

THE TUPELO TRACT—A MODEL SITE DESIGN COMPARISON

In the same way a developer might conduct some research to identify a tract of land suitable for acquisition and development, the authors of the *Green Growth Guidelines* used GIS data to identify several prospective development sites within coastal Georgia (See Appendix B for List of GIS Resources). The Tupelo Tract was selected by the authors to serve as a model development site and to illustrate how sustainable development strategies outlined in previous chapters can be applied to development sites located within coastal Georgia.

Although the actual name of the site was changed and the features found on and around the site were modified, the Tupelo Tract – with its relatively flat terrain, thick vegetative cover, proximity to freshwater and tidal wetlands, and diverse population of native plant and animal species – is representative of many of the prospective development sites found within coastal Georgia. The site is zoned residential, and like many of the region’s prospective development sites—is located along a main thoroughfare with access to existing infrastructure and a number of recreational and commercial amenities—making it ideal for residential development. Additionally, the site is located immediately upstream of a large system of coastal marshlands, beaches, and tidal creeks. It is an ideal site on which to demonstrate how the recommended site selection, planning and design process can be used to create more economically, environmentally, and social responsible developments in coastal Georgia.

In this section, we demonstrate how the recommended site planning and design process outlined in this chapter can be applied in coastal Georgia. It takes the reader through the process of site planning and design of a 188-acre undeveloped tract of land. Three site plans are developed for the model site; the Conventional, the Community Preserve (Conservation Subdivision), and the Village (New Urbanist/Traditional). The plans are evaluated to show the economic, environmental, and social benefits of conservation developments compared to conventional developments.

The most obvious advantage of the alternative design is the preservation of greenspace and the resultant water quality benefits. Other benefits of this approach include:

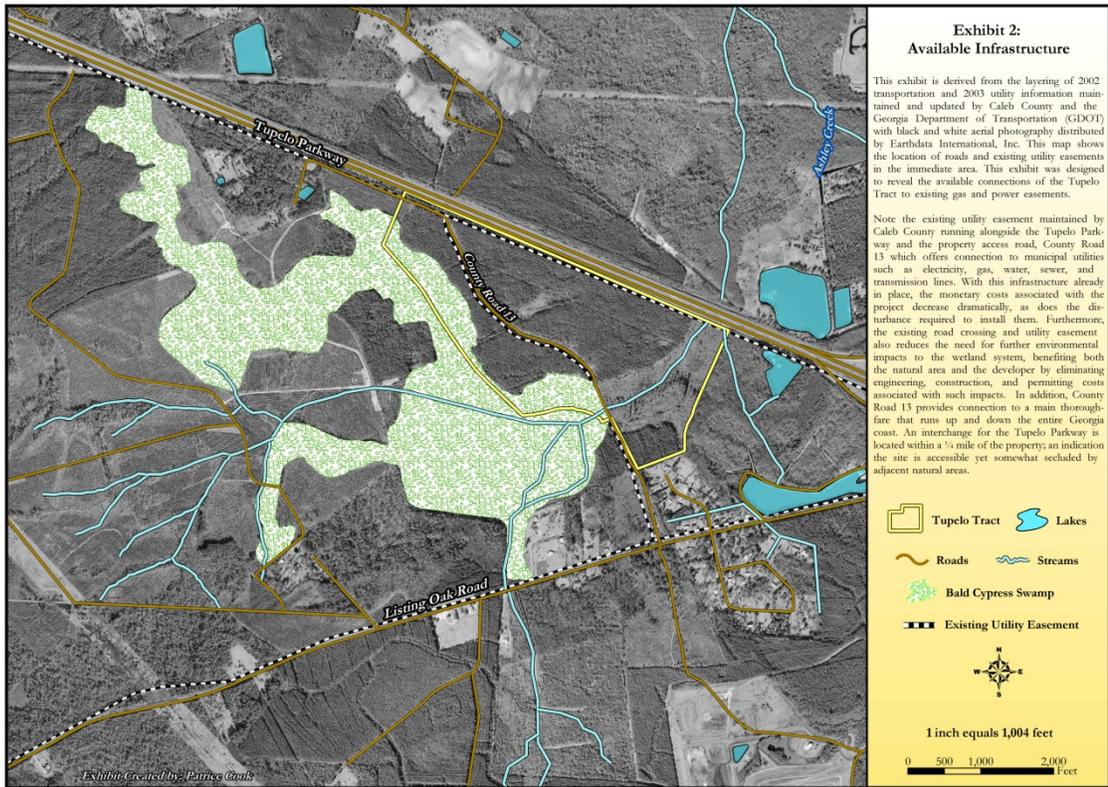
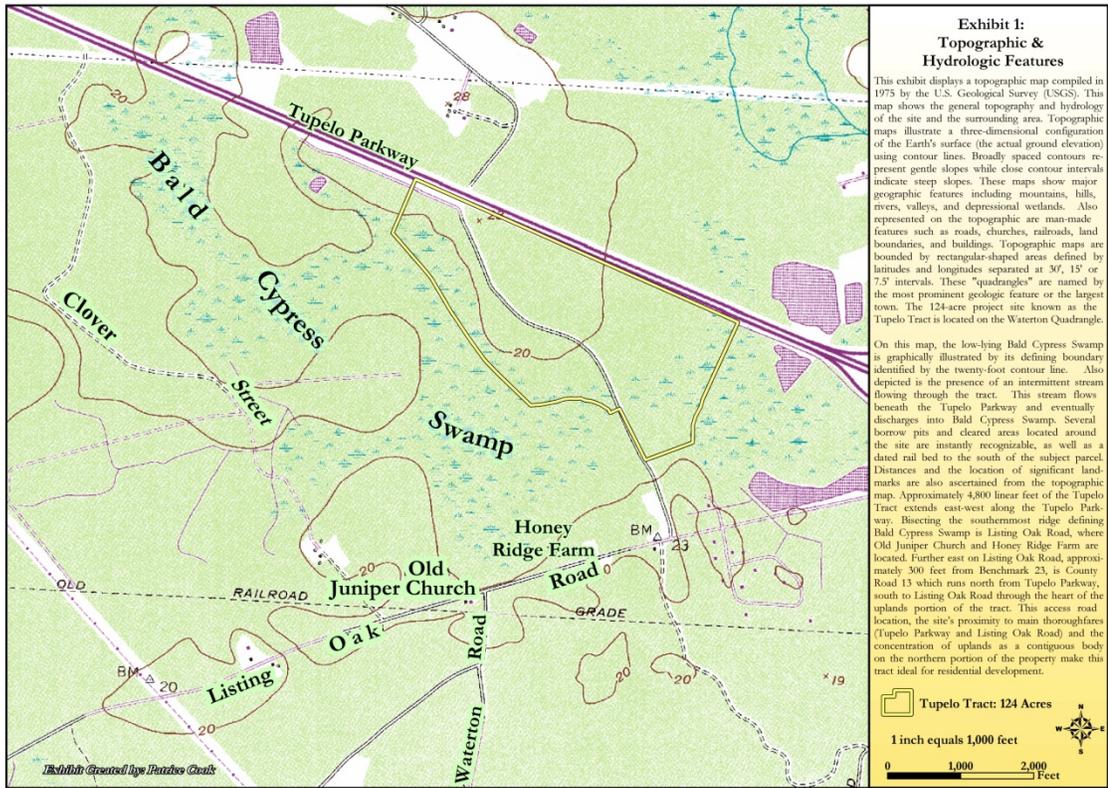
- 👉 The per lot cost of infrastructure including roads, piping, and other utilities is substantially reduced,
- 👉 Extensive surrounding green spaces gives residents a feeling of being connected to nature,
- 👉 The reduction of impervious surfaces per lot and the incorporation of alternative stormwater measures into the landscape design lessen the negative impact on the environment,

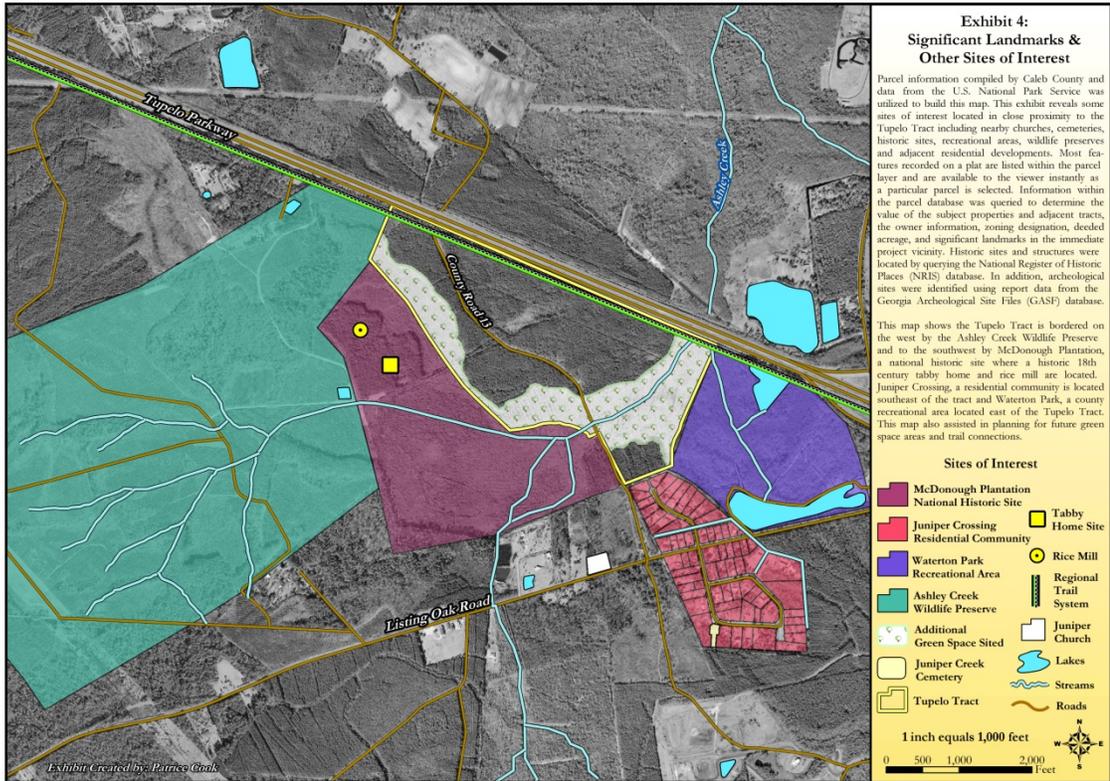
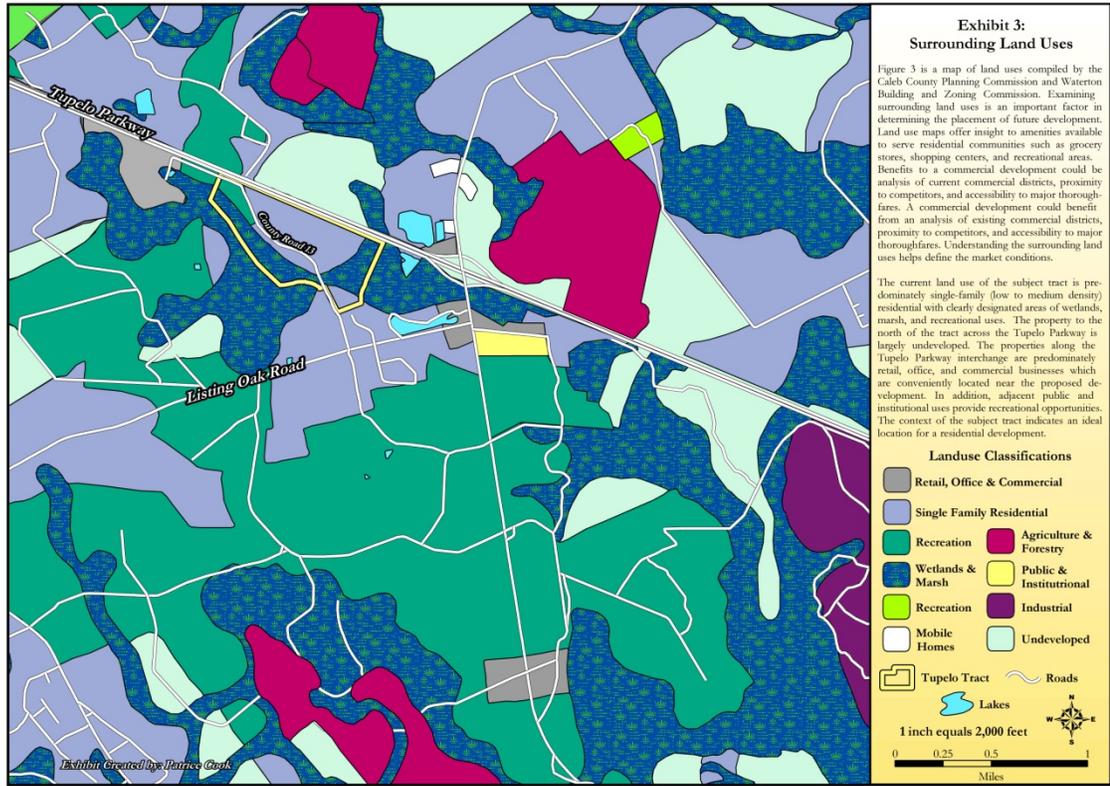
- 👉 The sizing of the community to allow for and promote walking, bicycling and other non-automotive transportation can reduce local automobile usage and consequently road maintenance and air pollution,
- 👉 Compact designs promote the interaction and proximity of residents, and large amounts of open space promote the development of the human relationships that comprise a real community, and
- 👉 Compact design considers and incorporates forested buffers and green space areas that serve as critical habitat for local wildlife.

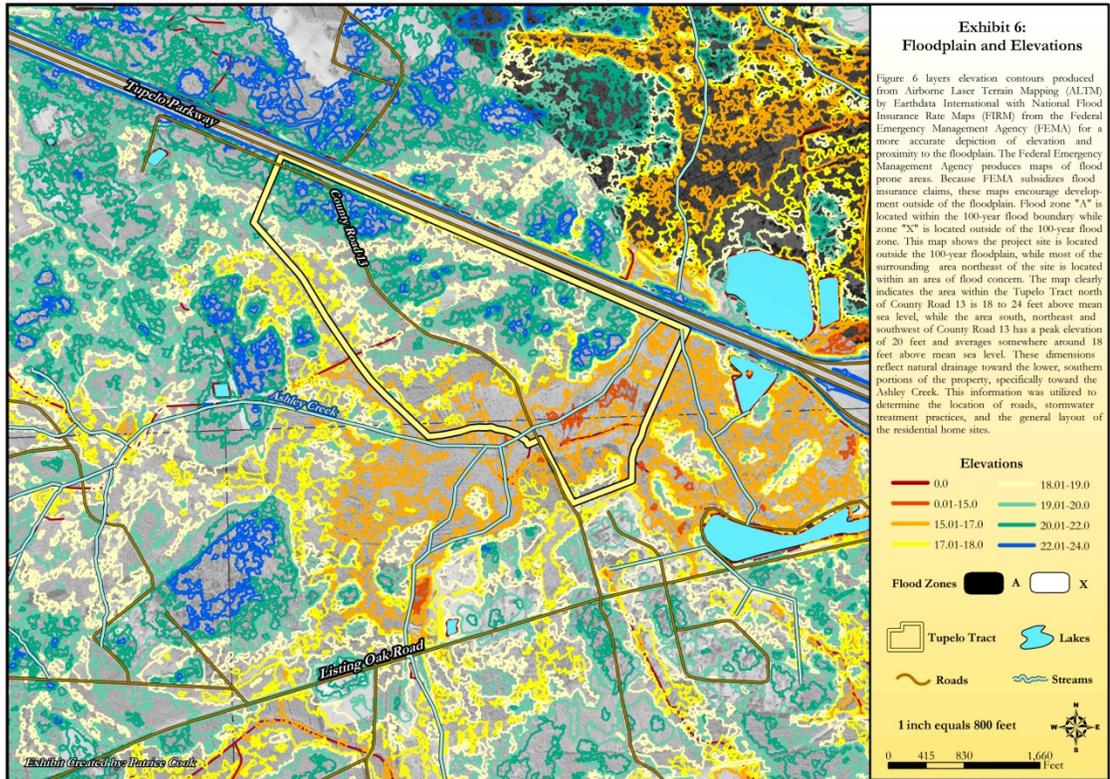
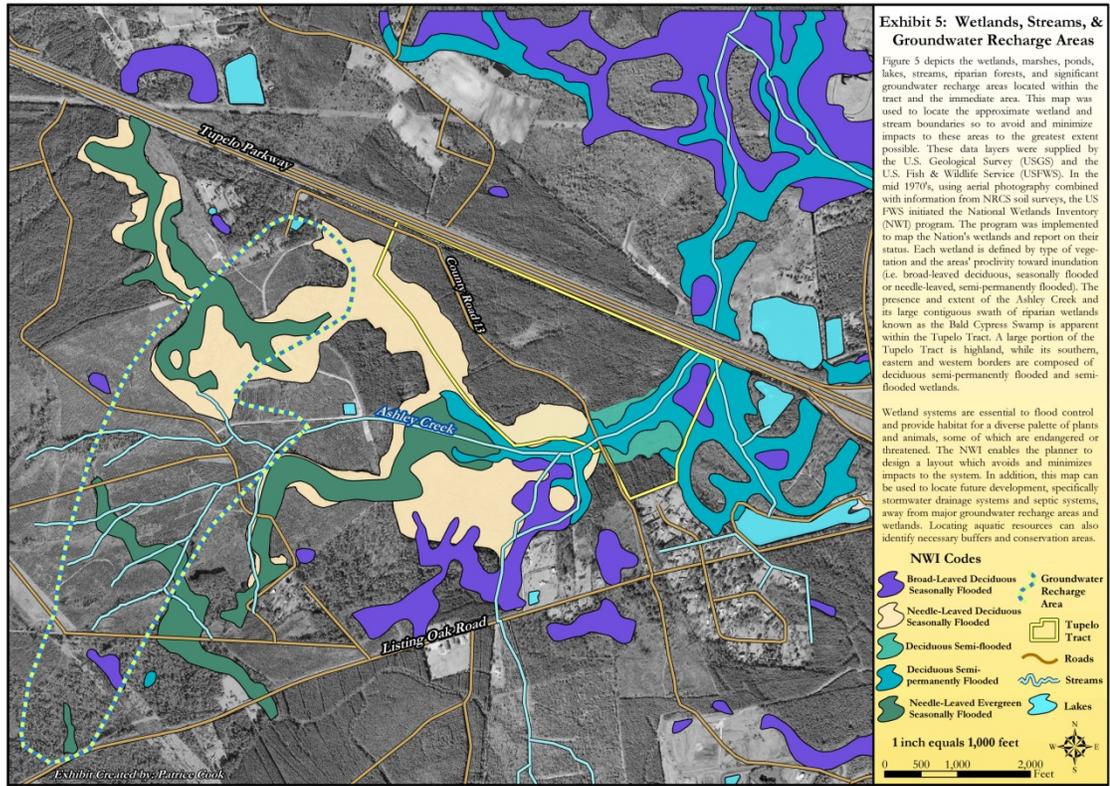
Site Fingerprinting

