

Sustainable COMMUNITIES

“We need to provide more sustainable housing options, like Charleston’s historic core, throughout the city.”

Elizabeth Hagood
Subcommittee Chair

Community design has a powerful impact on clean air, clean

water, and the rural areas and natural habitats areas that surround the city. More spread-out communities require more driving, which means more smog. And when communities expand outward they displace rural and natural areas. Community design also determines how much pollution is washed off of paved surfaces into surrounding water ways during rainstorms.¹

Automobile use is a direct result of how our communities are designed: how neighborhoods are laid out, and how they relate to one another. Community design can allow residents to use their cars sparingly, allowing them to choose walking, biking, and public transit more often. Community design can also promote more appropriate stormwater management practices.

Roughly 40% of Charleston's greenhouse gas emissions are related to transportation. To reduce these emissions and to protect the environment and

human health in other ways, it is necessary to reduce the use of automobiles over the next few decades. Fortunately, this is not as daunting a task as it may seem. Ingenious solutions are close at hand, right here in our own city.

Like all healthy cities, Charleston continues to grow and evolve. If the decision is made to grow responsibly - and to use the city's uniquely intact historic neighborhoods as a guide - we can dramatically reduce our dependence on the automobile for future generations. There will also be a special bonus for our children and grandchildren: Charleston will be cleaner, greener, healthier, safer, and generally more livable for our children and grandchildren.

Better Choices

Charleston is a national leader in not only the preservation of our historic structures, but in the preservation of our historic neighborhoods and communities. On the peninsula everything is close together. Homes casually mix with businesses, and residents enjoy the option of walking, biking, or hopping on a bus. Also, the public open spaces are some of the most beautiful in the world -

SUSTAINABLE COMMUNITIES

ACTIONS

1. Plan future growth to reduce vehicle emissions.
2. Decide first where growth should occur, then plan transportation accordingly.
3. Encourage sustainable site design.
4. Create a sea level rise adaptation plan.
5. Raise public awareness.



BENEFITS

Reduce energy costs



Create jobs



Improve public health



Protect clean air



Protect clean water



Conserve natural resources



Enhance quality of life



Slow climate change



Protect cultural identity



Raise awareness

perfect for anything from a morning jog to a neighborhood festival. People can happily live here without a car, and in fact many do.

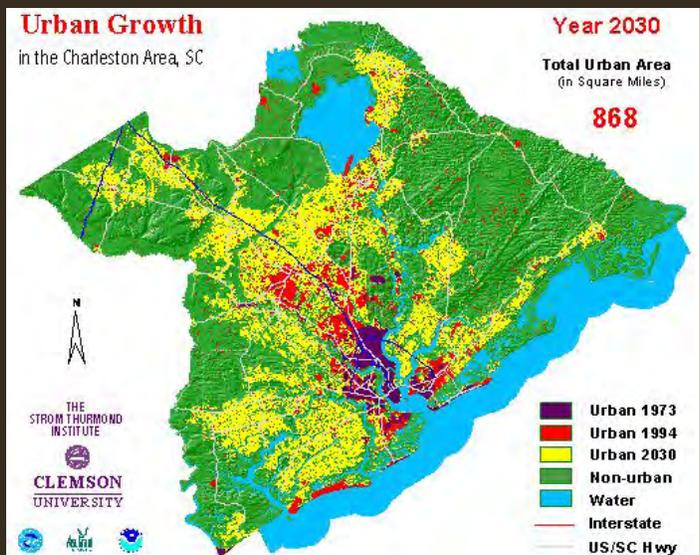
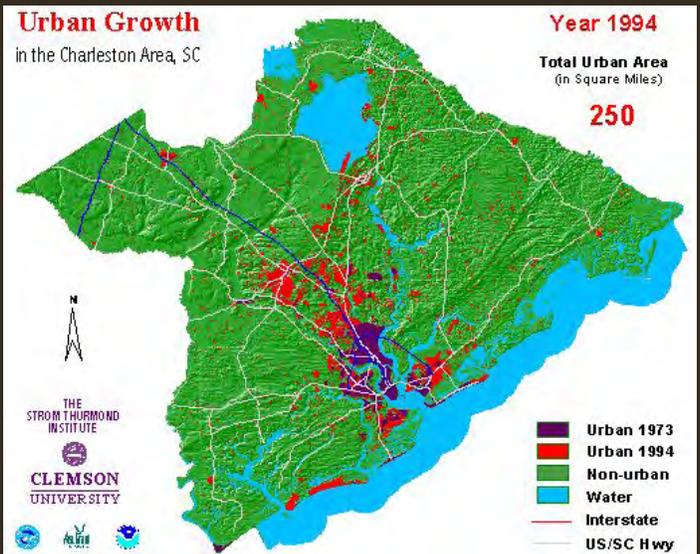
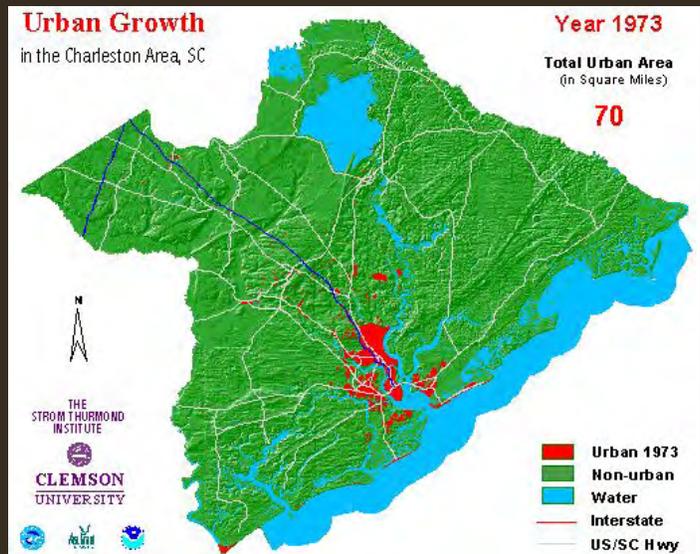
In other cities, core areas have fallen into decay, or fallen to the wrecker's ball. In newer cities, core areas may never have existed. Charleston is very fortunate to have preserved what other cities are now trying to rebuild or create from scratch.

However, in recent decades, Charleston has grown away from its original walkable design, becoming more spread out and more automobile oriented. The result is more heat-trapping gases, dirtier air and water, and the unnecessary loss of rural and natural landscapes.

