

**SEWER SERVICES IN THE UPSTATE  
MEETING THE CHALLENGE**

*A Twenty Year Plan From the Upstate Roundtable  
May 2009*



**UpstateRoundtable**

*A Five County Infrastructure Consortium  
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# **Executive Summary**

## **EXECUTIVE SUMMARY**

Regional comprehensive planning is most successful when the effort is coordinated among all stakeholder groups. The State of South Carolina has a process which calls for all its counties to produce a comprehensive planning study on a ten-year cycle.

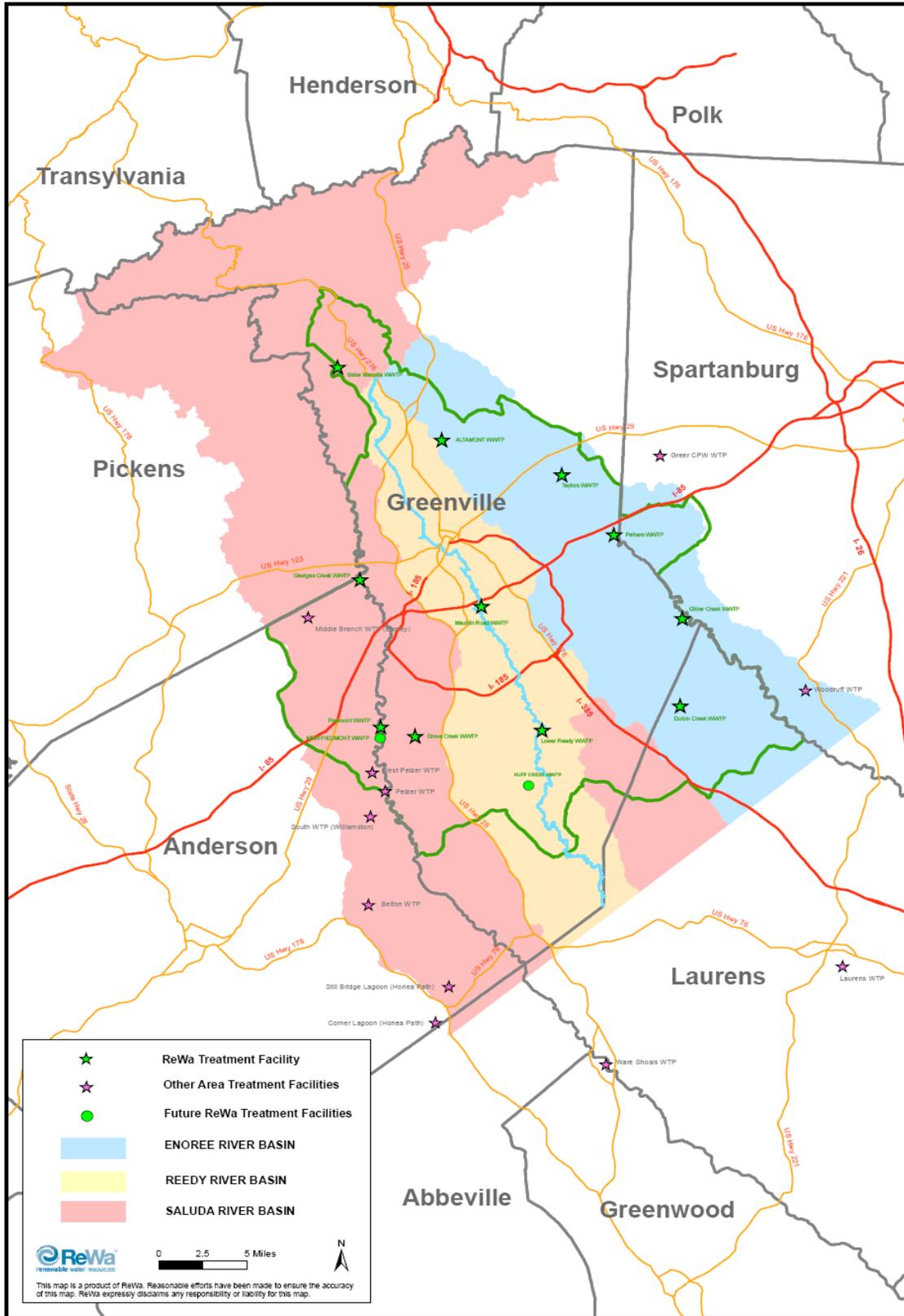
An important element of county wide planning is the plan for wastewater and water infrastructure. Conversely, an important element in wastewater and water infrastructure planning is the county-based plans for land use, roads, schools, future employment, and the like. Renewable Water Resources (ReWa) Board of Commissioners recognized this opportunity and decided to advance its 20 year planning process to coordinate with the statewide planning, thus allowing both plans to benefit from proactive, two-way involvement. It set a target for early 2009 to complete the report, obtain widespread support, and start implementation.

As a wastewater public utility in a growing metropolitan area, ReWa convened a volunteer collaboration to strategize an effective and environmentally sound direction for the organization to pursue long-term. The collaboration was named Upstate Roundtable and given the goal of aligning the regional wastewater system capacity and infrastructure with projected growth of Upstate South Carolina, while promoting environmental sustainability. Initially developed in 1994 and reconvened in 2008, the strategic planning group brought together over 60 community, governmental, and industry leaders to devise a 20-year plan guiding the future of ReWa. The series of recommendations developed by the Upstate Roundtable addressed the areas served by ReWa in the five Upstate counties of Anderson, Greenville, Laurens, Pickens, and Spartanburg. (Figure 1)

The planning took a regional approach. Since the principles of wastewater collection, treatment and reuse depend on a watershed more than political boundaries, this effort considered the needs of the three river basins in the Upstate, namely the Saluda, Reedy, and Enoree Rivers. As a result, Anderson, Greenville, Laurens, Pickens, and Spartanburg Counties were part of the plan.

