Case Study of the Village at Port Royal, SC:
Comprehensive Report of the Impact of Urban Design on Water Resources

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THE VILLAGE AT PORT ROYAL
(PORT ROYAL, SOUTH CAROLINA)

INTRODUCTION

The Village at Port Royal is a 50-acre New Urban development within the Town of Port Royal, located in coastal Beaufort County, South Carolina. Strong desire to reverse its decades-long trend of economic decline and capture some of the growth enjoyed by the rest of Beaufort County prompted Port Royal officials to adopt a master plan developed according to the principles of New Urbanism. The new master plan would create more sustainable redevelopment of the 440-year old town. Town officials and residents justified their response by the opportunity to simultaneously recapture Port Royal’s regional importance and protect the adjacent Beaufort River and Battery Creek.

The most critical factor to Port Royal’s successful steps toward revitalization and protection of both cultural and natural resources has been its willingness to negotiate within the structure of its master plan. This negotiability has invited tremendous participation on the part of the public and developers. The result has been a town where practically everyone has been intimately involved in the development of the Port Royal Master Plan and Comprehensive Plan. The best example of this is the temporary residence of the master plan designer and his family in the town for nearly two months. His presence in the community provided unparalleled opportunity for public access to the planning process and gave the designer a deep understanding for the unique qualities that define Port Royal. The product of these ingredients is a master plan that nurtures the rebuilding of the community’s urban foundation while preserving and protecting its environmental integrity.

Three issues define how the Village at Port Royal (hereafter, the Village) impacted the Beaufort River and Battery Creek. These issues derive from two land use policies used to guide development and the implementation of those policies through site design.

The first issue dealt with maintaining the Village’s unpaved pervious surface areas. The economic decline of the town since the end of World War II resulted in numerous vacant lots, unpaved streets, and unpaved parking areas. Low imperviousness allowed the sandy soils upon which the town is built to soak up rainfall and gradually release it into the saltwater marshes that buffer the Beaufort River and Battery Creek. Determined to preserve this feature, the town adopted a comprehensive plan in 1999 that specifically identified low imperviousness as a useful implementation strategy to ensure the maintenance of higher water quality, control stormwater runoff, and protect waterways and wetlands. This strategy was made manifest on each building site through the Traditional Town Overlay District Code, part of the Port Royal Comprehensive Plan.

The second issue involves how to preserve the Village’s natural areas to protect the Beaufort River and Battery Creek from stormwater runoff. The town wanted to minimize the disruption of natural hydrologic systems through more sustainable redevelopment.
Thus, when the town adopted its comprehensive plan in 1999, it specifically identified several implementation strategies to protect and buffer hydrologically sensitive areas. These strategies were implemented on a neighborhood scale through the Port Royal Master Plan, which was incorporated into the Port Royal Comprehensive Plan.

The third issue is the Village’s relaxed stormwater regulations. Although the South Carolina Coastal Zone Management Program requires stormwater management for all jurisdictions in the state’s eight coastal counties, some communities impose more control than others. Beaufort County requires all new developments to control as much runoff as would be produced by severe storms that occur once every 25 years, while the Town of Port Royal only requires control for runoff produced by less severe storms (once every ten years). Beaufort County argues the Town of Port Royal uses lower standards to attract new development at the cost of watershed degradation.

SETTING

The Town of Port Royal is located on the southern coast of South Carolina in Beaufort County, halfway between Charleston, South Carolina and Savannah, Georgia. The site is at the southern tip of a peninsula at the confluence of the Beaufort River, Battery Creek, and the Atlantic Ocean (see Figure 1). Marshes separate the town on its east, south, and west sides from the estuary. The town sits five feet above the tidal marsh on a flat “tabletop” of sandy loam. Sandy loam acts like a giant natural sponge – it absorbs water quickly and does not easily erode. When rain falls, the saturated loam allows water to seep slowly into the marsh. Ponds, streams, wetlands, and woodlands green the interior portions of the town (see Figure 2).
During the 1980’s, Port Royal’s population remained stagnant, as the community was bypassed by development and growth elsewhere in Beaufort County, including the prestigious resort community of Hilton Head Island. Port Royal began to capture some of the growth in South Carolina’s fastest growing county in the 1990’s through redevelopment and annexation (see Table 1).