People often assume that regions sprawl this way because of population growth, but this is not the case. Between 1973 and 1994, the population of Charleston, Berkeley, and Dorchester counties grew 41%, whereas the urbanized area grew 255%. In other words, the urbanized area grew about six times faster than the population.²

According to the most recent analysis, South Carolina ranks fourth in the nation, per capita, for its speedy conversion of rural land to urban uses.³ Moreover, South Carolina ranks fifth in the nation, per capita, for the amount of gasoline consumed.⁴

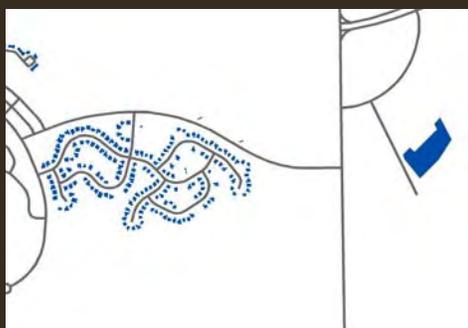
Urban expansion and gasoline consumption per capita, are an accurate gauge of whether our communities are designed to reduce, or to increase, auto use, heat-trapping gases, and negative impacts on clean air, clean water, and rural and



WALKABLE NETWORKS

Charleston has a long history of walkable neighborhoods. Connecting homes with services and jobs reduces dependency on cars, increases sense of community identity and enhances general livability. The City's goal is to build on its innate pedestrian network and provide alternatives to driving through increased connectivity with greenways, bikepaths and sidewalks to areas throughout the City. Well connected communities such as the one on the right, encourage walking.

Driving-only transportation pattern



- 7 minute drive to Piggly Wiggly
- 15 minute drive to Walmart
- 25 minute roundtrip to school
- 32 minute one-way to work



Driving-only transportation pattern in a West Ashley neighborhood and shopping center

Walkable connected transportation network



- 3 minute drive to Piggly Wiggly
- 5 minute walk to local clothing store
- 6 minute walk to school
- 9 minute one-way to work



Biking and walking to services enhances healthy habits and climate protection

natural lands. In the future, Charleston residents can make better choices about development, following the example of the historic peninsula that the city is so fortunate to have preserved.

Outgrowing Sprawl

Sprawl is not inevitable. In Europe, people not only walk and bike to nearby services; extensive public transit minimizes traffic and smog, and miles of productive farmland stretch just beyond the urban core.

In the United States, communities are now choosing to redevelop in a way that mimics these compact, sustainable patterns. The City and Charleston County have already agreed on an **urban growth boundary** to help contain sprawl. For the boundary to be fully effective there must be broader, regional agreement, and expansions of the boundary must be discouraged.

This plan recommends the following steps that the City can take to further align itself with the national movement to redevelop cities sustainably:

Encourage infill development in underused areas near the city core. These new communities should mix residential and

commercial uses with plenty of parks and public open space; they should be compact enough to support public transit; and they should be conducive to biking, walking, working, shopping, and playing near home;

Encourage the “retrofit” of suburban areas, connecting networks of smaller streets to reduce traffic jams on major roads and highways; adding nearby shops, parks, and employment opportunities so that people can choose to stay closer to home; and creating compact, transit-oriented communities along public transit lines;

Decide first where growth should occur, then plan transportation accordingly, rather than allowing big road projects to push urban sprawl into rural areas;

Create a regional public transit plan that supports the recommendations listed above; and

Encourage local food production and distribution, as well as the preservation of rural areas.

Once this plan is adopted, the next task will be to support the development of compact, sustainable communities, resulting in much greater choice for the housing consumer.

Research by the National

BEYOND SPRAWL



Getting beyond sprawl to redefine our sense of community and improve our quality of life is the challenge of Charleston in the 21st century. By encouraging walkability, buying local and planning well we can grow more sustainably.

Association of Homebuilders, the National Association of Realtors, and others indicates that there is considerable demand for housing in compact, sustainable communities. One-third of people surveyed say that they would rather live in a compact, sustainable community than in a typical subdivision. Also, if the location would shorten their commute, nearly 60% of people surveyed would prefer that choice.⁵

Currently, the demand for compact communities is much greater than the supply. As a

result, these communities are now 40% to 100% more expensive per square foot than houses in nearby subdivisions.⁶

Research indicates that if developers simply met this market demand, by 2050 this would reduce transportation-related carbon dioxide emissions by 7% to 10% from current trends.⁷ Among climate protection strategies, facilitating sustainable development is a remarkably inexpensive option. All it involves is shifting investments from the unsustainable to the

sustainable.

Sustainable Site Design

In addition to encouraging better design for entire communities, the City should also influence development decisions on a smaller scale. Here are two key examples:

Stormwater Management: In urban areas, stormwater runoff contains oil, gasoline, pesticides, petrochemical fertilizers, and other chemicals that are toxic to aquatic life. Conventional



Credit: Michael Schimpf Photography

Bennett's Point's outdoor classroom, in the ACE Basin, uses pervious surfaces to improve water quality and manage stormwater drainage.

stormwater management pours this runoff into street drains, then directly into surrounding bodies of water. Also, conventional stormwater systems often do not drain water efficiently, causing frequent floods. This plan recommends, instead, stormwater systems that filter polluted runoff through pervious pavements, healthy soils, and natural plantings. This protects clean water and also minimizes flooding .

Heat Island Effect: Cities become “urban heat islands,” consistently warmer than surrounding areas because of increased pavement, reduced vegetation, buildings that absorb heat and block wind, and waste heat from automobiles, air conditioners, etc. This increases demand for electricity, and consequently increases greenhouse gas emissions. This plan recommends investment in a multi-generation urban tree canopy, the use of pervious surfaces, and green roofs for new City buildings. These strategies, as well as the use of light-colored, reflective roofing, can help reduce the urban heat island effect.

Using a European pattern, our ancestors created a sustainable city where residents could easily work, shop, socialize, and relax near their homes. We still enjoy many acres of farmland and native ecosystems that once provided essential support for their community.

Now, cities around the country are discovering that the best way to meet the needs of future generations is to revive and reuse the old urban pattern that has been carefully preserved in downtown Charleston. Our city, then, finds itself in a privileged position - we are the new American role model for other cities that wish to develop more sustainably.

DESIGN WITH NATURE



Credit: Liollo Architecture

Buildings can be designed to work with natural infrastructure. A building’s site design can capitalize on existing natural systems and enhance the beauty and livability for its occupants.

In the design above, a multi-generational oak canopy is the framework for the design of the site and is preserved for future generations’ benefit.

“Charleston can continue to prosper and grow, without taking such a toll on our wildlife and waterways.”

Capt. Bryan Collins
Owner, Sandlapper Water Tours
& Green Committee Member

NATURE AS INFRASTRUCTURE



Credit: Rick Rhodes Photography

Buildings can live with nature and need not displace it. At the same time buildings benefit from Kiawah Island's natural air conditioning and stormwater management.



Waterfront Park's canopy shades visitors and residents while reducing City temperatures resulting from the urban heat island effect.