Capacity, products, sustainability, and funding were the major concepts emerging from the planning effort. Capacity addresses what, where, and when wastewater collection and treatment facilities are needed. The product concept focuses on the outcomes or results of collecting and treating wastewater. These outcomes or results have a value to the community and can reduce the net cost of producing renewed water. Sustainability addresses ways that ReWa can provide its services while minimizing unnecessary consumption of resources and promoting stewardship of water, land, energy, and regional cooperation for the Upstate's next generation. Multiple sources of funding will need to be developed as no one or two resources can provide the financing for all the recommendations.

**Figure 1. Upstate Roundtable Three Basin Study Area**



Assessing current and needed future facilities was an important part of the planning process. It involved projecting Upstate growth followed by quantifying the amount and location of wastewater resulting from such growth. The first step was accomplished by assembling Upstate professionals experienced with planning and regional growth to project the areas and timing of development likely to occur during the 20-year planning period. These professionals identified factors influencing growth, such as roads, schools, land use, water, and sewers. It then used the collective experience of the committee members and their knowledge of those factors to project where growth would occur and during what time. The county councils will ultimately determine the growth patterns. The Growth Committee believes that this pattern is most likely to occur based on recent and current development trends. It is obviously more difficult and expensive to provide wastewater services to a population that is widely dispersed across a region. Development of infill areas that already have sewer service will be more cost effective.

Due to the vast majority of people having sewer capability, the county should make the development of infill sites a priority.

ReWa engaged consulting firms to prepare river basin planning reports for the three rivers. These reports considered projected growth, demographics, topography, existing trunk sewer, pump station, and treatment plant facilities to project the origin and quantities of wastewater expected in the future. They also proposed a future alignment of new and relief trunk sewers and plant capacity expansions to serve ReWa's needs through 2030.

Unlike the 1994 projections that called for major plant expansions early in the planning period, this plan projects a larger need for additional capacity late in the period. Technology upgrades for the existing plants to address potential changes in water quality standards and new and relief trunk sewers will require about as much capital resources for the first five to ten years as will capacity increases for the treatment plants.

Identifying products and developing a variety of reuse programs for them was a key focus of the overall recommendation strategy. Examples of reuse opportunities include: a. developing cooperative efforts for conveying and distributing the renewed or clean water from treatment plants to the community via purple pipe systems, the separate special colored pipes for water reuse; b. evaluating the usability of methane gas generated from biosolids production and landfill decomposition; c. improving the existing agricultural reuse of biosolids as a fertilizer and soil amendment; and d. researching the potential for power generation through low head hydroelectric generation with treatment plant effluent.

Recommendations related to sustainability range from supporting efforts to plan and coordinate growth on a regional basis to specifics such as encouraging businesses to perform water audits in their production processes. Other initiatives include monitoring and reducing ReWa's carbon footprint, establishing a formal sustainability program at ReWa, utilizing ReWa's carbon footprint, utilizing the principles of LEED design with new projects, cooperation with regional water and wastewater utilities in building and maintaining infrastructure, product reuse, performing sustainability opportunity analyses on new projects, and developing policies defining how wastewater services will be fostered for areas without service providers.

Financing the anticipated trunk sewers, plant expansions and technology upgrades, and the needed rehabilitation of local collector sewers will have to be allocated in a planned, rather than a uniform, rate over the 20-year period. State revolving loans; economic stimulus funding; product reuse, energy, and related carbon credit sales; federal grants; shared development costs; and future funding opportunities will be needed to achieve these bold recommendations.

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# **INTRODUCTION**

## **BACKGROUND**

Residents of the Upstate of South Carolina are privileged to live in one of the nation's most beautiful areas. We enjoy an outstanding quality of life, supported by a stable and prosperous economy. Accordingly, we have an obligation to act responsibly so that our children and grandchildren may enjoy the same good fortune.

A healthy economy depends upon an adequate infrastructure of transportation, utilities, and communications systems that foster growth. The Upstate must ensure that its infrastructure is well maintained and expanded when necessary. In 1992, key business professionals and community leaders from Anderson, Greenville, Laurens, Pickens, and Spartanburg Counties convened to study critical elements of that infrastructure wastewater collection and treatment systems and to develop a vision for system growth over the next two decades.

The group became known as "The Upstate Roundtable" and adopted the following mission statement: "By January 1, 1994, a 20-year plan will be formulated to ensure that adequate sewer infrastructure is in place to provide for growth and development in the areas served by the Reedy, Saluda, and Enoree River Basins."

To achieve its mission, the group established these five major objectives:

1. To conduct an inventory of current assets, including projects which are in the active planning stage, and to assess those factors which impact the full utilization of those assets. This inventory will consist of roads, water, sewer, electrical, gas, and telephone services.
2. To provide a coordinated forecast of wastewater collection and treatment infrastructure needs over the next 20 years and develop a plan for meeting these needs efficiently and economically.
3. To identify the resources - human, physical, and financial that will be required to implement the long-range plan.
4. To educate the community on the necessity for implementing the long-range plan and to promote and encourage active cooperation among all essential entities, both governmental and private.
5. To focus special efforts on planning for the construction of regional wastewater collection and treatment facilities in the Saluda, Reedy, and Enoree River Basins.

In January 2008, Renewable Water Resources convened a second Upstate Roundtable with the intent of reviewing and revising the recommendations made in 1994. The work of this group was carried out by five committees: Policy and Community Issues, Technical, Regulatory and Legislative Policy, Finance, and Communications.

1. The Policy and Community Issues Committee addressed and made recommendations on important issues relating to ReWa's territory, services, and programs.
2. The Technical Committee was charged with conducting the inventory of the current infrastructure, providing the forecast of future wastewater collection and treatment capacity, and developing the plan to meet those future needs.
3. The Regulatory and Legislative Policy Committee was charged with addressing regulatory issues that would arise in implementing recommendations from any of the five committees and determining ReWa's most appropriate position on such issues.
4. The Finance Committee developed alternative methods of financing the construction and operating costs of facilities recommended by the Roundtable. It reviewed a variety of financing methods, including impact fees, grants and loans, bonded indebtedness, intergovernmental participation, and system privatization.
5. The Communications Committee determined how to educate the community on the necessity for implementing the long-range plan and how to encourage participation and cooperation among governmental and private entities.