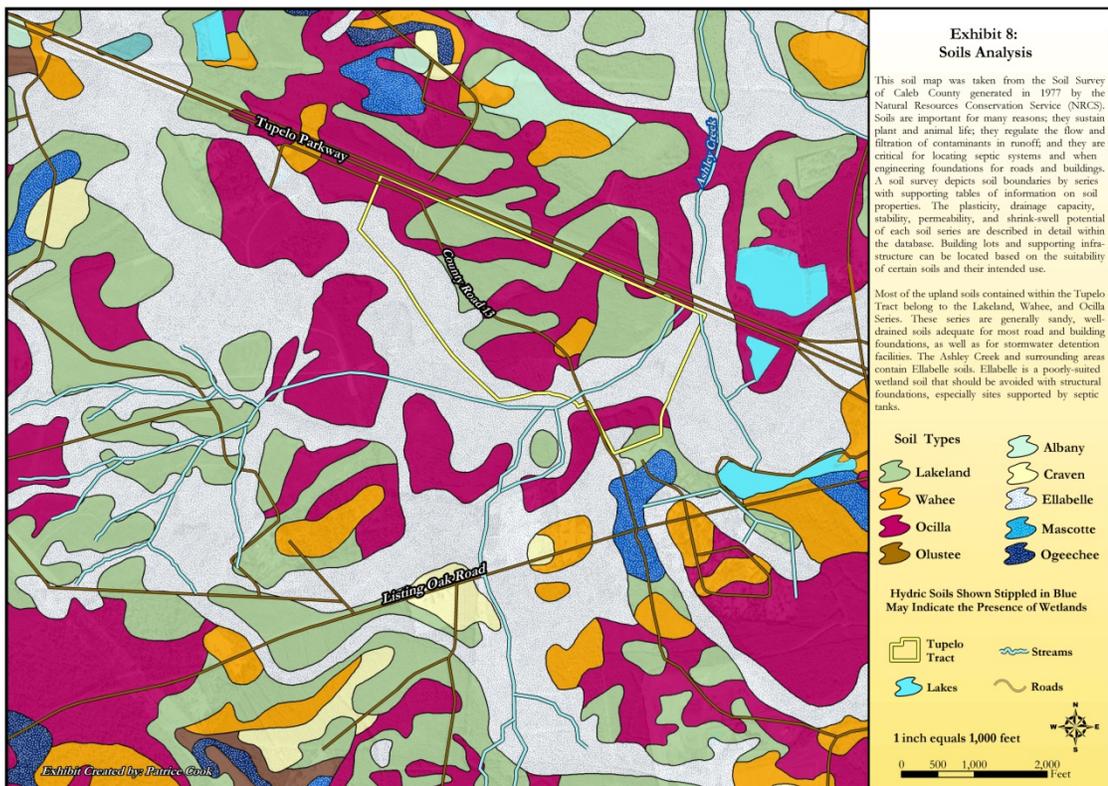
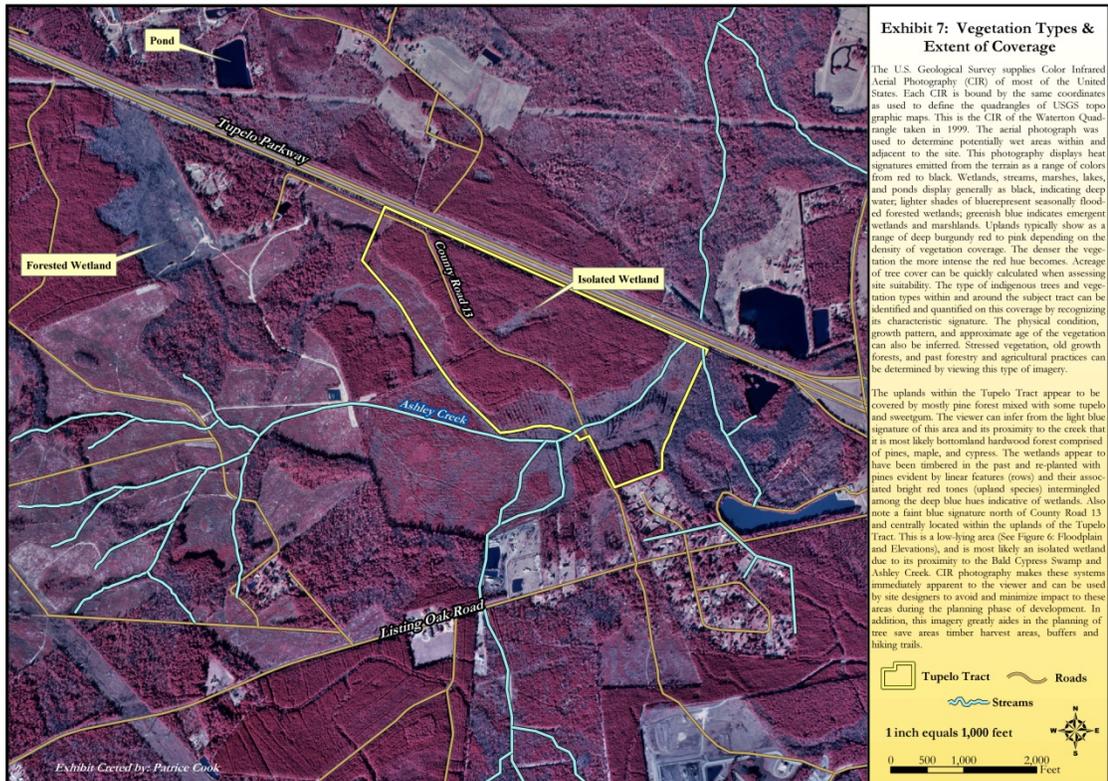
The following eleven (11) exhibits demonstrate how GIS is used to identify and map natural and man-made resources found of the Tupelo Tract. The following key features were mapped during the inventory:

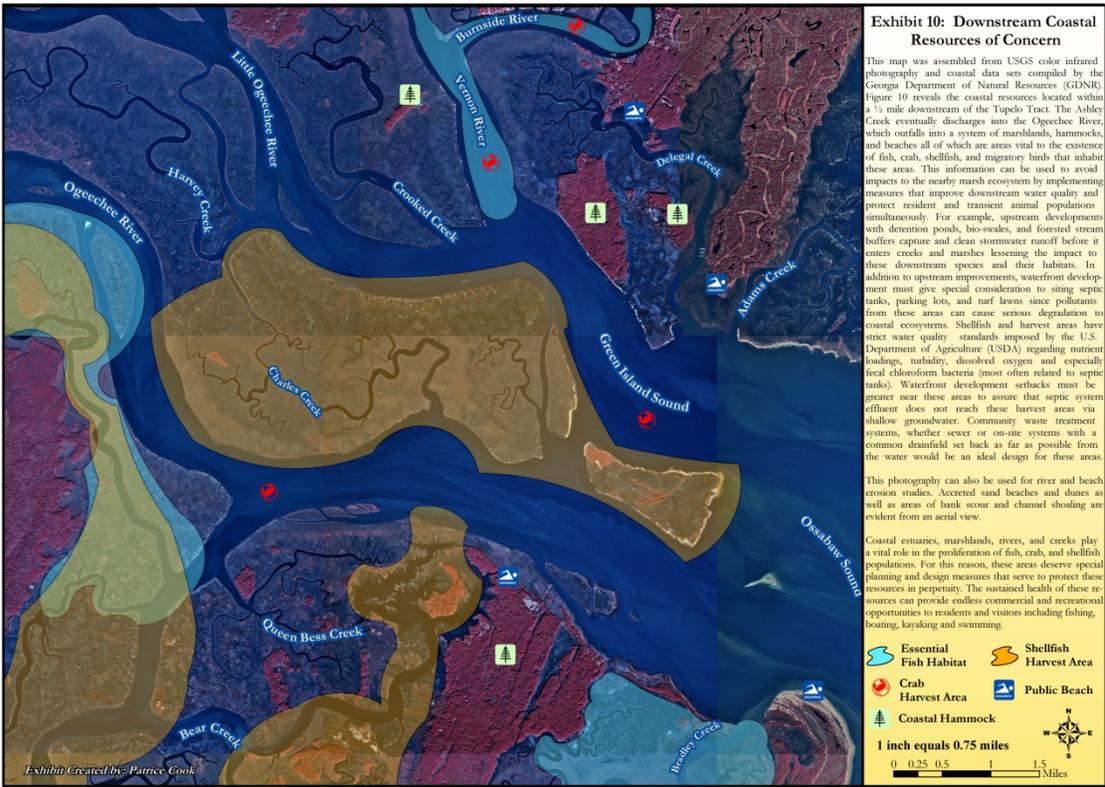
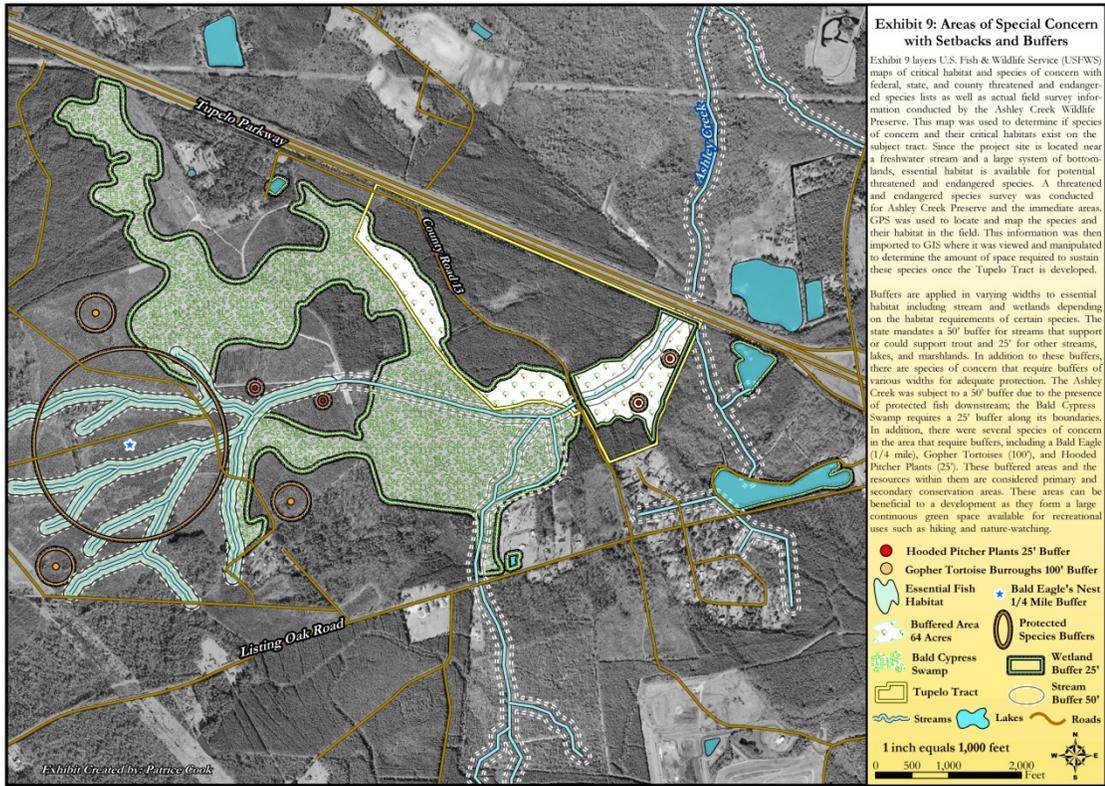
- Natural topography and hydrology.
- Available infrastructure including roads, rails, and utilities.
- Land use patterns and current zoning designations.
- Significant landmarks and nearby sites of interest.
- Location of wetlands, streams, and groundwater recharge areas.
- 100-year floodplain, major drainage ways, and contour elevations.
- Type and extent of tree cover.
- Soil series and approximate boundaries.
- Wildlife habitat and species of concern.
- Historic and archeological resources.
- Areas of special concern with protective setbacks and buffers.
- Downstream coastal resources bordering essential fish habitat and shellfish harvest areas including tidal marshlands, creeks, estuaries, beaches, and hammocks.



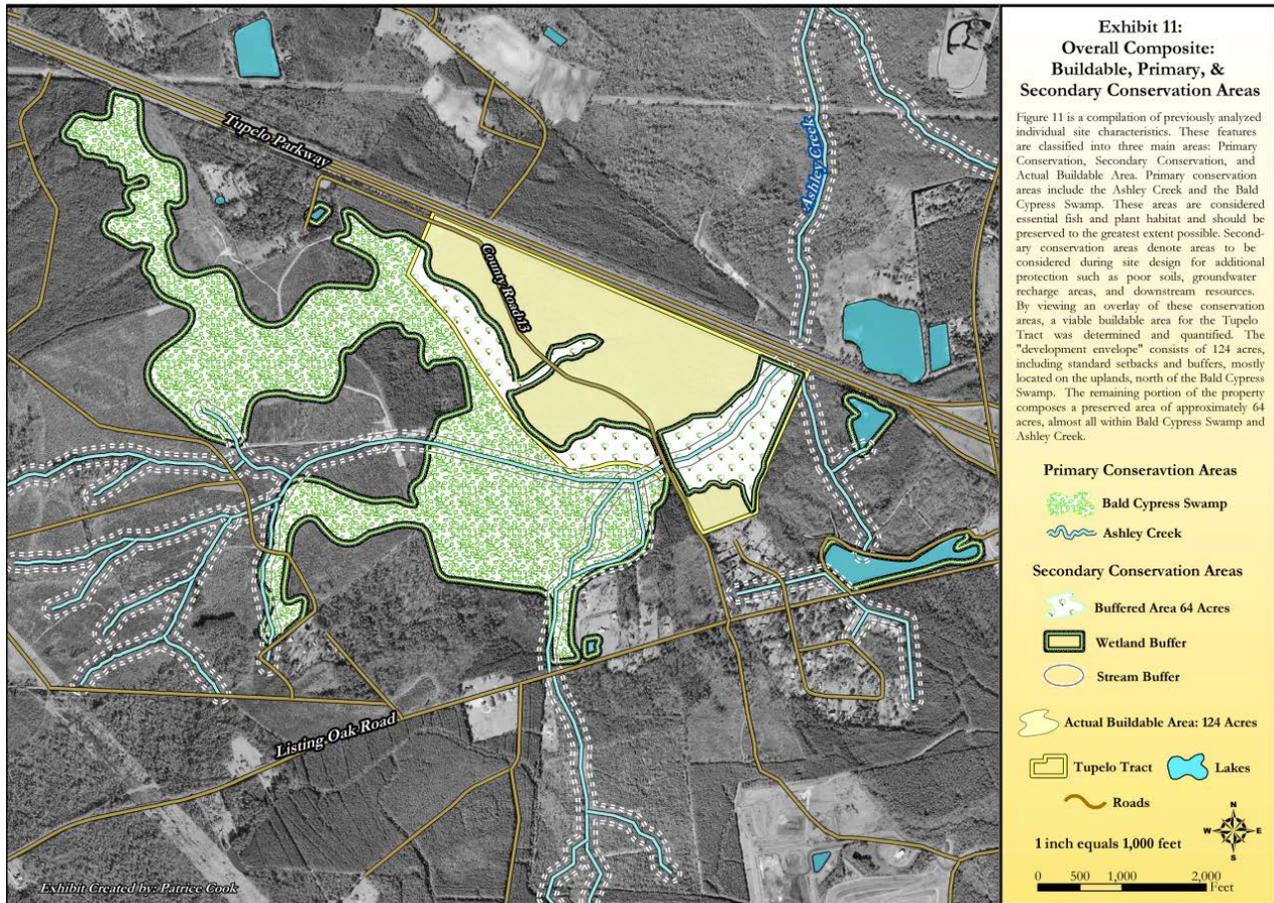








In subsequent steps of the site planning and design process, the results of the natural and man-made resources inventory were used to analyze the development site, delineate primary and secondary conservation areas, and define the site's buildable area. The gross area of the tract is 188.6 acres, consisting of 123.9 acres of buildable or upland area (66% of the tract) and primary and secondary conservation areas totaling 64.7 acres (or 34% of the tract).



General Descriptions of Development Types

Conventional Subdivision

Conventional development is characterized by low development densities, homogenous land uses, emphasis on the use of the automobile as the primary mode of transportation, and a lack of connectivity between adjacent developments. Generally, developments are built with separate land uses for residential, retail, office, civic, industrial, and multi-family uses. Typical site features include large buffers between areas with different land uses and development densities, roadway networks, consisting of primarily dead-end cul-de-sacs and collector roads, and few, if any functional sidewalks and bicycling lanes.

Each lot has nearly uniform road frontage, specified street standards, and minimum setbacks from roads or neighboring property owners. These restrictions generally result in equal-sized lots with homes placed in the same location on each lot regardless of the parcel's characteristics. The resulting group of homes or lots is typically termed a “subdivision”. In conventional subdivisions, individual homeowners privately own most or all of the land.

Stormwater runoff is usually managed using ditches, culverts, and storm drains that discharge directly to receiving creeks, streams, and wetlands. Little, if any, consideration is given to natural and man-made resources found on and adjacent to the site during the creation of the development plan. Increased land disturbance, conventional stormwater practices, and increased impervious areas challenge the viability of this option environmentally, and often economically as well.

Conservation Subdivision

Conservation development is a development pattern that results from the use of better site planning and design techniques. It is used to concentrate structures and impervious surfaces in a small portion of the development site, which leaves room for larger conservation areas and open spaces (e.g., parks, playgrounds) elsewhere on the site. Conservation developments are characterized by the use of smaller lots, alternative lot designs and the “clustering” of structures and other impervious surfaces within a small portion of the site.

Conservation developments provide a host of environmental benefits that are generally more difficult to achieve with conventional developments. A conservation subdivision is characterized by a compact footprint that retains significant areas of green or open space – sometimes as much as 40 to 60% – for the purpose of protecting natural resources (CWP, 1988). Reduced site imperviousness results in reduced stormwater runoff rates, volumes and pollutant loads, which

help better protect both on-site and downstream aquatic resources from the negative impacts of the land development process. This design also helps to minimize the size of and need for traditional stormwater management practices and infrastructure on development sites, which can reduce overall development costs.

Due to its limited impact, this style is the recommended option for areas such as islands, hammocks, and other sensitive sites that will not support more intense development. By design, these communities reduce overall impervious area and incorporate stormwater management features such as constructed wetlands and ponds, and roadside bioretention swales.

Conservation development is a density neutral option most applicable to suburban and rural areas. By using smaller lot sizes and alternative lot designs, the site planning and design strategy provides more open space with the same number of lots as conventional developments. The main idea is to create communities that preserve and protect natural and man-made resources and maintain green infrastructure corridors.