Advances in the science of Ecology have given us insights into the role that natural processes play in supporting human life on Earth. We have come to realize that the air we breathe, the water we drink, and even sewage treatment are the products of natural ecological processes. Collectively, the value of these “ecological goods and services” is greater than the economy of all the world’s nations combined: a staggering \$33 trillion (in 1997 dollars).⁸

Curiously though, we lost sight of this value as we developed our own cities and neighborhoods. As we built roadways, power grids, and all the underlying infrastructure of our built environment, waterways were polluted and cities became hotter as asphalt and buildings trapped the sun’s warmth. At the same time, pavement forced rainfall into the streets instead of recharging our groundwater, leading to increased flooding.

Now, as we begin to look for solutions, we are turning back to the role that nature plays in keeping our world livable. We can plant trees, for example, whose canopies shade the pavement, and whose roots break up the soil, allowing rain to recharge groundwater more easily. At the same time, tree trunks sequester the greenhouse gas, carbon dioxide, while leaves

OF OUR BUILT ENVIRONMENT



Credit: Wertimer & Associates

The use of native plantings reduces the need for more irrigation, saves money and absorbs stormwater while reducing runoff.



Credit: Phillip Dustan

Spartina marshes have always been nature's own filtration system that cannot be duplicated by any known human technology while providing us with birds to watch, shrimp, fish and oysters to eat and beautiful vistas.

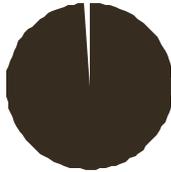
absorb pollutants and release life-giving oxygen. No man-made machines can accomplish these feats so efficiently at any price.

Today, many of our human activities, pollution, deforestation, and urbanization, have diminished the ecological activity of natural communities. Yet this process can be reversed as we begin to take greater advantage of nature. Swales and wastewater gardens trap and cleanse stormwater runoff. Green roofs cool buildings, trap rainfall, and even become a local source of food. As we enhance the beauty of our environment through trees and natural plantings, we can also create safer, healthier, and more peaceful homes, more livable communities, and a deeper sense of place. All we need to do is open our hearts and minds to real values to realize that nature really and truly does provide the infrastructure for humanity and our built environment.

Dr. Phillip Dustan,
Professor of Biology, College of Charleston,
and Green Committee member

Recommendations

Sustainable Communities Goals, Actions & Recommendations



Given the interrelated nature of the Sustainable Communities recommendations, several overlapping quantifiable measures could be attributed to this chapter. See page 21 for measurable effects of related strategies.

ACTIONS

1. Plan future growth to use land efficiently and reduce vehicle emissions.

- A. Encourage compact, complete and mixed use communities.
- B. Encourage infill development and the retrofit of suburban areas.
- C. Encourage sustainable “Traditional Neighborhood Design.”
- D. Encourage affordable housing.
- E. Encourage local, sustainable food production.
- F. Coordinate infrastructure decisions with other government entities to support sustainable development by way of the actions listed previously (C-1A through C-1E).

2. Plan where growth occurs, then plan transportation accordingly.

- A. Plan sustainable neighborhoods, then plan transportation to support them, rather than allowing poorly-planned roads to create sprawl.

- B. Create a regional public transit plan and a citywide “multimodal” transportation plan, then encourage “transit-oriented development.”

3. Encourage sustainable engineering standards.

- A. Revise engineering standards to minimize water pollution, reflect “nature as infrastructure” principles, and use less energy.
- B. Reduce the “urban heat island effect.”
- C. Develop sustainable parking strategies.
- D. Remove roadblocks to sustainable development.

4. Create a sea level rise adaptation plan.

5. Create public education programs.

C1. PLAN FUTURE GROWTH TO USE LAND EFFICIENTLY AND REDUCE VEHICLE EMISSIONS

C-1A: Encourage compact, complete and mixed use communities.

Automobile use is a major contributor to greenhouse gas emissions. Yet sprawl development separates our homes from workplaces, schools, and shopping, forcing us into our cars. At the same time, sprawl isolates people, promotes sedentary behavior, erodes a sense of community, and turns unique local landscapes into “Anywhere, U.S.A.”

Fortunately, there is no need to remain prisoners of sprawl. Development is based on local planning codes, along with public investment and market forces. We can change planning codes and direct public investment to create more diverse choices for city residents. We can also offer incentives for developers to create communities that integrate work, school, play, and home life. Added benefits include protection for clean water, agricultural land, and native habitat throughout the region.

Specific Recommendations

- **Context-Sensitive Planning:** The City should adopt a settlement code that encourages compact, complete and mixed use communities in urban, sub-urban and rural contexts. This code would reflect the special qualities of each area of the city (i.e. Peninsula, West Ashley, James Island, Johns Island, Daniel Island and Cainhoy). Currently, one type of planning tool for this purpose is “transect-based.”¹ Transect-based planning divides a metropolitan area into precise zones, ranging from the urban core to natural areas. Design standards vary logically according to the zone. In the future, other, better models may be developed. At that time, the City can consider these alternatives. (See Glossary for more on “context-sensitive” and “transect-based” planning.)
- **Sustainable Development Standards:** Settlement codes should promote complete, compact, and sustainable neighborhoods and communities, drawing from such models as the historic districts on the Charleston peninsula, as well as from such publications as the City of Charleston’s 2008 Preservation Plan, SmartCode, LEED-ND, Canons of Sustainable Architecture & Urbanism, and the Awahnee Principles. These standards should yield a range of densities, including establishing minimum densities where appropriate; provide a variety of housing opportunities/choices (including workforce housing); use “form-based codes” that encourage mixed uses; facilitate community-scaled civic and institutional uses (i.e. neighborhood schools); create connected, multi-modal street networks; provide appropriate recreational and open space; and protect significant natural areas; including native habitat and wildlife corridors throughout the city. (See Glossary for more on “form-based codes.”)
- **Incentives:** Incentives should be offered to developers willing to build complete, compact, and sustainable communities. These could include waived impact fees, streamlined permitting, and, if possible, assistance in obtaining public financing. Also, impact fees should be based on actual impact. (See Glossary for more on “impact fees.”)
- **Urban Growth Boundary:** Context-sensitive (urban to rural transect) planning is mapped from city centers and gathering places outward to an Urban Growth Boundary (UGB), beyond which development codes reflect the increasing rural nature of the area. As part of the next comprehensive plan update, the City should review its UGB for consistency and completeness. Particularly in Berkeley County, the City should map important natural and agricultural resources and evaluate growth projections, then determine how much new land is needed to accommodate future development. Throughout the city, a high priority should be given to directing new development toward infill and retrofitting suburban areas. In future

Recommendations

plan updates, the entire UGB should be reevaluated using the process described above. (See Glossary for more on “Urban Growth Boundary.”)

