toward a 100 percent renewable energy strategy in both its primary and back-up generation. It is likely that in the coming months the City will enter into a short term agreement to receive power from a local provider until the renewable plan can be implemented.

Research shows that if the business as usual model is followed in Greensburg, energy prices will continue to increase over the coming decades. A renewable electricity strategy will protect Greensburg from cost increases and fully realize the community's goal to become a sustainable model town. The City leadership, with the help of a high caliber team of experts, is currently working on a strategy and subsequent agreements whereby Greensburg will be fueled by 100 percent renewable sources. Currently, the renewable electricity strategy for Greensburg includes between 3MW and 4MW of wind power installed near town and

owned by the City, and 1.5 MW of back up bio-diesel power. They will likely enter into a Power Purchase Agreement (PPA) with a local power pool to provide additional baseload from renewable sources.

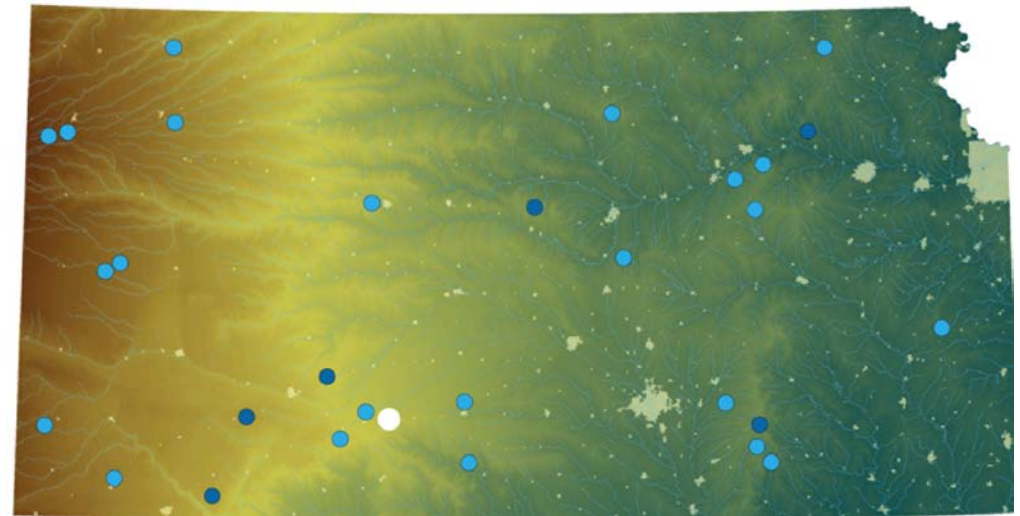
The following framework for the Comprehensive Energy Strategy has been developed and agreed upon:

- Offer 100% renewable source energy to Greensburg area customers.
- Maintain the consumer rates at or near the current rate despite nationwide increases in fuel and energy costs.
- Implement a system that can be maintained by current City staff.
- Include back up power in case of grid failure.
- Allow Greensburg the flexibility to control future electricity supplies.
- Define a system and strategy that is replicable in other Kansas communities.

CAPITALIZING ON ENERGY GOALS

When Greensburg's plan for citywide renewable generation is fully implemented and as the town develops into a truly sustainable community, a new value proposition will be available to attract businesses and industries to Greensburg. By achieving the goals for energy, the community will be able to offer stable energy rates, an attractive proposition in a volatile market. It is

also recommended that Greensburg encourage the development of industries and businesses that are based on renewable energy such as energy service companies, wind turbine maintenance shops, and manufacturers of bio-based fuels. More information about leveraging the green vision for economic development can be found in the economic development section of the Plan.



The six existing wind farms, and 24 engineered wind sites in Kansas. Three are in close proximity to Greensburg.

- Engineered Wind Sites
- Existing Wind Farms
- Greensburg

TRANSPORTATION



Many cities all over the world are encouraging the use of alternatives to traditional transportation, including incenting carpooling and motorized and manual bikes. In Tulsa, Oklahoma a simple swipe of a credit card will give you access to a pink bike (**bottom**) and the service is free of charge as long as you return the bicycle.

MINIMIZING USE AND PROVIDING ALTERNATIVES

Greensburg's size and the requirements of rural living greatly impact the diversity of available transportation options. Unfortunately, skyrocketing fuel prices and carbon emissions associated with transportation will continue to disproportionately impact Greensburg's citizens. There is no indication that this trend will be subsiding and that makes it particularly important that the community encourage alternative and efficient transportation options.

The rededication to creating a tight knit community that is walkable and with most necessities easily accessible are two of the most important steps in reducing unnecessary travel. The City's new trail network and enhanced streetscapes should also encourage more pedestrian activity. To further reduce the need for fossil fuel based transportation it will be necessary for Greensburg to:

- Provide alternatives to traditional automobile transportation
- Minimize the need for personal automobile transportation
- Use land use codes to encourage local business and community interaction
- Provide maximum alternatives to mitigate the need for long-distance business travel
- Minimize travel distances for goods and services



“Buy Fresh Buy Local” (**top**) is a nationwide campaign that could be used in Greensburg. There are also models for public electric charging stations (**bottom**)

Based on conversations with residents, City officials, NREL, and GreenTown we have compiled a list of design and programmatic initiatives that would accomplish some of the transportation goals and reduce dependence on traditional fossil fuels for transportation:

- Plan for charging stations for electric vehicles
- Encourage low emissions construction vehicles
- Create a centralized bio-diesel storage tank
- Design new facilities to encourage telecommuting and/or live-work spaces
- Create a loyalty card for shopping locally and for using locally provided services
- Create materials laying out potential financial and environmental savings from alternative transportation
- Create on-line logbook for voluntary tracking of individual transportation habits

Another valuable resource for information on implementation strategies, tax incentives, and cost analysis for alternative fueling can be found in “Options for Alternative Fuels and Vehicles in Greensburg, Kansas” an extremely thorough evaluation of the implementation requirements for alternative fueling crafted by NREL. The report demonstrates the power of City and County government in shifting their fleets to alternative fuels and the importance of that step to making fuels available to the wider community. A copy of the report can be found in the appendix.

Many of the ideas for minimizing unnecessary vehicular travel that came from the community rely on cooperation between neighbors. Greensburg’s tight community makes it an ideal town for cooperative transportation solutions. Through neighborly cooperation, individual efforts and by capitalizing on new technologies and available alternative fuels, Greensburg citizens can dramatically lower their dependence on fossil fuels, carbon footprint, and transportation costs.

CARBON

One of the buzzwords in sustainable community thinking today is Carbon or Carbon Footprinting. Carbon is a shortened name for carbon dioxide, one of several greenhouse gasses responsible for controlling the temperature of Earth. Carbon dioxide (CO₂) is the most abundant of greenhouse gas emission and tends to get the most attention. Carbon footprinting is an exercise that helps us understand, individually or collectively, how our actions affect the amount of CO₂ in the atmosphere. The current state of affairs shows that as a global community we emit far more CO₂ than the natural processes of our environment can absorb. It is estimated that if everyone lived like an average American, it would take five Earths to support the amount of carbon emitted into the atmosphere. This imbalance is in turn linked to increasing global temperatures that could dramatically change our landscape, economy and cultural experience of place. The three primary human emitters of CO₂ are energy generation, natural gas use, and transportation.

Carbon and its relationship to climate change and the effects it has on our physical experience of life on Earth are

often subtle and elusive. However, the affects of our carbon footprint today are expected to intensify to a dramatic level by the time our children are adults. It is now clear that our climate is warming. This will increase the intensity and frequency of severe weather events, like the EF-5 tornado that hit Greensburg in May 2007, and cause a decrease in precipitation that will influence the ability to continue growing water intensive crops in and around Greensburg.

As a community with the goal of becoming a model sustainable community, it is important for Greensburg to consider how to reduce its carbon footprint and serve as an example for other rural communities to do their part in protecting future generations.



According to the World Wildlife Foundation if everyone lived like an American, it would take five planet Earths to sustain life.



GREENSBURG'S CARBON FOOTPRINT

One of the most effective tools to understand a community's impact is a carbon emissions survey. This process includes taking an inventory of carbon dioxide, or greenhouse gas emissions, over a given period of time. Carbon dioxide is produced when gasoline, diesel, natural gas, coal and other fossil fuels combust. Data gathered from the inventory is then transformed into a statistic, which is popularly called the "carbon footprint." The carbon footprint number is usually expressed in pounds or tons of carbon dioxide emitted. This process allows the community to set a benchmark figure with which they can compare themselves to other communities. The information can also help local government, businesses and residents reduce their carbon emissions in the future.

Greensburg can obtain a good idea of its greenhouse gas emissions relatively easily using several available emissions accounting methods. Including the International Council for Local Environmental Initiatives (<http://www.iclei.org/index.php?id=1123>) or the Seattle Carbon Footprint Calculator (<http://www.seattle.gov/climate/SCPResources.htm>). In general, the years to be studied are specified, and data - much of it from government sources - is

collected and then converted to greenhouse gas emissions using standard coefficients.

Following protocol used by Cities for Climate Protection, typical categories evaluated in a carbon emissions survey are utilities -heating, electricity and transportation, which includes any vehicle using fossil fuels. Carbon emissions from utilities and transportation are the largest contributors to greenhouse gases.

Methane (CH₄), the second most important greenhouse gas from human activity, is a by-product of organic decomposition. With the large number of cattle operations in the vicinity of Greensburg, it might be wise to also consider methane as part of a future comprehensive carbon emissions study, as well as a source of renewable energy. Solid waste, another contributor to greenhouse gas emissions, should also be taken into consideration.

DEVELOPING A BASELINE

The following prototype emissions survey was done to give a preliminary idea of where Greensburg's emissions stood before the tornado and the potential reductions after rebuilding. The following figures are from the City's 2006 records and additional analysis completed by NREL.

ELECTRICITY IMPACT

Electricity used in Greensburg is created largely from coal-based sources. The source of electricity impacts the amount of CO₂ released per kilowatt-hour. Electricity originates with some other form of energy - falling water, wind, geothermal steam, nuclear, natural gas, oil, or coal. Electricity from fossil fuels emits far more greenhouse gas than electricity from renewable resources, e.g., hydropower, wind, and biomass.

Conversion Factors: In Greensburg, the utility fuel mixes are typically 1/10 wind, 9/10 coal-fired, therefore 1000 kWh = 594.6 lbs of CO₂ emissions.

2006 Electricity:

9,800,000 kWh = 5,827,080 pounds of CO₂



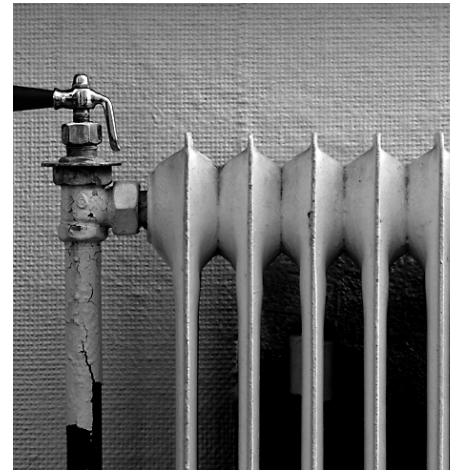
NATURAL GAS IMPACT

In Greensburg, natural gas is the primary source for heating.

Conversion Factors: 1 Therm of natural gas produces 11.64 lbs of CO₂

2006 natural gas use:

650,000 Therms = 7,566,000 pounds of CO₂



TRANSPORTATION IMPACT

Vehicles on Greensburg area roads were the only source of greenhouse gas emissions considered for this exercise. Other categories for future study might include air, rail and bus travel. Most vehicles in Greensburg are powered by fossil fuel, primarily gasoline and diesel, which are major greenhouse gas contributors. Most drivers drive alone to work or school. As the amount of driving increases, so does the amount of greenhouse gas emitted. For the purposes of this exercise, estimated figures and national averages were used:

Estimated Number of vehicles in Greensburg in 2006: 577

Average annual miles driven (national average): 15,000

Average fuel efficiency (national average): 20.7

Gallons of gas driven: (15000 x 577) / 20.7 = 418,116 gallons

Conversion Factor: Every gallon of gasoline burned releases 20 lbs of CO₂

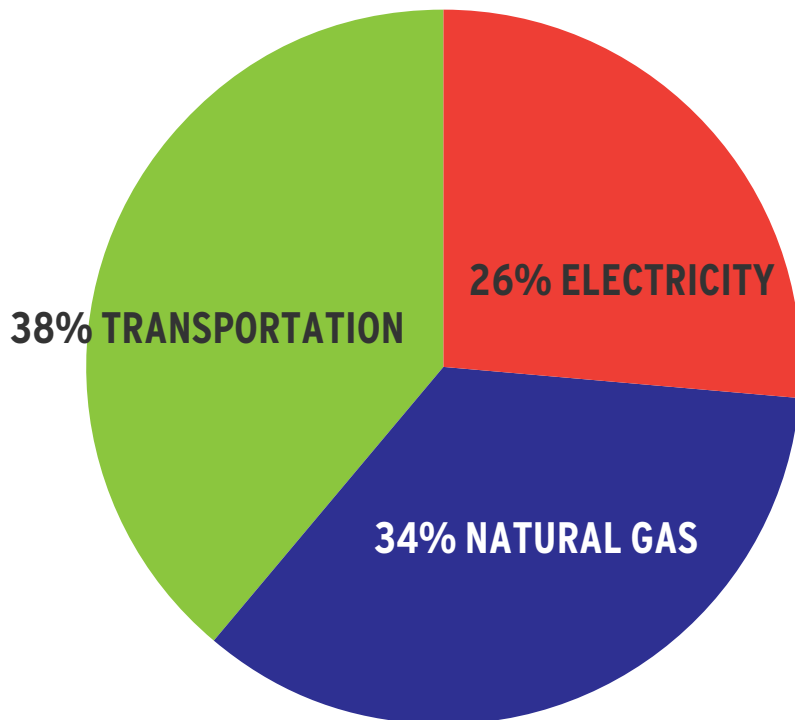
2006 transportation impact: 8,360,000 pounds of CO₂

2006 GREENSBURG ESTIMATED TOTAL CARBON EMISSIONS

ELECTRICITY 5,827,080 lbs
NATURAL GAS 7,566,000 lbs
TRANSPORTATION 8,360,000 lbs

TOTAL 21,753,080 lbs,
 or
 10,876.54 TONS OF CO₂

2009 ESTIMATED CO₂ EMISSIONS BREAKDOWN



REDUCING GREENSBURG'S CARBON FOOTPRINT

- Encourage local government, businesses and residents to conserve and reduce energy consumption.
- Integrate renewable energy sources, such as wind, solar and geothermal sources, into the town's energy mix.
- Biomass is another viable fuel that is carbon neutral when the entire life-cycle of growing the biomass is considered.
- Adopt community-wide greenhouse gas emissions reduction level targets.
- Adopt City codes that encourage sustainably designed and energy efficient buildings, landscaping and infrastructure.
- Encourage fleet owners to pool their purchasing power and encourage the availability of ethanol, biodiesel, and/or compressed natural gas for vehicles.
- Provide financial incentives to builders, businesses and home owners who install energy efficient buildings and equipment.
- Encourage residents to drive less and, if possible, to upgrade vehicles to more fuel efficient models.
- Encourage walking, biking and ridesharing rather than single occupant vehicle driving.
- Offer shuttle services to major points of town.

FUTURE STRATEGIES

From these numbers, Greensburg could begin to formulate strategies for reducing its carbon footprint by trimming use in the three areas, electricity, natural gas and transportation. In an effort to understand what is possible in Greensburg, we have loosely defined three targets for carbon reduction. It is recommended that the City create a full study to better understand feasible targets and how to achieve them.

If Greensburg is able to install alternative energy sources to generate electricity, and attain 100 percent renewable citywide generation, then all of the coal-based electricity could be replaced by carbon free renewable power. This ambitious goal would take the City's carbon emissions for electricity from six million pounds to zero. If electricity generation is 100 percent renewable, converting natural gas heaters to electric systems becomes an excellent way to reduce natural gas use in Greensburg. If 50 percent of the natural gas heated homes are converted to electricity and that electricity comes from wind power, another dramatic reduction in the overall carbon footprint is possible. The

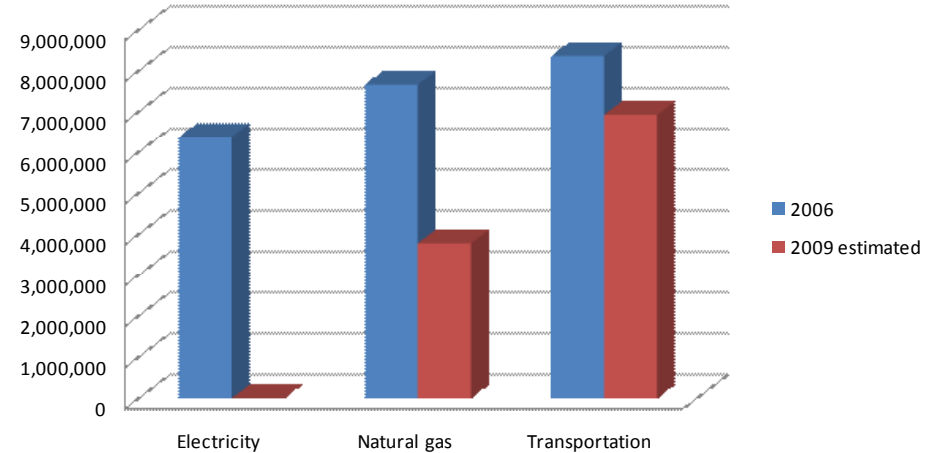
carbon emissions from vehicle travel come primarily from the burning of gasoline and can be reduced by incorporating high efficiency, flex fuel, or alternative fuel vehicles. If through a variety of transportation efficiency efforts the community as a whole improves the average fuel efficiency from 20.7 mpg to 25 mpg or reduces the vehicle miles traveled (VMT) by a similar percentage, the transportation impact would also significantly decrease. If these three targets are met, the scenario for 2009 would look like this:

2009 GREENSBURG ESTIMATED TOTAL CARBON EMISSIONS

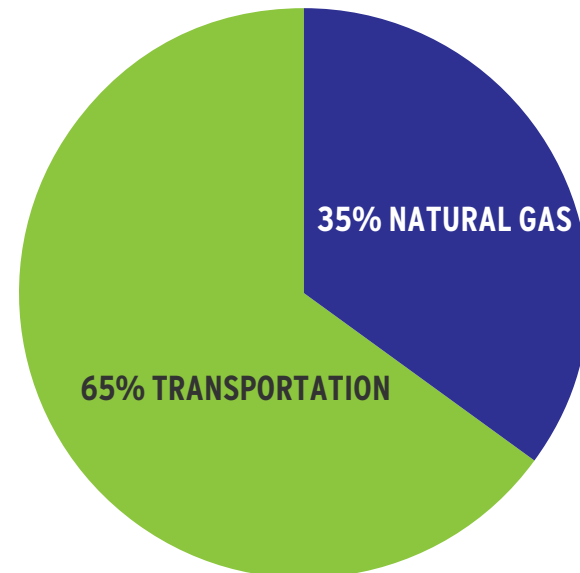
ELECTRICITY	0,000,000 lbs
NATURAL GAS	3,783,000 lbs
TRANSPORTATION	6,925,560 lbs