Given that this design allows the same number of residences as a conventional development under current zoning for most municipalities, and eliminates the need to obtain approval for higher density, it is more likely to be accepted by local development review authorities and the community due to high percentage of green space conserved. With its smaller lot size, some municipalities may require a special variance for this aspect, which is usually less effort than increasing density. This makes conservation design a highly effective development solution that can be immediately implemented in coastal Georgia with little regulatory difficulty.

New Urbanist Subdivision

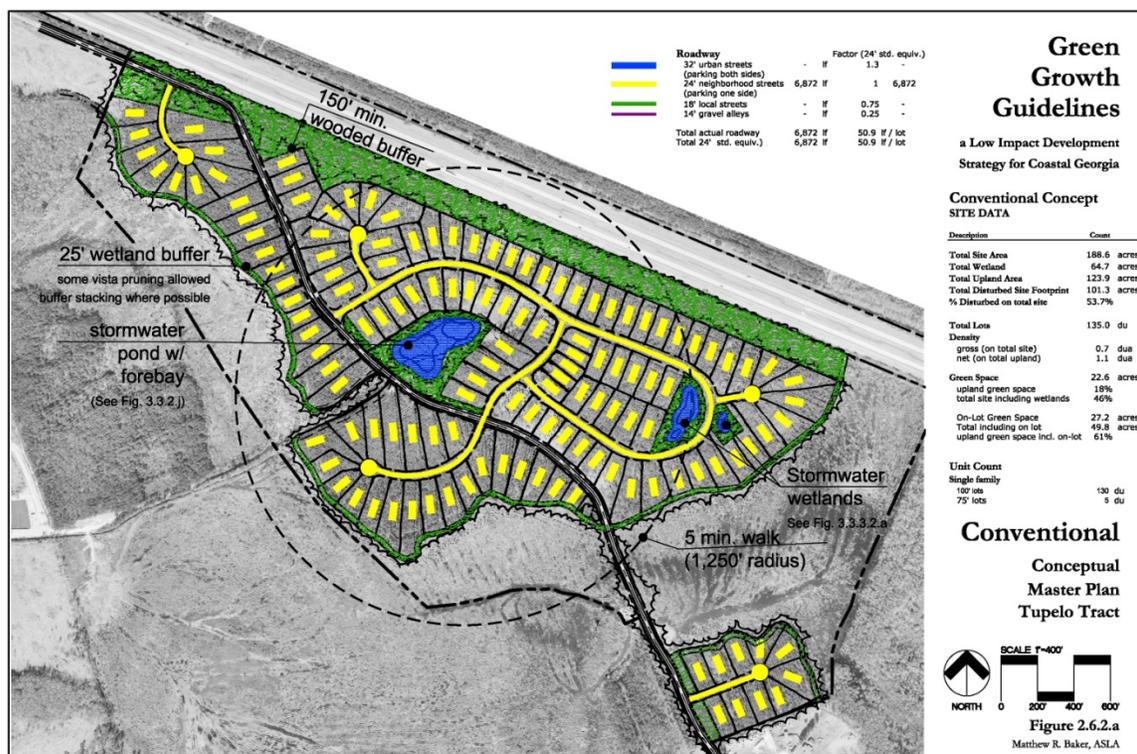
The New Urbanist approach, also known as Traditional Neighborhood Development, uses smaller lot sizes on one portion of the property to leave the remaining large conservation or open space areas (at least 20% or more of the total site). These areas improve the aesthetics of the property, serve as recreational areas for residents, protect natural resources and wildlife habitat, and support better stormwater management practices. Typically, road frontage and lot size is decreased to preserve ecologically sensitive areas, historical sites, or other unique characteristics of the land being subdivided.

New Urbanism is a concept derivative of the traditional development pattern. The New Urbanist approach is typically applied as an extension of an existing city or town, though it can also be applied to an area, such as a major intersection, where there is a desire to form a new node in the regional transportation network. Higher density is achieved through a grid system of streets scaled for pedestrians. It sites houses on smaller parcels of land, and the additional land that would have been allocated to individual lots is converted to common open space for residents in

the form of parks or squares. It is typically mixed-use, with a combination of housing types and retail/commercial areas, and presents opportunities for residents to walk to basic services or possibly to work in the community. Road frontage, lot size, setbacks, and other traditional subdivision regulations are redefined to allow for higher density with a mix of uses, and to preserve ecologically sensitive areas, historical sites, or other unique characteristics of the land. While this may require more effort to win approval in some municipalities, the New Urbanist development pattern creates lower impervious area and associated runoff *per lot* and does the most to mitigate the negative impacts of sprawling, conventional development.

Conventional Plan

The Conventional Plan for the Tupelo Tract has many of the characteristics of other conventional development project, although a few improvements were made during the site planning and design process. Normally, one might see lots extending into the Bald Cypress Swamp area; this plan positions the lots at the edge of the wetland. The buffer to the north separating the lots from the Tupelo Parkway is 150' wide; in a typical plan, this buffer might be shown at 25' in width if any buffer were provided at all. Additionally, a 25-foot wide has been provided along the edge of the Bald Cypress Swamp. Although the buffer is part of each individual lot, it will help protect the wetland from the impacts of the development process.



A small amount of open space is included on the Conventional Plan, with only 22.6 acres of the total buildable area – 18 % – devoted to buffers and stormwater management practices. The plan maximizes the amount of space used for lot creation, with 101.3 of the 123.9 buildable acres used to create 135 lots. The gross development density is 0.7 lots per acre (i.e. 135 lots ÷ 188.6) and the net development density (i.e., density within the actual buildable area) is 1.1 lots per acre (i.e., 135 lots ÷ 123.9 buildable acres). This low density is typical of what many existing zoning regulations call for. The total disturbed site footprint is 101.3 acres, which is 53.7 % of the site.

The average lot size is 100' by 275', which is 27,500 square feet or approximately two-thirds of an acre. This plan and the associated calculations assume conventional practices for on-lot development. Houses are set far off the street with minimum 70' setbacks. Driveways are 10' wide and extend to the rear of each house, which makes them 100' long and creates 1,000 square feet of impervious cover per driveway (i.e., 10' x 100'). The rooftop area of each house and outbuilding was set at 2,400 square feet, creating a total of 3,400 square feet of impervious cover on each lot. Two-thirds of each lot is clear-cut, leaving only a small portion of woods along the perimeter of each lot; the rest of each lot is covered by turf grass.

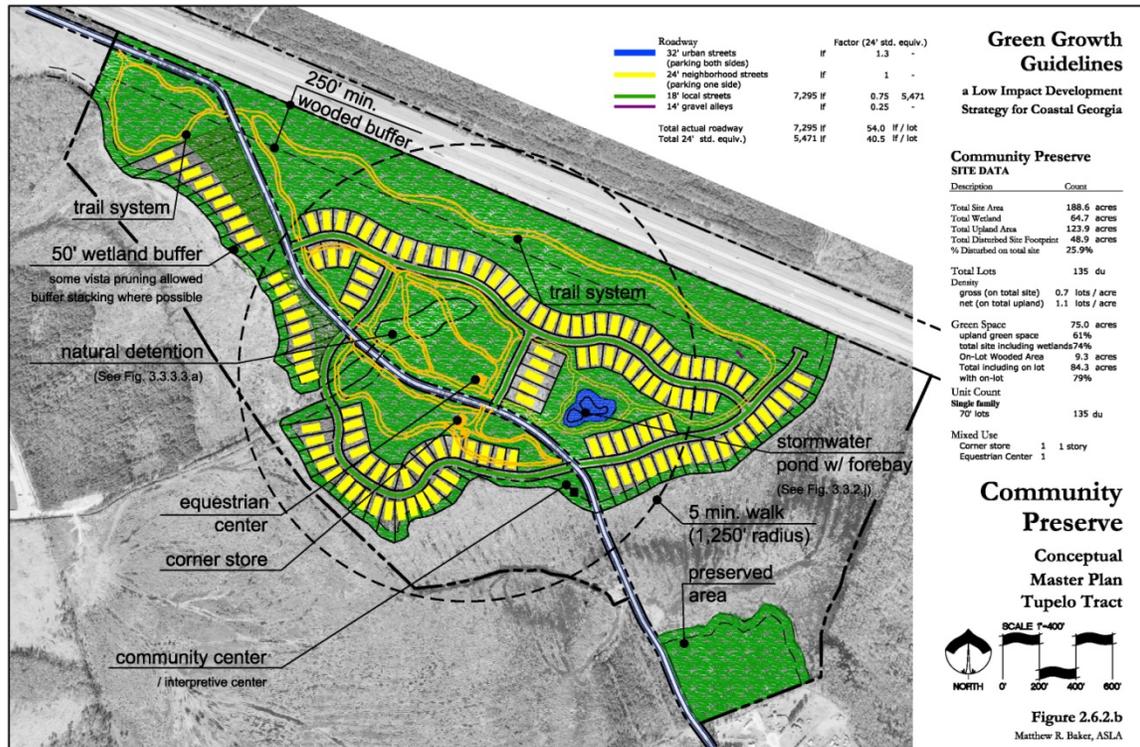
The total roadway length associated with the Conventional Plan is 6,872 linear feet. This plan uses only one standard roadway cross-section, which includes a 24' wide roadway with curb and gutter. The right-of-way for this standard cross-section is 50' wide, which is cleared and covered with turf grass. In the descriptions of the alternative development plans, this standard cross-section is referred to as the 24-foot standard equivalent.

Because of the way the site is laid out, the Conventional Plan requires 51 linear feet of roadway per lot which totals 6,872 linear feet of roadway for the entire development. Parking is handled entirely on each lot, although overflow parking is allowed on one side of the street. Cul-de-sacs (95' in diameter) are used frequently on the Conventional Plan, although the transportation network connects more frequently with existing roadways than a typical conventional plan would. A number of lots have frontages on County Road 13, which is an existing arterial roadway. Two other small clusters of lots at the east and west ends of the development site have a 25-foot wide buffer between them and County Road 13.

Post-development runoff from the Conventional Plan is the highest of the three plans. Using the rational method, and applying the appropriate runoff coefficient factor for woods, grass, and impervious cover, post-development runoff rates from the Conventional Plan are estimated to be 277.0 cubic feet per second (cfs). On a per lot basis, this equates to 2.1 cfs per lot. Pervious areas covered with turf grass generates the majority (46%) of this stormwater runoff (122.6 cfs). The amount of runoff from grassed areas could be reduced considerably simply by preserving more trees and other existing vegetation.

Many conventional developments use ditches, culverts, storm drains, and stormwater ponds to capture and manage stormwater runoff rates. Instead of using excavated ponds, this plan goes somewhat further by using stormwater ponds with sediment bays and aquatic benches, like those described in Chapter 3. These ponds can also be aesthetically pleasing when wetland plants are included and the shape of the pond is more refined. Therefore, the ponds in this plan are sited so they can be seen from the road, instead of being hidden in the back of the site. Ponds created with visual quality in mind can be a real asset to the community and serve as common open space.

Community Preserve Plan



The Community Preserve Plan for the tupelo tract uses many of the better site planning and design principles described earlier in this chapter. In the plan, a considerably higher percentage of the buildable area is preserved as open space, with 75.0 acres of the buildable area – 61% – preserved as open space. By comparison, only 22.6 acres the total buildable area – 18% – is preserved as open space in the Conventional Plan. In the Community Preserve Plan, the small area in the southeast corner of the site is completely preserved. A variable width buffer of between 250 feet and 450 feet has been provided between the lots and the Tupelo Parkway. Additionally, a 50 foot wide buffer has been provided along the edge of the Bald Cypress Swamp. Since the buffer will be a part of each individual lot, some buffer pruning will be allowed to create “view corridors.”

The Community Preserve Plan yields the same number of lots as the Conventional Plan (135 lots) and the gross and net densities are identical to those of the Conventional Plan at 0.7 lots per acre (i.e., 135 lots ÷ 188.6 acres) and 1.1 lots per acre (i.e., 135 lots ÷ 123.9 buildable acres) respectively. This low development density is typical of what many existing zoning regulations require. The total disturbed site footprint is 101.3 acres, which is 53.7% of the site. However, a

number of existing subdivision regulations may have to be relaxed in order to allow for the smaller lot sizes, reduced setbacks and frontages, and narrower roadways used on the Community Preserve Plan.

Lots in the Community Preserve are 70' wide, but vary in depth, and therefore size. The average lot size is 70' x 125', which equates to 8,750 square feet or one-fifth of an acre. Houses are set closer to the street with 40' setbacks. Driveways are 10' wide, but extend to the front – instead of the back – of each house which makes them 60' long and creates only 600 square feet of impervious cover per driveway compared to 1,000 square feet for the Conventional Plan. The rooftop area for the house and outbuilding was set at 2,550 square feet, which creates 3,150 square feet of impervious cover on each lot – 250 square feet less than that created by the Conventional Plan.

Because so much of the total parcel is preserved and the lots are much smaller, 66% less land will be cleared, graded, and covered with turf grass under the Community Preserve Plan than under the Conventional Plan. However, the on-lot turf area provided under the Community Preserve Plan is 83% less than that provided under the Conventional Plan. (i.e., 2,600 square feet for Community Preserve and 15,100 square feet for Conventional). The Community Preserve limits the disturbed footprint by reducing lot sizes to nearly one-third of conventional subdivisions. All told, the land disturbance footprint is only 48.9 acres, which is less than half of that of the Conventional Plan.

The total roadway length associated with the Community Preserve Plan is 7,295 linear feet, which is more than that associated with the Conventional Plan (i.e., 6,872 linear feet). However, this plan uses a roadway cross-section with an 18 foot wide roadway and no curb and gutter. This allows stormwater runoff to sheet flow off of the roadways and into roadside swales, which help reduce stormwater runoff rates, volumes and pollutant loads at their source. The right-of-way for this cross-section is 40 feet wide, which is 10 feet less than that of the standard cross-section used in the Conventional Plan. A number of lots front directly onto the existing County Road 13, and those with one side facing County Road 13 have 50' or more of community area as a side buffer.

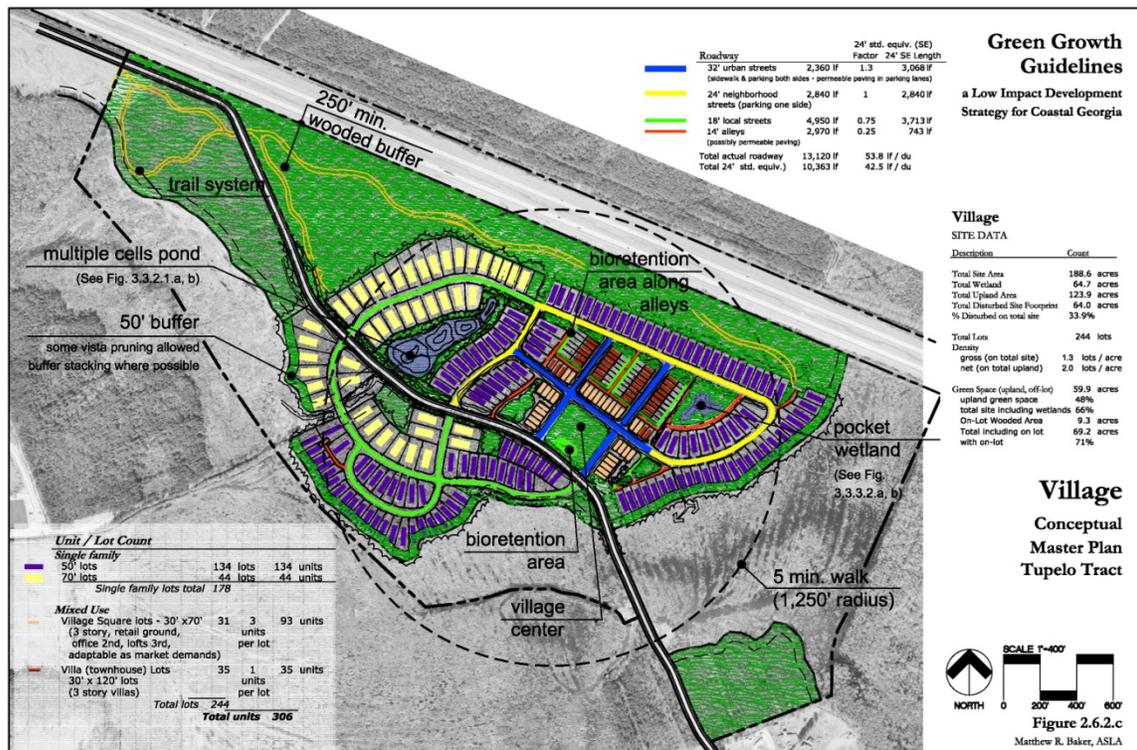
Parking is still provided on each lot, but the transportation network included on the Community Preserve Plan was laid out in a curvilinear “modified grid” pattern. It features longer block lengths and allowed the site planning and design team to follow the topography of the site and avoid sensitive environmental areas thereby reducing clearing and grading activities associated with road construction. As a result, the roads in the Community Preserve Plan are interconnected and free of dead end cul-de-sacs, with the exception of one hammerhead style turnaround used in the northeast corner of the site. However, this type of turnaround uses much less pavement than the 95-foot diameter cul-de-sacs used in the Conventional Plan.

An additional amenity that has been provided on the Community Preserve Plan is an extensive trail system that will someday connect with a larger regional trail system being planned for the area. The trail system will serve pedestrians, cyclers and horseback riders and will provide walking access to the general store that is planned for the site. Additional areas have been set aside for an equestrian center and a community shelter/interpretive center at the edge of the Bald Cypress Swamp. These passive and active recreational areas—which were lacking in the Conventional Plan—provide an opportunity for interaction between residents and help promote a sense of community and place.

Post-development stormwater runoff rates from the Community Preserve Plan are the lowest amongst any of the three preliminary development plans. Using the rational method, and applying the appropriate runoff coefficients for woods, grass, and impervious cover, post-development stormwater runoff rates are estimated to be 190.6 cubic feet per second (cfs). On a per lot basis, this equates to 1.4 cfs per lot. On-lot impervious surfaces (i.e., driveways, rooftops) generate the largest portion this stormwater runoff (70.5 cfs).

The practices used to manage stormwater runoff on the site are unique to this plan. The conservation development style affords more opportunity to manage stormwater on-site, using smaller, distributed practices that treat stormwater runoff through a variety of physical, chemical and biological processes. On the Community Preserve Plan, stormwater runoff is managed on-site using a stormwater wetland with forebay and by converting an existing natural depressional area into a natural detention area. The natural detention area is sited over an existing wooded depressional area and is designed to have trails crossing through it. The trails will be placed atop small berms that will traverse the depressional area, detaining water behind them and reducing stormwater runoff velocities so that it has a chance to infiltrate and interact with the vegetation remaining on the forest floor. The trail berms will be fitted with small culverts installed slightly above grade that will allow water to slowly pass from one “cell” to the next and will prevent the berms from overtopping in all but the largest storm events. Grass channels and dry swale located within the roadway rights-of-way and vegetated filter strips will provide pre-treatment for the natural detention area. For those lots backing up to the wetland, rain gardens and/or infiltration basins can be used on-lot and within the 50 foot wetland buffer using the buffer stacking technique discussed earlier.