Community, business, and governmental leaders, as well as technical experts, agreed to join the Roundtable, and they participated in the work of one or more committees. They prepared a comprehensive plan that provided adequate sewer services to meet the area's future needs. The intent of Renewable Water Resources is to garner public support for the plan and have it become part of the Appalachian Regional Development Plan, formulated under the guidance of the Appalachian Regional Council of Governments and the South Carolina Department of Commerce.

Moreover, this plan was the culmination of a lot of long hours, hard work, and careful thought by some of the best minds in the five-county area. But more importantly, it is the template that will guide future leaders as they determine wastewater collection and treatment infrastructure priorities in the Renewable Water Resources service area.

The following report will guide us through the two decades leading to year 2030. It is the result of the vision, persistence, and consensus of many volunteers.

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# Policies

## **POLICY RECOMMENDATIONS**

Policy recommendations for the efficient and orderly provision of clean water services within the Renewable Water Resources Service Area:

- A. The service area of ReWa should be expanded to include the Enoree, Reedy, and Saluda River watersheds, in portions of Pickens, Greenville, Spartanburg, Anderson, and Laurens Counties.
- B. The findings of the Combined Growth Committee are recognized as the probable development pattern for projecting upstate growth and wastewater flows in 2015, 2020, 2025, and 2030.
- C. ReWa should evaluate and prioritize efforts and expenditures aimed at minimizing rainwater from entering or wastewater leaving the sewer systems.
- D. ReWa should develop partnerships with other Upstate planning agencies and organizations in the development and drafting of recommendations for long-term planning of roads, schools, utilities, parks, and other infrastructure improvements.
- E. ReWa should establish a formal sustainability program to promote and achieve specific sustainability goals.
- F. ReWa will develop a 10-year plan for its clean water, energy, and biosolids products.
- G. ReWa should address multiple uses of its properties and rights-of-way.
- H. ReWa should investigate opportunities to work with the South Carolina Department of Health and Environmental Control (SCDHEC) to appropriately adjust the Residential Unit Contributory Load when determining wastewater treatment plant capacity.
- I. ReWa should evaluate the viability of obtaining more favorable energy supply contracts and agreements.
- J. ReWa should identify opportunities and the related legislative actions needed to expand into businesses that complement its primary services, such as selling carbon credits, while continuing its efforts to develop alternative revenue streams.
- K. ReWa should continue to refine policies related to rates and charges for its services that reflect good public policy.
- L. ReWa should consider potential strategies that help subdistricts achieve and maintain financial viability.
- M. ReWa should continue its policy of seeking the lowest cost of capital funding.
- N. ReWa should increase public education about its sustainability initiatives.

# **Recommendations Summary**

## **POLICIES AND SUPPORTING COMMITTEE RECOMMENDATIONS**

**This section outlines the policies and supporting committee recommendations for the efficient and orderly provision of clean water services within the ReWa service area. A more detailed description of the recommendations is presented in the respective committee reports.**

**A. The service area of ReWa should be expanded to include the Enoree, Reedy, and Saluda River watersheds, in portions of Pickens, Greenville, Spartanburg, Anderson, and Laurens Counties.**

### **Supporting Recommendations:**

- (1) Evaluate the practicality and feasibility of re-defining the ReWa service area, such that ReWa can provide treatment for all areas within the gravity drainage basins.
- (2) Support Appalachian Council of Government's (ACOG's) efforts to ensure that the 208 Water Quality Planning for our region is regularly updated with input from the existing Basin Managers, including Laurens County Water and Sewer Commission.
- (3) Encourage ACOG in 2009 to establish a planning work group to act as a sounding board for the Basin Managers as they monitor growth and water quality issues.
- (4) Lead the Basin Managers by 2011 in developing a comprehensive watershed management plan that projects and monitors actual water withdrawal point and non-point discharges by the river basin that would serve as a resource for growth and planning.
- (5) Develop sustainable alternatives for wastewater collection and/or treatment in un-served areas that complement the overall 208 Water Quality Plan.

**B. The findings of the Combined Growth Committee are recognized as the probable development pattern for projecting Upstate growth and wastewater flows in 2015, 2020, 2025, and 2030.**

### **Supporting Recommendations:**

- (6) Continue to plan future treatment plants so that property and layout allows for plant expansion.
- (7) Obtain properties and rights-of-way for future wastewater infrastructure as early as feasible.

- (8) Plan for development for areas not having sewer infrastructure should include technology and management practices that ensure ongoing operation, maintenance, and funding.
- (9) The technology for on site treatment or conveyance should be made according to the 208 Water Quality Plan.
- (10) Encourage the county to make the development of infill sites a priority, due to the vast majority having sewer capabilities.
- (11) Develop a proposal and work with County Councils and the Legislative Delegations to ensure that a governmental retailer is provided throughout the current ReWa service area.

**C. ReWa should evaluate and prioritize efforts and expenditures aimed at minimizing rainwater from entering or wastewater leaving the sewer systems.**

**Supporting Recommendations:**

- (12) Provide for sustainable repair and rehabilitation programs for the wastewater transportation systems that are adequately funded.
- (13) Assume a leadership role in a joint effort with satellite system operators to evaluate the following for their respective systems:
  - Trunk and satellite collector sewer capacity,
  - Causes of Sanitary Sewer Overflows (SSOs) (wet weather, vandalism, clogs),
  - Prevalence of ex-filtration, such as TV, FC testing,
  - Extent of storm water connections, including all types of roof and yard drains (domestic, commercial, and industrial)
- (14) Encourage implementation of best management practices for non-point sources pollution abatement.
- (15) ReWa and satellite collection system operators should support the implementation of State and Federally directed storm-water management programs by sharing data, responding to sanitary sewer system failures and capacity issues, and adopting sound engineering standards for construction, operation, and maintenance.
- (16) ReWa and local satellite collection systems should continue to improve and provide funding for Sanitary Sewer Evaluation Survey (SSES) activities and sewer rehabilitation programs for their respective areas as outlined in the ReWa/satellite I&I agreements.
- (17) ReWa and satellite system operators should continue to update and implement their respective Annual Operations, Maintenance, and Rehabilitation Work Plans.