TOTAL	10,708,560 lbs, or 5354.28 TONS OF CO₂
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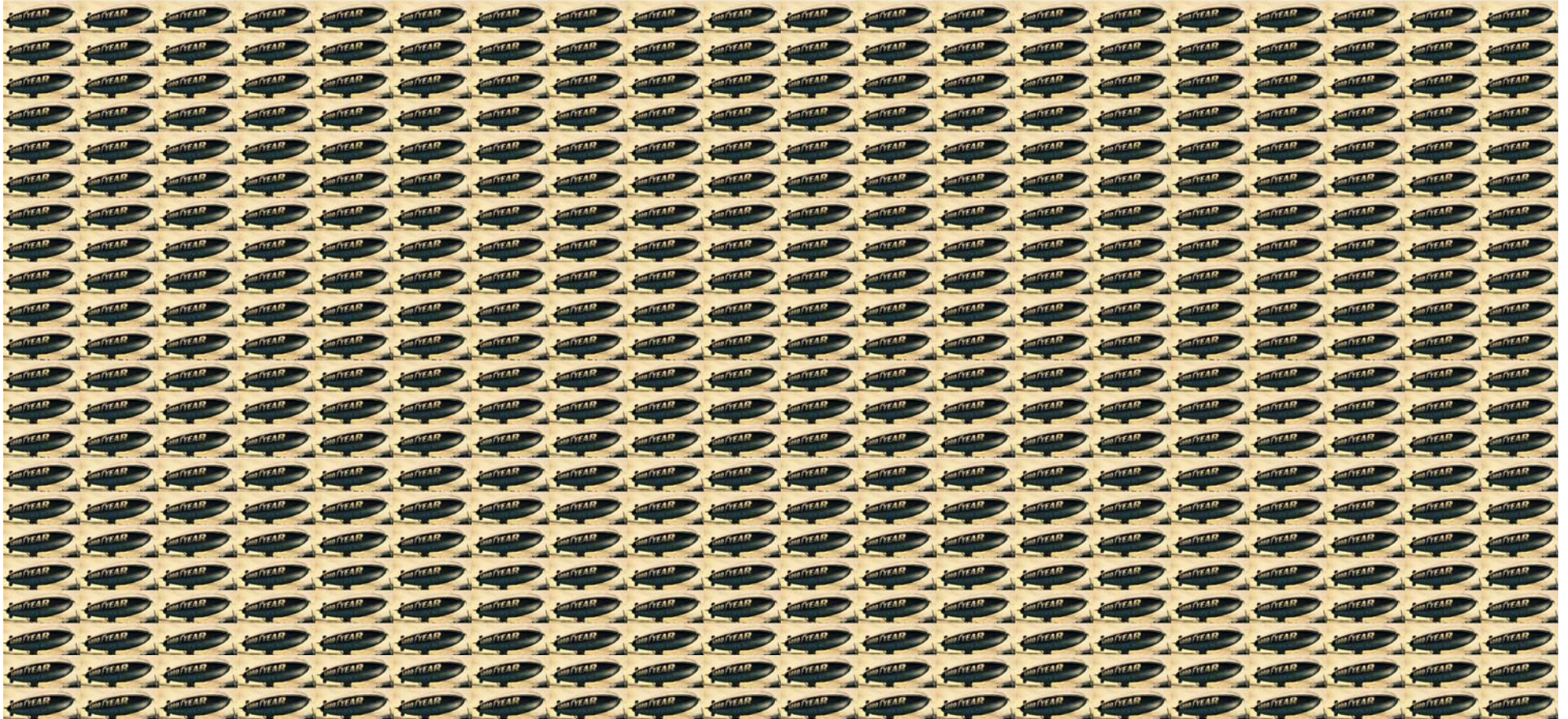
GREENSBURG CARBON EMISSIONS ESTIMATE



2009 ESTIMATED CO₂ EMISSIONS BREAKDOWN



This reduction is equal to **5522.26 TONS OF CO₂**, or roughly the equivalent of **500 GOODYEAR BLIMPS** full of greenhouse gases.



HOUSING

“A house can have integrity, just like a person. “

- AYN RAND

HOUSING

The May 4th tornado had an especially devastating impact on Greensburg’s housing stock. 763 homes were damaged or destroyed, eliminating 85 percent of the city’s housing capacity. In addition to the physical devastation, there is a huge discrepancy between the costs and rental rates for the antiquated housing stock in Greensburg before the tornado and the rates required for new construction. The entire housing market in Greensburg must be redefined and the only way for many of the low-income families to return is to be creative with available funding options. Even with all the financial support of state and federal agencies, these families will still pay more in monthly rents or mortgages and struggle on their current income to survive. This means that the housing challenges and economic development initiatives must work hand in hand to develop a solution. This section of the Sustainable Comprehensive Plan is intended to record the existing conditions in town, define the goals for housing re-growth, explain available programs and possible partnerships and make recommendations for housing design.

The housing issues in Greensburg are perhaps the most difficult rebuilding challenge and are also the most important component for attracting old

and new residents and businesses to the area. People who have jobs in Greensburg have difficulty affording new homes, and others who want to build new homes do not have adequate employment. Existing employers like the hospital and school find it difficult to attract new employees, and conversely new industries hesitate to locate in Greensburg because housing options are limited.



EXISTING HOUSING CONDITIONS

The majority of housing in Greensburg consisted of single-family homes and a few apartment developments. 70 percent of Greensburg householders owned their own homes and nearly half no longer had mortgage payments. Approximately 75 percent of homeowners had insurance; however the vast majority were underinsured. The average home was valued at \$46,500 due to the age of the housing stock. Now, one of the biggest challenges for homeowners is the gap between their insurance settlement and the \$120,000 estimated replacement cost of a 1300 sq. ft. three-bedroom, two-bathroom house. This poses a discouraging picture for those who want to return to Greensburg, and the lagging employment enhances the challenge.

Renters face similar challenges in returning to the community. The challenge for builders is to replace destroyed rental units with new construction in a market where the average rent was \$335 per month (source: FEMA Long-Term Community Recovery Plan). Even heavily subsidized low-income new rentals in Greensburg are costing \$650 for a modest two-bedroom apartment. Throughout the state of Kansas, low-income families are faced with the devastating realities of

GREENSBURG HOUSING BREAKDOWN

	Pre- Disaster		Post Disaster		Total Damage
	Housing Stock	Occupied Housing Units	Destroyed	Impacted	
OWNER (70% of the population)	621	515	462	72	534
Very Low Income (25% of the population)	155	129	116	18	134
Low Income (22% of the population)	137	113	101	16	117
Moderate + (53% of the population)	329	273	245	38	183
RENTERS (30%)	266	215	198	31	229
Very Low Income	67	54	50	8	58
Low Income	59	47	43	7	50
Moderate +	140	114	105	16	121
City Total	887	730	660	103	763

* Source: Greensburg LTRC Plan, August 2007

inflating affordable rental prices. The cost of affordable rental housing has climbed 22 percent since 2000 and is outpacing the wages of those who need it most. According to a report by the National Low Income Housing Coalition (NLIHC), fair market rent for a two-bedroom apartment in Kansas went up \$20 from last year to \$628. In order to spend 1/3 of monthly income on housing, a resident would have to make a wage of \$12.08 per hour, or \$25,136 annually. With an average per capita yearly income of \$18,054, and a median income of \$29,000, many Greensburg residents will struggle with inadequate housing funds.

Getting an acceptable amount of housing constructed and available is a primary concern. 133 new housing permits have been granted as of April 2008. This is a good start, but there are still nearly 150 families living in trailer housing provided by FEMA. It is assumed that many of the families will remain in this housing until it is no longer available, which means that initiatives for housing in Greensburg will continue to evolve and be greatly needed until at least November 2008.



A modular home was brought into Greensburg in November, 2007.

WORKFORCE HOUSING

The lack of workforce housing is a primary concern for outside contractors interested in working in Greensburg. The significant cost of driving in employees every day is resulting in construction costs that are out of line with what is typically expected. If possible, it is recommended that the City identify a potential project to build workforce housing for construction workers. An ideal project would transition into apartments, condos, or a hotel after the construction workforce declines.

HOUSING CHALLENGES

- Many Greensburg residents are faced with rebuilding homes and businesses
- Gap between insurance and real costs of rebuilding
- Little or no experience with building a new home
- No current employment
- Finding the work force to build 700 new residences
- Housing the work force to build 700 new residences



HOUSING GOALS

As the housing base is reestablished, the goal is to create a sustainable mix of housing types, affordable, high efficiency structures, and a healthy ratio of rentals and ownership.

SUSTAINABLE MODELS

The current housing situation in Greensburg is daunting. However, the community's goal to be a sustainable model presents new opportunities that will improve the housing crisis. In Greensburg affordable housing also means high efficiency homes. By reducing monthly electric bills homes in Greensburg are sustainable for the long-term. Homes should also be healthy, enjoyable places for our families. By incorporating sustainable building techniques such as daylight, operable windows and nontoxic paints and finishes the risk of illness is greatly reduced and overall human health is improved.

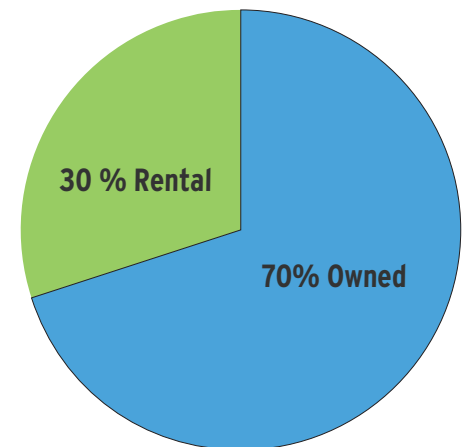
OWNER/RENTAL PERCENTAGE

Before the tornado, Greensburg was fortunate to have a healthy ratio of rented units to home ownership with approximately 70 percent of the residences owned and 30 percent rented. There is the chance that those who once owned a home will not be able to afford rebuilding, but instead will take

the option to rent. It is important for the City to keep a running tab of the rental to owner ratio and create programs that maintain a healthy balance.

AFFORDABLE HOMES

Affordable housing opportunities in Greensburg are as important as new jobs and economic development. The City, steering committee groups, and federal and state agencies currently assisting the recovery efforts must all be invested in creating affordable housing in order for it to become a reality in Greensburg. By creating new partnerships between residents, employers, financial programs, and other organizations the affordable housing problem in Greensburg can be solved.



CREATING PARTNERSHIPS

For some families the only way to rebuild in Greensburg is to enter into complex funding partnerships with local, state and federal agencies and organizations. There are some good examples of these partnerships already established in Greensburg. For example USDA Rural Development and the United Way of the Plains (Wichita, KS) entered into a first-ever fund leveraging partnership to allow the City of Greensburg to pay for home-building oversight, provided by Mennonite Housing Services, to support the construction of up to fifty (50) affordable, single-family homes. Additionally, fourteen local and regional partners assisted with this important housing recovery effort. These new homes will be built by their owners with the assistance of volunteer labor being provided by the business, faith-based, non-profit sectors, will be designed to be highly energy efficient and include a full basement with safe room.



The Green House in North Charleston South Carolina is used as an example and learning tool for the community.

By combining USDA loan and grant programs with Mennonite Housing and the homeowner's sweat equity, the final home price will be an affordable \$60,000, half of what it would otherwise cost to build a new home in Greensburg. This would never have been possible without the creative partnerships and efforts of the participating organizations.

There could also be private partnerships between residents and businesses to build mixed-use projects or between two families to create duplex or townhouse projects. One roof is more economical than two, and if appropriate partnerships are fostered, there is an immense opportunity to combine projects and reduce costs for both parties involved. In Greensburg, business owners historically lived above their storefronts in loft like apartments. It is the recommendation of this plan that a modern take on the old efficiency be encouraged in Greensburg. A local lending institution could draft a sample private partnership contract and help identify parameters and income requirements for these projects to ensure neither party is left footing the entire bill.

There are hundreds of ways that new buildings can be looked at in more economical ways, and if these partnerships are not a strong

consideration it is likely that many of Greensburg's current residents will not be able to rebuild. It is recommended that Greensburg organize a housing workshop with all funding partners to review which programs are working and identify potential areas for greater cooperation.

FUNDING PROGRAMS

There are dozens of funding mechanisms available to those rebuilding homes in Greensburg. From loans and grants, subsidized down payment programs, first time homebuyer incentives, and energy efficiency tax credits to emergency funds, the programs are varied and complex. Some of the funding mechanisms can be combined and some cannot, creating a system that can be frustrating to those building and financing a home for the first time. A Housing Resource Coordinator position was recently hired to help residents decipher the many programs available

and understand where to start. This individual will direct citizens toward resources and assist in the coordination of housing issues. In addition, the USDA has representatives in Greensburg to answer questions about that organization's programs. For at least another year, many residents will need the direct assistance of a resource coordinator or another on-the-ground resource and it is recommended that the City continue to offer personal assistance through links from the City website, City staff, or supporting the continued efforts of the current Housing Resource Coordinator. One possible model for this recommended City service is "Beyond Housing", an organization in St. Louis that helps educate low-income families about their housing options. A similar organization in Greensburg could help assist all new homeowners with a focus on low-income families.



EMPLOYER ASSISTED HOUSING

In order for housing challenges to be solved, they must be approached from every direction. One program to consider is Employer Assisted Housing. Employers who participate in these programs often provide down payment home ownership assistance in the form of second mortgage loans that are forgivable after a certain length of employment. Typically, the programs do have some income qualifications but often go up to 120 percent of the area median income. It is recommended that Greensburg seek to attract industries that provide employer assisted housing or even require that incoming industries provide a similar program to a percentage of employees. This initiative can be supported by an educational program or resource center where incoming industries can learn more about model programs and available tax credits. This programming could be made available through the Chamber or Commerce, the City or other local organization.

HOUSING DEVELOPERS

The renewed national interest in Greensburg may make it possible to ask for assistance from a green housing developer who could identify the possibility of an expedited housing project. A developer may also be of assistance in identifying creative alternatives for solving the current shortage of workforce housing. In an ideal situation this developer could take advantage of the scale of building required to build affordable green homes.



HOUSING DESIGN

The design of housing throughout Greensburg has a direct impact on the long-term safety, efficiency, diversity and appearance of the community. While individual budgets dictate a majority of the construction decisions, there are several techniques and guidelines that, if followed, will improve the appearance and performance of Greensburg's housing stock. It is recommended that the City create guidelines for the residential areas identified in the Future Land Use Scenario of this plan that include the following components: housing efficiency, sustainable guidelines, safety and durability, human vs. auto oriented design, modular homes, and guidelines for diverse housing types.



HOUSING EFFICIENCY

There have been significant advancements in efficiency of new housing. The National Renewable Energy Laboratory (NREL) has been on the ground in Greensburg providing tailor-made advice and methods to lower operating costs and improve overall performance and safety. The following guidelines are for a high efficiency home and were crafted by NREL for inclusion in this plan. Following these performance measures will not only improve the safety of your home and provide insulation from rising energy costs, but will also save money and reduce carbon emissions. More information about energy efficiency in homes is available in the Energy section of this Plan.

40% EFFICIENCY RECOMMENDATIONS

Insulation	Walls	R-21
	Roof	R-50
	Basement	R-10
Windows	Double-glazed, low-e, argon-filled	
	U-Value	0.28
	Solar Rating	0.37
Lighting		
	% Compact Fluorescents	80%
Heating		
	Efficiency Rating	90+%
Air Conditioning		
	Efficiency Rating	18
Appliances	Standard	
Water Heater	Tank - gas	
	Energy Factor	0.61
Ventilation	Supply	

* Source: NREL

ENERGY SAVINGS

For a typical 2,000 sq.ft. home: With High Efficiency Upgrades

Savings on Monthly Utility Bill ¹	\$76.58
Increase in Monthly Mortgage Payment ²	\$34.25
Net Monthly Savings	\$42.33

¹ Evaluated relative to current Building Code - IECC 2003.

² Based on a 30 year mortgage at 7% APR with an increase in loan value of \$4,000 for the 30% option, \$7,000 for the 40% option, and \$13,000 for the 50% option.

* source: NREL

DIVERSITY OF HOUSING OPTIONS

It is a well-known fact that in order for Greensburg to sustain itself for generations, it must be an attractive place for people of all ages. To provide for existing residents and to attract new residents of all ages, diverse housing choices need to be available that reflect the lifestyles of many different demographics. Providing a mixture of housing types results in an approach that is market-sensitive and flexible. Flats could be built above retail in the downtown core. These units are closely

connected to street life and provide close proximity to retail activities and other services. Near downtown, a medium density residential type (townhomes, smaller single-family residential and multi-family residential) will add to the vitality of the economic core. Finally, traditional single-family homes will be available to add further diversity to housing choices. We have seen across the country that communities with a variety of housing types are more likely to retain residents even as their lifestyles change.



Transect zoning is one way to ensure a variety of housing types are integrated into the community design.



Town Homes like these in Richmond, Virginia are appropriate housing types near the downtown core.



A variety of modest single family homes of a higher density are also appropriate near the downtown core.



Larger homes with large lots are appropriate on the perimeter of town, furthest from the downtown core.

SUSTAINABLE GUIDELINES

For the encouragement of sustainable and energy efficient re-construction in the residential sector, the following guidelines are recommended:

Energy Efficiency: design and construct homes to provide a Home Energy Rating System (HERS) score of 60 or lower (note: this represents a house with energy consumption 40% below that of a house built to the International Residential Code)

Indoor Air Quality: construct homes to meet the requirements of ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) Standard 62.2 “Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings” and use only power-vented sealed combustion appliances.

Durability: design and construct homes in accordance with the “Energy Star Indoor Air Package, version 2, Section I, Moisture Control” at www.energystar.gov.

Water Conservation: select high efficiency fixtures for sinks (kitchen and bath), showers and toilets. Use the criteria of LEED-H (LEED for Homes) Water Efficiency, WE, Credit 3.1. See www.usgbc.org.



This Habitat for Humanity home in Kansas City includes optimized solar orientation to take advantage of southern exposure, high efficiency plumbing fixtures, a geothermal heat pump, and salvaged and recycled materials.

Efficient Lighting: provide an Energy Star Advanced Lighting Package. See www.energystar.gov.

Position for future Solar Applications: orient one major roof slope to the south.



This zero energy home in Hickory, North Carolina is unassuming in character and its owners do not pay a monthly energy bill.

SAFETY + DURABILITY

It is impossible to build a tornado-proof home. However, it is possible to build a strong, safe home. Both homeowners and homebuilders should be educated about the best practices like durable building materials, safe rooms or basements, and storm shutters for areas prone to high winds like Greensburg. Part of becoming a sustainable rural town requires being aware of the climate, the hazards, and knowing how to prepare. By building homes out of durable, lasting materials, and incorporating appropriate strategies for high winds, Greensburg will sustain its building stock into the future. See the Hazard Mitigation section of this Plan for more detailed information.

In addition to being safe, residential units in Greensburg should also be durable. Building homes that will last for 100 years and are easily maintained will prevent blighted neighborhoods and dilapidation. Durable structures maintain their appearance and their resale value and should be encouraged throughout Greensburg.

HUMAN VS. AUTO ORIENTED DESIGN

Housing design affects community interaction and walkability by responding either to the needs of automobiles or to those of pedestrians. The community wants to foster walkable neighborhoods and housing design can respond to this goal. A pedestrian friendly home engages street life, often incorporating a front porch and keeping the front entry as the primary front facing feature rather than the garage. These diagrams to the right show the difference between human and auto-focused design.

Human Design

1. Prominent roof modulation
2. Prominent front entry with porch
3. Walk way
4. Alley in lieu of driveway

Automobile Design

1. Little roof modulation
2. Minimal front entry
3. Prominent garage and driveway

Human Oriented Design



Automobile Oriented Design

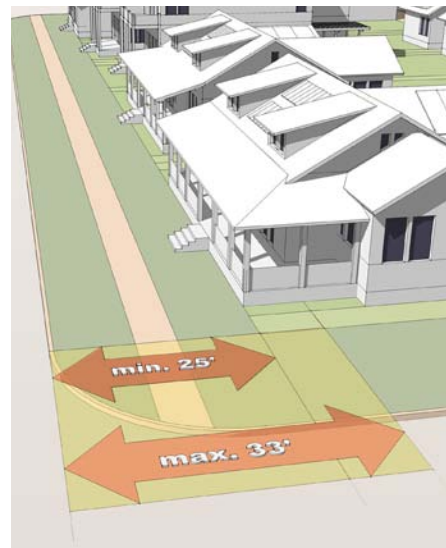


MANUFACTURED AND MODULAR HOMES

Some families have taken the manufactured or modular home route. The process is straight forward and popular designs and floor plans are available to choose from. The City should encourage residents to use the most sustainable and high efficiency manufactures and modular homebuilders. Recommended builder lists should be easily accessible on the City website and in printed materials located in the permitting office. Furthermore, pre-manufactured and modular homes should be required to follow the same design suggestions mentioned above to create a pedestrian friendly community.