Village Plan



The Village Plan for the Tupelo Tract uses New Urbanist concepts along with better site planning and design principles described earlier in this chapter. It yields more lots and significantly more dwelling units than the other two preliminary development plans. The Village Plan creates 244 lots, including 178 single-family lots, 35 townhouse (villa) lots and 31 village square lots. Land uses in the village square lots are intended for multiple uses and can vary, depending on the market, with retail or office space located on the first floor and office or residential space located on the second and third floors.

While the total yield is 244 lots, the total disturbed footprint is only 64.0 acres, which is 33.9 percent of the total site area. Comparatively, the Conventional and Community Preserve Plans disturb 53.7 percent and 25.9 percent of the total site area, respectively. This plan illustrates how higher density development can actually reduce the impacts of land development on important natural and man-made resources.

In the Village Plan, the small area in the southeast corner of the site is completely preserved. A 250-foot wide buffer has been provided between the lots and the Tupelo Parkway. Additionally, a 50-foot wide buffer has been provided along the edge of the Bald Cypress Swamp. Since the

buffer will be a part of each individual lot, some buffer pruning will be allowed to create view corridors.

The Village Plan creates a hierarchy of lot sizes with varying setbacks. The largest lots are located along the perimeter of the property and lot sizes decrease as one moves toward the center of the development. The lots around the perimeter are about equal in size to those in the Community Preserve Plan, while those in the center of the development are about one-tenth of the size of the lots included on the Conventional Plan. However, market research suggests that the small lots located near the center of the development can be expected to sell for at least 80 percent of the price of the lots on the Conventional Plan.

Village Plan Lot Sizes, Setbacks and Sales Prices				
Lot Type	Size	Average SF	Setback	Sales Price
Community Preserve	70' x 125'	8,750	40'	\$ 55,000
Conventional Residential	100' x 275'	27,500	70'	\$ 50,000
Average Lot Residential	75' x 200'	15,000	20'	\$ 47,500
Village Lot Residential	50' x 120'	6,000	15'	\$ 45,000
Village Live/Work	30' x 120'	3,600	0'	\$ 42,000
Village Square Lot	30' x 70'	2,100	0'	\$ 40,000

In the Village Plan, houses are located closer to the street – with reduced setbacks – to allow front porches to be located near the sidewalk. Driveways are 10 feet wide but are shorter than those provided in either the Conventional or Community Preserve Plan. They are not longer than 40 feet long, which creates only 400 square feet of impervious cover per driveway (i.e., 40 feet x 10 feet). The rooftop area of each house and outbuilding is much smaller since the houses are all two stories tall. The total amount of impervious cover created on each lot is about 1,840 square feet, which is much less than that created under either the Conventional Plan (i.e., 3,150 square feet) or Community Preserve Plan (i.e., 3,400 square feet).

The transportation network associated with the Village Plan is unique in that it uses a variety of roadway cross-sections. The streets used around the Village Center are 32 feet wide and are called urban streets, since they include sidewalks and on-street parking areas on both sides of

the roadway. The streets used further away from the Village Center are called neighborhood streets. They are narrower, at 24 feet wide, and have sidewalks and on-street parking on only one side of the roadway. The streets used in the areas farthest away from the Village Center are called local streets and are 18 feet wide, just like those used on the Community Preserve Plan. They have shoulders but no sidewalks or curbs and gutters. The transportation network also includes alleys, which are located between the blocks, and allow access to the rear of each lot.

The total roadway length associated with the Village Plan is 13,120 linear feet, which is more than that associated with either the Conventional Plan (i.e., 6,872 linear feet) or Community Preserve Plan (i.e., 7,295 linear feet). However, many of the roadway cross-sections used on the plan have decreased roadway widths which reduce the total amount of pavement used on the development site. The standard equivalent per lot length is 41.4 square feet per lot. Comparatively, the Conventional Plan requires 50.9 square feet of pavement per lot, while the Community Preserve Plan requires 39.9 square feet of pavement per lot.

Frequent connections between streets are provided in the Village Plan, allowing residents to use multiple routes to get to and from their destinations. Two hammerhead style turnarounds are used to provide access to two small clusters of lots at the southwest and northeast corners of the site. Hammerhead style turnarounds use much less pavement than the 95-foot diameter cul-de-sacs used in the Conventional Plan. The Village Plan, like the Community Preserve Plan, also includes an extensive trail system that will someday connect with a larger regional trail system being planned for the area.

Using the rational method, and applying the appropriate runoff coefficients for woods, grass, and impervious cover, post-development stormwater runoff rates from the site are estimated to be 237.8 cubic feet per second (cfs). On a per lot basis, this equates to 1.0 cfs per lot, which is lower than that of either the Conventional Plan or Community Preserve Plan. Although the transportation network generates a significant portion of this runoff (i.e., 51.7 cfs), on-lot impervious surfaces (i.e., driveways, rooftops) generate are the largest contributors of stormwater runoff on the site (i.e., 74.3 cfs).

Given the greater intensity of development, the stormwater management plan for the Village Plan is slightly more sophisticated than that for either of the other two preliminary development plans. A multiple cell stormwater pond, will be in the natural depressional area located just to the west of the planned village center. Located just northwest of the village center will be a pocket wetland designed to manage stormwater runoff from that portion of the site. Alleys will be surfaced with permeable pavement to reduce runoff volumes and manage stormwater runoff at its source. Along the edges of the alleys, bioretention areas and dry swales will be installed to capture and manage stormwater runoff from the backs of lots. On the southern edge of the village center, a large bioretention area will be created. It will receive runoff from the urban

streets and the village green. Grass channels and dry swales installed along the local roads will provide pre-treatment for the multiple cell stormwater pond. For those lots backing up to the pocket wetland, rain gardens will be used to manage stormwater runoff on-site. They will be sited within the outer zone of the 50-foot wetland buffer.

Other low impact development practices can be used to further reduce stormwater runoff rates, volumes and pollutant loads. These are not shown on the plan, but such runoff-reducing practices include green roofs, which would best be used on top of the buildings that will be constructed around the village square. The green roofs will not only reduce runoff rates, volumes and pollutant loads, but will also help mitigate the urban heat island effect and save energy within the buildings.

Cost, Revenue, and Profit Analysis

The revenues and costs of developing the Community Preserve, the Village, and the conventional subdivisions are compared and analyzed in the following sections. The comparison indicates cost benefits for the Community Preserve because it is density-neutral and has low infrastructure costs. Likewise, the Village yields similar cost benefits compared to conventional development, but requires higher initial capital expense for infrastructure in order to produce a higher number of lots and units. The costs of acquiring and developing the subject tract under of each of these three design plans and the resulting profits from each are detailed comparatively in the following *Environmental and Economic Benefits Analysis* Tables on Pages 84-87.

Site Acquisition Cost

The cost of acquisition assumes acquisition price per acre, rounded to include anticipated closing cost such as surveying, legal fees, and title insurance and then multiplied by the number of acres in the subject site. The acquisition amount per acre was generated from Whitley, Leggett, & Associates, a local, Georgia certified, appraisal firm and based on the sales of five residential subdivision tracts in the western Chatham County, Georgia area. The comparable data indicated prices per usable acre ranged from a low of \$16,519 to a high of \$26,793, making the average purchase price per acre for the Tupelo Tract \$20,139. The five purchases occurred over the period December 2002 to March 2004. All the parcels were fully wooded at the time of acquisition, with three of the five located partially in flood zones, one entirely in a flood zone and one entirely upland. All of the tracts were zoned to allow use as a residential subdivision, with four of the five designated Planned Urban Developments (PUD) permitting limited multi-family and commercial use. The cost of acquisition is shown as the same amount in all three cases, primarily because

the intended use of the property is the same for all three cases with little influence on price due to the actual design of the planned residential subdivision.

Roadway Cost

The size, length, and width of roadways and lots, with consideration for disturbed footprints and the drainage system of each lot, were calculated and detailed in the *Environmental and Economic Benefits Analysis Tables* on Pages 84-87. The following table is a summary showing projected size, length and width for the roadway system for each site development plan facilitating comparison of the amounts found in both alternative design plans with the conventional 24' standard equivalent:

Roadways	Conventional	Preserve	Village
# of Actual LF / 24' SE	100%	75%	79%
Actual Linear Feet	6,872	7,295	13,120
24' SE / Linear Feet	6,872	5,471	10,363

The conventional plan road system is 6,872 linear feet of neighborhood streets with parking on one side. The Community Preserve roadway takes approximately 18% less 24' SE/linear foot than the conventional plan primary due to its use of narrow and curbless local streets. The Village requires approximately 30% more 24' SE/linear foot than the conventional plan, due primarily to its use of urban streets with sidewalks and parking on both sides. Based on data provided by EMC Engineering Services, Inc. in Savannah, Georgia, the Community Preserve roadway system is the least expensive to construct at approximately \$30 per linear foot, nearly \$20 per linear foot less than the conventional plan road system. The additional width and consequential area required for use of 2,360 linear feet of urban streets in the Village pushed the cost of this road system to approximately \$60 per linear foot or \$10 more per linear foot than the conventional plan. However, the Village roadway system supports 306 housing units compared to 135 in the conventional plan. Simply put, the higher cost of the Village road system is offset by higher lot and unit yield.

Site Infrastructure Cost

Site infrastructure cost represents projected expense related to constructing roadways, site grading, construction of sewer and water/drainage systems, landscaping and irrigation, and impact and design/engineering fees. These are estimated based on standards within the local

area. Adding up the market cost of these resources, such as supplying sewer and water (labor, material, natural resources), are shown comparatively in the following:

Infrastructure	Conventional		Preserve		Village	
	LF	Total	LF	Total	LF	Total
Roadways	50	\$330,681	30	\$164,138	60	\$621,780
Excavation/Grading	10	\$68,780	10	\$54,713	10	\$103,630
Sewer/Water/Drainage	50	\$343,600	40	\$218,850	50	\$518,150
Landscape/Irrigation	25	\$171,800	20	\$109,425	35	\$362,705
Engineering/Impact Fees		\$472,500		\$472,500		\$1,009,000
Total Infrastructure Cost		\$1,400,220		\$1,019,625		\$2,615,265
Infrastructure Cost Per Lot		\$10,372		\$7,553		\$8,547

Grading cost for all three plans is estimated at approximately \$10 per linear foot, with the Village plan requiring the greatest expenditure due to its increased area for roadway. The Community Preserve’s use of less area for roadways resulted in an approximate 20% savings in grading cost compared to the conventional plan.

These same results are seen again in the cost of implementing sewer/water/drainage and landscaping/irrigation, with a downward adjustment (\$50 to \$40 per linear foot) made to the cost of sewer/water/drainage for the Community Preserve due to use of local streets without curbs and upward (\$25 to \$35 per linear foot) to the cost of landscape/irrigation in the Village due to its greater use of area.

Cost Conclusion

Overall, the cost of providing these resources in the Conventional Plan totaled \$10,372 per lot compared to \$7,553 per lot in the Community Preserve development plan and \$8,547 per lot in the Village plan. In this example, both the Community Preserve and the Village cost less to develop than the Conventional Plan.

Revenue and Profit Analysis

Case studies throughout the country show that there is a great demand for residential lots abutting open space (especially trails and greenways), such that they are often valued higher than lots with no adjacent open space and appreciate faster in value over time than lots in a conventionally-designed subdivision. Market surveys indicate strong consumer demand (faster absorption rate) for density-neutral development alternatives like the Community Preserve plan or even higher density developments like the Village where open or green space and use of green infrastructure practices is implemented. Further, sale results of residential and non-residential lots in similar developments indicate smaller lots bordering green space appreciate faster in value than larger lots with backyard views into other homes.

Market value(s) for the improved lots for each development plan were determined from sale comparables provided by Whitley, Leggett & Associates. The sales prices of 137 improved lots sold from 1998 to the present in four subdivisions in western Chatham County, Georgia were surveyed and compared. The lots were equal in size, dimension, and accessibility to those created and used in the Tupelo Tract. Two of the comparable subdivisions were conventional, while one could be considered community preserve and one a village. In the case of the village and community preserve comparables, lots sales were as high as \$120,000 per lot, while the range of lot prices within the conventional subdivisions were from \$42,000 to \$57,000. The model reflects a conservative estimate of value per lot based on size. For comparative purposes, lots of similar sizes have equal value regardless of where they are located within the subdivision. In reality, location of the lot plays a determining role in the price of the lot.

Once these values were determined, the tax millage rate applicable to Chatham County, Georgia was applied to the tax assessable portion of each lot's market value. Gross market value or gross lot sales are net of any sales or marketing commissions. The following table provides a breakdown for Revenue, Profit, and Tax Value for the Tupelo Tract:

	Conventional	Preserve	Village
No. of Residential Lots	135	135	244
Gross Market Value/Sales	\$6,737,500	\$7,425,000	\$10,822,000
Gross Profit	\$2,437,280	\$3,842,875	\$6,071,735
Profit Margin	41.2%	51.8%	56.1%
Property Valuation (Sold Out)	6,737,500	7,425,000	10,822,000
Potential Annual Tax Revenue	281,089	309,771	451,494

Gross Revenue or Market Value is the multiplication of the amounts of various types of lots by the market value for the respective type of lot as established by the market survey. This straight-line approach ignores absorption pace and lot value appreciation over time, both factors driven by external influences (such as consumer mortgage interest rates and local unemployment trends) not necessarily vital to comparing the discounted cash flow value of the Conventional Plan to the Community Preserve or Village. Indeed, the straight-line approach in this model assumes all values remain the same over an equal sell-out or absorption period for all three models. While the horizon is key to determining the actual internal rate of return, in this case it is more important that the models are compared on an equal basis without regard for differentiation in the absorption period. In actuality, research has shown both the Village and Community Preserve are currently experiencing greater absorption due to increased consumer demand. The results indicate both the Village and Community Preserve would yield greater gross revenue over an equal period of time than the Conventional Plan. The Village generates the greater value, due to its higher number of lots and housing units.

Gross profit is the gross value of individual lot sales less the direct cost of acquisition and site infrastructure development. Marketing, fixed expense (taxes, insurance), and operational overhead are not included in this model and would be subtracted from the gross profit to determine entrepreneurial profit. The greatest gross profit margin (calculated by dividing gross profit by gross sales) was achieved in the Village, at 56.1%. Community Preserve lot sales yielded a 51.8% profit margin. Lot sales in the Conventional subdivision averaged a 41.2% profit margin, indicative of lower gross lot sales and higher infrastructure cost compared to the Community Preserve and the Village.

While there is a greater gross profit potential in the Village, there is also greater gross infrastructure cost due to the higher number of serviceable lots. The Village gross profit can be increased further if calculated by the number of sellable units rather than sellable lots, as the Village calls for 306 total housing units on 244 lots. Potential commercial development also improves the gross profit in both the Community Preserve and Village, but is not compared here, as the Conventional plan does not have space for commercial development.

Revenue and Profit Conclusion

The Community Preserve Plan is a viable alternative to conventional development yielding an equal number of lots while costing less to construct and generating better than conventional profit margins. It is also a design that can be employed in most of coastal Georgia immediately, due to its similarity to conventional design. The Village plan generates more lots/housing units and a higher profit than the Conventional Plan. Both the Village and Community Preserve plans are better site designs than the Conventional subdivision, due to the lower cost to construct and

the added premium found in these forms of development – directly attributable to the ecological and social benefits of their design and consumer demand for these amenities.

Tax Considerations

When a residential development is built outside of a community, it requires roads, sewer systems and water lines to be built and brought to the development by the local governing authority. Eventually, schools and emergency services also become necessary. The cost of these is rarely returned by the collection of property taxes, in other words, most residential developments fall short of yielding sufficient tax revenue to pay for the municipal services required initially and over-time. The Village Plan development plan, however, is likely to generate tax revenue annually in an amount sufficient to pay for its annual operation and maintenance simply because of its higher density and consequential tax assessable valuation. While this may appear negative to the consumer on the surface, in reality the greater value and subsequent property tax revenue is allocated to a larger number of users in the same space, facilitating affordability.

Environmental, Economic and Social Benefits

Understanding the cost differences and profit potential among development styles is an evaluation tool for both local governments and land developers. Growing interest in sustainable development requires a comparative framework, including cost and profit considerations. This is especially true when considering historic trends and future projections for population growth, job growth, housing, family size and household income in the coastal areas of southeast Georgia.

Continuing the existing, conventional practice of site development—whether creating from existing green space or from within existing urban areas—will continuously result in expensive initial investments plus high maintenance costs almost entirely borne by the public or the developer. The best solution to the problem is the Green Infrastructure approach.

The alternative, more compact development plans discussed in this chapter provide the following economic benefits:

- ✓ Higher lot yield (Village Plan),
- ✓ Higher lot sales price (Community Preserve and Village Plans),
- ✓ Higher lot tax value (Community Preserve and Village Plans),
- ✓ Lower infrastructure cost per lot (Community Preserve and Village Plans),
- ✓ Enhanced marketability (Community Preserve and Village Plans), and
- ✓ Added amenities (Community Preserve and Village Plans).

In addition to environmental and economic benefits, the alternative, more compact development plans also provide a variety of social benefits including:

- ✓ A development with a “sense of community”,
- ✓ Convenience of a short travel to basic services,
- ✓ Recreation, both passive and active, with added green and open space,
- ✓ Communities that are more social, more connected with “nature”, and
- ✓ Greater opportunities for biking and walking.

Understanding the interaction between the physical layout and the social aspects of a place is what makes it possible to go from a mere development to a real neighborhood. Moving the buildings closer to the street provides a chance for social interaction with one’s neighbors.

The environmental benefits listed in the earlier section are also social benefits as well. Being free from a long commute both allows one to more time to spend with friends and family as well as limiting the air and water pollution generated from operating a vehicle. Having significant green space within walking distance provides an opportunity for nature walks, where wildlife can be observed, enriching the experience of living there. That same green space is helping to improve water and air quality.