- (18) Evaluate and, if practical, adopt by 2012, software that integrates the current computer-based GIS/SSES data management system and maintenance management system into a comprehensive asset management program.
- (19) Once a Total Maximum Daily Loading (TMDL) is developed, the load allocation and waste load allocation should be made according to the 208 Water Quality Management Plan. If more stringent limits need to be met, entities responsible for point and non-point sources should be given appropriate compliance schedules to upgrade facilities or implement best management practices.
- (20) Assume a leadership role in developing pollutant credit trading whenever the environmental protection achieved is more favorable than traditional solutions.

**D. ReWa should develop partnerships with other Upstate planning agencies and organizations in the development and drafting of recommendations for long-term planning of roads, schools, utilities, parks, and other infrastructure improvements.**

**Supporting Recommendations:**

- (21) Lead an effort to establish a list of resources that can be shared through intergovernmental agreements.
- (22) Encourage implementation of best management practices for non-point source pollution abatement.

**E. ReWa should establish a formal sustainability program to promote and achieve specific sustainability goals.**

**Supporting Recommendations:**

- (23) Continue ReWa's Pollution Prevention Award (P2 Award).
- (24) Establish a sustainability and environmental stewardship award for ReWa partners.
- (25) Develop a sustainable practice opportunity evaluation process by 2013.
- (26) Obtain LEED certification, where cost-effective, for new building construction and major building rehabilitation projects.
- (27) Implement programs to reduce the ReWa "carbon footprint" and Volatile Organic Compounds (VOC) emissions from the variety of tasks it performs.
- (28) Continue the practice of developing Wildlife and Industry Together (WAIT) or similar programs at ReWa facilities and properties.

- (29) Encourage water use audits at industrial and major commercial customer facilities.
- (30) Establish and achieve a goal of reducing Greenhouse Gas (GHG) emission to 5 percent below 2000 levels by 2020.
- (31) Work with county councils and other governments to address and, where practical, implement sustainability programs.
- (32) Set measurable goals for reducing, reusing, or recycling effluent, methane, and biosolids. Goals should be based on “per unit of output,” such as per million gallons treated.
- (33) Develop guidelines for purchasing economical “green” products.
- (34) Work toward a “zero waste to landfill” program for ReWa facilities.

**F. ReWa will develop a 10-year plan for its clean water, energy, and biosolids products.**

**Supporting Recommendations:**

**Renewed Water Product**

- (35) Develop relationships, guidelines, and incentives that encourage commercial and industrial facilities to reuse clean water from wastewater treatment agencies and find ways to recycle clean water from cooling systems on site.
- (36) Develop and encourage cooperative efforts with local entities to install “purple pipe systems.”
- (37) Develop and implement one or more “purple pipe” projects by 2013 to provide a visible public reference for the benefits of water reuse.
- (38) Evaluate the costs and feasibility of using ReWa treated effluent to augment flows, improve water quality, and enhance recreational uses.

**Energy Product**

- (39) Evaluate the feasibility of using the energy value of methane-rich gas generated from biosolids and refuse decomposition from landfills.
- (40) Evaluate potential opportunities for power generation through low-head hydroelectric generation with treatment plant effluent.
- (41) Use alternate energy sources, where practical.

- (42) Implement an energy reduction program for ReWa facilities, including baseline snapshot and metrics.

**Biosolids Product**

- (43) Evaluate and improve existing agricultural reuse of biosolids.
- (44) Investigate contracts with growers for productive use of available treatment plant land, water, and nutrients.

**G. ReWa should address multiple uses of its properties and rights-of-way.**

**Supporting Recommendations:**

- (45) Investigate opportunities related to multiple use of rights-of-way in supporting programs such as reuse conveyance, public trails, etc.
- (46) Develop policies that promote multi-uses of ReWa properties buffers, wetland enhancement, maintenance of open space, and recreational use.
- (47) Partner with other agencies to implement multiple use rights-of-way opportunities via intergovernmental agreements.
- (48) Encourage evaluation of land use policies by Greenville, Anderson, Laurens, Pickens, and Spartanburg Counties that affect rights-of-way.

**H. ReWa should investigate opportunities to work with the (SCDHEC) to appropriately adjust the Residential Unit Contributory Load when determining wastewater treatment plant capacity.**

**Supporting Recommendations:**

- (49) Investigate Residential Unit Contributory Loading to ensure the accuracy of system capacity analysis, long-range planning, and permit compliance.
- (50) Encourage SCDHEC to allow utilities to initiate planning, design, and construction of new treatment plants or upgrades based on actual influent flow rather than the cumulative permitted flow.
- (51) Encourage SCDHEC to allow utilities to propose alternative Unit Contributory Loading (UCL) factors to those listed in Rule 61-67, Appendix A. This would allow for UCLs from shops, restaurants, schools, etc., to be based upon local conditions and experience. The original UCLs would be used for sizing collection systems.

**I. ReWa should evaluate the viability of obtaining more favorable energy supply contracts and agreements.**

**Supporting Recommendations:**

- (52) Seek support for legislation that addresses renewable energy resources.
- (53) Seek support for legislation that would allow public water and wastewater facility generators to be operated in parallel with the electric utility grid under appropriate circumstances.
- (54) Seek support that would allow the operation of public water and wastewater facility generators for peak demand saving.
- (55) Evaluate the alternatives for ReWa to purchase electric power at the most competitive prices.

**J. ReWa should identify opportunities and the related legislative actions needed to expand into businesses that complement its primary services, such as selling carbon credits, while continuing its efforts to develop alternative revenue streams.**

**Supporting Recommendations:**

- (56) Support an amendment to ReWa's legislation to clarify its authority to sell renewed water products and byproducts.
- (57) Create incentives to utilize renewed water through business tax credits, sales refunds, or low-interest loans.
- (58) Evaluate how many potential carbon credits ReWa would generate, and ReWa's ability to successfully argue that the methane offset projects should be granted carbon credits.
- (59) Evaluate the economic impact of selling the carbon credits as a stand-alone product versus selling the carbon credits and generated electric energy as a package.
- (60) Evaluate becoming a member of the Chicago Climate Exchange (CCX) or similar groups.