NEIGHBORHOODS: LAYOUT AND FUNCTIONALITY

Neighborhood design has the ability to improve neighborly interaction, create attractive homes, and increase the environmental performance of a community. Setbacks, solar orientation, sidewalks, street layout and street trees all impact the feel of a neighborhood. The following recommendations contribute to a successful neighborhood.



A maximum setback for residential areas prevents uneven development that withdraws from the sidewalk.

SETBACKS

In order to maintain continuity in residential neighborhoods, it is recommended that the City change current zoning to include both minimum and maximum setbacks. Higher density areas should have smaller setback requirements.

SOLAR ORIENTATION

When possible, homes should be designed and oriented to optimize natural light and appropriate heat gain.

- On blocks with housing frontage facing south, deep front porches protect the mass of the house from harsh summer sun and let low winter sun in to help heat the home.
- Limit windows on the east and west: solar glare as well as heat gain and heat loss are easier to control with windows facing north and south.
- Roofs should be pitched for maximum southern exposure to allow for solar energy capture.



This diagram (above) illustrates how housing design can be optimized for solar heat gain and control as described.

SIDEWALKS

New residential development should be required to include 4-5' sidewalks on both sides of the street. This provides a link between homes and amenities and encourages neighbor interaction.

STREET LAYOUT

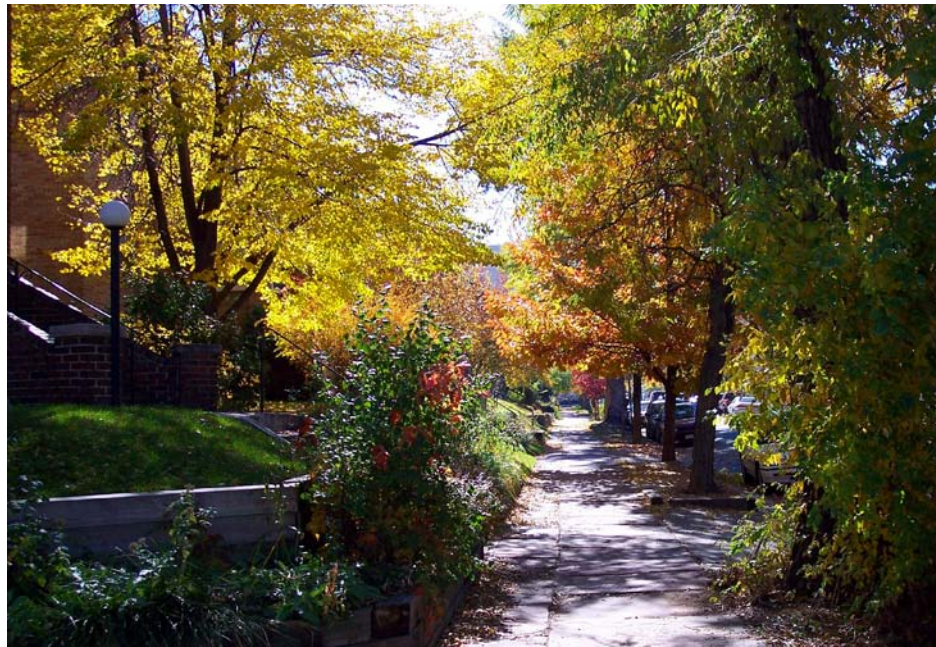
A street grid is most conducive to pedestrian activity and overall neighborhood safety. Cul-de-sac streets should be avoided. Narrow streets are also more conducive to pedestrians and often contribute to a more tight-knit neighborhood. A 24-26' street width is adequate for most residential streets. New residential projects outside of the established street grid should adhere to these recommendations, and new subdivisions should shift block patterning to allow for optimal southern exposure.



Suburban type development does not foster the sense of community that Greensburg hopes to rebuild.



Street trees are an amenity to residential areas providing safety and increased property values for home owners.



This sidewalk in Denver is encased with foliage and provides a comfortable way for neighbors to connect and for children to walk to school.

STREET TREES

The loss of Greensburg's urban forest was a blow to the image of the community. It is a fact that healthy tree coverage improves human health, mitigates environmental pollutants and improves energy efficiency. A program is being coordinated to replace street trees with native trees and should continue to be supported by the City. Tim McDonnell, Kansas State Arborist, wrote grants to replace the trees lost to the tornado and created a list of native species appropriate for Greensburg. It is Tim's goal to replace every tree lost to the tornado. See the appendix for the list of appropriate native trees and Tim's contact information.



Whether contemporary, **(top)** or more traditional, **(bottom)** homes in Greensburg should encourage community interaction and be built to last.

ARCHITECTURAL STYLE

The intent for architectural style is to convey the character of Greensburg through the ideas and technology of sustainable design. The primary goal is to create an architecture that is simultaneously functional, innovative and sustainable. Community discussions revealed that Greensburg citizens are open to contemporary design as well as traditional architecture.

Architectural style in Greensburg should consider innovative solutions while acknowledging the contextual design of a rural American town. Diversity and uniqueness are encouraged as long as designs maintain the overall pedestrian feel of neighborhoods. No home in Greensburg should overwhelm other structures.

INFRASTRUCTURE



In this image Elm Street is impassible after a rain event in Greensburg: May 2008.

STORMWATER

CURRENT STATE OF STORMWATER

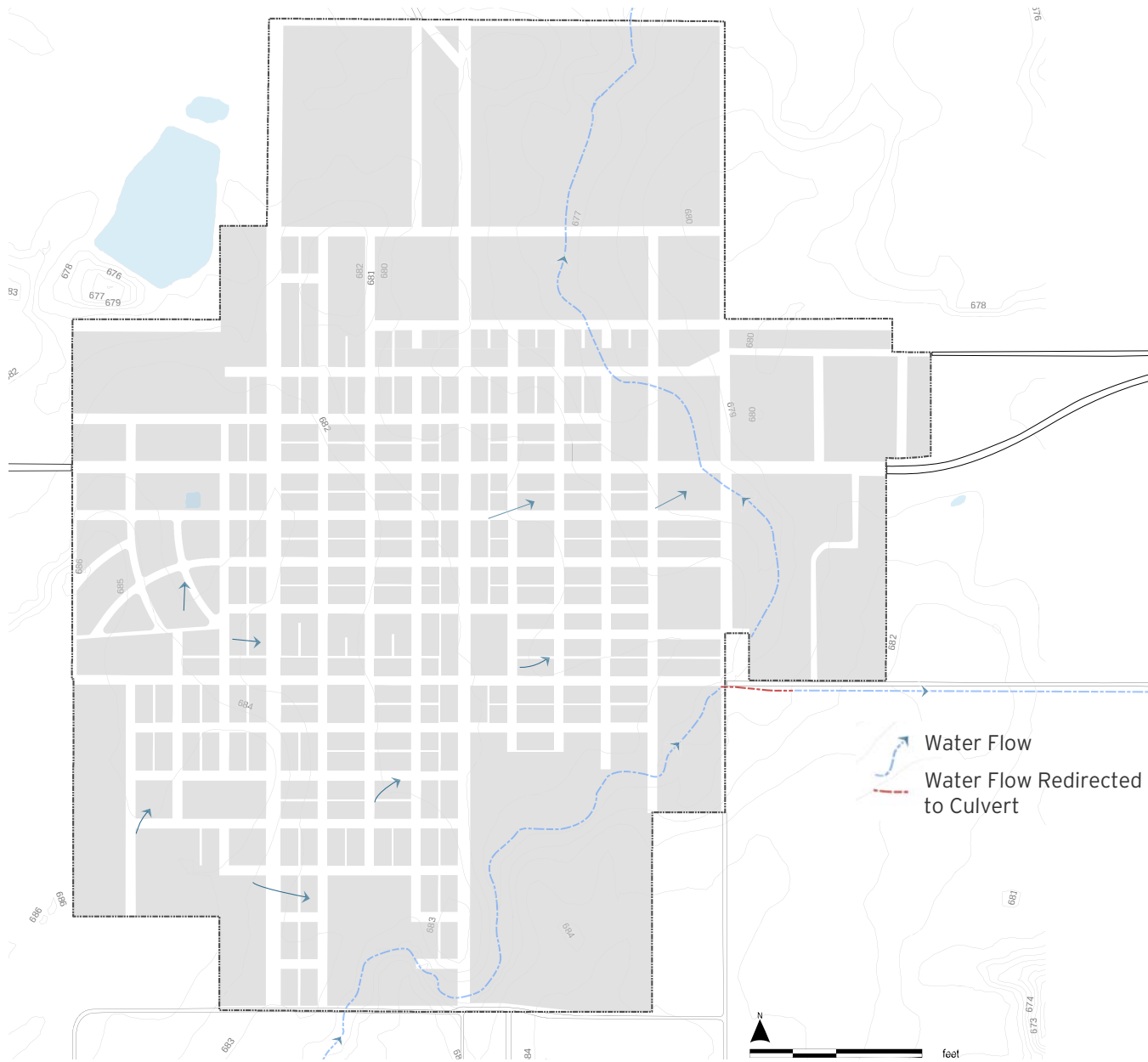
Greensburg lies near the center of the Rattlesnake Creek watershed and has an annual precipitation of approximately 22 inches. In Greensburg, stormwater comes from two sources: precipitation that falls on the town and runoff from the watershed south of the town which enters Greensburg at several points on the South and South-West city limits. Water that is not absorbed into the ground often ponds in low-lying areas before dispersing into the lake or the ephemeral streams throughout town.

One of Greensburg's community goals is to "treat each drop of water as a precious resource." After speaking to many members of the community, it became apparent that Greensburg faces many challenges to achieve this goal. Greensburg's relatively limited topographic relief, an inadequate above-ground curb and gutter stormwater system, and undersized culverts lead to flooding during storm events. Water quality is also a concern. The effect of nitrates, phosphates, metals, hydrocarbons, and total suspended solids (comprised of vehicular pollutants such as transmission fluids and oils) must be mitigated to improve overall water

quality, and to prevent further contamination of ground water. Because of the repair of many infrastructure systems, Greensburg is currently in a unique position to define a strategy for responsibly managing stormwater.



These images represent the current stormwater infrastructure that could be enhanced by green solutions.



Topography and Water Flow

Topographic relief and land cover influence water flow throughout the watershed. A natural systems-based stormwater management system must take both into account.

There is one drainage way that directs water through Greensburg. Very moderate slopes promote ponding during heavy rains.

AVOIDING HARMFUL CONVENTIONAL METHODS

Conventional stormwater management methods usually capture water flowing off impervious surfaces, channelizing or piping it, and then discharging it in undeveloped areas or releasing it into streams. Many of these methods, often called “hard” engineering solutions, aim to alleviate problems on individual sites but often lead to a number of larger environmental problems such as increased soil and stream bank erosion due to greater velocities, increased flooding potential downstream and interruption of the natural aquifer recharge process.

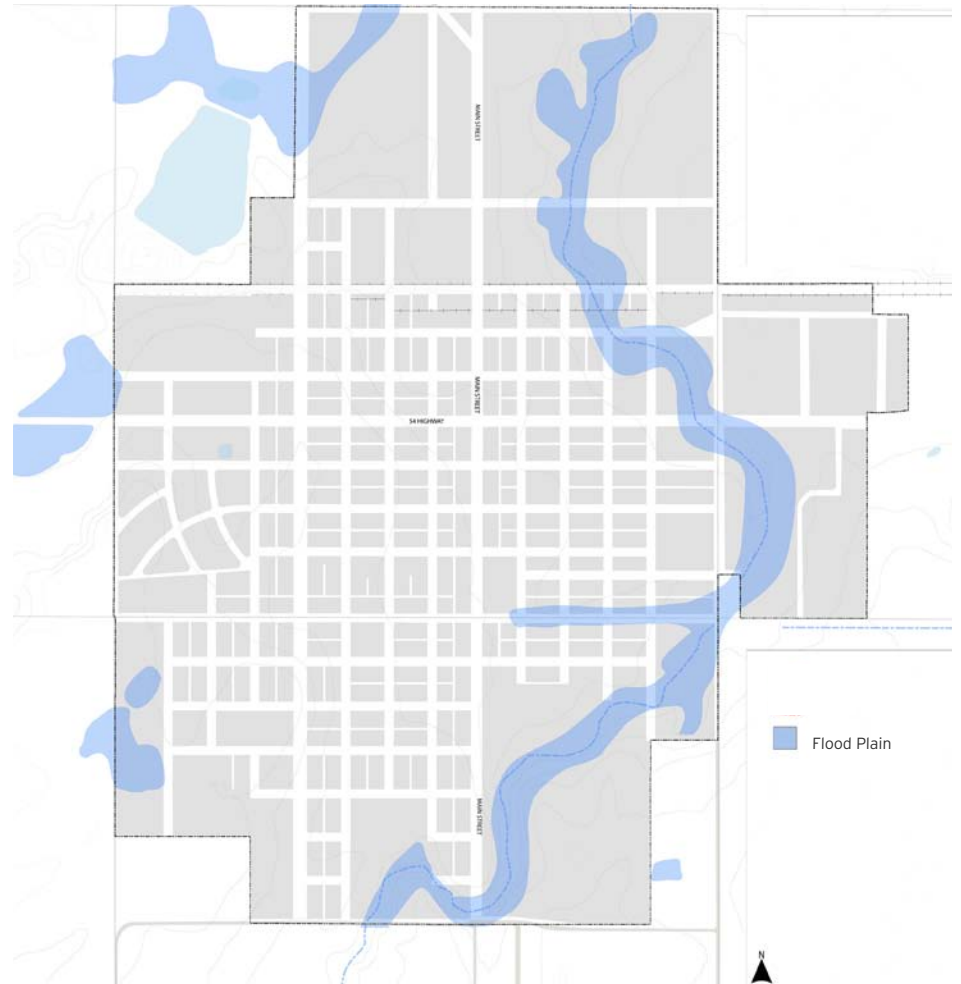


In most cases, these conventional methods were not developed to best manage stormwater, but rather were reactions to development patterns that ignored ecological impacts. The key to responsibly managing stormwater begins by integrating development patterns into the unique natural systems of Greensburg’s landscape. A citywide stormwater strategy will ensure that all development considers its effect on that system.



100 YEAR FLOOD PLAIN

The area shown is defined by FEMA as being affected by flooding during a one hundred year storm. Areas within the flood plain are ideal locations for innovative stormwater management solutions. This area could be improved with a system of integrated flood control practices.



HARNESSING THE NATURAL SYSTEM

The natural water treatment train (following pages) represents the flow of stormwater from the time it falls as precipitation to when it is either absorbed into the ground or rejoins the atmosphere due to evaporation. Each link in the treatment train plays an essential role in the conveyance, purification, and infiltration of stormwater. This natural process is a highly efficient stormwater management system suited to the plants, soils, and climates of the region and thus the ideal blueprint for Greensburg.

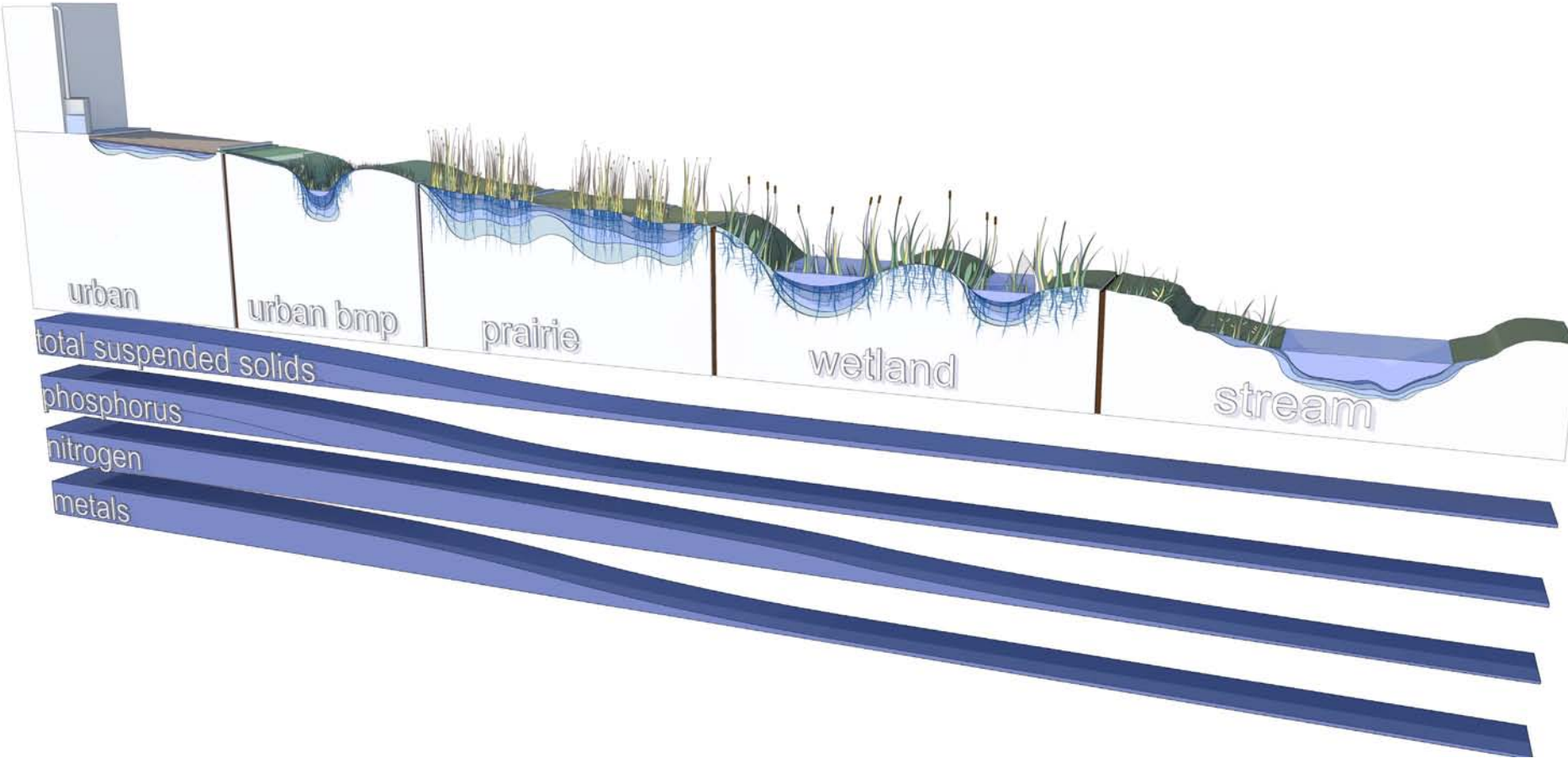
By understanding and incorporating the unique local water treatment train, the City of Greensburg has the potential to create an innovative system that will reduce water run-off volumes, improve water quality, and begin to recharge local aquifers. This stormwater management system uses “soft” or green engineering practices to recreate the natural treatment train throughout

Greensburg. The design of every structure, streetscape, and landscape should be influenced by this system. A truly integrated system has the potential to:

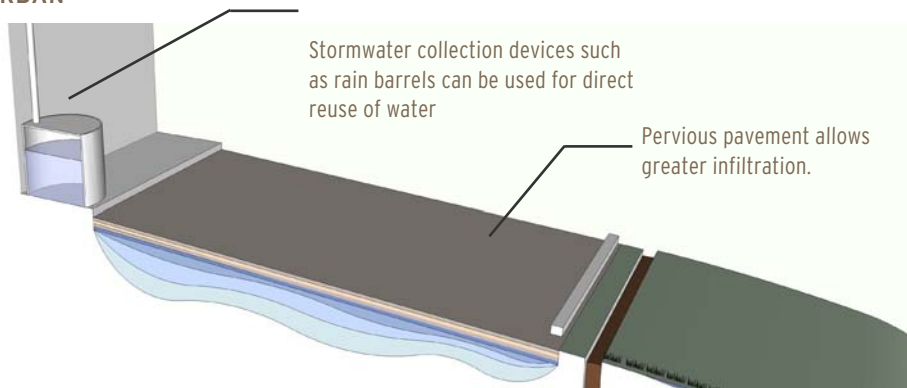
- Eliminate flooding by slowing and decreasing runoff volumes and increasing perviousness
- Dramatically improve water quality to ensure aquifers are recharged with pure water
- Ultimately create a community with zero stormwater runoff

If done correctly Greensburg has the ability to drastically reduce standing water problems while simultaneously cleaning rainwater and allowing for proper infiltration. It is recommended that as Greensburg rehabs its stormwater system it integrates a natural or “soft” solutions.