ENVIRONMENTAL & ECONOMIC BENEFITS ANALYSIS

SITE SUMMARY

Development Type	Conventional		Community Preserve		Village	
	Acres	% of Total	Acres	% of Total	Acres	% of Total
<i>Area Summary</i>						
Total Upland Area	123.9	65.7%	123.9	65.7%	123.9	65.7%
Total Wetland Area	64.7	34.3%	64.7	34.3%	64.7	34.3%
Total Site Area	188.6	100.0%	188.6	100.0%	188.6	100.0%
<i>Area Use Summary</i>						
	Acres	% of Total	Acres	% of Total	Acres	% of Total
Gray Space						
On-Lot Impervious	10.5	5.6%	9.8	5.2%	10.3	5.5%
Roads	4.6	2.4%	3.0	1.6%	7.2	3.8%
Right-of-Ways	7.9	4.2%	8.4	4.4%	14.1	7.5%
Green Space						
On-Lot Wooded Area	27.2	14.4%	9.3	4.9%	9.3	4.9%
On-Lot Lawn	46.1	24.4%	8.1	4.3%	18.3	9.7%
Common Area	22.6	12.0%	75.0	39.8%	59.9	31.8%
Wetland Conservation Area	64.7	34.3%	64.7	34.3%	64.7	34.3%
Total Gray Area	23.0	12.2%	21.2	11.2%	31.6	16.7%
Total Wooded Area	114.5	60.7%	149.0	79.0%	133.9	71.0%
Total Disturbed Footprint	101.3	53.7%	48.9	25.9%	64.0	33.9%
<i>Lot Yield Summary</i>						
	135	Lots	135	Lots	244	Lots
<i>Density</i>						
	135	Units	135	Units	306	Units
Gross on Site	0.7	Lots / acre	0.7	Lots / acre	1.3	Lots / acre
Net of Total Upland	1.1	Lots / acre	1.1	Lots / acre	2.0	Lots / acre
<i>Impervious Area</i>						
	Acres	% of Total	Acres	% of Total	Acres	% of Total
Total Impervious Area	15.1		12.8		17.5	
% Impervious Area / Total Area	8%		7%		9%	
Total Impervious Per Lot	4,869	SF	4,125	SF	3,118	SF
Per Lot Imp. Saving compared to Conventional	-	SF	744	SF	1,751	SF
RUNOFF						
	Rainfall Intensity		7.6 in /hr (I) (Note 1)			
Runoff Coefficient (C)	Acres (A)	Runoff (Q)	Acres (A)	Runoff (Q)	Acres (A)	Runoff (Q)
↓ cfs = cubic feet per second						
0.12 Predevelopment Runoff	123.9	113.0 cfs	123.9	113.0 cfs	123.9	113.0 cfs
Gray Space						
0.95 On-Lot Impervious	10.5	75.9 cfs	9.8	70.5 cfs	10.3	74.3 cfs
0.95 Roads	4.6	33.0 cfs	3.0	21.8 cfs	7.2	51.7 cfs
Green Space						
-	-	0.0 cfs	-	0.0 cfs	-	0.0 cfs
0.12 On-Lot Wooded Area	27.2	24.8 cfs	9.3	8.5 cfs	9.3	8.5 cfs
0.35 On-Lot Lawn	46.1	122.6 cfs	8.1	21.4 cfs	18.3	48.7 cfs
0.12 Common Area	22.6	20.6 cfs	75.0	68.4 cfs	59.9	54.6 cfs
0.35 Right-of-Way Lawn	3.3	8.8 cfs	5.4	14.2 cfs	6.9	18.4 cfs
Predevelopment Runoff (cfs)		113.0 cfs		113.0 cfs		113.0 cfs
Post-Development Runoff (cfs)		277.0 cfs		190.6 cfs		237.8 cfs
% of Conventional		100%		69%		86%
Runoff per lot (cfs)		2.1 cfs		1.4 cfs		1.0 cfs
per lot % of Conventional		100%		69%		48%
Runoff per unit (cfs)		2.1 cfs		1.4 cfs		0.8 cfs
per unit % of Conventional		100%		69%		38%

ENVIRONMENTAL & ECONOMIC BENEFITS ANALYSIS

SITE DATA

Development Type		Conventional		Community Preserve		Village	
<i>Lot Yield</i>	Size	No. of Lots	% of Total	No. of Lots	% of Total	No. of Lots	% of Total
Community Preserve	70' x 125'	-	0.0%	135	100.0%	-	0.0%
Conventional Residential	100' x 275'	130	96.3%	-	0.0%	-	0.0%
Average Lot Residential	75' x 200'	5	3.7%	-	0.0%	44	18.0%
Village Lot Residential	50' x 120'	-	0.0%	-	0.0%	134	54.9%
Village Live / Work	30' x 120'	-	0.0%	-	0.0%	31	12.7%
Village Square Lot	30' x 70'	-	0.0%	-	0.0%	35	14.3%
Total Lots		135	100.0%	135	100.0%	244	100.0%
		135 Units		135 Units		306 Units	
<i>Lot Size Summary</i>	Average SF	No. of Lots	Acres	No. of Lots	Acres	No. of Lots	Acres
Community Preserve	8,750	-	-	135	27.1	-	-
Conventional Residential	27,500	130	82.1	-	-	-	-
Average Lot Residential	15,000	5	1.7	-	-	44	15.2
Village Lot Residential	6,000	-	-	-	-	134	18.5
Village Live / Work	3,600	-	-	-	-	31	2.6
Village Square Lot	2,100	-	-	-	-	35	1.7
Total Lot Size		135	83.8	135	27.1	244	37.9
	Footprint						
<i>On-Lot Impervious Summary</i>	Average SF	% of Lot	Total SF	% of Lot	Total SF	% of Lot	Total SF
Community Preserve	3,150	36%	-	36%	425,250	36%	-
Conventional Residential	3,400	12%	442,000	12%	-	12%	-
Average Lot Residential	3,200	21%	16,000	21%	-	21%	140,800
Village Lot Residential	1,600	27%	-	27%	-	27%	214,400
Village Live / Work	1,600	44%	-	44%	-	44%	49,600
Village Square Lot	1,250	60%	-	60%	-	60%	43,750
Total On-Lot Impervious By SF			458,000		425,250		448,550
By Acres			10.5		9.8		10.3
<i>On-Lot Wooded Summary</i>	Average SF	% of Lot	Total SF	% of Lot	Total SF	% of Lot	Total SF
Community Preserve	3,000	34%	-	34%	405,000	34%	-
Conventional Residential	9,000	33%	1,170,000	33%	-	33%	-
Average Lot Residential	2,800	19%	14,000	19%	-	19%	123,200
Village Lot Residential	2,000	33%	-	33%	-	33%	268,000
Village Live / Work	400	11%	-	11%	-	11%	12,400
Village Square Lot	-	0%	-	0%	-	0%	-
Total Lot Greenspace By SF			1,184,000		405,000		403,600
By Acres			27.2		9.3		9.3
<i>On-Lot Lawn Summary</i>	Average SF	No. of Lots	Total SF	No. of Lots	Total SF	No. of Lots	Total SF
Community Preserve	2,600	-	-	135	351,000	-	-
Conventional Residential	15,100	130	1,963,000	-	-	-	-
Average Lot Residential	9,000	5	45,000	-	-	44	396,000
Village Lot Residential	2,400	-	-	-	-	-	321,600
Village Live / Work	1,600	-	-	-	-	31	49,600
Village Square Lot	850	-	-	-	-	35	29,750
Total Lot Greenspace By SF		135	2,008,000	135	351,000	110	796,950
By Acres			46.1		8.1		18.3

**ENVIRONMENTAL & ECONOMIC BENEFITS ANALYSIS
INFRASTRUCTURE**

Development Type		Conventional		Community Preserve		Village	
<i>Impervious Area</i>	Impervious Width	Linear Feet	Impervious Area	Linear Feet	Impervious Area	Linear Feet	Impervious Area
Urban Street (Sidewalk & Parking Both Sides)	42.00	-	-	-	-	2,360	99,120
Neighborhood Street (Sidewalk & Parking One Side)	29.00	6,872	199,288	-	-	2,840	82,360
Local Street (Narrower, Shoulder, no curb)	18.00	-	-	7,295	131,310	4,950	89,100
Alley (Model assumes impervious, consider pervious)	14.00	-	-	-	-	2,970	41,580
Total Roadway Impervious Area		6,872	199,288	7,295	131,310	13,120	312,160
By Acres			4.6		3.0		7.2
<i>Street Widths & Area</i>	Width	Linear Feet	Area	Linear Feet	Area	Linear Feet	Area
Urban Street (Sidewalk & Parking Both Sides)	32.00	-	-	-	-	2,360	75,520
Neighborhood Street (Sidewalk & Parking One Side)	24.00	6,872	164,928	-	-	2,840	68,160
Local Street (Narrower, Shoulder, no curb)	18.00	-	-	7,295	131,310	4,950	89,100
Alley (Model assumes impervious, consider pervious)	14.00	-	-	-	-	2,970	41,580
Total Actual Roadway		6,872	164,928	7,295	131,310	13,120	274,360
By Acres			3.8		3.0		6.3
<i>Right-of-Way (R/W)</i>	R/W Width	Linear Feet	Area	Linear Feet	Area	Linear Feet	Area
Urban Street (Sidewalk & Parking Both Sides)	70.00	-	-	-	-	2,360	165,200
Neighborhood Street (Sidewalk & Parking One Side)	50.00	6,872	343,600	-	-	2,840	142,000
Local Street (Narrower, Shoulder, no curb)	50.00	-	-	7,295	364,750	4,950	247,500
Alley (Model assumes impervious, consider pervious)	20.00	-	-	-	-	2,970	59,400
Total Right-of-Way		6,872	343,600	7,295	364,750	13,120	614,100
By Acres			7.9		8.4		14.1
<i>Total 24' Standard Equivalent (SE)</i>	SE Factor	Actual Linear Feet	SE Linear Feet	Actual Linear Feet	SE Linear Feet	Actual Linear Feet	SE Linear Feet
Urban Street (Sidewalk & Parking Both Sides)	1.3	-	-	-	-	2,360	3,068
Neighborhood Street (Sidewalk & Parking One Side)	1	6,872	6,872	-	-	2,840	2,840
Local Street (Narrower, Shoulder, no curb)	0.75	-	-	7,295	5,471	4,950	3,713
Alley (Model assumes impervious, consider pervious)	0.25	-	-	-	-	2,970	743
Total		6,872	6,872	7,295	5,471	13,120	10,363
# of Actual LF / 24' SE			100.0%		75.0%		79.0%
Actual Linear Feet			6,872		7,295		13,120
Standard Equivalent Linear Feet			6,872		5,471		10,363
per lot Actual Linear Feet			50.9		54.0		53.8
per lot Standard Equivalent Linear Feet			50.9		40.5		42.5
per unit Actual Linear Feet			50.9		54.0		42.9
per unit Standard Equivalent Linear Feet			50.9		40.5		33.9
Cost Per Linear Foot (LF) is based on Standard Equivalent (SE)							
COST ANALYSIS							
		Cost Per LF	Total Cost	Cost Per LF	Total Cost	Cost Per LF	Total Cost
Hard Costs							
Roadways		\$ 50.00	\$ 343,600	\$ 30.00	\$ 164,138	\$ 60.00	\$ 621,780
Excavation / Grading Cost		10.00	\$ 68,720	10.00	\$ 54,713	10.00	\$ 103,630
Sewer / Water / Drainage		50.00	\$ 343,600	40.00	\$ 218,850	50.00	\$ 518,150
Landscaping / Irrigation		25.00	\$ 171,800	20.00	\$ 109,425	35.00	\$ 362,705
Subtotal hard costs		\$ 135.00	\$ 927,720	\$ 100.00	\$ 547,125	\$ 155.00	\$ 1,606,265
Soft Costs							
Design/ Engineering (fees by lot)		1,000.00	\$ 135,000	1,000.00	\$ 135,000	1,000.00	\$ 244,000
Impact Fees (fees by unit)		2,500.00	\$ 337,500	2,500.00	\$ 337,500	2,500.00	\$ 765,000
Subtotal hard costs		\$ 3,500.00	\$ 472,500	\$ 3,500.00	\$ 472,500	\$ 3,500.00	\$ 1,009,000
Total Cost with Impact Fees			\$ 1,400,220		\$ 1,019,625		\$ 2,615,265
Average Cost Per Building Lot with Impact Fees			\$ 10,372.00		\$ 7,552.78		\$ 8,546.62
Total Cost without Impact Fees			\$ 1,062,720		\$ 682,125		\$ 1,850,265
Average Cost Per Building Lot without Impact Fees			\$ 7,872.00		\$ 5,052.78		\$ 6,046.62

ENVIRONMENTAL & ECONOMIC BENEFITS ANALYSIS

Projected Gross Profit & Tax Revenue

Development Type	Conventional			Community Preserve			Village				
Description	Size	Price/Cost Per SF	# of Lots	Price/Cost Per Lot	Total	# of Lots	Price/Cost Per Lot	Total	# of Lots	Price/Cost Per Lot	Total
<i>Lot Sales</i>											
Community Preserve	8,750	\$ 6.29	-	\$ 55,000	-	135	\$ 55,000	7,425,000	-	\$ 55,000	-
Conventional Residential	22,000	\$ 2.27	130	\$ 50,000	6,500,000	-	\$ 50,000	-	-	\$ 50,000	-
Average Lot Residential	11,250	\$ 4.22	5	\$ 47,500	237,500	-	\$ 47,500	-	44	\$ 47,500	2,090,000
Village Lot Residential	6,000	\$ 7.50	-	\$ 45,000	-	-	\$ 45,000	-	134	\$ 45,000	6,030,000
Village Live / Work	3,600	\$ 11.67	-	\$ 42,000	-	-	\$ 42,000	-	31	\$ 42,000	1,302,000
Village Square Lot	2,100	\$ 19.05	-	\$ 40,000	-	-	\$ 40,000	-	35	\$ 40,000	1,400,000
Gross Lot Sales			135	49,907	\$ 6,737,500	135	55,000	\$ 7,425,000	244	44,352	\$ 10,822,000
Acquisition Cost				21,481	2,900,000		21,481	2,900,000		11,885	2,900,000
Site Infrastructure Cost				7,872	1,062,720		5,053	682,125		7,583	1,850,265
Total Direct A & D Expense				\$ 29,353	\$ 3,962,720		\$ 26,534	\$ 3,582,125		\$ 19,468	\$ 4,750,265
Impact Fees				\$ 2,500	\$ 337,500		\$ 2,500	\$ 337,500		\$ 2,500	\$ 765,000
Total Direct A & D Expense with Impact Fees				\$ 31,853	\$ 4,300,220		\$ 29,034	\$ 3,919,625		\$ 21,968	\$ 5,515,265
Gross Profit without Impact Fees				\$ 20,554	\$ 2,774,780		\$ 28,466	\$ 3,842,875		\$ 24,884	\$ 6,071,735
Gross Profit Margin without Impact Fees				41.2%			51.8%			56.1%	
Gross Profit with Impact Fees				\$ 18,054	\$ 2,437,280		\$ 25,966	\$ 3,505,375		\$ 22,384	\$ 5,306,735
Gross Profit Margin with Impact Fees				36.2%			47.2%			50.5%	
Property Valuation					\$ 6,737,500			\$ 7,425,000			\$ 10,822,000
Assessed Value					2,695,000			2,970,000			4,328,800
Annual Tax Revenue					\$ 281,089			\$ 309,771			\$ 451,494
% of Conventional					100.0%			110.2%			160.6%

Green Certification Programs

LEED-Neighborhood Development



In 2009, The U.S. Green Building Council (USGBC), the Congress for the New Urbanism (CNU), and the Natural Resources Defense Council (NRDC) developed a rating system for neighborhood planning and development based on the collective principles of Smart Growth, New Urbanism, and Green Infrastructure and Building. Through certification, LEED for Neighborhood Development recognizes development projects that successfully protect and enhance the overall health and quality of our natural environment and our communities.

The LEED-ND rating system is made up of prerequisites, which all projects must meet, and a set of credits, from which each project can choose to earn enough points for certification. The system is divided into the following credit categories: Smart Location and Linkage (SLL), Neighborhood Pattern and Design (NPD), and Green Infrastructure and Buildings (GIB). The rating system can be applied, in its entirety or in part, depending on the scale of the project.

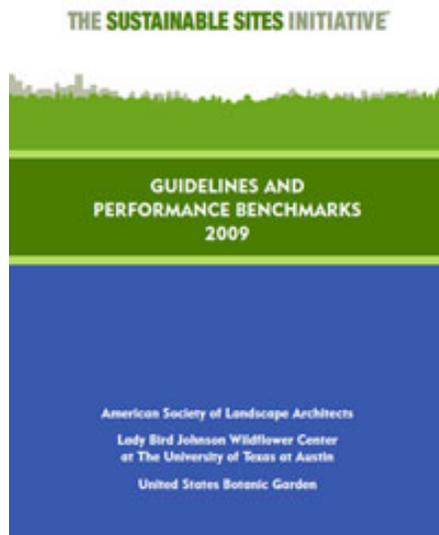
LEED ND projects vary widely in their scope and character—small infill projects qualify, as well as large master planned communities, and projects may apply early in the development process or immediately after construction is complete. As of April 2012, 106 pilot projects have been certified through the program.

For more detailed information, visit www.usgbc.org/ND. Additional information on green building practices is also available from the EPA's *Sustainable Design & Green Building Toolkit for Local Communities* at www.epa.gov/smartgrowth/partnership/tools.html.

Sustainable Sites Initiative (SITES)

The Sustainable Sites Initiative, known as SITES, is a joint effort by the American Society of Landscape Architects, Lady Bird Johnson Wildflower Center of the University of Texas at Austin, and the US Botanical Garden. This set of prerequisites and credits combines current research, technology, best practices and performance goals for the design, construction and maintenance of sustainable sites.

The Initiative developed criteria for sustainable land practices that will enable built landscapes to support natural ecological functions by protecting existing ecosystems and regenerating ecological capacity where it has been lost. This program focuses on measuring and rewarding a project that protects, restores and regenerates ecosystem services – benefits provided by natural ecosystems such as cleaning air and water, climate regulation and human health benefits.



The Guidelines and Performance Benchmarks 2009 includes a rating system for the credits that the pilot process will test for refinement before a formal release to the market place. The rating system contains 15 prerequisites and 51 credits that cover all stages of the site development process from site selection to landscape maintenance. Feedback from the pilot projects is being used to create a reference guide that will provide suggestions on how projects achieved the sustainability goals of specific credits.

The companion document titled *The Case for Sustainable Landscapes* provides a set of arguments—economic, environmental, and social—for the adoption of sustainable land practices, additional background on the science behind the performance criteria in the guidelines and performance

benchmarks, the purpose and principles of the Sustainable Sites Initiative, and a sampling of some of the case studies the Initiative has followed. Both documents can be downloaded at www.sustainable-sites.org.

Green Infrastructure Case Studies

As a collaborative effort, in 2012 the Southeastern Watershed Forum, University of Georgia River Basin Center, Environmental Protection Agency Region IV, Southeast Smart Growth Network, and community leaders from Georgia, Florida, North and South Carolina and Tennessee published *An Analysis of Selected Community Green Building Programs in Five Southeastern States*. The report contains green building case studies being implemented across 16 representative southeastern communities; four local examples are featured in the following section.

The full report can be found at www.southeastwaterforum.org. Additional information on green building practices is also available at the EPA's *Sustainable Design & Green Building Toolkit for Local Communities* website www.epa.gov/smartgrowth/partnership/tools.html.