**K. ReWa should continue to refine policies related to rates and charges for its services that reflect good public policy.**

**Supporting Recommendations:**

(61) To provide adequate funding for:

- a) Maintaining debt service coverage at a defined minimum level well above the 110% legally required by ReWa's rate covenant,
- b) Determining a percentage of infrastructure capital cost requirements to be funded internally,
- c) Maintaining contingency and capital reserves at defined levels,
- d) Reviewing and adjusting rates and charges periodically to reflect changes in ReWa's cost structure,
- e) Allowing growth to pay for growth (i.e., connection and other initial service charges are established to generate sufficient revenues to pay its portion of capital expansion costs),
- f) Aligning cost of services to growth and environmental requirements in the service area,
- g) Commissioning a rate study every three to five years to ensure rate adequacy for operations and construction cost,
- h) Evaluating the economic viability of alternate rate structures, and
- i) Reviewing funding strategies for providing wastewater services to non-serviced areas in the Upstate.

**L. ReWa should consider potential strategies that help subdistricts achieve and maintain financial viability.**

**Supporting Recommendations:**

- (62) Support most favorable political and economic avenues for borrowing by subdistricts.
- (63) Support the use of South Carolina constitutional debt limit capacities of subdistricts for general obligation borrowing.
- (64) Encourage subdistricts to impose sufficient user fees to support revenue bond borrowing.

- (65) Evaluate what types of controls and remedies ReWa should retain as to subdistrict operations to secure loans or grants from ReWa, and develop criteria to be used when considering these loans and grants.
- (66) Partner with the legislative delegations and other local governments to determine the appropriate strategy for dealing with subdistricts that are not economically or operationally viable.
- (67) Evaluate individual public programs as possible sources of project revenue for partnering subdistricts. Educate the subdistricts as to the availability of these programs.

**M. ReWa should continue its policy of seeking the lowest cost of capital funding.**

**Supporting Recommendations:**

- (68) Continue to maintain and review annually a current capital improvements plan to enable proposed projects to be included on the State Revolving Fund (SRF) priority list.
- (69) Pursue financing of capital projects through SRF prior to considering other alternatives.
- (70) Assess new construction designs to identify innovative processes which would qualify for grant funding.

**N. ReWa should increase public education about its sustainability initiatives.**

**Supporting Recommendations:**

- (71) Include sustainability in appropriate ReWa communications pieces. As part of this effort, develop a sustainability logo to “brand” this idea for association with ReWa.
- (72) Develop or include a sustainability section in a ReWa newsletter and other communications pieces and media.
- (73) Develop an employee level program where ReWa employees are encouraged to submit Pollution Prevention Pays ideas. Include this in existing ReWa awards programs.
- (74) Develop a “Sustainability Slide Set” with accompanying notes for presentation at various grade levels in Upstate schools and similar venues. ReWa should explore incorporation of this material into curriculum elements at various grade levels throughout the area.

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# **Committee Reports**

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# **Policy and Community Issues Committee Report**

## **POLICY & COMMUNITY ISSUES COMMITTEE REPORT**

### **A. Intergovernmental Resource Planning Coordination**

Upstate governmental agencies and organizations have a vested interest in the direction ReWa takes in the planning and managing of resources. It is important that there is a coordinated effort amongst the agencies and organizations in developing and implementing comprehensive plans. The community service vision and demands will be best served by a coordinated approach where all resources are defined and appropriately applied. The outcome can be maximum effort being placed on services rendered at minimum of cost. Coordination of efforts promotes sustainability and environmental stewardship, which will ultimately allow ReWa to continue to come closer to meeting its mission statement.

Recognition of the planning efforts by the cities, subdistricts, and Upstate organizations is critical in the coordination of resources for meeting the demands of growth. It is also paramount to achieving and sustaining compliance with environmental regulations. Water is a limited resource that can be best managed through cooperation and combined resource management. There are economic and quality-of-life benefits in the coordination for efficiency, sustainability, transparency, and the ability to bring the proper tools to implement the course of action agreed to by the vested parties.

#### **Recommendations:**

Governmental agencies should establish a list of resource needs that can be shared through intergovernmental agreements for greater financial efficiency

Governmental agencies and organizations should cooperate and work closely together on water resource management and planning issues.

### **B. Non-Serviced Areas**

Many areas of the five counties are in need or will soon be in need of wastewater collection and treatment facilities. Current regional sewer plans are not always able to provide reasonable solutions to these situations due to various obstacles. The key areas of concern fit into three distinct categories:

- a. Parcels that are contained within ReWa's boundary and a service provider's boundary,
- b. Parcels that are contained within ReWa's boundary but have no service provider, and
- c. Parcels that are not within ReWa's boundary but have a service provider.

Parcels that are contained within ReWa's boundary and have a service provider are considered infill areas. These are the locations that have sewer service surrounding them, but the infrastructure is not in place to directly serve them. The infill sites are generally the most cost-

effective to serve since treatment facility and conveyance infrastructures are already in place in their vicinity. The infill areas are depicted quantitatively according to basin in Table 1.

**Table 1: Infill Acreage as a % of ReWa’s WWTP\* Service Areas**

River Basin	Infill Acreage	Total Acreage	% Infill
Saluda Basin	6159	29937	21%
Reedy Basin	9099	80982	11%
Enoree Basin	8382	74632	11%

**\*Wastewater Treatment Plant**

Parcels that are contained within ReWa’s boundary but have no service providers are more difficult to deal with than the infill areas. As both a cause and effect, these sites typically lack infrastructure (treatment facilities and conveyance), due in part to the absence of a service provider. Growth that occurs in these areas largely results in the undesirable reactive approach to infrastructure planning.

The last category encompasses parcels that have a service provider and are not within ReWa’s established boundary. The providers in these locations usually have the means to provide complete sewer service to their communities; however, providing service to the fringes of their boundaries, which may lie within separate hydrologic basins, becomes cost-prohibitive. Additionally, these are also the locations that have ReWa infrastructure comparatively close to them.

**Recommendations:**

Work with planning agencies, regulatory agencies, and service providers to develop alternatives for providing wastewater collection and treatment to unserved areas that complement the overall regional sewer plans. Infill areas that promote cost efficiency in wastewater collection and treatment should be a primary focus.