- **Thoroughfare Standards:** Consistent with context-sensitive settlement codes, the City should adopt different street design standards for different communities. Current standards tend to mandate wider streets, and are the same whether the street is in historic downtown Charleston or suburban West Ashley. Instead, the new standards should encourage walking, biking, and neighborhood activity. Future investment in maintenance and waste collection vehicles should be consistent with the new thoroughfare standards.
- **Community Planning and Outreach:** Context-sensitive settlement codes should be created with significant community involvement so that communities have the opportunity to become comfortable and familiar with the principles of sustainable design. Focusing on one community at a time, as department budgets permit, planning staff should conduct “charrettes,” or detailed design workshops, in West Ashley, James Island, Cainhoy, the Peninsula, etc. After each charrette, planning staff should recommend changes to the comprehensive plan. These recommendations would be referred to the Planning Commission and City Council for approval and addition to the area plan. (See Glossary for more on “charrettes.”)
- **Planned Unit Developments:** As the City moves toward context-sensitive settlement codes, it should require that all Planned Unit Developments (PUDs) be designed to be context sensitive. Also, PUD standards should be revised to

include sustainable development requirements. Once new codes are adopted, PUD’s would no longer be needed and should be eliminated to avoid confusion and inconsistent requirements. (See Glossary for more on “Planned Unit Development.”)

C-1B: Encourage infill development and the retrofit of suburban areas.

The Charleston *Post & Courier* recently reported that approximately 135,000 homes were planned for the Charleston metropolitan area. Of these homes, 114,000, or about 85%, will be built beyond I-526, creating more sprawl and increasing auto emissions.

Sustainable cities are built on an entirely different model. Growth is directed toward underutilized “infill” sites closer to the urban core. In these areas, existing buildings can often be adapted, and natural landscapes protected or restored. Infill development reduces auto emissions, provides easy commutes, creates vibrant neighborhoods, and also saves taxpayers significant infrastructure costs.

Sustainable cities also “retrofit” their suburbs, making these areas less auto-dependent and more appealing to homeowners. At the simplest level, a suburban retrofit can involve inserting mixed-use residential pockets and town centers – some with significant public amenities – among existing office parks, malls, and subdivisions.

The most sustainable suburban retrofits emphasize the creation of “transit-worthy” communities. Such communities are dense enough to support public transit (at least 4 – 15 dwelling units per acre depending on the type of transit), and can conveniently be

linked with one another for that purpose. (See Glossary for more on “transit-worthy” communities.”)

Such projects not only reduce auto emissions by making alternative transportation feasible and strengthening street networks. They also mitigate traffic congestion, meet affordable housing needs, and create vibrant communities that provide residents with services and activities closer to home.

Specific Recommendations

- **Inventory:** The City should conduct a “room-to-grow” inventory of the City, i.e. an analysis of underutilized or poorly designed properties, to determine how much growth can be accommodated. Areas surrounding current and future public transit stops should receive especially careful attention.
- **New Infill Standards:** The City should modify its comprehensive plan and zoning codes to encourage infill development, permitting mixed uses and traditional neighborhood design in these areas.
- **New Suburban Retrofit Standards:** The City should modify its comprehensive plan and zoning codes to encourage the retrofit of suburban areas, permitting mixed uses and traditional neighborhood design in these areas. Specifically, the City should adopt a Century V Comprehensive Plan Amendment dealing with suburban retrofits and simultaneously adopt codes and regulations that encourage the use of sustainable design standards such as LEED-ND. Suburban retrofits should include a strengthened street network.
- **Incentives:** The City should provide incentives for infill development and suburban retrofits, possibly including waived impact fees, streamlined permitting, and/or assistance in obtaining public financing. The City is encouraged to establish a Redevelopment Authority to evaluate financial incentives such as Tax Increment Financing (TIF), Municipal Improvement Districts (MID), property tax abatement, impact fee abatement, public-private partnership, affordable housing funds, Local Development Corporation (LDC) funding, transportation funding for transit housing, and other funding sources relevant to infill development and suburban retrofitting. The Redevelopment Authority or the City could also take the lead in coordinating with financial institutions, including local community banks, likely to respond positively to redevelopment projects, in addition to educating these institutions about successful ventures elsewhere in order to increase their comfort level and the likelihood of successful investment.

C-1C: Encourage Sustainable “Traditional Neighborhood Design.”

“Traditional Neighborhood Design,” or TND, refers to neighborhoods that look and function like traditional towns, with minor updates to meet modern standards. TND is sustainable because it is walkable, contains mixed uses, reduces auto-dependency, provides jobs in neighborhoods, and preserves quality open space. TND makes it easy to walk or bike to essential services, and provides neighborhood amenities that encourage people to play and socialize near their homes. These include everything from street furniture under shade trees to urban

Recommendations

squares and village greens appropriate for festivals and community events. Also, TND developments provide density that is sufficient to support public transit (i.e. 4 - 15 dwelling units per acre depending on the type of transit). The primary obstacle in building a TND development is outmoded zoning codes that actually outlaw traditional neighborhood features and separate residential from commercial uses.

Specific Recommendations

- **Design Standards:** Zoning codes should be amended to permit traditional neighborhood features that support biking, walking, and neighborhood gatherings. These could include, for example, mixed uses, nearby parks and civic buildings, reduced lane widths, reduced right-of-way (ROW) widths, bundling of ROW utilities, smaller lots, and even smaller homes. Such flexibility not only allows developers to create bicycle- and pedestrian-friendly neighborhoods; it also frees more land for public green space.
- **Retail and Services:** Zoning codes should also be amended to ensure that neighborhood retail and essential services can be included in plans for all new development and redevelopment, including infill, suburban retrofit, and “greenfield” development that converts rural land to urban uses. Concepts such as the five-minute walk, the pedestrian shed, and mixed use centers should be included in this planning. Further, planning should go beyond small corner stores to include convenience stores (10,000-30,000 sq. ft.) and typical neighborhood centers (60,000-80,000 sq. ft.) (See Glossary for more on “pedestrian shed.”)
- **Research & Collaboration:** To the

extent that City budgets permit, the process of amending zoning codes to permit TND development should include retail expertise and examination of successful case studies, including financing scenarios and public-private partnerships. It should also include, to the extent possible, coordination with financial institutions and the Local Development Corporation (LDC), which could potentially help developers access Community Development Block Grants.

- **Priority Investment Act:** In its efforts to promote TND, the City should evaluate the S.C. Priority Investment Act, signed into law in 2007 to amend the Local Government Comprehensive Planning Enabling Act of 1994. This law allows local governments to identify “priority investment zones” in which they can eliminate nonessential regulations and use market-based incentives to encourage TND. Incentives may include, but are not limited to, density bonuses, streamlined permitting, design flexibility, reduced or waived fees, and relaxed zoning regulations such as lot area requirements or setbacks. Note: local governments must incorporate this law into their existing comprehensive plans during their next five-year review or update, which for Charleston occurs in 2009-10.

C-1D: Encourage affordable and workforce housing.