Chatham County, Georgia GREEN BUILDING PROGRAM

By Amble Johnson

Background

Incorporated in 1777 and located at the mouth of the Savannah River, Chatham County has a land area of 426 square miles and a population of 256,128.²³¹ Savannah is the county's largest and most renowned municipality and the Savannah Seaport and Savannah River distinguish the character of the area. Transportation and shipping are key facets of Chatham County's history and culture.²³²

In 2007, Chatham County's Board of Commissioners passed a resolution with the goal of becoming the "Greenest County in Georgia". This resolution articulates the County's goals for natural resource and energy conservation and the building of a "high-tech, knowledge-based, and creative local economy" to create an "environmentally, economically, and socially sustainable future."²³³ To promote this vision, the Board enlisted the Chatham Environmental Forum (CEF), a collaboration of business, environmental advocacy, and government stakeholders formed to promote environmental initiatives that have broad based support in Chatham County to craft a "Road Map" to becoming greener.²³⁴

With Chatham Environmental Forum's Road Map as the overarching guide, the county has initiated and expanded several environmental initiatives. For example, the county is focusing on sustainable building by promoting the green construction of county and commercial buildings. All new county buildings are required to achieve LEED SIL-



Sustainable Fellwood. Green housing development in Chatham County, Georgia.

ver certification or better, and this requirement also extends to renovation projects that cost \$100,000 or more.²³⁵ In addition,

new commercial buildings that achieve LEED Gold certification receive full abatement of state and county taxes for five years and partial abatement for ten years, if they demonstrably "increase employment opportunities" and constitute expansion into "enterprise zones".²³⁶

In addition to achieving LEED certification of new buildings and large scale renovations, the county government has made numerous improvements and modifications to improve efficiency and sustainability of county facilities. As part of Chatham Environmental Forum's Road Map to streamline the government's

sustainability measures, in 2007 and 2008 staff evaluated the county's carbon footprint, and used the findings to implement

“ This resolution articulates the County's goals for natural resource and energy conservation and the building of a 'high-tech, knowledge-based, and creative local economy' to create an 'environmentally, economically, and socially sustainable future.' ”

“ New commercial buildings that achieve LEED Gold certification receive full abatement of state and county taxes for five years and partial abatement for ten years, if they demonstrably 'increase employment opportunities' and constitute expansion into 'enterprise zones'. ”

231 U.S. Census Bureau State and County Quickfacts; <http://quickfacts.census.gov/qid/states/13/13051.html>

232 <http://georgiafacts.net/counties/countyid=13051>

233 <http://www.chathamcounty.org/Portals/ChathamCounty/Greenest%20County/Greenest%20County%20Resolution.pdf>

234 <http://www.chathamcounty.org/Home/GreenestCounty.aspx>

235 <http://www.chathamcounty.org/Portals/ChathamCounty/Greenest%20County/Greenest%20County%20Achievements.pdf>

236 Chatham County, Ga., Code §7-1002(a)(2) (2008).

CHATHAM COUNTY, GEORGIA

“ 2007 and 2008 staff evaluated the county’s carbon footprint, and used the findings to implement various energy saving renovations to county facilities.”

various energy saving renovations to county facilities.²³⁷ Facility improvements at county buildings in recent years include the installation of acrylic insulating panels on Administrative Courthouse windows, the electronic ballasts and high-efficiency fluorescent light bulbs in the Judicial Courthouse, Administrative Courthouse, and Citizens Service Center buildings, the county’s acquisition of the “bulb eater” to recycle fluorescent light bulbs used in county buildings, expanded recycling programs at government buildings, and the installation of an air conditioner to improve energy savings in the Administrative Courthouse.²³⁸

Program Inception and Development

Chatham County’s goal of becoming “The Greenest County in Georgia” was articulated on October 5, 2007, in a resolution passed by the Board of Commissioners. Rather than outlining specific policies or criteria to meet its goal, the single-page resolution instead calls upon the Chatham Environmental Forum to develop a plan that identifies ways to “conserve our natural resources; conserve energy in every way possible; enhance our ability to use local labor, talent and materials; and, to make sure that our investment in new infrastructure will help us build a high-tech, knowledge-based, and creative local economy.”²³⁹ The Forum should “bring together representatives of local governments, local businesses, and local environmental groups, as well as other community-based institutions” to prepare and execute this plan.²⁴⁰

The Chatham Environmental Forum was originally established in 1989 to provide a venue to discuss local environmental issues. The Forum describes itself as a “three-legged stool” that



Abernethy Commons is a LEED-Certified Shopping Center.

“ Government buildings, new County-funded buildings and renovations costing \$100,000 or more are required to achieve at least LEED Silver certification.”

grants equal representation to government, business, and environmental groups’ interest in order to offer consensus-based analyses of environmental issues.²⁴¹

In February of 2009, the Chatham Environmental Forum released the 52-page “Road Map for Chatham County”. To draft the plan, CEF members and community stakeholders met weekly in committees for over six months. The CEF members who helped in the drafting totaled 24 men and women, 8 rep-

237 <http://www.chathamcountygov.org/portal/ChathamCounty/Greenest%20County/Greenest%20County%20Road%20map.pdf>

238 <http://www.chathamcountygov.org/portal/ChathamCounty/Greenest%20County/Greenest%20County%20Achievements.pdf>

239 Chatham County Resolution “Call for Chatham County to Become ‘The Greenest County in Georgia,’” passed October 5, 2007; text available at: <http://www.chathamcountygov.org/portal/ChathamCounty/Greenest%20County/Greenest%20County%20Resolution.pdf>.

240 <http://www.chathamcountygov.org/portal/ChathamCounty/Greenest%20County/Greenest%20County%20Resolution.pdf>

241 <http://www.jiisocialism.com/boards/>

CHATHAM COUNTY, GEORGIA

representing businesses, 9 representing environmental advocacy groups, and 7 representing government. Georgia Power and the Savannah Area Chamber of Commerce were among the business interests represented. The Sierra Club, US Green Building Council, and Savannah Tree Foundation were among the environmental advocacy interests. And government representation included the Georgia Ports Authority, City of Savannah, Chatham County Youth Commission and the Chatham County-Savannah Metropolitan Planning Commission. During the drafting process, one environmental advocate and one business representative held the position of CEF Chair.²⁴²

The document itself is divided into Green Space / Land Use, Energy, Transportation, Climate Change, Creative Infrastructure, Water Management, and Solid Waste sections, each drafted by a different CEF committee.²⁴³ It focuses enhancement and coordination of existing conservation programs and policies to reach an environmentally sustainable Chatham County in each of the targeted sections.

In 2006, the Board of Commissioners adopted an ordinance incentivizing the achievement of LEED Gold certification for commercial buildings. For the first five years, the code grants full state and county tax abatement. This incentive then tapers off by 20% each year from year six to year ten, when it ends. To be eligible, construction projects must be new or expanding into an "enterprise zone" and must increase local employment opportunities.²⁴⁴

For government buildings, new County-funded buildings and renovations costing \$100,000 or more are required to achieve at least LEED Silver certification. This mandate began as a 2010 County Commission motion; in 2011, the Board of Commissioners amended the county code to include the requirement.²⁴⁵

The county has also taken steps to enhance the sustainability of local government buildings through periodic retrofits, upgrades, and new programs. For example, the County has installed acrylic insulating panels on the windows of the Admin-

istrative Courthouse to improve the insulation of the building without compromising its historical aesthetic. Other improvements include electronic ballasts and high-efficiency fluorescent light bulbs in the Judicial Courthouse, the Administrative Courthouse, and the Citizens Service Center. In 2010, the installation of a more efficient air conditioner improved energy savings in the Administrative Courthouse.²⁴⁶

Funding

While much of the funding for Chatham County's sustainability initiatives comes directly from the county, the local government also coordinates with state and federal programs to achieve its goals. For example, a 2009 Energy Efficiency Community Block grant from Georgia Environmental Facilities Authority allocated Federal stimulus funds. The grant totaled \$300,000 toward lighting and HVAC upgrades. A 25 percent energy savings will then be redirected to fund 80 total "green jobs" for a local poverty reduction initiative.²⁴⁷

Chatham County partially funded the development of the CEF plan. Additional funding was provided by contributions from the CEF and its members.²⁴⁸ The joint funding effort demonstrates one of the benefits of enlisting the CEF to coordinate the county's green goals.

Results

As a result of Chatham County's sustainability efforts, the Georgia Department of Natural Resources' (DNR) Partnership for Sustainable Georgia accepted the county's 2010 application for bronze-level partnership.²⁴⁹

The Southwest Chatham Library opened in October 2009 with LEED-silver certification. Approximately 50,000 square feet in area, it is the second-largest library in the library system. It includes highly reflective roofing material, landscaping with native plants that do not require irrigation, low-flow water fixtures, and low-VOC adhesives, among other sustainable building practices.²⁵⁰ Also, the library's innovative use of natural light

242 <http://www.chathamcounty.org/Portals/ChathamCounty/Greenest%20County/Greenest%20County%20Roadmap.pdf>

243 <http://www.chathamcounty.org/Portals/ChathamCounty/Greenest%20County/Greenest%20County%20Roadmap.pdf>

244 http://www.cleanair-coolplanet.org/for_communities/green_building_ordinances.php

245 <http://www.chathamcounty.org/Portals/ChathamCounty/Greenest%20County/Greenest%20County%20Achievements.pdf>

246 <http://www.chathamcounty.org/Portals/ChathamCounty/Greenest%20County/Greenest%20County%20Achievements.pdf>

247 <http://sawdailynews.com/main.asp?SectionID=2&SubSectionID=18&ArticleID=30721>

248 <http://www.chathamcounty.org/Portals/ChathamCounty/Greenest%20County/Greenest%20County%20Roadmap.pdf>

249 <http://www.chathamcounty.org/Portals/ChathamCounty/Greenest%20County/Greenest%20County%20Achievements.pdf>

250 <http://www.liveoskpi.org/Upload/SWChathamFactSheet.pdf>

CHATHAM COUNTY, GEORGIA

and light-sensors further contribute to energy efficiency and a smaller carbon footprint. Installation of a green roof is in future plans for the library.²⁵¹

Lessons Learned

In its strong tax incentives for commercial green building and other initiatives, Chatham County has taken aggressive steps toward becoming greener. However, no single government department leads the way. Instead, the Board of Commissioners delegated the overarching goal to the Chatham Environmental Forum.²⁵² The group's make-up of business, environmental advocacy, and government actors has ensured a coherent plan. CEF's emphasis on designing consensus-approved approaches to problems has also been

an asset for its goals for the county.²⁵³ In empowering a group of informed stakeholders, Chatham County strives to establish concrete, achievable goals that will help to address the future climate and resource issues that the coastal county will face.

Other Initiatives

In 2009, Chatham County established a "Green Team" to develop and implement energy and resource conservation strategies, and the same year appointed a Liaison to the Chatham Environmental Forum.²⁵⁴ Chatham County's major sustainability steps extend to land use. The original resolution cites Chatham County's unique geographic wealth, including barrier islands, tidal marshes, the Savannah River delta, and pine and live oak forests, among other ecological treasures.²⁵⁵ Land conservation makes sense, therefore, as a primary goal for the county government; the Resource Protection Commission adopted a 2009 site acquisition policy with recommendations from the Environmental Forum in mind. Granting resource protection is

based on site classification, the landowner's willingness to protect the land, the price of acquisition, and the potential for funds from grants or matching funding sources to supplement Chatham County's financial investment.²⁵⁶ The Resource Protection Commission also adopted an ecological systems ranking manual to guide the classification of each site. The ranking manual is 55 pages in length, and it provides a standard procedure for ranking sites for the county's Resource Protection Commission. Specifically, six ranking criteria focus on the site's environmental qualities, four deal with historical and cultural significance, three address the site's public use value, and one focuses on opportunities for collaboration with other organizations.²⁵⁷

Another example is the Lower Ogeechee River Trail program. Through a \$100,000 grant from the Georgia Rec-

reational Trail Grant Program, Chatham County has routed and will construct two miles of trails through bottomland hardwood forest in land that had been set aside as part of Chatham County's land conservation program in 2008.^{258 259}

Many of the short-term steps advocated by CEF in the Road Map have been met. For example, in 2010 twenty hybrid buses joined the Chatham Area Transit fleet. Also, the Metropolitan Planning Organization adopted "Complete Streets" guidelines, and the Public Works department opened Chatham County's fourth recycling center.²⁶⁰

Another major result of Chatham County's sustainability initiatives is completion of the Westlake / Lamarville Reforestation Project. The project connects two existing County-owned forestlands, provides flood mitigation for the County and resulted in the planting of nearly 500 new trees. It also constituted a successful partnership between Chatham County, the Georgia Forestry Commission, the Savannah Tree Foundation, and neighborhood associations.²⁶¹ In addition to the Westland/Lamarville Reforestation Project, Cha-

Land conservation makes sense, therefore, as a primary goal for the county government; the Resource Protection Commission adopted a 2009 site acquisition policy with recommendations from the Environmental Forum in mind.

251 <http://www.chathamcounty.org/Portals/ChathamCounty/News/Chatham%20County%20Connection/2009/April%202009.PDF>

252 <http://blog.thecreativecoast.org/a-road-map-for-chatham-county-for-its-journey-in-becoming-the-greenest-county-in-the-state-of-georgia/2009/03/03>

253 <http://www.joinchatham.org/about-cef>

254 <http://www.chathamcounty.org/Portals/ChathamCounty/Greenest%20County/Greenest%20County%20Achievements.pdf>

255 <http://www.chathamcounty.org/Portals/ChathamCounty/Greenest%20County/Greenest%20County%20Resolution.pdf>

256 <http://www.thempc.org/documents/CCFPC/Site%20Acquisition%20Policy.pdf>

257 http://www.thempc.org/documents/CCFPC/Evaluation_Manual%201.15.09.pdf

258 <http://www.n-georgia.com/new-ga-trails-press-release-2010.html>

259 <http://www.chathamcounty.org/Portals/ChathamCounty/Greenest%20County/Greenest%20County%20Achievements.pdf>

260 <http://www.chathamcounty.org/Portals/ChathamCounty/Greenest%20County/Greenest%20County%20Achievements.pdf>

261 <http://www.chathamcounty.org/Portals/ChathamCounty/Greenest%20County/Greenest%20County%20Achievements.pdf>

CHATHAM COUNTY, GEORGIA

Chatham County's Conservation Land Program, overseen by the Chatham County Resource Protection Commission, expanded in 2010 to over 3,000 acres of property. Land management plans exist for the 178-acre Pennyworth Island and the 150-acre Whitemarsh Preserve.²⁶²

Extending Chatham County's sustainability theme of cooperation, the county has teamed with the City of Tybee Island to harvest geothermal energy. The Tybee Island Library Branch is currently connected to the geothermal system.²⁶³ The governments are also collaborating in expansion of Tybee's geothermal energy use, requesting proposals from firms to offer services and materials to do this.²⁶⁴

As part of its publicity for the Road Map plan, the Environmental Forum launched a JoIN web site.²⁶⁵ The site offers resources and mechanisms for individuals, businesses, organizations, and municipal governments to enlist in Chatham County's green initiatives. The web presence also offers a place for businesses to highlight their sustainability measures.²⁶⁶

²⁶² <http://www.chathamcounty.org/Portals/ChathamCounty/Greenest%20County/Greenest%20County%20Achievements.pdf>

²⁶³ <http://www.chathamcounty.org/Portals/ChathamCounty/Greenest%20County/Greenest%20County%20Achievements.pdf>

²⁶⁴ http://www.cityoftybee.org/Assets/Files/Finance/2011/2011-621_GeothermalFIFP.pdf

²⁶⁵ <http://www.scaddistrict.com/?p=20804>

²⁶⁶ <http://www.joindahatham.com/partners-directory>

Cherokee County, Georgia GREEN BUILDING PROGRAM

By Amble Johnson

Background

Cherokee County is just north of Atlanta off of Interstate 575. Its land area totals 424 square miles, and it has a population of 214,346, which represents a 51% increase over the County's 2000 population.²⁶⁷ Cherokee County is a rapidly growing county on the suburban fringe of the Atlanta metro area. Its median age is 34.0 years, and the median household income of \$64,922 is nearly \$20,000 higher than Georgia as a whole.²⁶⁸ Canton is the county seat, but Cherokee County also contains the cities of Ball Ground, Holly Springs, South Canton, Waleska, and Woodstock. The northern part of the county is mountainous and remains rural, while the southern and eastern parts are growing as Metro Atlanta grows.²⁶⁹

Since 1990, Cherokee County's population has increased as a result of its proximity to Atlanta, and increasing local employment opportunities accelerate this growth. Cherokee County's Community Assessment, done as part of the comprehensive planning in 2007 for the County and the Cities of Ball Ground and Waleska, anticipates the County's 2030 population to nearly double to approximately 420,000 people.²⁷⁰ Many of the

Cherokee County's Community Assessment, done as part of the comprehensive planning in 2007 for the County and the Cities of Ball Ground and Waleska, anticipates the County's 2030 population to nearly double to approximately 420,000 people. Many of the County's environmental concerns arise from the pressures expected from this continued rapid population growth.



Brick Mill Falls in Cherokee County, Georgia.

County's environmental concerns arise from the pressures expected from this continued rapid population growth. The Community Assessment argues for the "proactive" preservation of the county's natural resources, specifically wilderness areas and fresh water and offers some specific ideas for achieving this preservation.²⁷¹

Program Inception and Development

Cherokee County's Green Building Program is designed to ensure new county building projects are green and encourage private development to be green as well. It is important to note that this program is only one part of a multi-pronged approach toward preserving the natural environment, which is an essential part of the community's vision. Cherokee County also has programs in place to protect and preserve greenspace through land acquisition and during the development process.