**TABLE 1: POPULATION AND POPULATION GROWTH FOR POLITICAL JURISDICTIONS THAT CONTAIN THE PORT ROYAL OVERLAY DISTRICT**

<table>
<thead>
<tr>
<th>SPATIAL UNIT</th>
<th>POPULATION</th>
<th>POP CHANGE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOWN</td>
<td>2,977</td>
<td>2,985</td>
</tr>
<tr>
<td>COUNTY</td>
<td>65,364</td>
<td>86,425</td>
</tr>
<tr>
<td>STATE</td>
<td>3,121,820</td>
<td>3,486,310</td>
</tr>
</tbody>
</table>

*Source: U.S. Census Bureau*

The marked contrast between Port Royal’s near-zero growth in the 1980s and strong growth in the 1990’s reflected the beginning of redevelopment and a more aggressive annexation policy by the town in the 1990’s. The 1994 South Carolina Comprehensive Planning Enabling Act proved the catalyst for town officials to inject new life and development into Port Royal through a new master plan. With wide public participation and the guidance of a prominent New Urban design firm, the town embraced New Urbanism as their future and approved a master plan in 1996. A Traditional Town Overlay District Code was adopted as part of the master plan in 1997 to ensure New
Urban conventions would be carried out at the individual building sites. Both documents were adopted as part of the Port Royal Comprehensive Plan in 1999. The town then used their comprehensive plan as a blueprint for future development. The town also proactively sought annexation of unincorporated adjacent parcels to boost its tax base and extend the New Urban design philosophy across a larger area to complement the New Urban redevelopment of the town’s core. Port Royal’s efforts to capture Beaufort County growth yielded a population increase of nearly 1,000 people between 1990 and 2000, compared to an increase of only eight between 1980 and 1990.

SITE DESIGN FEATURES

Featured in "Architecture" and "Builder" magazines, the Village at Port Royal was selected by the Congress for the New Urbanism as one of the Top Ten Traditional Neighborhood Designs in the United States for 1996 (Habersham Land Company 2001). The Village was developed on the same urban framework that has characterized Port Royal since the 18th Century (see Figure 2). The streets cross each other at right angles, creating short blocks with sidewalks. Outside the Village, however, there are entire blocks that lack houses or commercial buildings. Historic renovation and new construction contrast with older, dilapidated structures and aging mobile homes that reflect the hard economic times endured by Port Royal over the past 50 years. Since then, new construction has been steady and the town’s built environment continues to grow through small developments such as the Village, building rehabilitations, and new public buildings along Paris Avenue, the main downtown thoroughfare. The new civic buildings include Port Royal’s town hall, senior citizens center, police station, fire station, post office, and elementary school (see Figure 3).

![Figure 3. Port Royal Civic Buildings](image-url)
Many of the parking facilities, streets, and alleys in and near the Village are pervious (see Figure 4). There are curbs, gutters, and parking along Paris Avenue, although there is little surface paved parking. The largest surface parking areas are near the three principal civic uses: post office (north), the school (midtown), and town hall (south). Furthermore, Port Royal has not installed curbs and gutters along streets in the Village. Most streets are narrow, about 12 feet wide, with shallow grassy swales on either side to accommodate runoff. Since the sandy loam allows rapid infiltration, the town maintains that this method of stormwater management will remain environmentally and fiscally prudent as the town redevelops.

![Figure 4. Pervious Alley and Parking Areas in the Village at Port Royal](image)

The growth of Port Royal in the 1990’s is a direct testament to urban revitalization and annexation. Significant portions of surrounding areas of Beaufort County are now part of the Town of Port Royal in addition to its historic core (see Figure 5). Commercial and office development has returned along Paris Avenue, along with new residential construction. Currently, there are two units for sale in Port Royal’s historic core, that were built after the town adopted its master plan in 1996: a 1,000-square foot condominium for $105,000 and a 2,000-square foot house for $184,000 (National Association of Realtors 2003).
LAND USE POLICY FRAMEWORK

Two key land use policies influenced how the Village impacted the Beaufort River and Battery Creek: 1) The 1994 South Carolina Comprehensive Planning Enabling Act, which mandated the 1999 Port Royal Comprehensive Plan and 2) The South Carolina Coastal Zone Management Program.