STORMWATER TREATMENT TRAIN

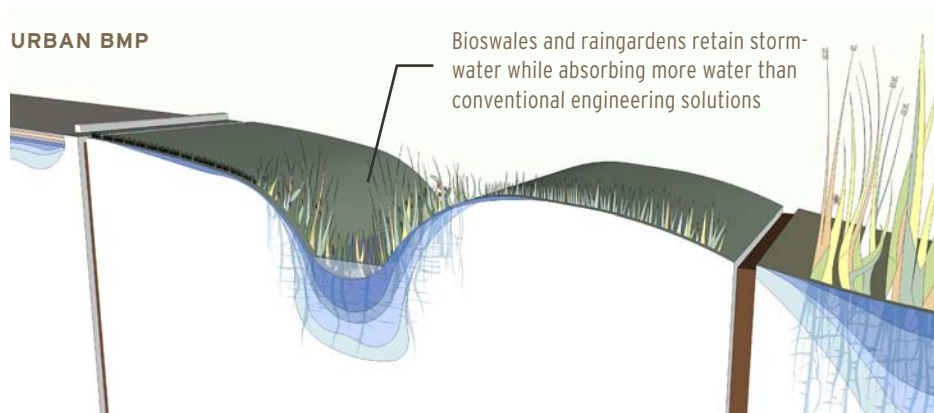


URBAN



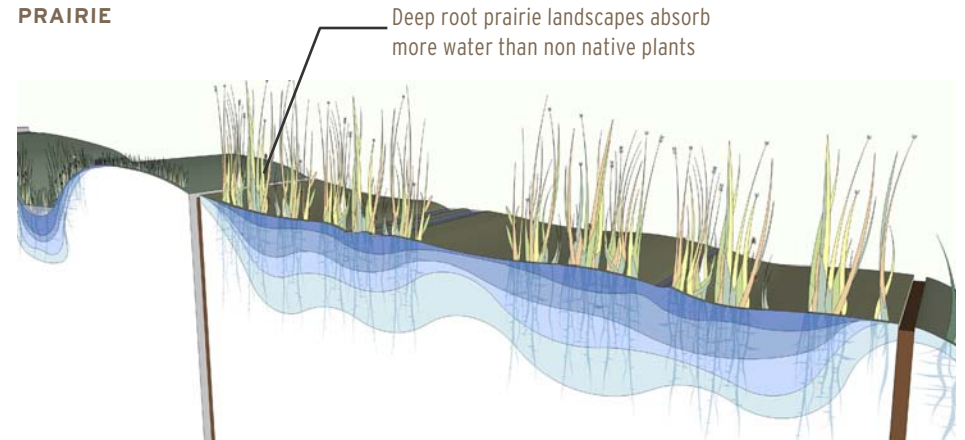
Developed areas shall minimize imperviousness, maximize infiltration, and capture as much water for reuse as possible. In the diagram above rainwater is harvested off a building and stored in a cistern and pervious pavement allows infiltration.

URBAN BMP



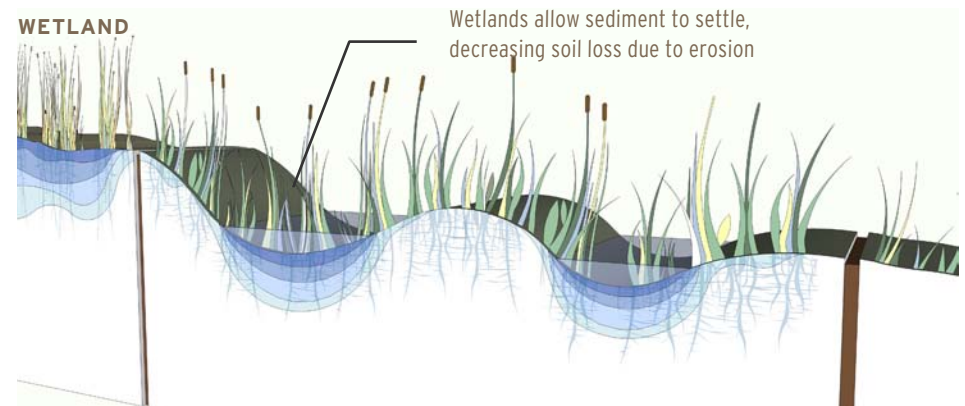
In manicured natural spaces, such as parks, native plantings are strongly encouraged. Raingardens, bioswales, and other best management practices aid in purification and infiltration.

PRAIRIE



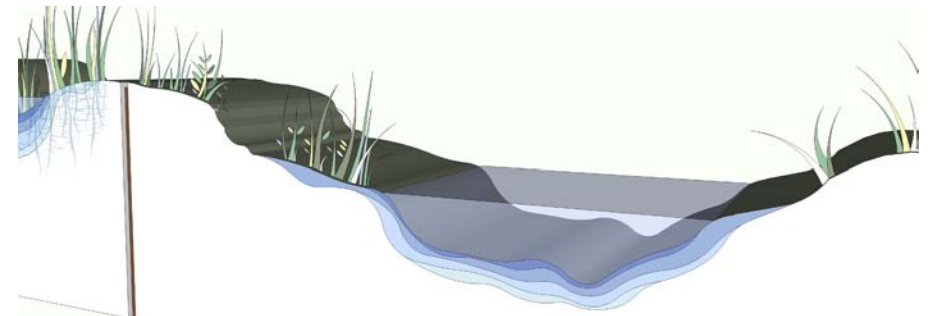
Overland flow through native prairie grasses advances the purification and infiltration process by closely simulating water flow patterns found in pristine Kansas landscapes.

WETLAND



Runoff not infiltrated in earlier phases of the train is collected in wetland systems, which removes most of the remaining toxins.

STREAM



Remaining runoff is dispersed into local reservoirs or ephemeral streams.

CREATING A FRAMEWORK

To properly design a natural stormwater management system the existing geography becomes the basis for drainage. This system is comprised of vegetated land forms, the Parks and Green Corridors system, and is integrated into more developed areas where conventional elements of the built environment can be subtly redesigned to handle water.

Areas of all densities and uses must play their part, from the downtown core to the residential blocks and undeveloped fields, and all have unique conditions that require a variety of stormwater management strategies. Areas of low impact development or no development should be considered potential restoration zones.



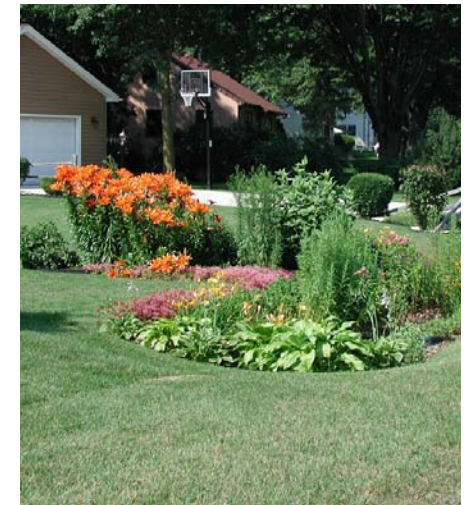
Creative stormwater capture (top), bioswales (middle), and pervious parking (bottom) are all techniques for integrated stormwater management.

Downtown & Relatively Dense Development Areas

In highly developed areas, such as the Downtown Core, the goal is to minimize imperviousness, harvest stormwater and maximize water infiltration. Components of the stormwater system in denser developments should be incorporated into the City's architecture. Cisterns and rain barrels will harvest as much reusable water as possible from roofs and other impervious surfaces. On streetscapes, lawns, and vegetated zones, "soft" engineering solutions of plants, swales, and topographic depressions should be implemented in place of "hard" engineering solutions such as concrete channels, curb inlets, and storm sewers.

Residential Areas & Low Density Development

Like higher density developments, the ultimate goal is to minimize imperviousness and maximize water infiltration. Rain barrels, cisterns, and other components should be incorporated into the residential architecture. The use of native drought-tolerant plants is encouraged because they require less irrigation and have extensive root systems which absorb water quickly in storm events. Rain gardens and bioswales are also easily implemented in these areas.



Rain gardens can be planted in residential areas and are easy to maintain.

Streetscapes & Green Corridors

Main Street, Bay Street, Highway 54, and Grant Avenue have the potential to be developed into the primary circulation arterials in Greensburg. They also have the potential to become the arterials of Greensburg's stormwater management system. Green amenity zones along these primary circulation routes should become above-ground water conveyance systems which collect excess runoff from yards and streets and ultimately transport water to zones that form the subsequent steps in the treatment train.



Vegetated streetscape features can make transitions from trails to streets safe and easy for pedestrians and cyclists.

Parks

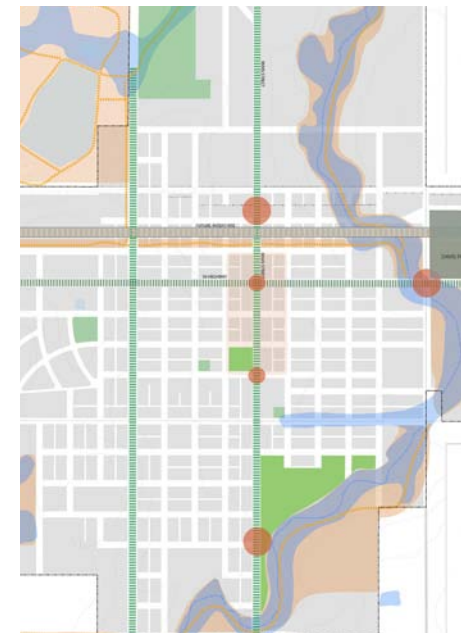
The replacement for Davis Park, Memorial Park, and the other parks in Greensburg are important links in Greensburg's natural stormwater management system. Excess runoff is a greater problem on active recreation zones because athletic fields and manicured fescue lawns are less pervious than native vegetation, particularly when heavy use causes compaction. Ponding and flooding is also a major concern in open spaces because of the lack of topographic relief in Greensburg. Larger rain gardens, bioswales, and other strategies are needed to manage stormwater on these sites and could also be designed as educational amenities.



Restored wetland areas can be used as passive recreation or education.

Undisturbed Areas, Restored Zones, and Trail Systems

The most significant stormwater management capacity is in undisturbed and potential restoration zones located on the edges of Greensburg. It is vitally important to identify, protect, and restore the significant existing natural features and systems. Restored native prairie zones and waterways will facilitate the final treatment and infiltration processes in the treatment train, and will serve as Greensburg's greatest natural amenity and a powerful source of identity.



The concept for integrating streetscapes, parks, and restoration zones is discussed further in the Parks and Green Corridors section of the Plan.

STORMWATER RECOMMENDATIONS

It is recommended that the City of Greensburg take the following actions in order to create a natural stormwater management system, protect and restore the existing ephemeral stream channels and enhance habitat corridors that are an integral part of the flood protection and natural character of the city:

CREATE STORMWATER MANAGEMENT MASTER PLAN

A detailed study of Greensburg's region and the Rattlesnake Creek watershed should be conducted. The final plan would contain specific strategies for implementing many of the concepts outlined in this plan and specify methods of monitoring the City's progress.

ADOPT BEST MANAGEMENT PRACTICES MANUAL

Best Management Practices (or BMPs) are strategies for controlling water runoff and improving water quality. Creating a Greensburg BMP manual would give local government the toolbox necessary to comprehensively manage stormwater. The toolbox would be easily interpreted and adapted by developers with the guidance of the City during the preliminary plan phase, and would help ensure high-quality

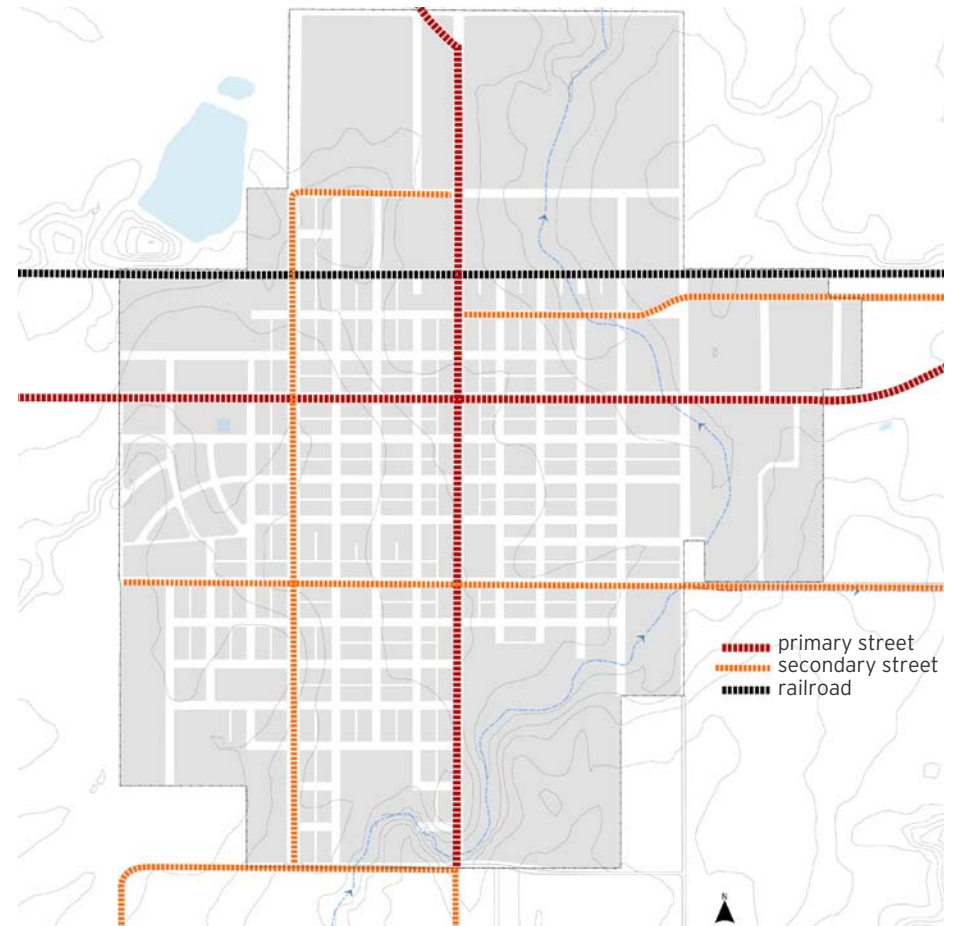
smart site development. The BMP's should be applied with a "Level of Service Method (LOS)" which allows the City to determine the level of investment into stormwater protection at a site-by-site or zoning basis, and ensure that a minimum LOS is achieved with each development. The recently adopted Kansas City BMP manual is an example that can be used as starting point. It can be found in the appendix.

ESTABLISH A WATER QUALITY MONITORING PROGRAM WITH KSU EXTENSION

Stormwater BMP's and Greensburg's dedication to sustainability could create attractive research projects with the Kansas State University extension office. An effort should be made to identify the potential of this relationship.

IDENTIFY ENDANGERED AND DAMAGED LANDSCAPES TO IMPLEMENT DEVELOPMENT RESTRICTIONS AND RESTORATION INCENTIVES IN THESE AREAS

The City of Greensburg must identify endangered and damaged landscapes in order to protect critical habitat. These restrictions should include stream and flood plain buffers, no-build zones, and potential native landscape restoration zones.



As the City embarks on detailed designs for Greensburg's Streets, special attention should be paid to the following streets. Primary Streets should have the most boulevard- like treatment and secondary streets should also have more extensive streetscaping. Detail about these street typologies are discussed in the following section.

CITY STREETS

Greensburg's major circulation routes need to play an important part in the goal to become more walkable and connected. Some major street corridors, including Main Street, Bay Street, Highway 54, and Grant Avenue, have the potential to become the major pedestrian and vehicular boulevards which link Greensburg together. The designs of these boulevards must reflect their importance and their specific roles in the community and will vary based on surrounding land uses, vehicular uses and the potential pedestrian traffic load.

KANSAS AVE./54

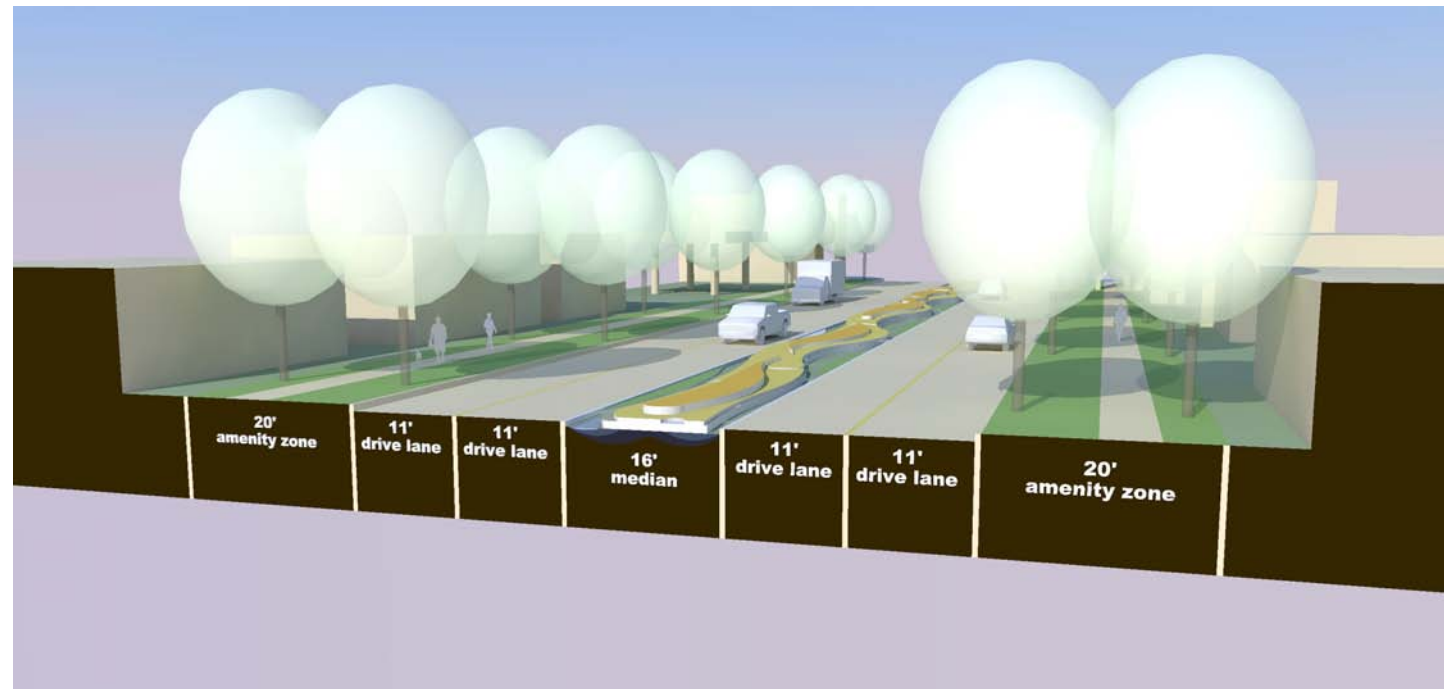
U.S. Route 54 is part of the U.S. highway system and runs for 1,197 miles from western Illinois to El Paso, Texas. Highway 54 serves as an important commercial boulevard in Greensburg, and as part of discussions about the Downtown District, citizens gave feedback about their vision for the future of existing Highway 54. Because highway traffic that currently drives through Greensburg will eventually be rerouted to a new freeway system, it is important to plan for a design of existing 54 that is true to the goals of the community.