Cherokee County's construction of its LEED Silver Certified Cherokee County Administration Building in Canton is a tangible example of the County's commitment to sustainable development. The building totals 78,000 square feet. It holds the offices of department heads and other county personnel, as well as a full-service conference center with an auditorium and over 8,000 square feet of flexible meeting space.²⁷² The green building features account for a 20% reduction in energy

267 U.S. Census Bureau State and County Quickfacts: <http://quickfacts.census.gov/qib/states/13/13057.html>

268 http://www.city-data.com/county/Cherokee_County-GA.html

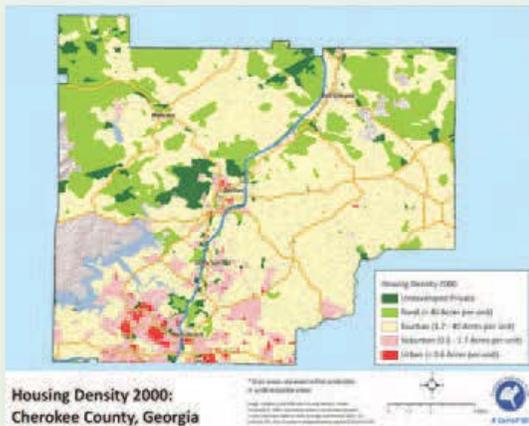
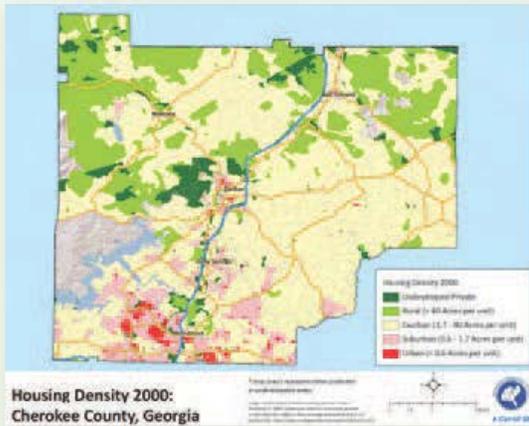
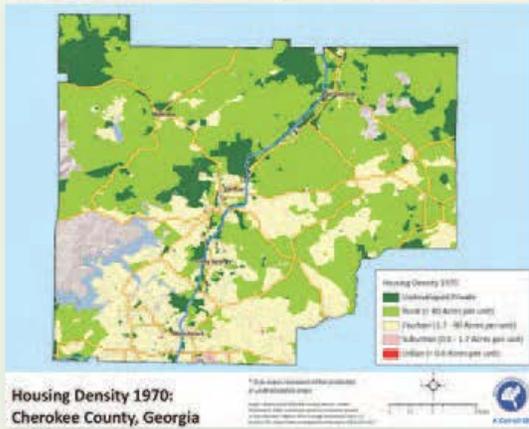
269 http://www.cherokee.ga.gov/departments/planningandzoning/uploads/File/CompPlan/Cherokee_Assessment_Vol_1_Final.PDF

270 Cherokee County Community Assessment, Vol. 1: Issues and Opportunities. Prepared by Plan Cherokee, January 2007. Available at: http://www.cherokee.ga.gov/departments/planningandzoning/uploads/File/CompPlan/Cherokee_Assessment_Vol_1_Final.PDF

271 http://www.cherokee.ga.gov/departments/planningandzoning/uploads/File/CompPlan/Cherokee_Assessment_Vol_1_Final.PDF

272 <http://canton-ga.gov/listings/cherokee-county-administration-building-and-conference-center>

CHEROKEE COUNTY, GEORGIA



Cherokee County's Green Building Program is designed to ensure new county building projects are green and encourage private development to be green as well. It is important to note that this program is only one part of a multi-pronged approach toward preserving the natural environment, which is an essential part of the community's vision.

costs and 50% reduction in water usage. Through construction materials and practices, the building fosters improved indoor environmental quality and water and energy conservation.²⁷³ 75% of the building's construction waste was recycled. Bike racks and special parking spaces for fuel-efficient and carpool vehicles encourage conservation in employees' transportation. Through low-flow fixtures and water-efficient landscaping, the building boasts 50% reduced water usage. There is also an on-site recycling program, and a white roof that reduces the building's heat island effect and, therefore, the energy usage associated with cooling. Finally, the use of building materials with low VOC content enhances the building's indoor environmental quality.²⁷⁴

The success of the new Administration Building has led county officials to set new county-wide green construction policies. All new county buildings that exceed 5,000 square feet must be LEED certified, and local government building renovations must follow LEED guidelines.²⁷⁵ The County also committed to energy and water use audits to be completed for all county government facilities by 2013.²⁷⁶

To incentivize the private sector to follow the government's lead, green development in residential and commercial buildings is encouraged. Permitting reviews are expedited for new projects that achieve LEED, EnergyStar, or EarthCraft certification. Additionally, fees are reduced for such certification in

273 http://www.cherokeega.com/departments/project2_page.cfm?projectId=62

274 http://www.cherokeega.com/departments/project2_page.cfm?projectId=62

275 http://www.atlantaregional.com/File%20Library/Environment/Green%20Communities/Cherokee_Certified-Green-Community-Presentation_Dec1-2010.pdf

276 http://cherokeetribune.com/view_full_story/10643222/article-Green-is-the-way-to-go

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“The green building features account for a 20% reduction in energy costs and 50% reduction in water usage.”

“All new county buildings that exceed 5,000 square feet must be LEED certified, and local government building renovations must follow LEED guidelines. The County also committed to energy and water use audits to be completed for all county government facilities by 2013.”

“Permitting reviews are expedited for new projects that achieve LEED, EnergyStar, or EarthCraft certification. Additionally, fees are reduced for such certification in private developments.”

private developments.²⁷⁷ These fee reductions generally total around 50% of the typical permitting cost, and the local government provides initial plan reviews of private green building projects within two days.²⁷⁸

As a water conservation measure, the Cherokee County Water and Sewer Authority (CCWSA) Board of Directors voted to participate in the Metropolitan North Georgia Water Planning Region Toilet Retrofit Program. This program incentivizes homeowners to replace their inefficient toilets with efficient ones. Rebates of \$50 and \$100 are available for houses that were built before 1992 (after 1992, low-flow requirements were added to the rules for new homebuilding).²⁷⁹ After making the switch, a family of three conserves around 33 gallons every day.²⁸⁰

As early as 2001, Cherokee County outlined a “Greenspace Vision” to conserve 20 percent of the county’s land within 10

years in its Planning and Land Use document. The land to be conserved includes: natural areas which have important recreational, ecological and aesthetic values, wildlife management areas and prime habitat, and prime agricultural and forest lands. To fund such efforts, the county received early funding from the Governor’s Greenspace Program, instituted a Special Purpose Local Option Sales Tax and impact fees, and passed a \$90 million Parks and Greenspace Bond in 2009. In 2008 Cherokee County voted to meet the Comprehensive Plan’s call for more aggressive greenspace acquisition. The Parks, Recreation, and Green Space Bond set aside funds to purchase new land and improve existing parks and greenspace. Each acquisition is approved by the Board of Commissioners, and the bond constitutes a significant investment in the county’s greenspace. (Citation: <http://parkbond.cherokeega.com/>)

Cherokee County also offers two ways to incorporate sustainability strategies into new developments. First, developers may choose to utilize the Conservation Design Community Ordinance in most residential zoning districts to reduce residential lot sizes while setting aside a minimum of 40% greenspace within a new neighborhood. This strategy, sometimes known as a Conservation Subdivision, has been successful in allowing land development while preserving sensitive natural areas. Second, Cherokee County has a Traditional Neighborhood Development (TND) zoning district that is available in the more densely developed areas. The Home Depot Foundation’s Sustainable Cities Institute cited Cherokee County’s Traditional TND Ordinance as a model policy. In its description, the institute cited the ordinance’s emphasis on ensuring “integrated and diverse community features and uses.” These uses include the presence of greenspace and the use of thoroughfares for walking and other alternative transportation (specifically, bicycles).²⁸¹

Funding

The initial costs associated with green building is included in \$22 million construction cost of the Cherokee County Administration Building.²⁸² With its LEED Silver certification, however, the increased construction cost should ultimately be offset with savings. Since new construction is an on-going cost for local governments anyway, building sustainable government build-

277 <http://woodstock.11alive.com/content/metro-atlanta-communities-recognized-sustainability-programs>

278 http://www.atlantaregional.com/File%20Library/Environment/Green%20Communities/Cherokee_Certified-Green-Community-Presentation_Dec1-2010.pdf

279 <http://www.northgeorgiawater.org/html/392.htm>

280 http://www.northgeorgiawater.org/files/MNGWFD_Toilet_Rebate_Program_FAQs.pdf

281 http://www.sustainablecitiesinstitute.org/view/page.basic/legislation/feature.legislation/Model_Ordinance_Cherokee_County

282 <http://canton-ga.patch.com/listings/cherokee-county-administration-building-and-conference-center>

CHEROKEE COUNTY, GEORGIA

As early as 2001, Cherokee County outlined a “Greenspace Vision” to conserve 20 percent of the county’s land within 10 years in its *Planning and Land Use* document. The land to be conserved includes: natural areas which have important recreational, ecological and aesthetic values, wildlife management areas and prime habitat, and prime agricultural and forest lands.

Developers may choose to utilize the *Conservation Design Community Ordinance* in most residential zoning districts to reduce residential lot sizes while setting aside a minimum of 40% greenspace within a new neighborhood.

ings is an easy way for counties to encourage green building without significant added costs.²⁸³

Results

The Cherokee County Administration Building is a tangible success that has come out of Cherokee County’s Green Building Program. The initial costs of the green features have begun to pay for themselves in reduced water and energy usage. It is an example of local government leading by example by directly

With sprawl a major concern in development, the *Conservation Design Community and Traditional Neighborhood Development Ordinances* are examples of Cherokee County’s proactive approach to encouraging deliberate, thoughtful development, and this approach guides much of the county’s green building strategy.

demonstrating the benefits of sustainable building practices.²⁸⁴ Data is still being collected and analyzed for the energy retrofit projects on existing county buildings. The incentives for new private developments have yet to be utilized due to the recent economic downturn. With sprawl a major concern in development, the *Conservation Design Community and Traditional Neighborhood Development Ordinances* are examples of Cherokee County’s proactive approach to encouraging deliberate, thoughtful development, and this approach guides much of the county’s green building strategy.

Lessons Learned

Cherokee County’s emphasis on voluntary programs and zoning options yields a low-cost approach to fostering green building. This is reinforced by the county’s reliance on outside mechanisms to fund and administer many of the green initiatives. The toilet retrofit rebate is not so much a Cherokee County initiative as the county’s participation in a program of the broader Metropolitan North Georgia Water Planning Region. Cherokee County residents have access to many loans and rebates for energy improvements, but these come from the federal government or from energy providers themselves.

However, the *Comprehensive Plan* shows Cherokee County citizens’ concerns over future growth. Because of the natural growth of the Metro Atlanta area, many pressures encourage sprawling developments. Mandating steps such as the *Traditional Neighborhood Developments Ordinance* and proactive zoning may be necessary to avoid this.

Other Initiatives

The Cherokee Environmental Sustainability Initiative (CESI) exists to facilitate long-term sustainability, primarily through community involvement. CESI inspires and educates Cherokee County residents to actively sustain the local environment. Specifically, it focuses on the small acts that individuals and small groups can do to contribute.²⁸⁵ For example, the loss of tree cover as the county grows is a specific problem area that CESI has sought to address, through acts such as tree planting and nursery creation.

While it is not part of the Cherokee County government, the Cherokee County Chamber of Commerce also contributes to

²⁸³ http://www.cherokee.ga.com/departments/project2_page.cfm?projectId=62

²⁸⁴ http://www.cherokee.ga.com/departments/project2_page.cfm?projectId=62

²⁸⁵ http://www.cpa.net/community_cesi.php

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Cherokee County's sustainability measures. It articulates the goal of "Living green, working green, thinking green." As part of this goal, it maintains a list of Going Green businesses that adhere to a list of environmentally responsible criteria. Participation is completely voluntary and is not rewarded with financial incentive, but by showcasing businesses the Chamber of Commerce contributes to a culture of proactive sustainability.

The steps necessary for businesses to qualify include basic green practices in seven categories: solid waste prevention, recycling, purchasing, energy conservation, water conservation and water quality, transportation, and stakeholder involvement in environmental practices. The Chamber provides businesses with a menu of green business practices, and based on the number of employees businesses must follow a certain amount of these practices. For small businesses with five or fewer employees, four practices must be met. For the largest companies of 100+ employees, fifteen practices must be met. These practices include the use of reusable rather than disposable materials when possible, recycle printer toner and ink jet cartridges, use low-emission building materials for remodeling, the installation of low-flow water fixtures, and other similar steps, and it reinforces the county's goal of empowering people to take steps to protect the local environment.²⁸⁶

A primary concern facing Cherokee County is the encroaching sprawl of Metro Atlanta. As a result, the Comprehensive Plan and the Zoning Ordinance convey citizens' desire to keep the county unique. Since citizens identify environmental beauty as a crucial part of that uniqueness, conservation and intelligent development are a crucial part of the county's green buildings agenda.

²⁸⁶ <http://www.cherokeechamber.com/green.htm>

Douglas County, Georgia GREEN BUILDING PROGRAM

By Amble Johnson

Background

Named for abolitionist Fredrick Douglas, Douglas County is located 20 miles west of Atlanta. It covers 200 square miles of area. In 2010, the US Census Bureau recorded 132,403 people living in Douglas County, which marked a 43.6% growth since 2000.²⁸⁷ The median per capita income in 2010 was \$24,516, and 12.3% of the population lived below the poverty level.²⁸⁸ The county serves as a western gateway to Atlanta, and it offers convenient access to Hartsfield-Jackson International Airport.²⁸⁹

Rapid growth is a defining characteristic of Douglas County. In a message from the Board of Commissioners available on Douglas County's web site, Chairman Tom Worthan characterizes the county as "a changing community—evolving from a rural area to suburbia and becoming the economic hub of west Georgia. However, we ensure that our growth is 'smart growth', and that the quality of life continues to be high for all our citizens."²⁹⁰ This stated goal of "smart growth" seems to drive Douglas County's sustainability measures, and green building is a significant component of the County's vision of smart growth.

Program Inception and Development

Many of Douglas County's sustainability initiatives were instigated as part of the County's application for the Atlanta Regional Commission (ARC) Green Communities Program. The program encourages local governments to demonstrate "leadership on environmental sustainability in the areas of conserving energy, investing in renewable energy, conserving water, conserving fuel, reducing waste and protecting and restoring the community's natural resources." Specific measures and benchmarks are required for communities to qualify, and a majority of Douglas County's sustainability practices aim to conform to these requirements.²⁹¹



The Emergency Operations Center in Douglas County collects and stores rainwater.

Douglas County's Green Community Ordinance, which the Douglas County Board of Commissioners ratified November 3, 2009, embodies the most significant sustainability measures enacted by the County. It requires New EnergyStar or EarthCraft Light Commercial certification in new construction or renovation of public buildings (subject to Board approval if meeting the certification adds costs exceeding \$10,000). This document also offers expedited plan review, processing, and permitting for privately owned buildings that have LEED, EarthCraft, or EnergyStar certification. Furthermore, it requires the installation of high efficiency water fixtures such as WaterSense certified toilets and faucets in new public building installations.²⁹² These

287 U.S. Census Bureau, State and County Quickfacts, <http://quickfacts.census.gov/qfd/states/13/13097.html>

288 *Id.*

289 <http://www.celebrate douglascounty.com/about/index.html>

290 <http://www.celebrate douglascounty.com/about/chairman.html>

291 http://www.celebrate douglascounty.com/view/departments/view_dept/&dept=360&department=Green%20Community%20Program

292 <http://www.celebrate douglascounty.com/view/global/viewdownload/>

DOUGLAS COUNTY, GEORGIA

66 Douglas County has also taken measures to make it easier for homeowners to install solar panels. The County adopted Chapter 26 of the International Residential Code, which prevents both homeowner associations and local government agencies from unnecessarily impeding installation of solar panels on residential structures.

sustainability requirements for local government buildings ensure that Douglas County leads by example in constructing green building.

Douglas County has also taken measures to make it easier for homeowners to install solar panels. The County adopted Chapter 26 of the International Residential Code, which prevents both homeowner associations and local government agencies from unnecessarily impeding installation of solar panels on residential structures.²⁹³

WaterFirst Community designation is required to be one of ARC's Green Communities. Douglas County received its designation as a WaterFirst Community from the Georgia Department of Community Affairs (DCA) on February 4, 2009. DCA cited the county's recent construction of a new wastewater treatment plant, as well as strong educational programming, stormwater management, and zoning and land use regulations as qualifications.²⁹⁴

Like Green Community designation, the Livable Centers Initiative (LCI) is offered by the Atlanta Regional Commission. The LCI is a program that encourages local jurisdictions to plan and implement strategies that link transportation improvements with land use development in order to create sustainable communities. The program provides grants to plan enhancements of existing transportation centers and corridors.²⁹⁵ The idea of creating sustainable, livable communities through linking

transportation improvements with land use development strategies is an example of the "smart growth" that Douglas County strives for. In March of 2007 Douglas County received an LCI grant for the Highway 92 Emerging Corridor. On September 20, 2011, Douglas County applied for an LCI Transportation Project Grant for a proposed multi-use trail and raised bridge connecting Deerlick Park, Chestnut Log, and Mt. Carmel School.²⁹⁶

Funding

Much of Douglas County's sustainability program was designed to have little or no impact on the County's budget. The County employs no extra staff to work on its sustainability initiatives. Many measures are coordinated by Mark Teal, the Director of Development Services and County Engineer.²⁹⁷ Incentives for private green building are not monetary; expedited permitting does not cost the County money, as they simply move qualifying projects higher up on the list.²⁹⁸ Ultimately, none of Douglas County's sustainability measures cost a significant amount of revenue. This allows the County to implement the steps necessary to achieve Green Community status without straining the \$77.4 million county budget.²⁹⁹

Results

As a result of its environmental sustainability initiatives, the Douglas County Courthouse received the Government Building of the Year Award for 2009-2010 from the Building Owners and Managers Association of Atlanta.³⁰⁰ The courthouse, which was built by the architecture firm Cooper Carry, also earned the US EPA's Energy Star Award in 2009.³⁰¹

Even more significantly, Douglas County met its goal of achieving Atlanta Regional Commission's Green Community status. It received the ARC's Bronze Green Community designation.

Ultimately, the Atlanta Regional Commission's Green Communities Program served as a guide for Douglas County's environmental initiatives. By tailoring its approach on the ap-

http://www.celebratedouglascounty.com/view/global/viewdownload/&docid=3388&file=/Green_Community_Ordinance_11-3-09.pdf

²⁹³ http://www.celebratedouglascounty.com/view/global/viewdownload/&docid=3386&file=/18_Community_Remove_Solar_Barriers.pdf

²⁹⁴ http://www.celebratedouglascounty.com/view/global/viewdownload/&docid=3389&file=/22_Government_DCA_WaterFirst_Community.pdf

²⁹⁵ http://www.celebratedouglascounty.com/view/departments/view_dept/&codept=266&department=Livable%20Centers%20Initiative

²⁹⁶ http://www.celebratedouglascounty.com/view/departments/view_dept/&codept=266&department=Livable%20Centers%20Initiative

²⁹⁷ http://www.celebratedouglascounty.com/view/departments/view_dept/&codept=292&department=Development%20Services

²⁹⁸ http://www.celebratedouglascounty.com/view/global/viewdownload/&docid=3388&file=/Green_Community_Ordinance_11-3-09.pdf

²⁹⁹ <http://www.celebratedouglascounty.com/view/global/viewdownload/&docid=3837&file=/2011Budget.pdf>

³⁰⁰ http://times-georgian.com/View/full_story/6480135/article-Courthouse-chosen-Government-Building-of-the-Year

³⁰¹ <http://www.coopercarry.com/awards/>

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“Ultimately, the Atlanta Regional Commission’s Green Communities Program served as a guide for Douglas County’s environmental initiatives.”

“Douglas County approaches sustainability with a limited scope. Their initiatives specifically limit the financial burdens; they seek to improve projects that are already required, such as purchasing Energy Star appliances or building more efficient buildings, and they do not use additional staffing to implement these changes.”

plication and relying on economically sustainable measures, Douglas County has achieved Bronze Green Community status. Its green buildings approach matches the government’s overall goal of “smart growth”.