The Comprehensive Planning Enabling Act of 1994 mandated all local jurisdictions in the State of South Carolina pass comprehensive land use plans in accordance with state guidelines within 5 years (Municipal Association of South Carolina and the South Carolina Association of Counties 1994). This act proved the catalyst for the Town of Port Royal to take the initiative to reverse five decades of economic decline and disinvestment. Town leaders hired a new town manager with a background in finance, organized themselves around the common goal of urban renaissance, and educated themselves about the potential of New Urbanism to achieve more sustainable redevelopment. The town contracted one of the most prominent New Urban design firms in the United States to develop a new master plan. After two years of public meetings, design charrettes, seminars, and workshops, the head designer moved to Port Royal with his family and lived there for nearly two months while he drafted the Town of Port Royal Master Plan. The town approved its new master plan in May 1996.
The town then used its master plan as a blueprint for a comprehensive land use plan that would satisfy the Comprehensive Planning Enabling Act. In October 1997, the town passed a code that would apply New Urban design conventions to individual buildings in the town’s historic core. The Traditional Town Overlay District Code and the approved master plan were then integrated into the Port Royal Comprehensive Plan. Adopted in March 1999, the Port Royal Comprehensive Plan heralded a new era for the second oldest community in the United States. The comprehensive plan served as a road map for Port Royal to revive itself while preserving the environmental features that defined its unique character.

The South Carolina Coastal Zone Management Program (SCCMP) governs the stormwater management of redevelopment projects in the state’s eight coastal counties. The program publishes its regulations in the South Carolina Stormwater Management and Sediment Control Handbook for Land Disturbance Activities (State of South Carolina 1998). The SCCMP specifies that all projects within one-half mile of Coastal Zone receiving water bodies are subject to stormwater regulation. Specifically, the SCCMP mandates coastal jurisdictions control runoff such that “Post-development peak discharge rates shall not exceed pre-development discharge rates for the 2- and 10- year frequency 24-hour duration storm event” (State of South Carolina 1998, p. 22). As Beaufort County and the Town of Port Royal are both coastal jurisdictions, developments in these communities must control runoff for storms as severe as the 10-year event. However, the SCCMP also provides an option for more stringent control: “Implementing agencies may utilize a less frequent (more severe) storm event (e.g. 25-year, 24-hour) to address existing or future stormwater quantity or quality problems.”

Beaufort County chose more stringent control, but Port Royal did not. The result is two different stormwater policies in neighboring jurisdictions, one more demanding of developers than the other. Some Beaufort County planners and stormwater managers claim that weaker Port Royal stormwater regulations, caused by lack of town resources, have made the idea of development in Port Royal more attractive. These county officials maintain that Port Royal’s aggressive annexation policy has been successful because development in Port Royal only has to meet the town’s lower standards. Port Royal planners and the town manager, on the other hand, admit that while resources do not allow an extensive built stormwater management system, their use of natural hydrology and low imperviousness controls and treats runoff better than an extensive pipe system. These Port Royal officials maintain that they pursue annexation to increase the town’s tax base and extend the Village concept of sustainable planning practice over a broader area. Different attitudes among county and town planners over watershed protection have created political tension.

SITE DESIGN

South Carolina’s and Port Royal’s land use policies translated to three site design issues that defined the Village’s impact on the Beaufort River and Battery Creek. First, the Port Royal Comprehensive Plan specifically called for less imperviousness to protect water resources. Accordingly, the Village is composed of multi-story homes, narrow gravel
streets and alleys, and grassy swales to accommodate runoff. Second, the Port Royal Comprehensive Plan also prescribed the protection of natural features to control and treat stormwater. This was accomplished through tidal marsh buffers and a system of natural ponds and wetlands to simultaneously control stormwater and shelter local wildlife. Finally, the Town of Port Royal Stormwater Management Plan followed the minimum control guidelines required by the South Carolina Coastal Zone Management Program (SCCMP). Its flexible, less rigid approach has made annexation to Port Royal more attractive to Beaufort County developers. However, while town officials view annexation as an opportunity to extend the Village concept of natural stormwater management, Beaufort County planners lament the loss of land subject to their stricter stormwater control standards as a move toward watershed degradation.

Section Three of the Port Royal Comprehensive Plan is the Natural Resources Element. The Natural Resources Element contains goals that guide the town’s vision to “preserve and enhance its natural beauty, environmental quality, and manmade resources, ensuring harmony between the natural and manmade environment” (Town of Port Royal 1999, p. 16). Goals Two and Three focus on watershed protection, respectively the “maintenance of high standards of air and water quality and quantity” and “the protection of waterways and wetlands” (p. 16). Each of these goals is supported by implementation strategies that protect watersheds through reduced imperviousness and protection of natural areas. 

**Imperviousness**

The Town of Port Royal Comprehensive Plan promotes imperviousness reduction. The plan states that to maintain high standards of air and water quality and quantity (Goal Two), the town should limit impervious surfaces. Furthermore, the plan states that to protect waterways and wetlands (Goal Three), the town should design roadways to reduce stormwater runoff by minimizing the total amount of impervious surfaces. The Village at Port Royal implements these strategies through the design of its circulation system and buildings. These design elements are outlined in the Traditional Town Overlay District Code.