The intention of the future design for existing 54/Kansas Ave. is to maintain a pedestrian friendly streetscape as a continuation of Main Street's commercial district. The primary recommendations about the future of Kansas Ave. (54) are as follows:

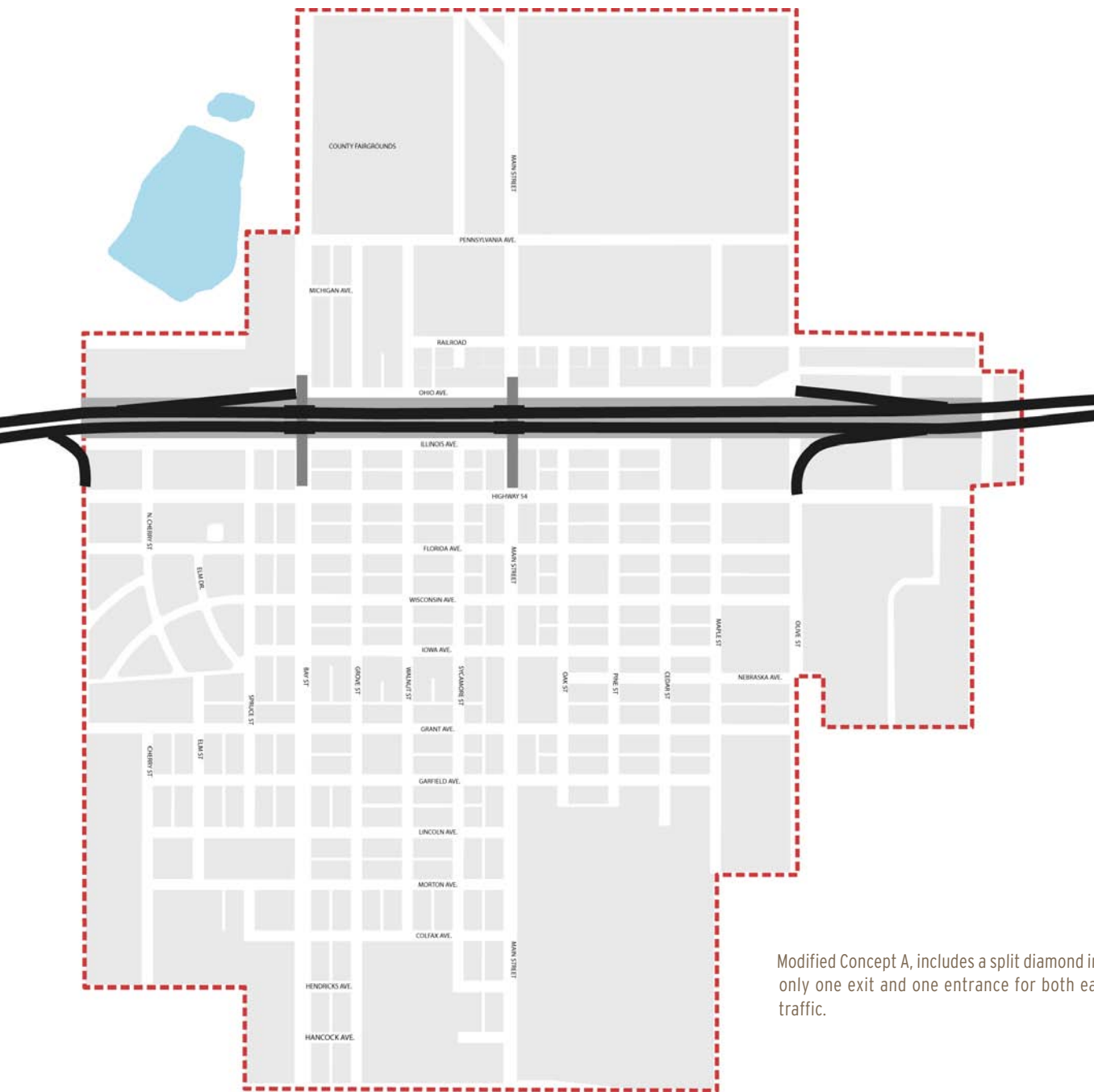
- The future Streetscape design should include a planted median and generous sidewalk amenity zone.
- Zoning along 54 and within 3 blocks in each direction of Main Street should require building fronts to be brought up to the street. Parking should be located behind the building

frontage rather than in front like many big box stores.

- As the likely entry into Greensburg for visitors, Kansas Ave. must reflect the sustainable vision and Midwestern charm the community is built around. This corridor is the gateway into Greensburg and must be respected as such.



A section of future design for Kansas Ave/54 shows recommended sidewalk, drive lane and median width.

**FUTURE FREEWAY (54)**

In 2002, the Kansas Department of Transportation published the U.S.-54/U.S.-400 Location Design Concept Study. According to the study, The ultimate vision for U.S.-54 throughout southwest Kansas is a freeway; an interstate-like highway that allows access only at interchanges. The study recommended a bypass around Greensburg because any freeway through town would have displaced an unacceptable number of home and businesses. The tornado prompted Greensburg City officials to approach KDOT about considering a new location for the road about midway between the current highway and the railroad tracks three blocks to the north. City officials and business leaders believe that a freeway closer to town, rather than around it, may provide better visibility, access, and future benefits to the community.

Many scenarios for the freeway have been discussed through extensive collaboration with the Greensburg community. During a Design Workshop in late July, a group of citizens, designers, KDOT engineers and consultants decided on the “Modified Concept A” design (shown, left). This scheme was preferred because it provided a desirable mix of visibility,

access, and economic development opportunities. Since that decision, additional concerns have developed, and the City, citizens, engineers, and planners are looking again at the problem of effectively satisfying Greensburg's future needs with the new freeway project.

Some of the community's priorities are:

- Ensure that those who do exit at Greensburg are encouraged to come into the downtown district.
- Show off Greensburg's charm to those who exit the freeway.
- Give people a reasonable opportunity to turn around and

come back to Greensburg if they miss an exit.

- Effectively serve trucks exiting to industrial development on the East side of town.
- Effectively serve the hospital and emergency service.
- Allow for safe pedestrian and vehicular connections between the south and north side of the freeway and accessibility of amenities on the north side of the new freeway (State Fishing Lake, Fair and Rodeo Grounds , Coop building).
- Main Street needs to be a through street and not a dead end into the freeway.

PROS AND CONS OF MODIFIED CONCEPT A:

Pros

- Main and Bay are through streets allowing vehicle and pedestrian access to the coop and the state fishing lake.
- This scheme effectively brings exiting east-bound traffic into Greensburg's downtown core.
- West-bound traffic has a chance to turn around one mile after the Greensburg exit at Hwy 185.

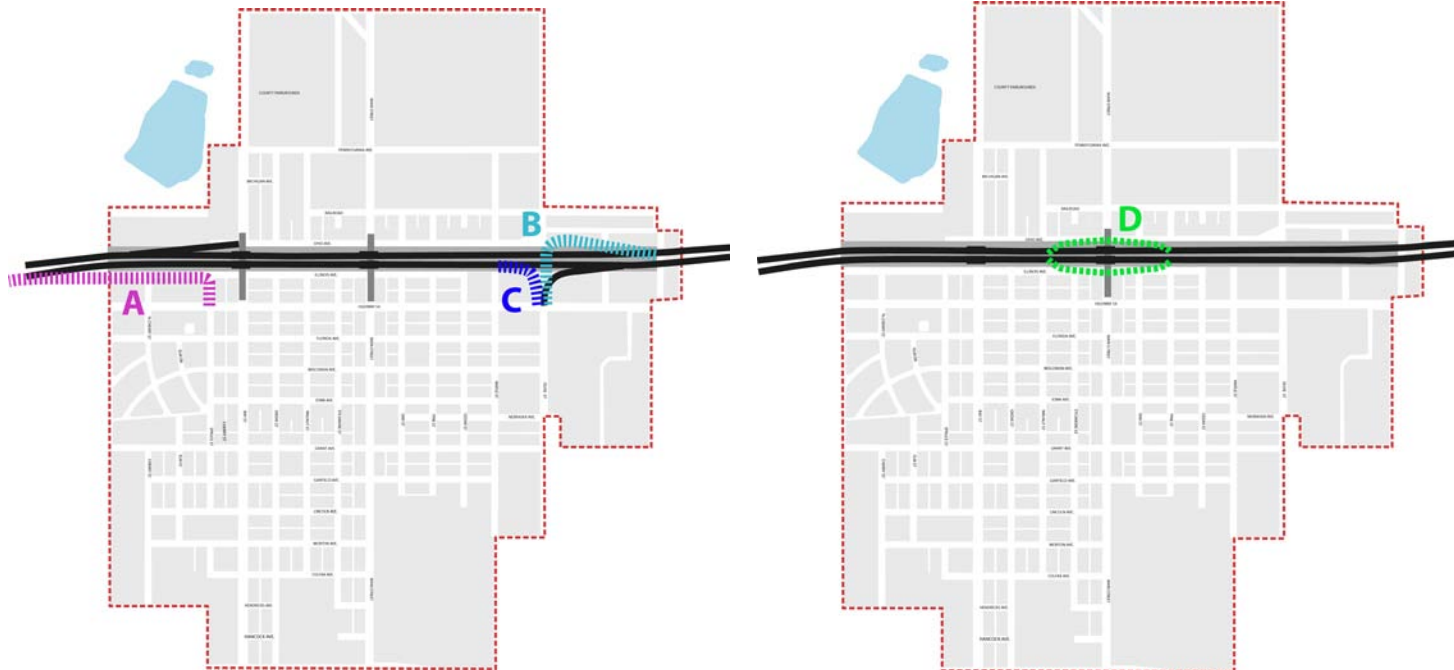
Cons

- Exiting west-bound traffic is not brought into downtown, but has an option to stay on the north side of

the freeway, never seeing the heart of Greensburg.

- East-bound traffic does not have a second opportunity to exit for four miles.
- There is no link from the south to the north side of the freeway on the east side of town, where industrial development could occur.

The most pressing concern is that the amount of future development in town is very much in flux. With several large industrial or manufacturing projects currently being pursued, the planning team recommends waiting on the final interchange decision until there is a better understanding of future needs.



These diagrams illustrate several alternatives that were under investigation for new interchanges off of Hwy 54.

- A. Brings east-bound exiting traffic further into the heart of Greensburg.
- B. An underpass at Olive Street for exiting west-bound traffic would bring traffic onto Kansas Ave./54.
- C. An additional east-bound exit on the east side of town gives travelers a second opportunity to exit into Greensburg.
- D. One full diamond interchange in or around Main Street would bring all entering and exiting traffic within close proximity to downtown Greensburg.

MAIN STREET

Main Street should be thought of as a community space and the center of activity. It is a place to bring people together and an icon of Greensburg's resurgence. As it develops, it will become the most visible signal of the goals of the community. Main Street has the potential to become a major pedestrian route, particularly from the downtown core south to New Davis Park and the Greensburg School. Streetscape characteristics that were encouraged in the downtown core should be applied to the length of Main Street, including wide sidewalks, attractive lighting, coordinated plantings and street trees. Traffic-calming devices at major pedestrian crossings are also encouraged.

BAY STREET & GRANT AVENUE

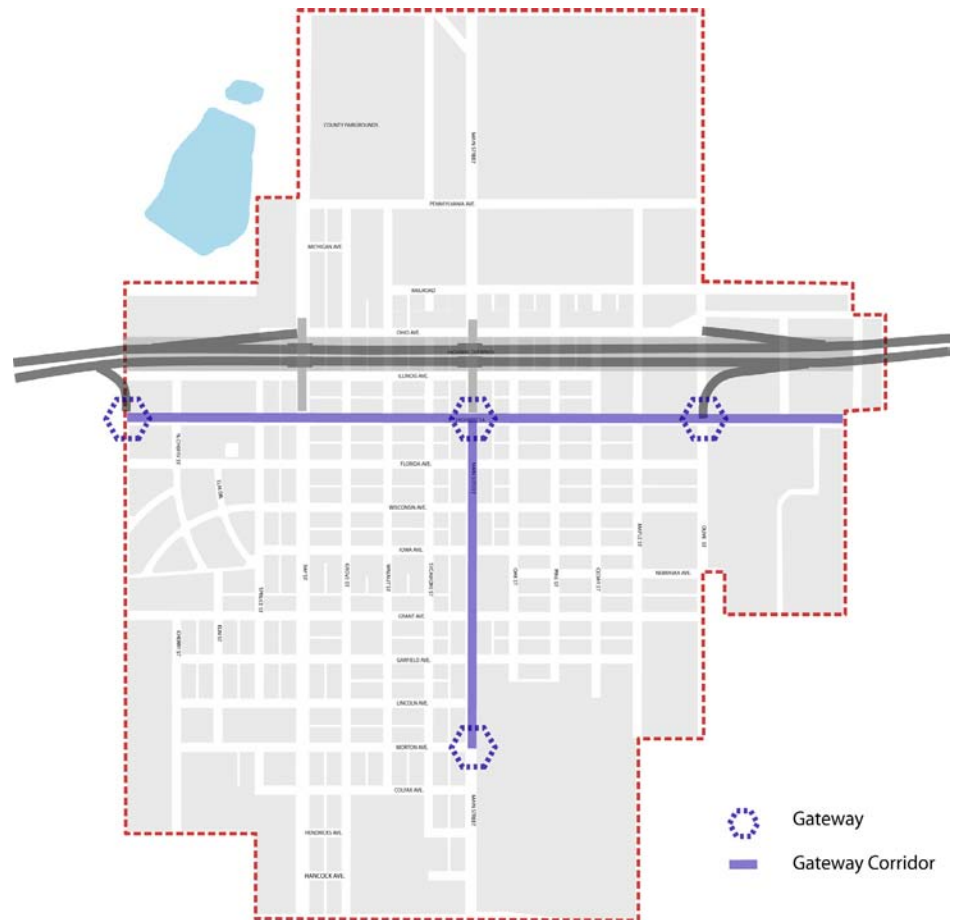
Bay Street & Grant Avenue pass primarily through residential areas of Greensburg, and the streetscape designs should reflect this. The wide right of way on these streets make them suited to become major corridors for pedestrian traffic and stormwater transmission and treatment. Additionally, Bay Street will likely be an alternate for trucks that do not want to drive up Main Street to the coop.

GREENSBURG GATEWAYS

Gateways are important design tools for marking entrances and exits into special districts, or into cities themselves. Gateways can exist in the form of signs, natural features, plants, or architectural portals. Greensburg has the opportunity to create several important gateways, especially on Highway 54 where most vehicular traffic enters and leaves town. These entry and exit points in particular have the potential to become restored prairie and wetland zones, which could make strong statements about the character of Greensburg's landscape and its commitment to building a sustainable community.

Many other potential locations for Gateways exist as well, including the north and south entries into the downtown core. When identifying all of the potential locations for gateways in Greensburg, it is important to remember that gateway features work on many scales; some are designed to be observed by motorists, some by pedestrian on foot, and some by both. The important thing is that they signify

the transition from one environment to another. When well designed, gateways can emphasize and celebrate the character of a place, and truly create a sense of arrival. Regardless of the specifics of the design, the safest strategy is to go with something simple that relates to the geography or history of the city.



TRAFFIC CALMING

Implementing traffic calming strategies can ensure vehicular traffic moves safely through the community. This is especially important considering Greensburg's goal to become a more walkable, pedestrian-oriented community, and while slowing automobile traffic may seem counterintuitive, it is crucial to creating successful and safe pedestrian friendly environments. Research has shown that higher speed roads are uncomfortable for pedestrians and do not make good environments for commercial facilities.

There are a variety of traffic calming techniques that can be used to slow traffic. Raised crosswalks, neck downs, traffic circles and a host of other techniques can be used to slow automobile traffic to speeds conducive to pedestrian safety and productive commercial opportunities. On-street parking is a calming technique that could be used extensively, especially in the downtown core. Planted bulb-outs are another strategy that can be used to slow traffic and create attractive on-street parking bays that provide parking for shopping opportunities.

Lane widths are another consideration in the creation of safe and attractive streets. Narrower streets actually slow traffic and create a more intimate sense of scale that appeals to shoppers and to residents. Using narrow streets where appropriate saves significant infrastructure dollars and is more fitting to many development types.

WASTEWATER MANAGEMENT SYSTEM

The current wastewater system in Greensburg is in need of repair. Many pipes are undersized or contain toxic asbestos insulation and must be replaced. In the short-term, the City must identify and correct these problem areas in order to restore wastewater services to the necessary structures. In the long-term, the City should implement water-saving measures in all plumbing systems throughout Greensburg, and commit to exploring opportunities to implement more passive wastewater treatment systems with low energy inputs. Important long-term wastewater goals should be:

- The reduction of wastewater volumes
- The adoption of environmentally responsible wastewater treatment and disposal strategies
- The identification of ways to re-use wastewater as a resource

The City of Greensburg should install only low-flow fixtures in city projects, and encourage all private projects to do the same. The City should also explore the potential for using waterless urinals and composting toilets in appropriate situations.

Many advances have been made in natural systems-based, decentralized wastewater treatment systems that are energy efficient and provide high quality discharge. These systems harness native plants and micro-organisms in a constructed wetland systems to safely treat waste underground and discharge water that can be used for irrigation or percolate into the ground. These "living machines" can even be used to grow harvestable plants and help develop alternative opportunities for new businesses that use the nutrient rich by-products.



This is an example of a "living" treatment facility using natural systems to clean waste water.

ELECTRIC UTILITY

After complete destruction in the May 2007 tornado, Greensburg's primary power grid was restored by rebuilding key poles and power lines. While this was a necessary short-term solution to Greensburg's electric infrastructure problem, it is important in the long-term for the city to explore options for transferring from above-ground lines to an underground system. Underground systems have many advantages. The removal of power poles and lines from view will have a positive aesthetic effect on the environment in Greensburg. Placing power lines underground will also protect them from storms, high winds, ice, and other potentially damaging effects. This ensures that short-term outages are avoided and that complete destruction is not repeated.



This LED streetlight will be the predominant fixture in Greensburg. The LED technology uses less electricity and puts off a higher quality of light.

LIGHTING

Exterior lighting is an important design tool for improving safety and security in downtown districts. When done right, lighting can greatly enhance the character, landmarks, and circulations routes. It can be used to highlight architectural details, to draw attention to amenities, or to celebrate a streetscape.

Overlighting does not translate into increased security, and choosing what not to light is as important as choosing what to light. Ideally, a streetscape is designed to use the fewest possible fixtures while still providing adequate light.