Evaluate the practicality and feasibility of existing service providers to expand their boundary to serve unsewered areas.

Evaluate the practicality and feasibility of redefining the ReWa service area to encompass natural drainage basins.

**C. Growth**

Growth is one of the most important parameters that affect facility planning for water and wastewater infrastructure. In order to obtain experienced insights in this regard, a Combined Growth Committee (see list of members) with a broad understanding of factors influencing Upstate growth was recruited from the Technical and the Policy Committees of the Upstate Roundtable. The Upstate Roundtable Plan covers the period 2009 – 2030, and projecting Upstate growth for this period is one of the most important elements of this undertaking.

The Committee goal was to form a consensus on where growth is likely to occur in the Enoree, Reedy, and Saluda River Basins in Spartanburg, Laurens, Anderson, Pickens, and Greenville Counties in 2015, 2020, 2025, and 2030 by:

- a. Defining the extent of influence sewers have on development,
- b. Defining the factors that will influence growth over the next 2 decades,
- c. Reviewing data and information available to address the goal, and
- d. Providing a growth projection for the Upstate Roundtable.

The pattern of development in the ReWa service area over the next 20 years will have an effect on the nature, extent, and cost of wastewater collection and treatment services. The Committee's views about where and when growth will occur are detailed in Figure 2. The Committee's growth projections were compared to the 2012 Census Bureau study (Figure A1), the GPATS 2030 Projections study (Figure A2), and the Growth Projections for South Carolina study dated January 2008 by the Strom Thurmond Institute at Clemson University (Figure A3). The comparison revealed that an overlay of the Committee's map correlates well with each of the three studies. The County Councils will ultimately determine the growth patterns. The Growth Committee believes that the proposed pattern is most likely to occur based on recent and current development trends. (2007, GPATS; 2007 US Census Data; 2007 Campbell, C.E.)

It is obviously more difficult and expensive to provide wastewater services to a population that is widely dispersed across a region. In ReWa's service area, there are approximately twenty-five thousand (25,000) acres of infill sites where wastewater treatment capacity is available but the infrastructure for collecting and transporting sewage to the plants is not in place (Figure A4). These sites are generally located in areas identified by the growth studies to experience active growth. The findings of the Committee support the concept of using infill sites over other sites when possible.

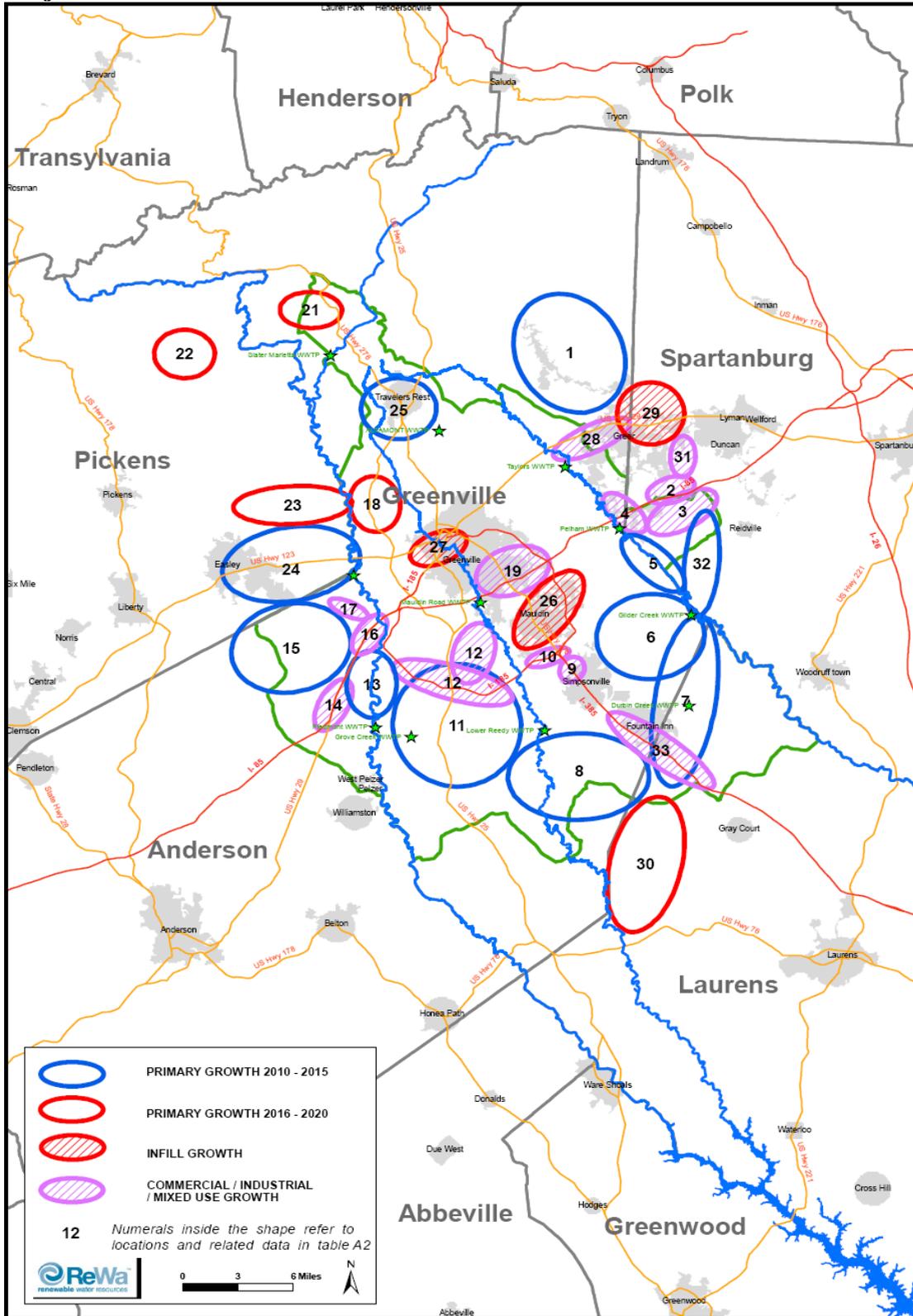
### **Recommendations:**

Plan future treatment plants so that space and layout allows for plant expansion and for advanced technology processes likely to be required by changing regulations.