The recommendations listed previously (C-1A through C-1C) - which encourage compact development, infill development, suburban retrofits, and Traditional Neighborhood Design - can all help increase the City’s supply of affordable housing. Additional measures should also be taken to promote affordable and workforce housing because it is vitally important that people

of all income levels have easy access to employment.

- **Affordable Housing Recommendations:** A representative of the City's Sustainability Division should be included on the City's Affordable Housing Task Force to insure that affordable housing is as sustainable as other forms of housing. Also, affordable housing should be indistinguishable from, and as marketable as, other forms of housing. Further, the City should consider seeking state and federal funds, including transportation funds, to support affordable housing projects based on a mixed-use development model. The City should also explore the feasibility of offering financial incentives to potential residents.
- **New Standards:** The City should set minimum thresholds for achieving diversity of housing types in new neighborhoods, i.e. minimum densities and/or allowances for accessory units. At the same time, the City should move forward in permitting accessory units throughout the city.

C-1E: Encourage local, sustainable food production.

On average, food is trucked approximately 1,500 miles before appearing on an American dinner table, adding to the vehicle emissions that spur climate change. Also, most food production in the US releases additional greenhouse gases and has other significant negative effects on the environment.

By contrast, sustainable cities in Europe and elsewhere offer residents larger quantities of fresh, local food, much of it produced with negligible environmental impact. In the US, hundreds of new developments feature organic farms and "edible

landscaping" as the primary amenity. These developments, including the posh Serenbe near Atlanta, are just one aspect of a broader movement called "agricultural urbanism," which promotes the integration of sustainable food production into urban settings. (See Glossary for more on "agricultural urbanism.")

Specific Recommendations

- **Protect Agricultural Land:** The City should protect remaining agricultural areas within its borders and advocate protection beyond the Urban Growth Boundary from suburban sprawl. Incentives should be among the tools used to protect this land.
- **Allow Food Production:** Coordinating with Berkeley, Dorchester, and Charleston counties and organizations promoting local food production, the City should map urban, suburban, and rural areas, permitting local food production at all scales wherever possible, including apiaries. Throughout the City the presumption should be in favor of permitting food production. Food distribution should also be permitted at appropriate locations, potentially including roadside stands and drop-off points for community supported agriculture in residential neighborhoods.
- **Support Gardens/Markets:** The City should support creation of food-based gardens at schools, on rooftops, and in parks and abandoned lots where feasible. Also, the City should support creation of additional farmers markets where appropriate.
- **Encourage Sustainable Production:** The City should consider offering incentives for landowners willing to

Recommendations

farm in a way that does not threaten human health, clean water and biodiversity, or exacerbate climate change.

C-1F: Coordinate infrastructure decisions with other government entities to support sustainable development by way of the actions listed previously, C-1A through C-1E.

The SC Priority Investment Act is a 2007 amendment to the Local Government Comprehensive Planning Enabling Act of 1994 which requires a basic level of coordination among local governments, school districts, utilities, etc. as they plan roads, schools, sewer lines, and other public infrastructure. Public infrastructure is often poorly planned and can encourage unnecessary sprawl development in rural areas if not properly coordinated. The motto “plan where you grow, and grow where you planned,” should be cooperatively applied by local government.

Note: local governments must incorporate this law into their existing comprehensive plans during their next five-year review or update, which for Charleston occurs in 2009-10.

Specific Recommendations

- The City should fulfill the requirements of the Priority Investment Act during the Comprehensive Plan Update in 2009.
- The City should be a leader and advocate of regional planning and intergovernmental/interagency coordination. Concerning public infrastructure planning and spending, the City should consider requiring current analysis of impacts, costs, and

benefits of all proposed public infrastructure projects that are not adjacent to existing thoroughfares and/or human settlement of a certain density. The City should use that data to construct an impact fee scale based on *actual* impact. If legally permissible, the City could use these collected impact fees to establish a revolving fund to assist with City expenses related to infill projects and suburban retrofits.

C2. PLAN WHERE GROWTH OCCURS, THEN PLAN TRANSPORTATION ACCORDINGLY.

C-2A: Plan sustainable neighborhoods, then plan transportation to support them, rather than allowing poorly-planned roads to create sprawl.

Often, decisions to build roads are made in isolation from decisions about community development. The result has been broad highways - which in turn spawn commercial strips, attract sprawling residential development, displace working farms, and destroy both native habitat and a local “sense of place.”

By contrast, sustainable cities seek first to create vibrant, active neighborhoods, then link them using a “connected” transportation network. Where roads are not well connected, larger streets and freeways promote auto-only travel and traffic congestion. They also increase vehicle miles traveled and consequently increase auto emissions.

By contrast, a connected street network offers travelers multiple options. This improves traffic flow, shortens trip lengths,

and minimizes auto emissions. The result is a sustainable urban fabric, in which residents can fulfill many daily needs closer to home; can often choose to walk, bicycle, or use public transit; and can travel shorter distances when they do use autos.

Specific Recommendations

- **Communities First:** The City should plan vibrant, active, context-sensitive neighborhoods, then link them by planning a connected transportation infrastructure.
- **Fifty-Year Vision:** The City, along with the Berkeley-Charleston-Dorchester Council of Governments (BCD-COG), should plan for a 50-year vision of such linked neighborhoods.
- **Revise for Consistency:** The City should revise zoning, land development, building codes, and engineering standards to ensure adherence to the principle of communities first, transportation second.

C-2B: Create a regional public transit plan and a citywide “multimodal” transportation plan, then encourage “transit-oriented development.”

Charleston is well designed for public transit and has critical components available, such as existing rail lines and appropriate densities. Though the City cannot create a regional public transit plan alone, it can provide the leadership essential to a cooperative, intergovernmental effort. The City can also ensure that this plan is based on the principle of communities first, transportation second.

Once a public transit plan is in place, future

development should be organized around future transit lines and hubs. Development in these areas should integrate rather than separate jobs and housing, and establish appropriate densities supportive of transit-oriented development.

Further, critical to transit-oriented development is the opportunity for residents to walk, cycle, etc. to public transit stops. Therefore a citywide “multimodal” transportation plan should facilitate a safe, efficient coexistence among those who choose to walk, cycle, and use scooters or roller blades, as well as those who use autos and public transit. (See Glossary for more on “multimodal” planning and “transit-oriented development.”)

Specific Recommendations

- **Regional Plan:** The City should request that the Berkeley-Charleston-Dorchester Council of Governments (BCD-COG) develop a regional public transit plan with all local counties and municipalities, based on the principle of communities first, transportation second.
- **Sub-Area Plans:** Next, sub-area plans for future public transit stops should be developed through a series of local workshops aimed at educating the public, soliciting opinions and support, and identifying potential solutions.
- **Zoning Revision:** The zoning code near future public transit stops should be amended to reflect standards for minimum densities, parking structures, park and ride features, and mixed uses needed for transit-oriented development. New rules should delineate requirements related to the “pedestrian shed” and “transit shed,” so that residents will live close enough

Recommendations

to services and transportation that they can choose not to use automobiles. (See Glossary for more on “pedestrian shed” and “transit shed.”)