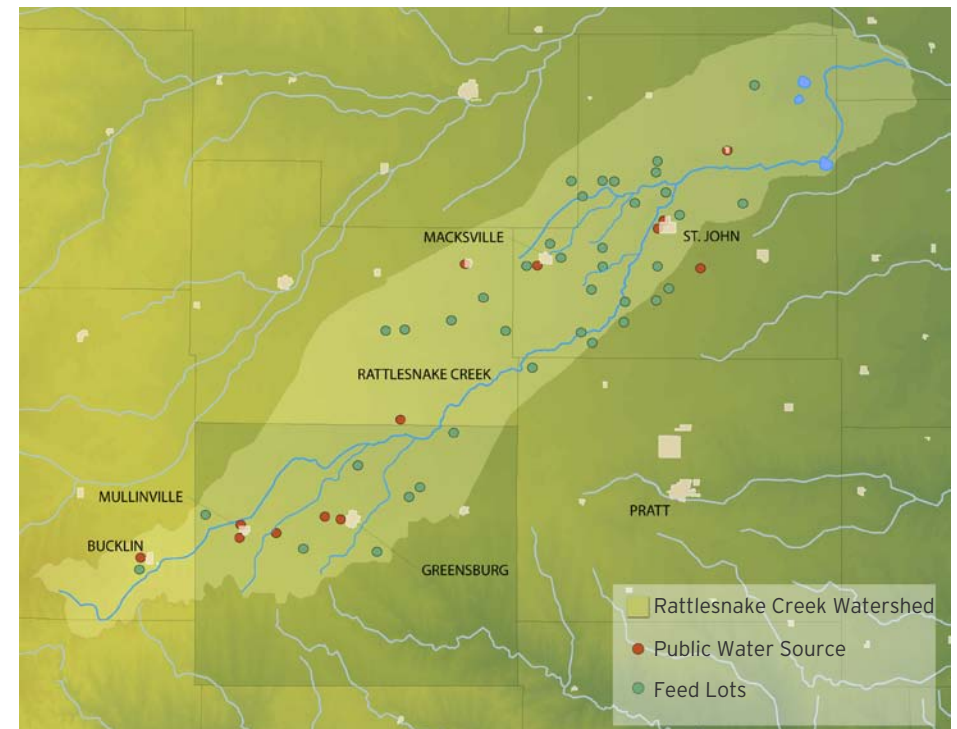
Light color is another important component to selecting appropriate street lighting. One particular good example was reported from Sewickley Pennsylvania. This metal halide light produces a superior light color and should be referenced when addressing this issue.

Dark Sky

Western Kansas is known for its brilliant sunsets and crystal clear night skies. There are very few places in the world where you can still find your favorite constellation on a clear night, and Greensburg should encourage full cut-off, high efficiency light fixtures and bulbs designed to minimize energy consumption and light pollution.

WATER SUPPLY

Many of the water wells in Greensburg are in the process of being repaired. Furthermore, the well in Davis Park is not currently operational due to high nitrate levels. Because it is Greensburg's goal to "treat each drop of water as a precious resource," it is important that water systems are integrated and educational programs are created to help improve the quality of water in City wells. This is an indication of the need to be a better steward of Greensburg's water resource. By implementing the



With feedlots and water supply in close proximity, stewarding water resources and protecting water quality in Greensburg becomes vital.

suggested stormwater treatment techniques and proactively improving water quality, future contaminants can be eliminated.

Greensburg's water tower was destroyed in the tornado. The new tower went up in April and now stands as a symbol of Greensburg's dedication to rebuilding an improved city. The old tower held 55,000 gallons, but due to its inability to supply the needs of the town, the size of the new water tower was increased to 100,000 gallons of storage. The new tower is yet another



example of how creative partnerships have allowed Greensburg to reach its goal. The tower was funded through a collaboration between FEMA, KDEM, KRWA, Rotary International, South Central Community Foundation and USDA Rural Development.

SOLID WASTE

The old adage, "waste not, want not" is ingrained in anyone who grew up in the state of Kansas. Our pioneer history taught us never to take more than we need, and not to waste what may not be available tomorrow. In this way, Kansans are not new to the idea of reducing waste and recycling.

In order to become a truly sustainable community Greensburg must continue teaching future generations about recycling and waste management. The majority of the natural resources that we extract from the earth are refined and used once before being placed in a landfill. Much of what we put into landfills never biodegrades and often pollutes adjacent groundwater and aquifers, an invaluable resource in western Kansas. As Greensburg develops into a model sustainable town, it is important to move towards reducing waste or possibly even eliminating landfill waste.



KIOWA COUNTY RECYCLING

The Kiowa County Recycling Center was located in Greensburg before the tornado and is in the process of being re-imagined and reinstituted in town. Before the tornado, Greensburg recycled approximately 22 percent of potential recyclable waste. It is the goal of the County and the City to reach 80-85 percent. The City, County, FEMA, KDHE, and EPA are currently working together to create a program that will help reach this goal.

It is possible for the Kiowa County Recycling Center to be a model. The Kiowa County Recycling Center should continue to evaluate how to improve upon the current recycling program. Although the program is currently drop-off only, as Greensburg grows it could be feasible to implement city-wide or county-wide pick up services to encourage greater participation.

CITY INITIATIVES

In addition to the Kiowa County Recycling Center, the City of Greensburg and community partners should develop an educational campaign with the goal of reducing waste generated by residents and commercial operations by 70 percent through recycling, reclaiming, or composting. During the rebuilding years, construction waste will be an issue and there is an opportunity to dramatically cut down on landfill materials. The City is in a position to require innovative waste management requirements for new construction projects. LEED points are awarded when 50-75 percent of construction waste is diverted from the landfill.

Techniques for reaching waste reduction goals:

- Educational programming could be provided by the City to inform residents and businesses about simple, cost-neutral ways to reduce waste
- The City can work with potential new industrial partners who would use the municipal waste as a clean fuel source or as raw materials with the possibility of making Greensburg a zero waste town
- The City and County should create a program for ongoing monitoring of the per capita waste production so

as to celebrate successes in reduction

- Public buildings should be required to supply easily accessible recycling rooms with separation bins
- Community trash repositories in parks or along trails should include recycling options
- The creation of a community compost pile for lawn and food waste

PARKS + GREEN CORRIDORS

A HOLISTIC APPROACH

Great park and open space networks are comprised not only of playgrounds, baseball fields, and walking trails, but also of schools and houses, downtowns, streetscapes and people. Their components are woven into the fabric of a town, and enrich the activities of everyday life.

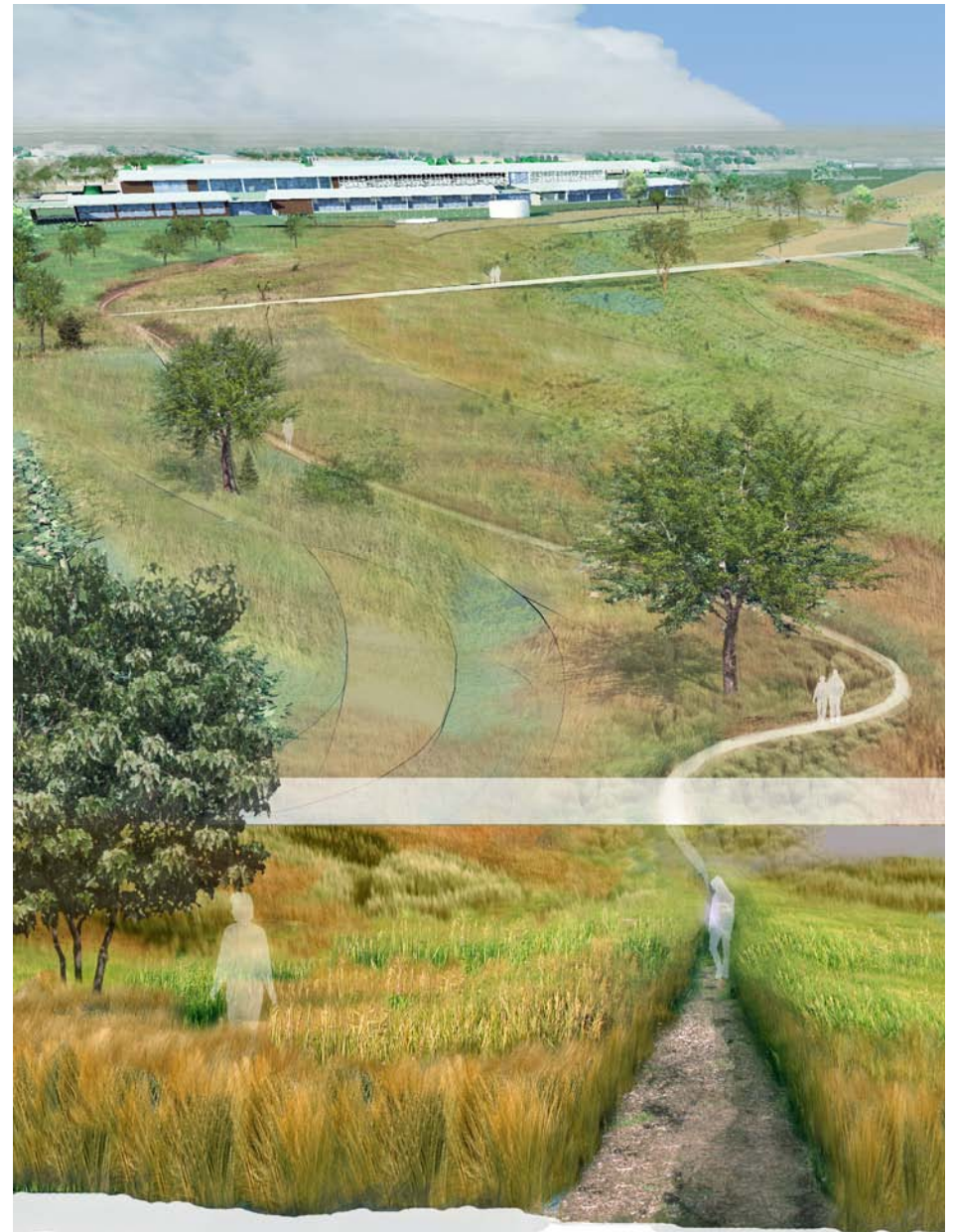
Throughout the comprehensive planning process, the community voiced their need for a variety of outdoor recreational opportunities. The citizens of Greensburg have strong ties to the natural landscapes in and around town, and they wisely recognized that the rebuilding process offers a unique opportunity to create the outdoor amenities the community desires.

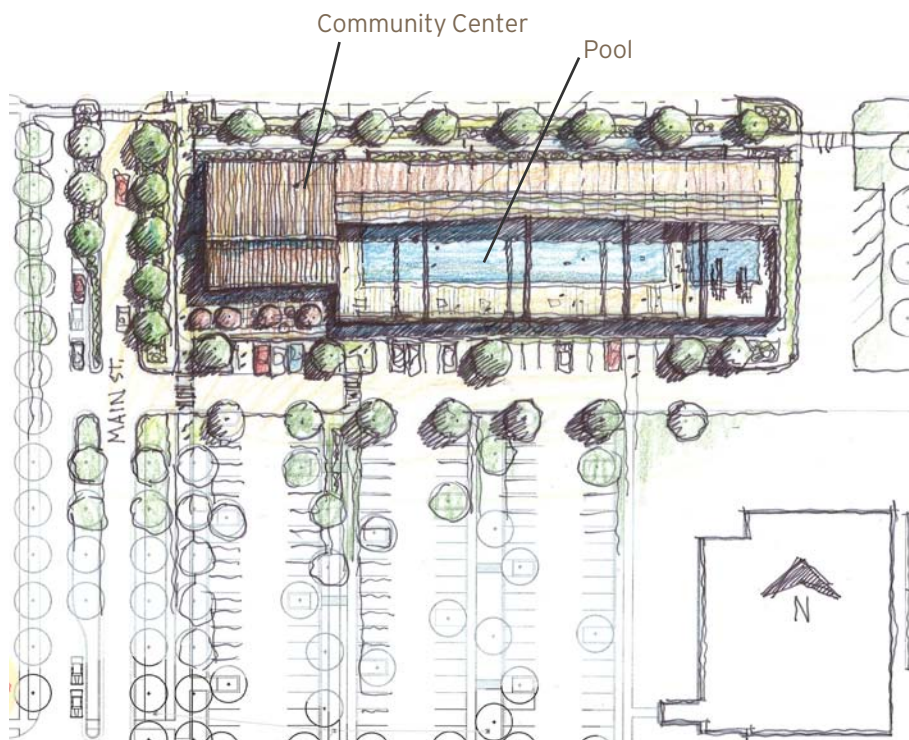
Having such a network is within Greensburg's reach. In order to succeed, the City must take a holistic approach to envisioning and planning these amenities, and must be equally deliberate in developing them. The City must resist the temptation to complete projects as funding, volunteers, or donations become available and instead follow a well-defined overall plan.

This chapter is a how-to guide for developing Greensburg's outdoor recreational amenities within a sustainable framework. It identifies the major components and discusses pilot projects which, when completed, will fill the immediate recreation needs of the City and provide precedents for future expansion. The Plan also recommends the formation of a Parks & Recreation function in the Greensburg City Government, and discusses potential community programs, partners, and the funding sources needed for these projects to reach their maximum potential.



Using native plantings in parks and trails not only requires less maintenance and uses less water for irrigation, but can also educate the community about best practices.





INDIVIDUAL & COMMUNITY HEALTH

Studies show that people with greater access to parks and outdoor recreational amenities are healthier and more active. These benefits are often the ultimate reason for creating parks and green spaces. Many of the most famous parks of the twentieth century were created out of a need for an escape from the crowded, polluted, industrialized cities.

Green spaces serve similar needs in both large urban centers and small towns. They provide the chance to catch a breath of fresh air and enjoy the open space for recreation and activity. Many scientific studies have demonstrated that accessible green space enables and encourages exercise, improves psychological health, and helps build stronger communities.

COMMUNITY CENTER

The planning team has seen a consistent interest to improve human health and quality of life within Greensburg. One potential amenity that could improve access to exercise, increase community interaction, provide recreational opportunities, and even attract new residents would be a Community Center. This facility could provide a host of exercise classes and fitness equipment dramatically improving resident's access to year-round exercise. Ideally, this

facility could be shared with the new school allowing students superb access to a wider variety of fitness opportunities. We have seen that shared community/school facilities also provide an excellent way for parents, teachers, and youth to interact.

ENVIRONMENTAL HEALTH

Central Park in New York and Hyde Park in London are often referred to as the "Lungs" of their respective cities. It is easy to understand this statement in the context of human needs, but this analogy also applies to the natural ecosystems within the city.

With the proper design, green networks can express and complement the natural ecosystems of Greensburg and provide an important opportunity for environmental stewardship. Parks and other green spaces reduce the heat retained by buildings and pavement, often called the "urban heat island effect". The vegetation in green spaces filters air and provides crucial habitat for wildlife. Green spaces cleanse and infiltrate stormwater runoff. When integrated into the built and natural environments, natural stormwater treatment systems prevent flooding and cost substantially less to install and maintain than traditional engineering solutions.

RESTORATIVE DESIGN

The best guide to developing park and green space amenities are the native conditions of the region. Many of the greatest outdoor amenities succeed because they have been developed or preserved according to their original functions. Natural wetland areas can be protected and developed into educational showcases. Other areas may be more suited to grassland restoration or more manicured gardens. Natural waterways should be respected and incorporated into natural-systems based stormwater treatment systems. Even in more heavily developed districts such as downtown or residential areas, natural ecosystems can guide park development.



A SUSTAINABLE FRAMEWORK

Due to the necessities of funding, phasing, and development, the Green Network is broken down in this Plan into a list of individual projects, some with greater priority than others, some with current funding available, and many without. Despite this, it is imperative to think of the Green Network as a single, cohesive plan built on a sustainable framework.

A SUSTAINABLE PLAN

Like other organisms, the Green network will derive its strength from the broad diversity of its parts, and like the maturation of a child, its upbringing must be calculated and caring.

The following sustainable practices were identified as guiding principles to support the development of an integrated natural systems-based parks and open space plan and are detailed in the following pages:

- Integrated Stormwater Management System
- Native and Xeric Plantings
- Sustainable Materials
- Sustainable Construction
- Site Analysis
- Restoration and Conservation



Many programming options for parks in Greensburg have been discussed including (clockwise from top left): an outdoor amphitheatre, water feature, baseball fields, native planting garden and farmers market.

SITE ANALYSIS

Site inventory and analysis is as important for the un-built environment as it is for the built environment. Suitability studies make sure we understand the impacts a development will have on a site. They ensure that a project fits into a wider, more regional concept and does not compromise future restoration efforts. For instance, wetlands should only be developed in areas that are already naturally inclined to flooding and not in high, dry land areas. To identify the best use for the land the City should always require a detailed inventory and site analysis prior to development regardless of whether for a trail, a formal park, or a restoration area.

INTEGRATED STORMWATER MANAGEMENT SYSTEM

Integrated natural-systems stormwater management systems help the remediation, filtration and infiltration of stormwater back into the environment. Elements of the water management system may include bioswells, raingardens, and any other water slowing or controlling device.

A natural, systems-based stormwater management system will ensure that runoff is as clean as possible when it goes back into the aquifer. More details about Greensburg's natural system-based stormwater management strategies can be found in the "Infrastructure" chapter.



The Downtown Streetscape employs decorative planter zones to capture street and sidewalk stormwater runoff for storage and infiltration. Natural systems-based stormwater features can provide many functional and aesthetic benefits when incorporated into park and open space design.

NATIVE AND XERIC PLANTINGS

Native and Xeric planting are terms referring to two classification of plants. Natural plants refer to plants that are naturally occurring in the area of interest—Greensburg—currently or in the past. An example of a Greensburg native plant would be an oak tree and an example of a non-native plant would be a palm tree.

Xeric plants (from the Greek 'Xeros', meaning dry) can be defined simply as "drought resistant plants." These plants do well in arid climates, like Greensburg, as they require little or no irrigation.

Native plants are sustainable options, because they are proven to be well suited for the climate of the region. They may also be important to other natural systems including the local ecological cycle, and provide food and habitat for local wildlife. Xeric Plants are a sustainable option for Greensburg because they do not require as much water in an area that receives only 22 inches of precipitation annually. This is especially important considering irrigation wastes a great deal of treated potable water that could be better used by the residents of Greensburg.

Greensburg has a great opportunity to make sustainable plant choices in every parks and openspace project. All it takes to incorporate native and xeric plants is a knowledge of plants and making a choice to favor native or xeric options over invasive plants and plants that require excessive irrigation.

The use of these plants will show that the community is serious about the overall health of natural systems and of their community.

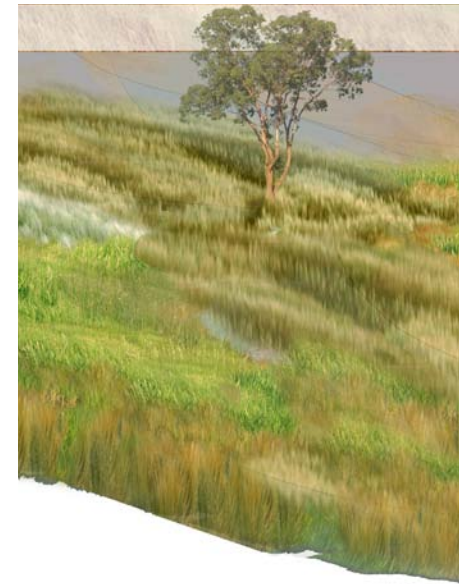
SUSTAINABLE MATERIALS

The use of sustainable materials is just as important for the parks and open spaces of Greensburg as it is for any other project in the town. Any time materials are used in a park, from the trees planted to the mowers that cut the grass, a decision is made about which product, out of the many options, is the most responsible. It should be a priority of the Parks Department to look at a variety of options when making choices about materials to ensure sustainable products are used whenever possible. Sustainable material options include recycled, reclaimed or local materials. A detailed definition of sustainable materials is available in the Built Environment section of this plan.

SUSTAINABLE CONSTRUCTION

Sustainable construction techniques are most often associated with building construction but are also applicable to parks and open space projects. In this application, responsible construction will mean reducing the impact of construction practices like the use of heavy machinery and toxic materials and protecting existing environments from being destroyed during the construction process.

It is recommended that by following proper phasing the development of the parks and openspace projects, which includes various streetscape projects, seek to minimize the use of heavy equipment, toxic fertilizers and materials, and preserve existing vegetation, ecosystems, and habitat.