Obtain properties and rights-of-way for future wastewater infrastructure as early as feasible.

Development planned for areas without sewer infrastructure sufficiently close to allow connection should propose technology and management practices that ensure, for the homeowner and public, ongoing operation, maintenance, and funding. These practices need to also include a mechanism for an entity to assume stewardship of the infrastructure if the original party cannot fulfill its responsibility. The technology for on site treatment or conveyance to a small treatment plant should be made according to the 208 Water Quality Plan.

**Figure 2. Combined Growth Committee Projections**



The ReWa staff should estimate the difference in wastewater collection and treatment costs (capital and operating) for the 5 to 1 growth scenarios presented in the Strom Thurmond Institute Study.

The infill sites in ReWa's service area should be the top priority places for extending sewer services in the future since this can be accomplished without having to build new and expensive treatment plants.

#### **D. Recognition Incentives**

The customers of ReWa continually strive to allow ReWa to provide a cleaner environment. The use of incentive programs, such as awards, would celebrate those customers and partners that have undertaken innovative programs and initiatives that exemplify environmental stewardship and demonstrate dedication to the ReWa mission.

Recognition of outstanding service and support of sustainability as well as awareness of the Upstate's environmental challenges are important in achieving a long-lasting means of promoting environmental stewardship. The current ReWa Pollution Prevention Award, which recognizes outstanding efforts in waste minimization, water conservation, and overall pollution prevention, is an example of the outreach opportunities available to ReWa. Broadening the Pollution Prevention Award to encompass sustainability encourages industrial customers to review their operations with a goal of documenting successes and identifying additional opportunities.

#### **Recommendations:**

Continue the ReWa Pollution Prevention Award.

Establish a sustainability award.

Establish an environmental stewardship award for ReWa partners.

#### **E. Products**

There are several products and byproducts of wastewater treatment that have historically been unutilized. Upstate sewer providers should educate the community on reuse opportunities and actively research, investigate and implement policies that foster the use of products and byproducts, including treated effluent, solids, methane, and land. Reuse strategies offer cost saving opportunities and promote sustainability. The reuse strategies could be used for commercial, industrial, residential, and recreational applications.

The number of potential reuse alternatives is sizeable and is expanding in the current Upstate water crisis and drought. Most alternatives that may be considered by ReWa have been piloted or demonstrated in other locales. An objective engineering evaluation of these, in the context of the

Greenville area, is required to prioritize options and for long-range budget and community relations planning.

A water reuse demonstration program will enable ReWa to start the process of overcoming any community resistance to reuse as well as evaluate various technical, regulatory and economic issues. Such a program should involve as many stakeholders as possible and include a vigorous public participation and public relations component. Synergies are possible with education stakeholders, including public schools and Clemson University's Department of Environmental Engineering and Earth Sciences.

To prevent reinventing the wheel, ReWa should develop active and robust relationships with other, similar agencies with active water reuse programs. These relationships will enable ReWa to learn the technical, economic, and community acceptance successes and challenges already faced by these agencies. They also will enable ReWa to identify challenges not yet met by other agencies so ReWa can work on one or more of these to add to the body of useful information on water reuse.

As part of the strategic planning process, ReWa should include a plan for implementation of viable water reuse opportunities. The information generated in several recommendations presented herein will provide the platform for preparation of the 10-year plan.

One potential strategy includes the capture of the energy value associated with the existing hydraulic head between final treatment units at ReWa plants and the normal water levels of receiving waters. The energy value can conceivably be cost effectively converted to electrical power. Electrical power generated could be utilized onsite to reduce plant power consumption, and excess power could conceivably be fed back into the power grid. Another strategy includes capturing methane generated by biosolids and landfills for beneficial use. Currently, the methane is used to heat digesters or is flared. The excess methane has an untapped energy value which can be used at treatment facilities, including heating buildings, fueling vehicles, etc. There are also opportunities to reuse treatment plant effluent to improve upstream water quality and to provide reclaimed water irrigation at parks and other locations along the Reedy River. Finally, the organic content and nutrient content of residual biosolids has tremendous value as a soil amendment for agricultural fields, and ReWa has implemented an extensive sustainability program of agronomic application of biosolids throughout the Upstate. All of these strategies should be evaluated to determine how each may be measured and optimized.

### **Recommendations – Renewed Water Product**

By 2013, develop and implement one or more purple pipe projects to provide a visible public reference for the benefits of water and to gain experience with water reuse that will lead to long-term optimization.

Develop relationships, guidelines, and incentives that encourage commercial and industrial facilities to reuse clean water from wastewater treatment agencies and to find ways to recycle clear water from cooling systems on site rather than discharging to the public sewer.

Prepare a 10-year plan for implementing viable water reuse opportunities.

Develop and encourage cooperative efforts with local entities to install “purple pipe systems,” the industry standard infrastructure for distributing renewed or cleaned water from water reclamation plants, including activities at ReWa.

Install “purple piping systems” at ReWa plants for irrigating the grounds and non-potable uses with processes.

Retain a qualified engineering firm to identify, evaluate, and develop planning level costs of potential reuse alternatives, including irrigation of both public and private lands and industrial/commercial uses such as street cleaning, construction dust control, and process water. Identify and evaluate potential regulatory and stakeholder concerns.

ReWa should encourage growth in areas with planned wastewater infrastructure.

Evaluate the costs and feasibility of using ReWa treated effluent to augment and improve water quality flows and recreational use of impaired sections of rivers.

Evaluate the costs and feasibility of using ReWa treated effluent for alternative purposes, e.g., industrial and street cleaning, construction materials, and site management.

Evaluate potential regulatory and stakeholder concerns.

### **Recommendations – Energy Product**

Evaluate with other agencies the feasibility of using the energy value of methane rich gas generated from biosolids production at wastewater treatment plants and refuse decomposition in landfills, in addition to the current practice of heating digesters.

Evaluate potential opportunities for power generation through low-head hydroelectric generation with treatment plant effluent.