- **Multi-Modal Plan:** The City should develop a citywide multimodal transportation plan, complete with capital improvement recommendations and funding strategies. Collaboration with Charleston County, BCDCOG, and CHATS is essential. In order to focus on this priority, the City should revise the Comprehensive Plan to do away with mutually exclusive traffic study requirements.

C3. ENCOURAGE SUSTAINABLE ENGINEERING STANDARDS

C-3A: Revise engineering standards to minimize water pollution, reflect “nature as infrastructure” principles, and use less energy.

There are many ways the City’s engineering standards can be revised to enhance sustainability. Perhaps the most important revisions are needed to protect our diminishing wetlands and water quality. While the State has jurisdiction over filling wetlands, the City can still do a great deal to protect wetlands and other water resources by how it chooses to manage its stormwater runoff.

In populated areas, stormwater runoff contains oil, gasoline, fertilizers, herbicides, and other chemicals that are toxic to aquatic life. Conventional stormwater management systems allow this runoff to spill off pavement and manicured lawns into stormwater drains, then directly into surrounding bodies of water. In addition, frequent flooding results when conventional stormwater systems fail to

drain water as efficiently as natural drainage systems.

Alternatively, stormwater systems based on the principle of “nature as infrastructure” capture and filter polluted runoff by mimicking natural drainage systems. These systems also reduce stress on stormwater drains, minimizing flooding. Further, the best “nature as infrastructure” designs can significantly reduce engineering and construction costs. They are also compact and attractive, potentially increasing property values. (See chapter introduction for more on “nature as infrastructure.”)

Specific Recommendations

- **Higher Standards for Stormwater:** The City should require the use of stormwater systems based on “nature as infrastructure” principles. Techniques include pervious pavements, bioswales and rain gardens, and the combined use of trees and structural soils. The best of these natural stormwater management techniques have been compiled into the “light imprint” standards.² Light imprint standards are designed to be used with context-sensitive planning, and specify which techniques are most appropriate in which parts of the city. The City’s Storm Water Management Plan and Drainage Manual should be brought into alignment with Light Imprint standards, and the City should expeditiously approve and adopt them. (See Glossary for more on “Light Imprint.”)
- **Higher Standards for Buffers:** The City should establish higher standards for protection of water resources, including fresh and saltwater wetlands, going beyond the minimal protection provided by state and federal laws. New standards should include wider natural

buffers, with specific requirements for supplemental plantings, native vegetation, and buffer preservation. Further, the City should devise and fund a monitoring and enforcement plan, including meaningful fines.

- **Stormwater Fees:** The City should develop a tiered schedule for stormwater fees for all development, commercial and residential, existing and proposed. These fees should be based on actual impact.
- **City Properties:** New construction on City properties should use exemplary sustainable design for paved areas, landscaping, buffers, and pervious surfaces wherever possible.
- **Shoreline Enhancement:** The City should create a “Living Shorelines” enhancement program that promotes the use of natural structures instead of conventional engineering to protect and restore damaged shorelines. Programs should encourage planting oyster beds, reducing wake-zones, planting vegetative buffers, etc. This should be undertaken in collaboration with the state’s Office of Ocean and Coastal Resource Management (OCRM) and other local governments. (See Glossary for more on “Living Shorelines.”)
- **Wetlands/Water Quality Expertise:** The City should have an ecologist on staff with expertise in natural resource protection, with particular expertise in stormwater management, soils, topography, water quality, and wetlands and critical area protection (including delineation, buffering, habitat protection, and federal, state, and local policies governing these areas.) Further, the City should establish an advisory committee to review standards and enforcement mechanisms and

provide supplementary expertise on wetlands and water quality.

- **Essential Data:** City planners have access to a wealth of Geographic Information Systems (“GIS”) data on natural resources, water resources, and drainage information in and around City boundaries. The City’s GIS inventory should be updated with the most current information available from USGS, SCDNR, NOAA, and Coast Guard professional land surveys, plats, site plans, etc. GIS information should include wetlands data, existing topography, critical line data, receiving water bodies, existing outfalls, existing drainage systems, etc. Information should be integrated on a regional basis.
- **Collaboration:** The City should continue to collaborate with other local governments on watershed management and public education.
- **Additional Standards:** The City should also revise other engineering standards based on national LEED standards - for example, the use of reclaimed materials to increase pavement strength. Further, the City should adopt the 2030 targets for public lighting, reducing energy use and minimizing light pollution by requiring light-emitting diodes, down-lighting, and pathway lighting. Finally, the City should consider eliminating all but the most essential lighting (joining the Dark Skies Initiative), as well as increasing enforcement to address noise pollution.

C-3B: Reduce the “urban heat island effect.”

The “urban heat island effect” occurs when metropolitan areas are warmer than the surrounding countryside. Cities become

Recommendations

heat islands because of increased pavement, reduced vegetation, buildings that absorb heat and block wind, and “waste heat” from automobiles, air conditioning, and industry.

The Charleston peninsula is often 3-6 degrees warmer than surrounding areas on a summer day, with a much higher differential at night. Warmer urban temperatures increase air conditioning costs, as well as peak energy demand and greenhouse gas emissions. They also diminish quality of life for city residents; facilitate the formation of ozone and other air pollutants; and stress vegetation and aquatic ecosystems.

One of the most effective ways to reduce the urban heat island effect is to plant shade trees. Another is to create “green roofs” -- that is, soil installed on the top of buildings and planted with a variety of vegetation. Both strategies have important additional benefits. Trees reduce stormwater runoff by intercepting and diminishing the impact of rainfall and by making the soil more porous. This causes the water to drain into the soil or onto paved surfaces at a much slower rate, decreasing the possibility of overwhelming stormwater systems or other drainage patterns. As a result, groundwater is recharged, flooding is reduced, and pollutants are filtered naturally rather than poured directly into creeks and rivers. Both trees and green roofs capture carbon dioxide (a potent greenhouse gas); provide wildlife habitat; and create a more beautiful and more peaceful urban atmosphere. Other strategies to reduce heat include the use of light-colored, reflective roofing and pavements.

Specific Recommendations

- **Multigenerational Tree Canopy:** The

Plan should promote a diversity of long-lived tree species chosen for their environmental benefits, including heat reduction, carbon sequestration, and runoff retention. (See Glossary for more on “Multigenerational Tree Canopy.”)