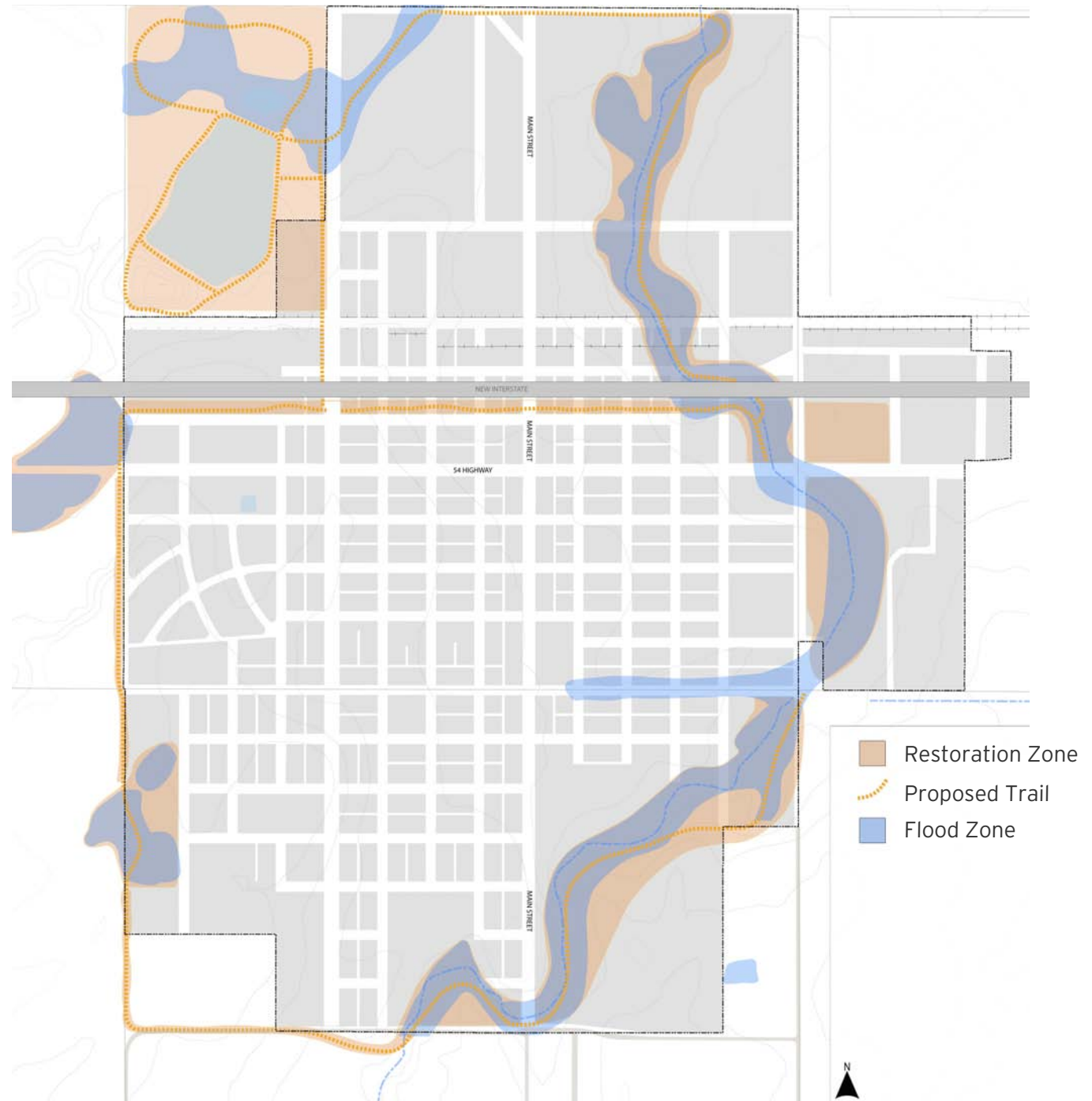


RESTORATION AND CONSERVATION

A conservation area is land dedicated to the safeguarding of natural features. A conservation area may be a nature reserve, a park, a land reclamation project, or other area. The conservation areas can be set up to protect specific animals, plants, or natural systems. An example would be buffer zones around a creek that allows the natural cycle of the stream to occur unaffected by human development.

Conservation areas can be a large part of the parks system in Greensburg as they allow for a different, less formal type of park with both active and passive activities such as bird watching or picnicking. These conservation areas are important because they protect natural elements that are not able to protect themselves. By limiting our impact on a site we can allow natural systems to restore the area.

Conservation areas will improve the quality of life in Greensburg by promoting a healthy active lifestyle and restoring Greensburg's natural capital.



PILOT PROJECTS

It is vitally important to identify the pilot projects; the priority projects that will be the anchors of the Green Network.

The greatest park and green space networks harness their diversity to support a wide array of recreational uses. Rather than simply providing isolated patches of manicured park space, Greensburg's Green Network will offer restored native landscapes, sports fields, spaces for community BBQs, fairgrounds and fishing amenities, trails and walkable streetscapes. Most of Greensburg's potential park and green space amenities can be organized into one of four major typologies:

- Park Space
- Restored Landscapes
- Trails and Green Corridors.
- Passive Recreation

Each typology is represented by a pilot project. These initial projects have been chosen because they represent a wide array of uses and typologies important to the community, and because they can become powerful precedents for future park development.



PARK SPACE

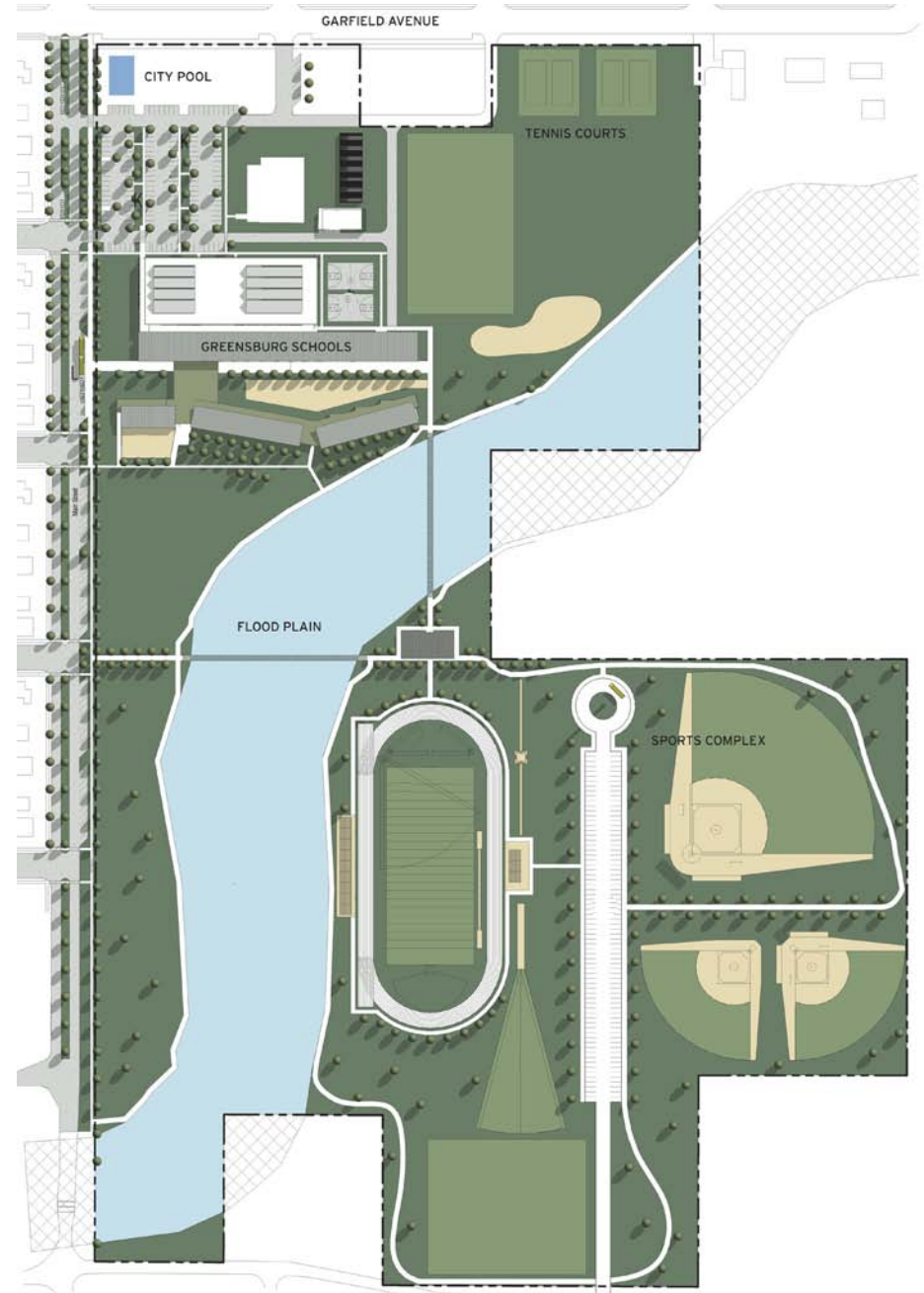
When people think of parks, they often think of manicured park spaces that offer active recreation amenities like swimming pools and sports fields, and public spaces that support community activities and celebrations. Greensburg should maximize its investment in park space by focusing park development efforts and resources into a few locations. Centralizing these park space amenities will create busier, more social outdoor spaces, and lower both the initial development cost and provide maintenance savings in the future.

The Memorial Park downtown and New Davis Park adjacent to the Greensburg School campus have been identified as pilot projects for active park space.

NEW DAVIS PARK

The many elements of New Davis Park will surround the Greensburg School complex and encompass active and passive recreation opportunities including the swimming pool to the sports complex and portions of the trail network. The decision to share important outdoor uses with the school increases the efficiency of construction and of long-term maintenance. It also creates a stronger series of community spaces by increasing the density of uses within the park and allowing easy pedestrian access from Main Street and the surrounding neighborhoods.

The community's vision for New Davis Park will be best realized by the formation of a strong partnership between the City of Greensburg and the Greensburg School District.



This drawing shows the potential layout of Greensburg Schools surrounded by the green space amenities of New Davis Park.

MEMORIAL PARK

The Big Well Memorial Park downtown has the potential to be a social and symbolic landmark for Greensburg. Its central location, between City Hall and the Big Well at the south end of Downtown, makes it a natural gathering space for the community and the many tourists who visit annually, and a logical location to memorialize both the events and aftermath of May 4th, 2007.

The design of Memorial Park should take advantage of a central location by providing flexible gathering space for community events such as BBQs, carnivals and the farmer's market. An outdoor amphitheater would provide a venue for musical acts and other presentations.



A view looking east from Memorial Park, shows the new City Hall.



Memorial Park will support many community activities while also serving as an important link between City Hall, Downtown, and the Big Well Museum. A linear landscape element could potentially link these places, serving as a memorial walk which would be inscribed with important names and events.

TRAILS

Trail networks are an integral part of any parks and open space plan because they link the developed parts of town to the surrounding natural landscape amenities, and weave these elements into neighborhoods and downtown districts.

GREENSBURG TRAIL NETWORK

Unlike many other parks projects, the various segments of the Greensburg trail network exist on both publicly and privately owned land. This unique situation is an opportunity for community collaboration between the City departments, private landowners and the entire community who benefit from this recreational framework.

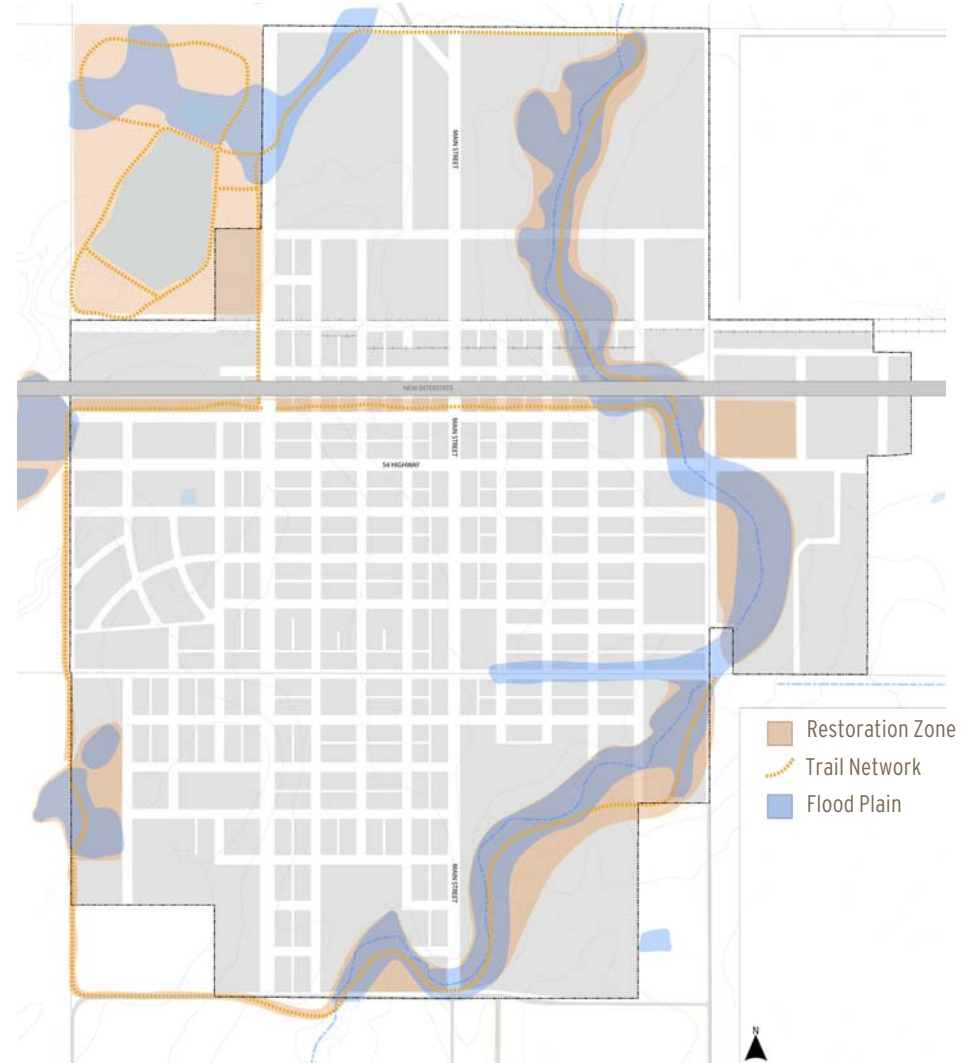
More than any other parks project, the trail network has the potential to be broken down into smaller projects. This presents an opportunity for the entire community to take ownership of the planning and development of trails. The floodplain corridor separating Greensburg Schools from the sports complex is a logical location for a segment of trail and an ideal place for the pilot trails project.

GREEN CORRIDORS

Green street corridors are the counterpart to natural trails. They maintain the integrity of the natural landscape within the confines of the town.

DOWNTOWN STREETScape

The Downtown Streetscape is the first Green Corridors project and its design will become an important precedent for future Green Corridor designs throughout town. Because of its location in Greensburg's primary business district, the streetscape design utilizes more rigid forms and landscapes to complement the built environment.

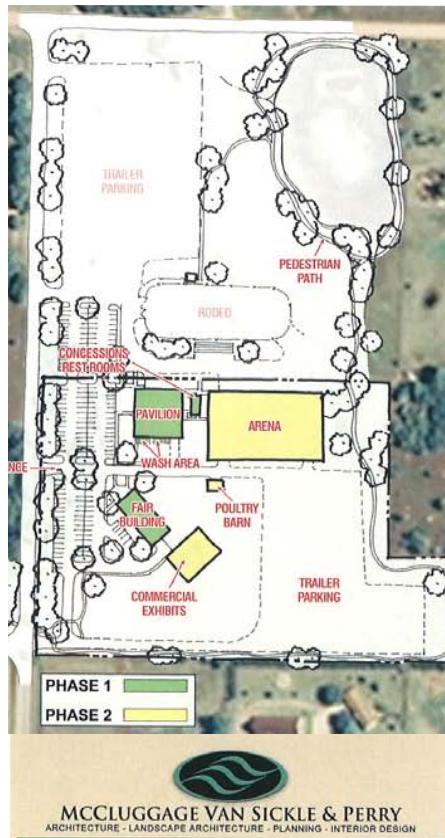


This diagram demonstrates a potential layout for the Greensburg Trail Network. The layout creates a major linear trail system with additional legs that surround the town and creates important linkages between neighborhoods and community uses like the school and sports complex.

PASSIVE RECREATION

COUNTY FAIRGROUND & STATE FISHING LAKE

The State Fishing Lake provides Greensburg with an important passive recreation amenity, and the improvements at the adjacent County Fairground will create a regional draw. These facilities will anchor the northern portion of the parks system and represent a large recreational amenity. Recreation opportunities in this area include a pedestrian path, fishing, and annual rodeo events.



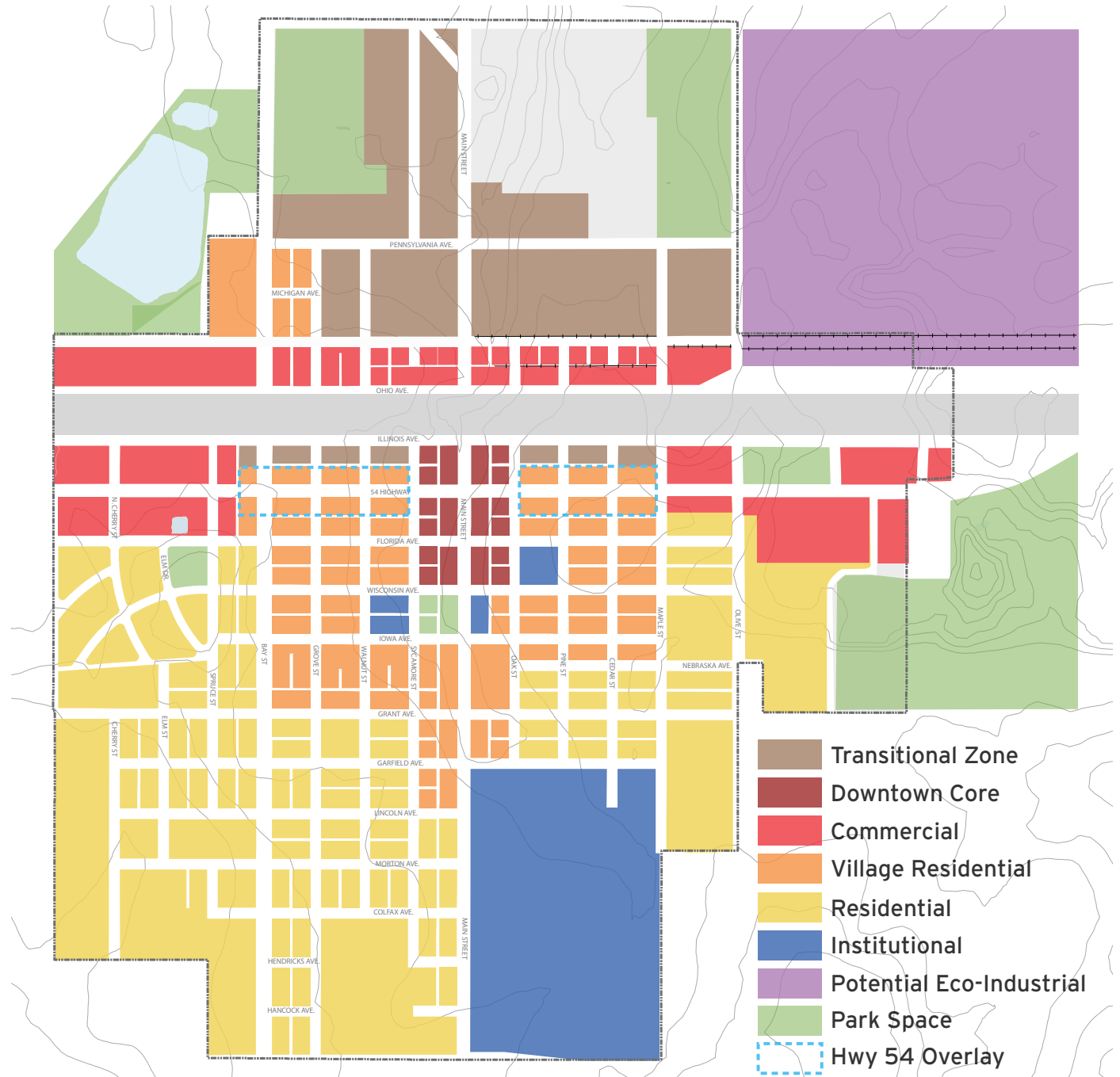
FUTURE LAND USE + POLICY

LAND USE AND ZONING

Zoning is the method by which land uses are organized to promote the ideal integration of businesses, homes, and other functions that create a complete city. In Greensburg, the surviving infrastructure and property ownership suggest keeping most property in the same type of land uses that existed prior to the tornado. Most of the prior land uses were compatible with its neighbors and do not require modification. However, previously existing non-conforming uses, uses that were non-conforming prior to the Tornado, should not be allowed to rebuild if the use is in conflict with the intent of this plan and the surrounding area. In general, it is the recommendation of this plan that many compatible uses should no longer be considered separately under zoning law.