The circulation system of the Village retains the street network already in place. Madrid Avenue and 7th through 14th Streets remain narrow (about 12 feet wide) and unpaved, while Paris Avenue was widened for parking, paved, curbed, and guttered. The other streets are not paved and curbed so that stormwater may infiltrate the streets while reduced runoff flows into the grassy swales and yards on either side (see Figures 6 and 7). The town waived eight feet of road right-of-way along these streets to shorten building setbacks. Less yard space between buildings and the street translates to shorter driveways and less imperviousness. Most driveways and alleys are also unpaved. Therefore, they can absorb more rainfall (see Figure 4).
The amount of parking along Paris Avenue is kept to a minimum by sharing facilities among the post office, elementary school, and town hall. Homes and businesses outside the Village are also kept close to the street, reducing the length of driveways and front walks. Parks and recreation areas are kept free of paved surfaces, except for some play courts (see Figure 8).
Buildings are encouraged to be multi-story wherever possible to reduce the building footprint, including traditional two-story homes (see Figure 9). This approach, supported by the Traditional Town Overlay District Code, was also applied to the Port Royal Elementary School (see Figure 3).
Natural Area Protection

The Town of Port Royal Comprehensive Plan prescribes natural area protection. The plan states that to maintain high standards of air and water quality and quantity (Goal Two), the town should designate areas for uses compatible with their natural functions and place appropriate vegetative buffers between receiving water bodies (marshes, creeks, and rivers) and the areas of heaviest land use. Furthermore, the plan states that to protect waterways and wetlands (Goal Three), the town should discourage the trading or filling of wetlands by developers because of wetlands’ capacity to filter pollutants and control flooding and erosion. According to the plan, the town should establish greenways around urban areas and design stormwater drainage systems to better mimic the path of runoff in natural systems. The Village at Port Royal exemplifies the town’s implementation of these strategies through an elaborate system of hydrologically sensitive areas to clean and control runoff.

The Town of Port Royal preserved natural areas to detain and treat stormwater runoff before it reaches Battery Creek and the Beaufort River. Aside from the grass swales used to filter runoff along streets, the Town has preserved the freshwater marshes and wetlands that drain much of the town from north to south (see Figures 10 and 11). This marsh-and-wetland system takes the place of a constructed stormwater pond system. The Town uses the system for natural drainage and, in extreme rainfall events, pumps excess runoff from the Village stormwater pond to the “headwaters” of the wetland-mash system. The runoff then meanders through the marshes and wetlands of the town before it reaches Battery Creek and the Beaufort River. The freshwater marshes provide runoff control, biofiltration, and a natural sanctuary for local wildlife. The town considers this method of stormwater treatment superior to constructed detention facilities because it utilizes the land’s natural hydrology.

![Figure 10. Port Royal Wetlands / Rookery System](image)
Stormwater Regulation

The Village essentially covers seven urban residential blocks near the Town Hall at the southern end of the Traditional Town Overlay District (see Figure 12). The entire site consisted of about 141 single-family homes built on 50 acres and was subject to stormwater regulations under the South Carolina Coastal Zone Management Program. A stormwater detention pond was placed between the saltwater marsh and the railroad tracks with an outflow through a series of rip-rap and then saltwater marsh (see Figure 13). Originally, stormwater from this section of town flowed directly to Battery Creek through a grassy swale that led to the creek. The swale still remains, but now it channels water into the pond for detention and settling before the water flows into the saltwater marshes of Battery Creek.
The developer also installed a system of flashboard risers in the pond. These risers, when in place, prevent outflow from the pond to the marsh when the pond is at higher levels due to heavy rainfall. The risers act as plugs in the outflow pipe from the pond to the rip-rapped channel leading to the Battery Creek marshes. The risers keep the water in the pond longer to allow more sediment and other pollutants to fall out. The risers also allow water to be detained long enough for pumps to move excess water from the pond to the head of the town’s wetland-marsh system (see Figure 10). During a 100-year storm, these risers may be removed if water overwhelms the pumping system. Direct flow to Battery Creek during an extraordinarily heavy rain prevents flooding in the Village’s yards and homes.