- ◇ **Master Plan and Coverage Goal:** The City should develop an Urban Forestry Master Plan, beginning with an Urban Forest Effects Model of the City’s existing urban forest. Further, the Master Plan should set a citywide tree canopy coverage goal to meet or exceed 40%, with specific goals set for different areas and for new and existing development.
- ◇ **Public Land:** The City should invest in a multigenerational tree canopy on public land. This requires not only protecting the existing canopy of mature trees, but also planting on a regular schedule to replace these trees. It is important to select a diversity of tree species, focusing on native species and those that conserve water. Further, the City should give as high a priority to urban planting as it does to planting in suburban and rural areas.
- ◇ **Private Land:** Through its land development standards and through the use of incentives, the City should promote the planting of shade trees and the use of native vegetation and natural backyard buffers on private land. Further, existing shade trees on private land should be replaced if removal is necessary.
- ◇ **Stewardship Fee:** The City should advocate a state-level fee for the purchase and planting of new

trees by local governments.

- **Cool Roofs & Pavements:** For new construction on City property, the City should set a high standard by using green roofs and rooftop gardens, as well as light-colored, reflective roofing and pavements. Again, plant species should be diverse, with a focus on native species and those that conserve water. On privately-owned property, the City should use incentives to promote the use of these heat-reduction strategies.

C-3C: Develop sustainable parking strategies.

Large parking lots encourage the exclusive use of single-occupancy automobiles, and also contribute to the heat island effect. By developing new parking strategies, the City can support public transit, bicycling, walking, etc.; minimize environmental impacts; and maximize efficiency.

Specific Recommendations

- **Diverse Strategies:** The City should implement a variety of parking strategies. These should include shared parking, which allows multiple users to share a single space on a predetermined schedule; and “park once” districts, which allow motorists to park in a central location then access multiple stores and services on foot. Also, the City should consider reduced parking requirements. Further, the City should explore “shared vehicle systems,” now popular in many urban areas, which provide easy access to vehicles from a shared fleet for short periods of time. Shared vehicle systems allow families to reduce their need for multiple cars and reduce the pressure to maximize parking capacity. (See Glossary for

more on shared parking, “park once districts,” and “shared vehicle systems.”)

- **Visitor and College Parking:** The City should investigate parking management strategies that relate to out-of-town visitors, as well as college campuses. In both cases the goal should be to discourage the use of single-occupancy vehicles and encourage the use of bicycling, walking, and public transit.
- **Multiple Levels:** The City should discourage the creation of single-level parking lots and instead encourage multi-level parking structures with green roofs and sustainable stormwater systems.
- **City Parking:** All City public parking lots and garages should use exemplary sustainable design, including pervious surfaces, native landscaping, tree canopies, and sustainable stormwater systems.

C-3D: Remove roadblocks to sustainable development.

Application of many of the sustainable development principles discussed in this plan currently requires variances, rezoning, or an extensive review as part of a Planned Unit Development process - or they are prohibited altogether. Once City codes are amended to permit and promote sustainable development, these barriers and delays should be eliminated.

In the meantime, the City should identify and eliminate any barriers to sustainable design and construction in the development review process. The City should offer incentives to developers of sustainable communities. Sustainable development projects should be encouraged and

Recommendations

systematically facilitated through practices such as waived impact fees, streamlined permitting, and assistance in obtaining public financing.

Specific Recommendations

- **Training/Liaison:** The City should invest in training on sustainable design and construction for staff members who review development plans. During a transitional period, the City should establish a special liaison to help guide sustainable development projects through the review process. An objective third-party standard should be used to determine which developers the liaison can assist - for example, LEED-ND.
- **Regional Coordination:** The liaison and other relevant staff should also be trained to help developers of sustainable communities coordinate intergovernmental and interagency review (involving, for example, counties or state agencies).
- **Process Improvement:** The City should investigate development review processes used in cities friendly to sustainable design and construction, and revise its own process to facilitate sustainable projects.
- **Incentives:** The City should waive impact fees, assist with public financing, and guarantee expedited permitting for those developers whose practices meet a certain objective, third-party standard - for example, LEED-ND. Impact fees should be based on actual impact, rewarding developers of infill communities and requiring higher fees for developments far from the urban core.

C4. CREATE A SEA LEVEL RISE ADAPTATION PLAN.

Sea level is conservatively projected to rise at least one foot over the next century. While many nations and communities are taking steps to reduce greenhouse gases, there is already a buildup in the atmosphere, and Charleston will experience some effects of climate change for years to come. Thus, it is essential that the city plan to adapt to projected impacts.

Specific Recommendations

C-4A: Establish a commission to create the plan.

The City should empanel a "Blue Ribbon" commission, representing local stakeholder groups. The commission should be established as soon as possible, and should be charged with developing this plan within one year.

- **Impacts:** The plan should identify potential short-term, mid-term, and long-term impacts of climate change scenarios likely to affect the City. Issues to be addressed include accelerated sea level rise; increased flooding; intensification of tropical storms; drought; saltwater intrusion into coastal rivers and aquifers; increases in pollen and mold spores; increases in heat-related illness; increases in ground-level ozone; impacts on the insurance and tourism industries; loss of homes and communities; displacement of residents; wildlife and fishing impacts; and insect vectors.
- **Options:** The plan should identify policy options for addressing the impacts of climate change on residents (particularly temperature-sensitive

populations); vital infrastructure and public facilities; economic systems; energy systems; transportation systems; communications systems; natural systems (including farmland, forests, and wetlands); and all other areas of concern throughout the city.

- **Process:** The commission should: (1) review available reports and state and national adaptation plans; (2) create an inventory of adaptation policy options, relying on examples from flood-prone communities like New Orleans and Holland; (3) analyze the cost-effectiveness of these options, as well as the potential risks and costs associated with inaction; (4) prioritize selected policy options based on the certainty and severity of adverse impacts to citizens, ecosystems, and local economies; (5) include suggested policies to be used in considering major capital investments; (6) include a plan and suggested sources of funding for developing accurate assessments of sea level rise; (7) include a plan and suggested sources of funding for public education and outreach; (8) provide specific goals, as well as a time line, for recommended actions; and (9) call for periodic update of the plan (at least every five to ten years.)

C-4B: Involve all affected agencies and sectors.

The commission should involve and coordinate with all appropriate federal, state, and local agencies (e.g. NOAA, DHEC), organizations (e.g., Save The Lowcountry Coalition), and institutions (e.g., universities) to ensure that all potential impacts and solutions are identified. Further, the plan should complement and be coordinated with related efforts, including:

- **Emergency Response:** State and local emergency management response plans address short-term responses to natural disasters, including violent storms.
- **CECAC:** The Governor’s Climate, Energy, and Commerce Advisory Committee (CECAC) developed a state Climate Action Plan which specifically addresses adaptation.
- **OCRM:** The Office of Ocean and Coastal Resource Management (OCRM), a division of the state Department of Health and Environmental Control (DHEC), has formed a Shoreline Change Advisory Committee. The Committee’s charge is to identify research needs and policy options to address storms, coastal erosion, and sea level rise.