Lessons Learned

Douglas County approaches sustainability with a limited scope. Their initiatives specifically limit the financial burdens; they seek to improve projects that are already required, such as purchasing Energy Star appliances or building more efficient buildings, and they do not use additional staffing to implement these changes. By taking a small, economically conservative approach to environmental sustainability, Douglas County’s initiatives avoid controversy while promoting the government’s vision of smart growth.

Other Initiatives

The County’s Green Community Ordinance’s impose a requirement of a ratio of 20 acres of greenspace per 1000 county residents. Another section of the ordinance guides the County’s policy toward its vehicle fleet’s size and makeup. Finally, it outlines green purchasing policies and a recycled product listing for the county government to follow.³⁰²

The Green Community Ordinance also guides county employees’ energy efficiency policy. It requires them to turn off all

lights and non-essential electronic equipment at the end of each work day, to consolidate public meetings when there are “less than four non-emergency, non-time sensitive items for vote on a regularly scheduled meeting agenda,” and to install energy efficient light bulbs when bulbs are replaced in government buildings.³⁰³

The local government has also adopted a Bike and Pedestrian Plan to encourage alternative transportation friendly policies. The Plan was adopted as a part of the Green Community application.³⁰⁴ Douglas County also offers nontraditional recycling facilities to deal with such waste as pesticides, herbicides, electronics, batteries, cell phones, and compact florescent light bulbs.³⁰⁵

Douglas County encourages mixed-use private development by offering Community Smart Growth Incentives / Bonuses. Specifically, increased density bonuses are awarded to developers for projects that incorporate mixed-use design principles as specified in Section 507, Article 5 of Douglas County’s Unified Development Code.³⁰⁶

Since 2004, Douglas County has adopted shared parking requirements; a green fleet policy for all newly purchased county vehicles, and a no-idling policy for government vehicles.

A Community Water Supply/Conservation Management Plan³⁰⁷ was also developed to help Douglas County’s Green Communities application and their long term environmental sustainability.

http://www.celebratedouglascounty.com/view/global/viewdownload/&docid=3374&file=/37_Government_No-Idling_Policy.pdf

http://www.celebratedouglascounty.com/view/global/viewdownload/&docid=3370&file=/23_24_25_Water_Use_Reduction_and_Efficiency.pdf

³⁰³ Ibid.

³⁰⁴ http://www.celebratedouglascounty.com/view/global/viewdownload/&docid=3379&file=/44_Community_Bike-Pedestrian_Plan.pdf

³⁰⁵ http://www.celebratedouglascounty.com/view/global/viewdownload/&docid=3385&file=/51_Community_Nontraditional_Recycling_Facilities.pdf

³⁰⁶ http://www.celebratedouglascounty.com/view/global/viewdownload/&docid=3386&file=/56_Community_Smart_Growth_Incentives.pdf

³⁰⁷ http://www.celebratedouglascounty.com/view/global/viewdownload/&docid=3370&file=/23_24_25_Water_Use_Reduction_and_Efficiency.pdf

³⁰² Ibid.

North Charleston, South Carolina

OAK TERRACE PRESERVE GREEN BUILDING PROGRAM

By Amble Johnson

Background and Description

Oak Terrace Preserve is a residential community located in the City of North Charleston, South Carolina. This development is an innovative example of a public/private partnership fostering the construction of green buildings. North Charleston's city government purchased the land with the goal of bringing environmental sustainability and economic stimulation to a blighted neighborhood.⁴¹⁴ Oak Terrace Preserve developers follow EarthCraft homebuilding guidelines.⁴¹⁵ When completed, Oak Terrace Preserve will house 374 families in single-family homes and townhouses in its 55-acre location.⁴¹⁶ Currently, approximately 100 homes are occupied, and under the current real estate market conditions, Oak Terrace Preserve anticipates constructing and selling the rest of the homes over the next three or four years.⁴¹⁷

Adherence to environmentally sustainable practices is an important qualifier for the homebuilders that Oak Terrace Preserve uses. The City pre-qualified four home builders that property owners can select to build homes in the subdivision. The builders are Carriage Hill Associates of Charleston, Crescent Homes, Pulte Homes, and the Verdi Group. All four are based in North Charleston or Charleston. Furthermore, while the developers follow strict sustainability guidelines for each home, they used custom and standardized floor plans. Each new house is individually designed in order to encourage a more aesthetically pleasing neighborhood.⁴¹⁸ Also, this approach allows for private homebuilders to tailor their construction to clients' wishes while assuring the government of the ecological benefits of the project. In ensuring the environmental sustainability of Oak Terrace Preserve homes, North Charleston left much leeway to



Street scene in Oak Terrace Preserve. Photo credits Southeast Watershed Forum.

“ This development is an innovative example of a public/private partnership fostering the construction of green buildings. ”

“ Adherence to environmentally sustainable practices is an important qualifier for the homebuilders that Oak Terrace Preserve uses. The City pre-qualified four home builders that property owners can select to build homes in the subdivision. ”

414 Home Depot Foundation Case Study of North Charleston, 2009; http://www.homedepotfoundation.org/assets/files/aoe_sod09_sc.pdf.
 415 Oak Terrace Preserve; <http://www.oakterracepreservecc.com/homes/earthcraft.html>.
 416 An interactive map of the property is available here: http://www.oakterracepreservecc.com/location/interactive_area_map.html.
 417 Interview with Keith West, Public Relations for Oak Terrace Preserve.
 418 Oak Terrace Preserve; http://www.oakterracepreservecc.com/homes/our_builders.html.

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“ The only specific requirements builders faced were to follow EarthCraft® building standards and to preserve the site's oak trees. ”

“ A number of manufacturers have been involved in implementing sustainable products and practices in the neighborhood, including the use of recycled materials for construction, no-VOC carpets, energy-saving lighting, and water-saving toilets. ”

“ The use of green building standards yields some market advantages for Oak Terrace Preserve as homebuyers look to engage in environmental sustainability while not sacrificing the convenient proximity to North Charleston and Charleston. ”



Sustainable technologies like the pervious paving above blend with old oak trees in this green development. Photo credits Southeast Watershed Forum.

developers. In selecting builders, it searched for those with a broad commitment to sustainability. The only specific requirements builders faced were to follow EarthCraft® building standards and to preserve the site's oak trees.⁴¹⁹

Another example of public-private cooperation in Oak Terrace Preserve is its partnership with private manufacturers. In the early 2000s, The Noisette Urban Alliance identified specifications for sustainable products in building sustainable homes. As the project evolved, a number of manufacturers have been involved in implementing sustainable products and practices in the neighborhood, including the use of recycled materials for construction, no-VOC carpets, energy-saving lighting, and water-saving toilets.

While the national real estate market is largely depressed, home sales in the Charleston area are rebounding, sparked by

retirees from the Southeast and the burgeoning technology and aerospace prospects of Boeing. The use of green building standards yields some market advantages for Oak Terrace Preserve as homebuyers look to engage in environmental sustainability while not sacrificing the convenient proximity to North Charleston and Charleston.

Program Inception and Development

Originally, Oak Terrace Preserve was a part of a much larger project conceived in conjunction with the Noisette Company that was generally known as “Noisette”. The goal of the Noisette Project was to revitalize North Charleston—its education, residences, economy, and ecology—through a large scale redevelopment of 3,000 acres centered on the redevelopment

419 Home Depot Foundation Case Study of North Charleston, 2009; http://www.homedepotfoundation.org/assets/files/aoe_sod09_sc.pdf.

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of the City's abandoned naval yard. The company held community meetings and newsletter communications to gauge the needs of North Charleston residents and businesses.⁴²⁰ Within this broad framework, Oak Terrace Preserve defined its mission as establishing a residential area with close proximity to businesses, schools, and recreation that nevertheless restores "the natural balance of nature that has been compromised by standard development practices."⁴²¹

Oak Terrace Preserve comprises 55 acres of the 3,000 acres that the City, Noisette and other investors planned to redevelop. The City of North Charleston purchased the 55 acres that was originally used to house World War II-era naval shipyard workers. Cedrus Development, LLC is now the project manager responsible for the development of the Oak Terrace Preserve community.⁴²²

While both the Noisette Company and Cedrus Development are private entities, North Charleston's mayor's office and the City Council were both involved in development of the program and in defining its scope over the last ten years, and they continue to be involved in promoting the development.⁴²³ The City Council deems completion and support of Oak Terrace Preserve one of the top priorities of the city's revitalization. The City of North Charleston recognizes Oak Terrace Preserve as a distinguishing feature for its community, and it strives to support the sustainable residential development as a catalyst for the revitalization of Park Circle.

Funding

Oak Terrace Preserve is a public-private project. The original master plan, incorporated into the city's Comprehensive Plan for redevelopment, initially estimated an aggregate \$1 billion in public and private investment throughout the 3,000-acre area over a 15-year period. While private construction and real estate companies market Oak Terrace Preserve, the city remains the landowner, and is responsible for infrastructure costs and the purchase of the development's 55 acres.

For its community revitalization needs, the City of North Charles-



Bioswales enhance water infiltration into the soil, reducing runoff. Photo credits: Southeast Watershed Forum.

“Oak Terrace Preserve inspired the development of nearby green neighborhoods like Mixson and Hunley Waters, and the sustainable retrofitting of existing homes throughout Park Circle.”

ton has utilized South Carolina General Assembly-approved Tax Increment Financing (TIF) districts, located both on and off the former naval base, for its ongoing infrastructure needs.

420 Noisette Master Plan, Chapter 1: Vision; <http://www.noisettesc.com/masterplan.html>.

421 Oak Terrace Preserve FAQs, 1.

422 See Oak Terrace Preserve Press Release dated March 8, 2010; available at: <http://blog.oakterracpreserve.com/wp-content/uploads/2010/03/DTP-NewsRelease-CedrusContract.pdf>.

423 <http://www.postandcourier.com/news/2011/mar/22/noisette-at-10-years/>.

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Basically, TIF is a method to use future gains in taxes to finance current improvements, which, in theory, will create conditions for those future gains. When public projects are built, there are often gains in the value of surrounding properties, thus luring investment – consequently, the increased site value and investment generates new tax values for the municipal government of the city.

A major objective of the city's revitalization was developing new infill neighborhoods in Historic Park Circle, which had not witnessed new home construction on this scale for more than 50 years. Thus, the TIF investment in Oak Terrace Preserve is deemed a breakthrough, as young families are now moving back to Park Circle.

Before the revitalization of Park Circle, Park Circle neighborhoods did not generate enough tax revenue to support the services they received, including fire and police protection.

Current estimates indicate that Oak Terrace Preserve, upon final build out to 374 homes will generate a new tax base of \$75 million in city and county collections (based on an average value of \$200,000 per unit cost X 374 units) in a once heavily blighted area.

Oak Terrace Preserve inspired the development of nearby green neighborhoods like Mixson and Hunley Waters, and the sustainable retrofitting of existing homes throughout Park Circle.

The Home Depot Foundation estimated Oak Terrace Preserve's costs at \$13.4 million for the first phase of the development, \$4.7 million of which was made up by land costs.⁴²⁴

Results

In the early stage of the revitalization, political division surfaced in North Charleston over the role of government in community development, and there was some dissension over the city's role in residential development. After the completion of Phase One for 100-plus homes, Oak Terrace Preserve is popularly viewed as a source of pride for North Charleston residents. Recognitions for the development include honors from *Cottage Living Magazine*, *Green Builder Magazine*, and *Men's Journal*, as well as the reader-voted "Best New Development"

424 Home Depot Foundation Case Study of North Charleston, 2009; http://www.homedepotfoundation.org/assets/files/aoe_scd09_sc.pdf.

“In its award, the Foundation cites Oak Terrace Preserve first in its section ‘Successful Implementation of Plan’ for exemplifying intelligent planning in the areas of ‘Housing, Natural Resources, Land Use & Development, and other categories.’”

by local *Charleston City Paper*.⁴²⁵ Those involved in Oak Terrace are most proud of North Charleston's 2009 recognition by the Home Depot Foundation for the prestigious "Award of Excellence for Sustainable Community Development".⁴²⁶ In its award, the Foundation cites Oak Terrace Preserve first in its section "Successful Implementation of Plan" for exemplifying intelligent planning in the areas of "Housing, Natural Resources, Land Use & Development, and other categories."⁴²⁷

The City was awarded the National League of Cities Award for Municipal Excellence in late 2010, which was partially attributed to the implementation of the sustainable Oak Terrace Preserve project. In 2011, Oak Terrace Preserve was named a global finalist in Project Award Category for The International Awards for Livable Communities, a United Nations-supported sustainability initiative. (See www.northcharleston.org)

Currently, about 100 of the anticipated 374 family housing units are occupied, despite the generally depressed market for new homes.⁴²⁸ The average home price is \$219,000. The area is a big draw for its proximity to good schools and North Charleston and Charleston resources.⁴²⁹ In 2005, the North Charleston Elementary School, another component of the City's original vision, opened as the South Carolina's first LEED-certified elementary school. *Newsweek* rated the Charleston County Academic Magnet High School (which also has an environmentally sustainable campus) as one of the top 15 public high schools.⁴³⁰ Some credit North Charleston's "long view" toward

425 <http://www.oakterracepreservesc.com/news/>

426 Interview with Keith West, Public Relations for Oak Terrace Preserve

427 Home Depot Foundation Case Study of North Charleston, 2009; http://www.homedepotfoundation.org/assets/files/aoe_scd09_sc.pdf.

428 Interview with Keith West, Public Relations for Oak Terrace Preserve

429 Home Depot Foundation Case Study of North Charleston, 2009; http://www.homedepotfoundation.org/assets/files/aoe_scd09_sc.pdf.

430 "America's Best High Schools," *Newsweek*, May 27, 2007.

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sustainable community development—reflected in initiatives like Oak Terrace Preserve and school improvement—with attracting developments such as the Boeing assembly plant and Clemson University Restoration Institute that have recently located in the area.⁴³¹

Lessons Learned

While the development is broadly seen as having a positive impact on North Charleston, it has faced challenges. For example, the original residences at Century Oaks were unfit for habitation, and largely abandoned. The neighborhood faced major problems with obsolete housing and infrastructure in the former Century Oaks, dating back to World War II-era housing which had a projected ten year lifespan. In order for Oak Terrace Preserve to be built, the dilapidated housing of its predecessor, Century Oaks, had to be removed, so North Charleston provided consultation and financial help to relocating residents. In attracting new residents with improved schools, infrastructure, and housing, the city government assured that resources are available for current residents' use. City ordinances have evolved to better foster Oak Terrace Preserve's vision, and new, innovative amenities were added, like the stormwater management system. These steps include adjusting zoning requirements to allow for the setbacks that preserved Oak Terrace Preserve's oak trees.⁴³²

More broadly, the challenges and success of Oak Terrace Preserve and the Noisette Company offer lessons for broad urban revitalization efforts. The company's efforts were assisted by public involvement and focus on specific initiatives, but they were hampered by ambitious scope and turmoil in national financial and housing markets by 2008.

Other Initiatives

In addition to requiring homes constructed according to Earth Craft guidelines, Oak Terrace Preserve utilizes a number of other low impact development (LID) practices to minimize the environmental impact of the neighborhood. One significant practice is the inclusion of advanced environmental stormwater treatment systems such as using rain garden, bioswales, road side infiltration areas, pervious pavers, and forebays that are interconnected with perforated piping to continually promote

infiltration and retention of stormwater on site, while also preventing flooding of adjacent properties.⁴³³ Pervious walkways and on-site rainwater harvesting techniques, such as rain barrels or cisterns, are used throughout the community, but these are not connected to the piped network though they contribute to reducing the speed and volume of stormwater leaving the site.⁴³⁴ Oak Terrace Preserve has been a leader in implementing stormwater best management practices, and it has been held up as a model for other communities. The development's LID stormwater practices serve as the basis for a guide published by the South Carolina Department of Natural Resources and a number of environmental organizations to instruct other home owner associations in the implementation and maintenance of LID stormwater infrastructure.⁴³⁵

Additionally, public frontage tightly follows set standards. Oak Terrace Preserve mandates the number of ornamental shrubs, canopy trees, and under story trees per 100 lineal feet of frontage, based on which of two types that the buffer area fits.⁴³⁶

Oak Terrace Preserve also allocates certain areas as "Pocket Parks" which ensure preservation of the area's trees and provide passive recreation. A "Pedestrian Green Way" ensures public access between "Public Parks". And "Community Links"

“Oak Terrace Preserve utilizes a number of other low impact development (LID) practices to minimize the environmental impact of the neighborhood. One significant practice is the inclusion of advanced environmental stormwater treatment systems such as using rain garden, bioswales, road side infiltration areas, pervious pavers, and forebays.”

431 Interview with Keith West, Public Relations for Oak Terrace Preserve

432 Home Depot Foundation Case Study of North Charleston, 2009, http://www.homedepotfoundation.org/assets/files/aoe_scd09_sc.pdf.

433 "Beyond Pipe and Pond: Oak Terrace Preserve Case Study" Clemson Coastal Research and Education Center; August 6, 2010; power point presentation available at: http://www.dnr.sc.gov/marine/NERP/present/pipepond/DeebHorton_OakTerracePreserve.pdf

434 "Low Impact Development: Stormwater Series," S.C. Sea Grant Consortium, available at: http://www.sceagrants.org/pdf_files/lid_final_brochure.pdf. This brochure also contains helpful descriptions and illustrations of some of the stormwater management practices implemented at Oak Terrace Preserve.

435 "Maintenance of Low Impact Development (LID) Stormwater Practices: Guidance for Homeowners Associations Based on Oak Terrace Preserve in North Charleston, SC," available at: <http://www.dnr.sc.gov/marine/NERP/pdf/LIDMaintenanceBrochure.pdf>

436 "Oak Terrace Preserve City of North Charleston Final Application for Planned Development District (PDD)", March 2005

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serve to connect the community as a whole. This includes greenways, bike trails, and other passages, and may follow natural or man-made corridors. All of these open space features contribute to the stormwater management, plant preservation, and natural aesthetic of Oak Terrace Preserve.⁴³⁷ Stormwater management and local species preservation are major focal points of landscaping rules. Impervious pavement is limited to 10% of a lot's surface area, and non-native turf is limited to 20%. The rest of the yard should be native plants of varying species, although they may be arranged formally by the owner. Permanent irrigation is permitted, and is encouraged to link with graywater or rainwater collection systems.⁴³⁸

Oak Terrace Preserve's LID practices also focus on lighting for outdoor spaces. To reduce development impact on natural environments, and to minimize light trespass and improve night sky access, Oak Terrace Preserve's builders are encouraged to follow lighting guidelines outlined in the IESNA Recommended Practice Manual: Lighting for Exterior Environments (IESNA RP-33-99).

These LID practices support Oak Terrace Preserve's overall goal of environmentally aware housing and community design. Such a comprehensive approach to green living also distinguishes Oak Terrace Preserve to homebuyers.

“Oak Terrace Preserve also allocates certain areas as “Pocket Parks” which ensure preservation of the area’s trees and provide passive recreation.”



A pocket park at Oak Terrace Preserve provides a scenic stop where neighbors can meet. Photo credits Southeast Watershed Forum.

437 Ibid.

438 *Id.*