There has been significant commentary, some of it critical, by involved parties toward Port Royal’s ability to handle stormwater. This criticism has been particularly sharp by Beaufort County planners and stormwater managers as they watch developers vie for annexation into Port Royal to capitalize on the town’s more flexible approach to watershed protection. Some contend that Port Royal’s stormwater management program lacks the sophistication expected under Beaufort County standards and guidelines. A few have pointed out that flooding is quite common in Port Royal because of a high water table and few storm drains to accommodate runoff. Though the town’s sandy soils drain well, the lack of topography and ubiquitous tidal creeks, marshes, and wetlands can slow drainage during heavy rains and create tremendous ponding in Port Royal’s swales, yards, and parking areas. Another criticism is that Port Royal relies too heavily on natural drainage areas such as wetlands to accommodate heavy runoff and does not make a big enough investment in built stormwater detention facilities. Critics claim that while such practice may not be problematic now, non-investment in stormwater management...
can become a serious issue as redevelopment becomes more intense. The town has admitted that while it supports natural methods of stormwater management, it also lacks the funds to implement more stringent controls through a manmade system.

CONCLUSION

What Worked?

The positive aspects of Port Royal are many. The town represents perhaps the best example of New Urbanism’s potential: restoration of an old town to corral sprawl in surrounding communities in a more sustainable and compact, urban form. The urban framework for Port Royal is already established, so disturbance due to construction is minimal. Vegetation is mature and the drainage patterns have already acclimated to the presence of human disturbance on the site. Furthermore, there are no steep slopes and the soils drain easily. The town has been careful to preserve the water resource features it has and to use natural areas as much as possible to treat what runoff does occur. The opportunities for natural treatment are plenty: grassy swales, sandy soils, natural ponds, freshwater and saltwater marshes, and wetlands. Each plays a role in the sites hydrology to clean the water and slow it down before it empties into the estuary formed by the confluence of the Beaufort River, Battery Creek, and the Atlantic Ocean. To allow these natural areas to do their job, the town minimizes imperviousness through gravel alleys and driveways, shared and unpaved parking, uncurbed streets, and taller, narrower buildings.

What Did Not Work?

The major weaknesses of Port Royal may be exposed as more of the town redevelops. Simply not enough of the town has been rebuilt to determine whether the natural protection approach to stormwater management used for the Village and adjacent areas will work. There are many vacant lots and the downtown commercial district does not currently demand the level of traffic that will test the ideas of shared parking and narrow roads. Newer, larger developments are now planned along Ribault Road, the major highway that connects the historic core of Port Royal to recently annexed Port Royal neighborhoods, the City of Beaufort, and Hilton Head Island (see Figure 2). Critics’ fears about flooding and overload of current facilities may become a reality once these larger projects are in place and create new runoff.

One potentially disturbing trend evident through annexation is that Port Royal does not impose as stringent standards for runoff mitigation as surrounding Beaufort County. While Beaufort County requires that developments be designed for 25-year flood events, Port Royal has more relaxed regulations that only require designs for 10-year flood events. There is some suspicion by the county that the recent surge in annexations to Port Royal are based more on the desire by developers to avoid county stormwater regulations than a desire to be part of Port Royal’s urban renaissance.
What Did the Village at Port Royal Teach Us?

Port Royal refused to fade away from neglect and disinvestment as many had expected. A planning impetus from the State of South Carolina and the insights of a creative developer and visionary town manager combined to give the town new life. The state’s call for local comprehensive plans, the opportunity to capitalize on the booming growth in Beaufort County, and the tenacity of its citizens produced a new master plan and comprehensive plan that mapped Port Royal’s road to recovery. The developer of the Village at Port Royal quickly put the ideas into practice and the town began to resuscitate. Homes were constructed and bought, dilapidated structures torn down, and renovations begun. In just one year the Port Royal Elementary School doubled its enrollment. Spin-off development began to surface as word spread about new life in Port Royal. Town government worked hard to keep civic institutions like a new post office, town hall, and elementary school in the downtown district. Other businesses soon followed. Riding their success and a new wave of tax revenue, the town moved forward on a vigorous annexation program to spread its vision across a larger portion of Beaufort County. The momentum continues unabated.

Despite the positives, Port Royal must diligently adhere to its master plan and the plan’s goals of conservation, preservation, and sustainable urban form. Deviation from these to accommodate the pressures of sprawl that threaten other parts of Beaufort County would unravel the sustainable community fabric the town has labored to weave. The town is literally in the midst of a fragile environment that could not sustain major impacts to its waterways and wetlands as a result of poor development practice. The Town of Port Royal must maintain its delicate balance between urban growth and natural preservation to stay on its chartered course.

REFERENCES