FUTURE LAND USE SCENARIO

The Future Land Use Map for Greensburg is the map to generally guide future development. It is important to note that while this map appears more homogeneous than prior iterations, the intention is to communicate the general character of an area. Compatible uses are highly encouraged regardless of indication by the map.



ZONING TYPES

DOWNTOWN CORE

As described in the Downtown portion of the Plan, the central business core represents an opportunity for Greensburg to demonstrate its commitment to a new type of commerce and to recommit to a highly pedestrian oriented community center. The Downtown Core will be home to local businesses, tourism attractions, City and County offices, higher density housing, restaurants, and a host of other community amenities. It may be helpful to think of Downtown as the part of Greensburg that will be active for the largest part of the day. From sun up until late evening there should be people enjoying some part of Downtown Greensburg. Main Street should also be

thought of as a community gathering space. It is a destination where the city, county, or region can come together and celebrate shop and see the ongoing transformation of Greensburg.

Housing above Main Street businesses and small, dense housing projects should be encouraged in downtown. Housing in immediate proximity to downtown businesses will help provide a ready customer base and keep the downtown area active. While large housing projects that take up prime commercial frontage are not encouraged, medium density residential directly behind Main Street businesses or along side streets would be ideal.



This view from a residential balcony in downtown Greensburg enjoys a view of vibrant street life.



HWY 54 OVERLAY

This area should be thought of as the gateway to Downtown. Businesses along Kansas Avenue are no less important to the overall community economy. They will be highly visible and every visitor to Greensburg will travel through this corridor. These businesses are more likely to require parking on-site or nearby and will likely have a slightly lower density of activity. Parking should be provided behind businesses whenever possible. Although some parking to the side of a business may be necessary, large lots are not recommended. Parking in front of businesses is strongly discouraged.

Business along Kansas Avenue will continue to serve the daily needs of a regional population. It is likely that

commercial nodes will develop along Kansas Avenue near the ramps for the new highway. These areas will be important gateways and should be given particular attention.

The new boulevard design will improve the general aesthetics of the corridor and make it a more attractive location for pedestrians, bicycles, and automobiles. It is very likely that when the highway moves to the north, the old right of way will remain as an important thoroughfare. It is appropriate to begin transitioning this corridor to become Greensburg's primary boulevard.

COMMERCIAL

Commercial uses are made up of retail and office users. While commercial uses will be scattered throughout town, this zoning classification applies specifically to much of the areas along the existing and proposed Highway 54 alignment. This area will house businesses that are focused on highway access and will likely attract a wide variety of users. While the Commercial use areas should not be as restrictive as Village Residential or the HWY 54 Overlay, care should be taken to ensure that the businesses that locate in many of these visible areas represent the desired character for the community established in this Plan. Parking is still encouraged to be located behind or adjacent to development rather than in front.



Kansas Avenue will become Greensburg's boulevard. Commercial uses should encourage parking to occur behind the business rather than on the street.

HOUSING

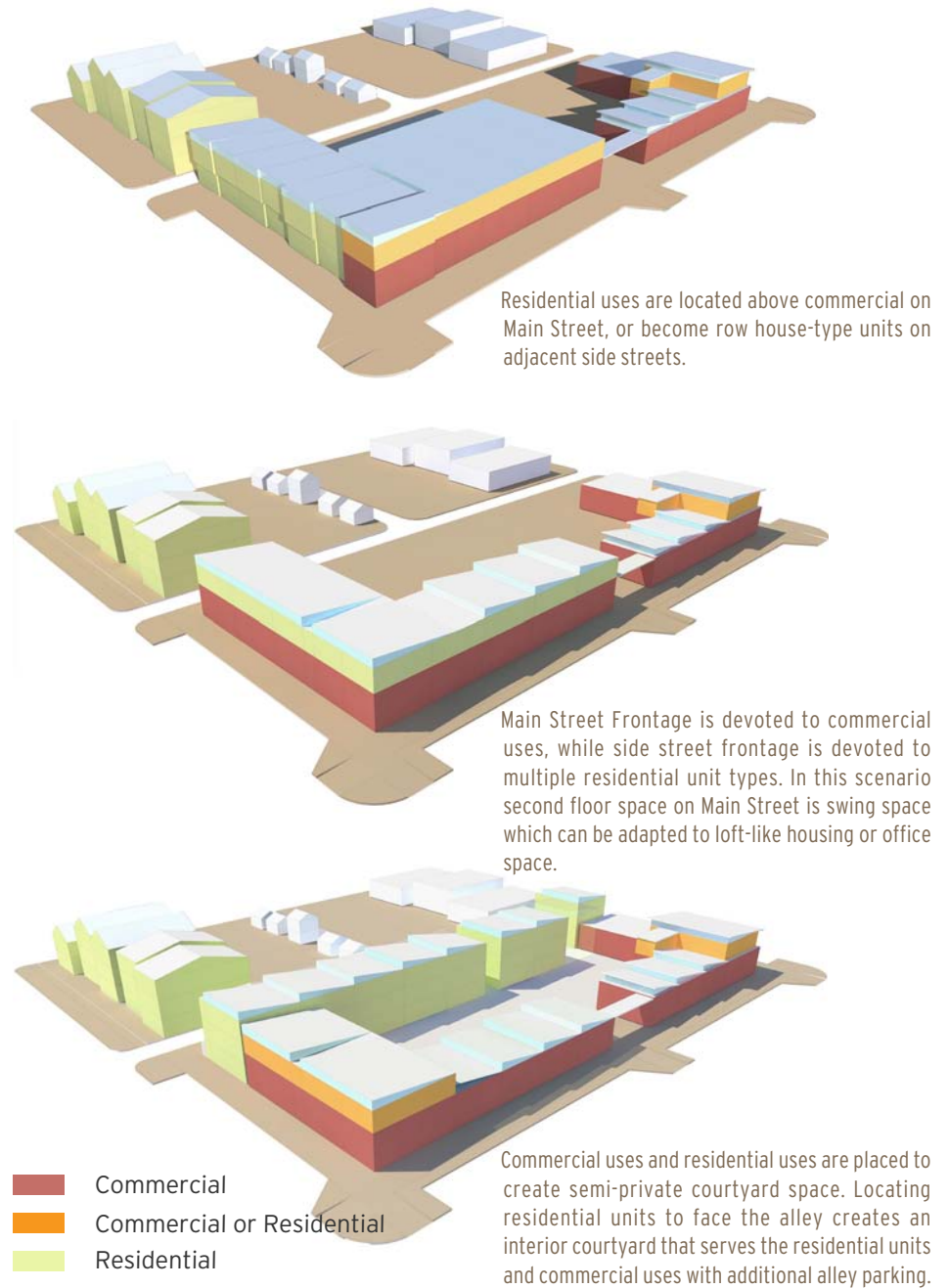
To provide a variety of housing types that suit the needs of a mixed-age community, Greensburg's housing stock should address the types of housing desired by a wide variety of potential users. This means providing housing at a variety of sizes, types, and rental as well as owner-occupied. Providing rental housing for temporary workers, for residents waiting to build a home, and for residents who prefer to rent will better serve the rebuilding of Greensburg. There will likely be three types of housing that will develop in the near-term:

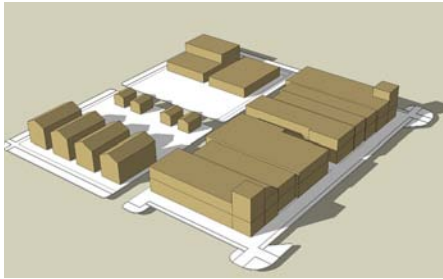
VILLAGE RESIDENTIAL

Village residential is a term developed to describe the residential housing that is clustered near downtown Greensburg. The lots are typically smaller than those on the outskirts of town and had a slightly higher density. This density created a larger population directly adjacent to downtown, and also provided a slightly different housing type. After the rebuild, it is likely that there will be individuals who would like to live close to downtown in a slightly smaller house and not have to maintain a large yard.

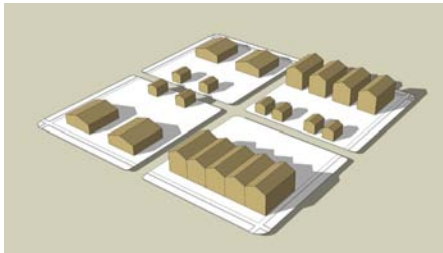
Preserving the existing parcel pattern would be one technique that would promote the continued function of this district. The planning team recommends a separate classification for residential blocks that fit into this category (see Future Land Use Scenario). In this classification, an owner would not be allowed to construct a house that infringes on a neighboring parcel even if it was under the same ownership. This would not be a restriction on ownership, an individual could still purchase neighboring parcels to be used as yard or as development, but it would provide for an eventual reuse of the area at a density that better supports downtown

These scenarios (right) demonstrate a variety of ways to accommodate residential uses into the downtown core.

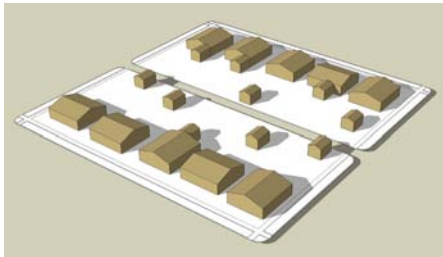




Downtown Core Residential



Village Core Residential



Traditional Residential

and approximates pre-tornado conditions. It is also recommended that multi-family residential be allowed in this area, and that a high degree of mixed-use functions also be encouraged.

It is important to note that the concept of using zoning to protect the “Village Residential” area was not met with universal approval. While a majority of the citizens and stakeholders were in favor of the concept, some people voiced a concern that it went too far.

RESIDENTIAL

Traditional residential areas prior to the tornado were single-family homes of modest to medium size. A majority of new residential construction will likely fall into this category. These homes are the standard family dwelling unit. Multi-family dwellings should be allowed pending approval by City Planning and City Council.

TRANSITIONAL ZONE

Much of the land to the north of the new Highway 54 alignment will be in flux for the coming years. There will inevitably be some isolation occurring after the road improvements and to date not much redevelopment has been planned in North Greensburg. The proximity to the active railway and Coop also adds noise and activity to the area. Because the area

traditionally held small maintenance and manufacturing business owners (welding shops, repair shops, etc.) as well as housing, it is anticipated that some of those previous owners will want to rebuild. As discussed in other sections of this plan, while the predominant use in the transitional zone will be business owners, there will likely be the opportunity for housing to be part of the mix.

Transitional Zoning is meant to allow for the coexistence of a variety of maintenance, manufacturing and commercial businesses along with housing if it is so desired. The character of the area will be active and conducive to a working economy. With excellent access to transportation infrastructure this area also represents an opportunity for potentially new manufacturing activities. The area is well served by existing water, sewer, and electric utilities and will be attractive to industry users and, in places, homeowners. It will be necessary to monitor the progress of this area and to remain nimble in the enforcement of zoning regulations. In time the long-term use for the area will become clearer and it might be necessary to revisit the regulations accordingly. In all cases the intent and goals of this Sustainable Comprehensive Plan should be referenced when making future adjustments.

POTENTIAL ECO-INDUSTRIAL

Industrial uses were historically isolated from town for very good health and safety reasons. Many modern industrial users can be much better neighbors than their predecessors. Furthermore, manufacturing is a particular target market for an emerging green economy and these facilities are likely to be very good contributors to the local economy. However, it is most often still the case that large scale industrial operations should not be allowed in residential areas. Highway access and the potential to build off of other industrial users make the northeast part of town an ideal location for some of the new potential industrial users.

INSTITUTIONAL

Institutional users include city offices, the hospital, county facilities, school property, and other not-for-profit land users. These entities are vitally important to the community through the services they provide and jobs they create. The location and functionality of institutional land uses is likely to cluster near downtown. Churches are another institutional use and are largely compatible with any land-use type.

PARK SPACE

Park uses are meant to adhere to the guidelines established in the Parks + Green Corridors section of this Plan.

MIXING USES

There is no designated mixed-use zone in the Future Land Use Map. This intentional omission should not be interpreted as a wish to segregate compatible uses. On the contrary, compatible uses from different land-use classifications should be allowed and even encouraged in adjacent zoning areas. For example, commercial uses that are compatible with residential uses (a corner store, beauty salon, florist, small offices, etc.) should be encouraged. As a further example, a community center or small museum under current zoning would not be allowed in a residential zone but these uses are compatible and likely desirable in those locations. It is ultimately the decision of the Planning Commission and City Council to determine the revisions necessary to the existing zoning code, but the intermingling of congruent uses often simultaneously improves the richness and walkability of the community.

VACANT PROPERTY

There is a danger that some of Greensburg's once complete neighborhoods will not be initially rebuilt to the same density. Vacant properties or land that is bought by a single owner to create a larger parcel can result in a less cohesive neighborhood feel. The missing development can give the appearance of "missing teeth" in the City's urban fabric. While Greensburg rebuilds, there will likely be vacant properties interspersed amongst new development. While this is to be expected, it will impact community appearance and attitude. It is important that a concerted effort be undertaken to mitigate these impacts and reweave Greensburg as soon as possible. The planning team has 3 recommendations for managing vacant properties:

FOCUS ON THE CORE

Where possible, the City should encourage redevelopment efforts from the core of town gradually outward. While many individual homeowners will want to rebuild on their existing property or may even desire to locate further from downtown, it is the recommendation of the planning team that publically provided redevelopment funding be concentrated near the city core and gradually moved outward. This will help create a complete appearance in downtown and then build out from

there. By focusing on the center and working outward, Greensburg will rebound more quickly and also be better positioned to demonstrate its resiliency. Additionally, it is more affordable to provide utilities and amenities to a more condensed population.

COMMUNITY GARDENS

In the short-term, vacant lots should be considered as part of the larger open-space network. It is even advisable that the City think about managing some of these properties as temporary "pocket parks" depending on their location and visibility. Another strategy would be to use vacant lots as community gardens. This improves the appearance of the community and also potentially augments locally grown produce. As a country we are starting to understand the impact of buying local food. A 2003 study in Iowa found that the average



Produce from the Richmond Community Garden in British Columbia is donated to the Richmond Food Bank.

distance that food travels from farm to plate is 1,494 miles, excluding imports. Locally-sourced foods travel only 56 miles on average. Additionally, Americans spend an average of \$244 per household on produce, according to the USDA. If consumers spent more of that money in their own towns or states, it could positively impact the local economy.

LAND-BANK

It may be necessary for the City of Greensburg to land-bank vacant properties. If there is capacity for the task, the City would take control or purchase vacant parcels and be responsible for maintenance. In this way, the City could control the rate and type of development in different parts of the city, make rapid decisions for projects that require larger land-holdings, and potentially sell off parcels to augment maintenance and other city functions. While there may not be any appetite for this technique today, it may be a strategy worth investigating as City staff becomes available to focus on other tasks.

SOLAR ACCESS

Access to direct sunlight during the winter months dramatically reduces heating costs and improves the performance of solar panels and solar hot water heaters. To ensure optimal solar exposure, adhere to the following guidelines:

SOLAR SETBACKS

Serious consideration should be given to the implementation of a solar access ordinance. Under this scenario, houses would be setback from their northern property line to allow for optimal solar access.

SOLAR SHADING

Solar access is a complex issue and will likely need additional City guidance. In order for Greensburg to continue to grow as a sustainable town it is important to ensure one owner's solar panels are not shaded by another owners building additions, growth of trees and shrubs, etc.

Ultimately a solar access ordinance should be adopted. To ensure the encouragement of solar panels is not delayed while the City clarifies the details of a solar access ordinance, access issues can be handled on a case by case basis. Example ordinances are included in the appendix of NREL's "Near-Term Energy Recommendations for Greensburg."

RENEWABLE ENERGY GENERATION

WIND AND SOLAR ORDINANCE

To protect public safety and to maximize the beneficial capabilities of distributed energy generation strategies, NREL crafted specific wind and solar ordinances. These ordinances regulate the height of towers, the noise of wind turbines, and the connection of individual systems to the City's energy grid. It is recommended that these ordinances be reviewed and adopted as soon as possible.



FUTURE GROWTH

In the near term all of the rebuilding efforts should be focused on building a strong core in Greensburg and on establishing neighborhoods within the boundaries of the existing city limits and ideally from the center of town outward to protect a tight-knit community fabric.

It is possible that Greensburg's population will exceed its 2006 population and that some expansion will be necessary. In new subdivisions care should be taken to protect natural resources, accomplish the goals of the Master Plan, and contribute to the success of the community as a whole. New development projects must have strong connections to the existing community and the traditional street grid.

STREET LAYOUT

If new sub-division becomes necessary in Greensburg, orient blocks with the long side running east/west to allow residences to best capture natural sunlight.

RECOMMENDED ORDINANCES AND ZONING CODE CHANGES

SIGN ORDINANCE

Now is an excellent time to implement a sign ordinance to control the types of signage allowed within City limits. We have seen great improvements in the visual quality of cities with robust signage ordinances. This is one particular area where a universally applied rule can go a long way toward drastically improving the look of a community.

REFINEMENTS TO THE ZONING CODE

Included in the appendix is a list of potential refinements to the zoning code that are desirable based on the findings of this Sustainable Comprehensive Plan (see "Suggested amendments to the land development code and subdivision regulations). It is recommended that these modifications be reviewed and evaluated by the Planning Commission.

CONSOLIDATED GOVERNANCE

It was a recommendation of the FEMA Long-Term Recovery Plan that the City of Greensburg and its neighbors enter into a discussion about consolidating governance. After spending nearly a year examining the issues, the planning team believes the potential to gain efficiency and improve coordination between City and County endeavors warrants further investigation. While there are significant feelings amongst some community members that this will not be appropriate, many others believe that it has the potential to improve their governance. It is recommended that a preliminary investigation of the benefits and obstacles be undertaken. To be successful, a consolidation must be widely supported by people across the County. Diverse representation by a cross section of the public on the exploratory task force is critical. While the final decision very well may be that a consolidated government is not warranted, its investigation is appropriate.

CONCLUSION

When the recommendations recorded in this plan are compiled and overlaid with an unyielding commitment to rebuilding Greensburg as a model sustainable community, there is the potential to create a very special town. In the past few months the planning team has seen signs of the potential and it is tremendously exciting. The coming year will determine if Greensburg is able to meet its ambitious goals. The eyes of the country are on Greensburg and we are confident that the inspiration that has created hope for the community will grow to inspire all that care to look.

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