C-4C: The plan should be implemented with reasonable speed.

Public education and outreach efforts about the need for adaptation should begin immediately. “Low-hanging fruit” opportunities should be addressed as rapidly as possible, and proactive adaptation initiatives should begin within the next two to three years.

C5. CREATE PUBLIC EDUCATION PROGRAMS

The City has access to a wide range of resources related to public education, both within its various departments and among the public agencies and non-profit groups whose missions include educating Charleston residents about sustainable community planning and development. In educating the public about the Climate Change and Sustainability Plan, opportunities for collaboration abound.



Recommendations

Specific Recommendations

- **City Departments:** Both internally and with the public, City departments should continue to build awareness about the benefits of sustainable development models, including compact communities, urban infill, and suburban revitalization.
- **Collaboration:** City departments should collaborate with public agencies and non-profit groups to accomplish this goal, thereby making the most of limited resources.

SECTION 157

[energyefficiency_va.pdf](#).

11. [ix] See “Energy Policy Report,” State Regulation of Public Utilities Review Committee (2009) at 5, <http://www.scstatehouse.gov/citizensinterestpage/EnergyIssuesAndPolicies/FinalPURCEnergyReport.pdf>.
12. [x] See “2008 State Energy Efficiency Scorecard,” American Council for an Energy-Efficient Economy, http://www.aceee.org/pubs/e086_es.pdf.
13. [xi] A utility in Colorado has committed to reducing consumption by an impressive 1.4% in 2013. Also, Vermont utilities reduced energy consumption by approximately 5%, and peak demand by approximately 6%, between 1991 and 1997. See “Comments on Energy and Energy Policies in South Carolina,” SC Coastal Conservation League (2008) at 12-13 and cites therein, <http://www.scstatehouse.gov/citizensinterestpage/EnergyIssuesAndPolicies/CommentsReceived/Coastal%20Conservation%20League%20Comments.pdf>; see also “Powering Down in Juneau,” Berkeley Lab News Center (2009), <http://www.lbl.gov/publicinfo/newscenter/features/2008/EETD-alaska.html>. (Juneau, Alaska residents voluntarily reduce peak power usage by 40% during an eight-week crisis in electrical power delivery).
14. [xii] Duke Energy’s goal is consistent with a unanimous recommendation by the state’s Climate, Energy, and Commerce Advisory Committee (CECAC). See *id.* at 14 and cites therein.
15. [xiii] See “Energy Policy Report,” South Carolina Regulation of Public Utilities Review Committee (2009) at 6,
<http://www.scstatehouse.gov/citizensinterestpage/EnergyIssuesAndPolicies/FinalPURCEnergyReport.pdf>.
17. [xiv] See “Los Angeles Will End Use of Coal Fired Power,” *Reuters* (2 July 2009), <http://www.reuters.com/article/GCA-GreenBusiness/idUSTRE56165X20090702>.
18. [xv] See “Austin Energy Raises Green Energy Goal,” *News 8 Austin* (4 Sept 2009), http://news8austin.com/content/your_news/default.asp?ArID=251247.
19. [xvi] See “Renewable Energy,” Grand Rapids, Michigan official site, retrieved August 2009, [mhttp://www.ci.grand-rapids.mi.us/index.pl?page_id=9143](http://www.ci.grand-rapids.mi.us/index.pl?page_id=9143).
20. [xvii] See “Offshore Wind Farms and the Environment,” *Danish Energy Authority* (2006) at 3, http://www.bluewaterwind.com/pdfs/havvindm_korr_16nov_UK.pdf.
21. [xviii] See “An Offshore Wind Power Industrial Cluster for South Carolina,” Clemson University Restoration Institute (2009) at 3, <http://www.scribd.com/doc/14832620/Charleston-SC-Offshore-Wind-Ins-Trust-Rial-Hub-White-Paper>.
22. [xix] *Id.*
23. [xx] The U.S. Department of Energy predicts that South Carolina could generate 1,000 to 5,000 megawatts of energy from offshore wind. See “Energy Efficiency and Renewable Energy,” U.S. Department of Energy (2009) at 10, http://www.windpoweringamerica.gov/pdfs/20_percent_wind_2.pdf. This represents 4% to more than 20% of the state’s current peak summer electrical capacity, according to an e-mail exchange with Dr. Nicholas Rigas of the Clemson University Restoration Institute on 15 Sept 2009. Peak summer capacity is the maximum amount of electricity that can be put on the state’s grid during peak hours.

24. [xxi] See "An Offshore Wind Power Industrial Cluster for South Carolina," Clemson University Restoration Institute (2009) at 4, <http://www.scribd.com/doc/14832620/Charleston-SC-Offshore-Wind-Ins-Trust-Rial-Hub-White-Paper>.

Cleaner Energy Recommendations

1. See http://apps1.eere.energy.gov/states/maps/renewable_portfolio_states.cfm.
2. See <http://www.energy.ca.gov/renewables/index.html>.
3. See <http://www.reuters.com/article/GCA-GreenBusiness/idUSTRE56165X20090702>.
4. See http://www.ci.grand-rapids.mi.us/index.pl?page_id=9143.

Sustainable Communities

1. Studying a 600-acre property in Mt. Pleasant, scientists from Clemson University and elsewhere looked at the impact on clean water from two possible development scenarios: conventional sprawl, and a more clustered design that minimized pavement and kept buildings away from the water's edge. The sprawl design produced 43% more stormwater runoff than the clustered design. Also, in the sprawl design, the runoff contained three times as many pollutants. See "The Belle Hall Study," Dover, Kohl & Partners (1996), http://www.doverkohl.com/files/pdf/Belle%20Hall_low%20res.pdf.
2. See "Modeling and Predicting Future Urban Growth in the Charleston Area," Strom Thurmond Institute of Government & Public Affairs, Clemson University (2003), <http://www.strom.clemson.edu/teams/dctech/urban.html>.
3. See "Land Conversion in South Carolina: State Makes Top Ten List," Jim Self Center on the Future, Clemson University (2000) at 2-3, <http://www.strom.clemson.edu/publications/london/conversion.pdf>.
4. See "Gasoline Consumption Per Capita," Statemaster.Com (2001 source, retrieved August 2009) http://www.statemaster.com/graph/ene_gas_con_percap-energy-gasoline-consumption-per-capita.
5. See "Growing Cooler: The Evidence on Urban Development and Climate Change," Urban Land Institute (2007), at 8-9, <http://www.smartgrowthamerica.org/documents/growingcoolerCH1.pdf>.
6. *Id.*
7. *Id.*
8. See "The Valuation of the World's Ecosystem Services and Natural Capital," *Nature*, v. 387 (15 May 1997) at 253-260.

Sustainable Communities Recommendations

1. See, e.g., <http://www.transect.org/>.
2. See <http://www.lightimprint.org/>.