Use alternate energy sources versus energy from fossil fuels, where practical.

Implement an energy-reduction program for all ReWa facilities, including baseline snapshot and metrics.

### **Recommendations – Biosolids Product**

Evaluate and improve existing agricultural reuse of biosolids, the by-product of treating and stabilizing the solids in municipal wastewater.

Investigate contracts with growers, e.g., sod or tree farmers, etc., for productive flora growth at the wastewater plants using the water, land, and nutrients available. This activity should start with a “snapshot” for baseline determination and to serve as the benchmark for metrics.

### **Recommendations – Green Initiatives**

Set goals for reducing, reusing, or recycling effluent, methane, and biosolids. Goals should be based on “per unit of output,” such as per million gallons treated. Goals should start with a “snapshot” for baseline determination and to serve as the benchmark for metrics.

Develop guidelines for purchasing economical “green” products, such as biodegradable cleaning products, wastewater treatment chemicals, materials with recycled content, etc.

Work toward a “zero waste to landfill” program for ReWa’s facilities.

Perform an inventory of GHG emissions for all of ReWa’s facilities and operations.

Set the goal of reducing GHG emission by 5 percent below 2000 levels by 2020.

Work with county councils and other governments to address and, where practical, implement sustainability programs.

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# **Technical Committee**

## **TECHNICAL COMMITTEE REPORT**

### **A. Regional Cooperation**

The Enoree, Reedy, and Saluda River Basins are all impacted by regional water quality decisions. Any major water quality issues have a direct impact on the future development of any one of the five counties. A regional approach to water quality planning will provide a unilateral approach to future planning and, hopefully, provide good environmental solutions for a variety of stakeholders that represent multiple jurisdictions. Many times basin-wide decisions are made utilizing boundary lines that do not reflect the reality of the area hydrology. Many areas of the five counties are in need of wastewater collection and treatment facilities. Current regional sewer plans do not always provide reasonable solutions to these situations due to the location of existing infrastructure.

#### **Recommendations:**

Continually work with ACOG to ensure that the 208 Water Quality Plan for our region is regularly updated with input from the existing Basin Managers and other stakeholders, including Laurens County, which is not specifically within the counties served by ACOG.

Develop a planning work group that includes stakeholders from all five counties and that adequately represents the water and wastewater utilities, regulatory agencies, and municipal and county governments. The group would monitor growth and water quality issues in the Enoree, Reedy, and Saluda River Basins and provide recommendations to the existing three Basin Managers for facilitating these needs.

Develop a comprehensive watershed management plan that projects and monitors actual water withdrawals and point and non-point discharges by river basin. This plan could serve as a database resource for growth and regional sewer planning throughout the five-county region.

Work with planning and regulatory agencies to develop alternatives for providing wastewater collection and/or treatment to unserved areas that complement the overall regional sewer plans.

### **B. Sustainability**

Evaluations during the initial stages of project planning will lead to best opportunities for increasing sustainability at minimal cost.

LEED certification will lead to improvements in ReWa projects and will demonstrate the agency's commitment to environmental improvements.

Improving awareness of emission reduction and fuel conservation can save money for ReWa. Current successes include "buy local" initiatives and special parking for fuel-efficient vehicles and carpools. Improvement of fleet fuel consumption by conversion to hybrids and/or flex-fuel

vehicles can enhance environmental and economic goals. Investigation of route optimization may save additional emissions and moneys. Introduction of encouragements to carpool (such as broad awareness of erideshare.com) can produce added savings. (2008 Water Environment Federation)

These and similar programs promote sustainability to employees and the community through education, wildlife enhancement, and community involvement.

Less water down the drain means less water to treat. It extends the life of existing treatment capacity. For example, Powdersville Water District has a system in place for performing such evaluations. (Water Environment Federation, Sustainability 2008 Green Practices for the Water Environment Conference Proceedings)

### **Recommendations:**

Perform a “sustainable practice opportunity evaluation” on technology and staffing of major new ReWa projects to identify feasible initiatives for implementation.

Investigate LEED certification for existing buildings during major rehabilitation and remodeling programs, and encourage LEED certification where cost effective for new construction at ReWa.

Implement programs to reduce the ReWa “carbon footprint” through efforts such as saving on emissions and fuel consumption.

Continue the practice of developing WAIT, Wildlife Habitat Council, or similar programs at ReWa facilities and properties.

Implement programs to reduce VOC emissions from the variety of tasks performed by ReWa.

Encourage Water Use Audits at customer facilities.

Encourage Water Use Audits at industrial and major commercial customer facilities.

### **C. Infiltration and Inflow (I&I), Stormwater, and Non-Point Source Pollution**

Wastewater transportation system improvements will protect waters of the State from wastewater contamination and will help stabilize wastewater treatment plant operations and discharge limits. These evaluations will help to prioritize programs aimed at minimizing rainwater from entering and wastewater from leaving the wastewater transportation system.

Non-point source pollution will consume an increasing percentage of the available capacity of our streams and prevent improvements in water quality. These programs will lead to improved water quality in streams and lakes in the Upstate. In addition, these programs will continue to correct historical problems and will ensure timely ongoing repairs to the wastewater

transportation system. Aggressively monitoring and evaluating new methods and technologies will lead to more efficient wastewater transportation system operation and maintenance. A comprehensive asset management system will improve the process of prioritizing repair and replacement projects.

**Recommendations:**

ReWa should continue sustainable, planned, and funded ongoing repair and rehabilitation programs for its wastewater transportation collection system with at least the minimal funding as outlined in the Operation Maintenance and Rehabilitation Work Plan. The goal is to rehabilitate the system in 15 years.

ReWa will take a leadership role in a joint effort with satellite system operators to evaluate the following:

- Trunk and satellite collector sewer capacity
- Causes of SSOs, (wet weather, vandalism, clogs)
- Prevalence of ex-filtration
- Extent of storm water connections including all types of roof drains and yard drains (domestic, commercial, and industrial)

ReWa and satellite collection system operators should support the implementation of state and federally directed stormwater management programs in the Upstate by sharing data, responding to sanitary sewer system failures and capacity issues, and adopting sound engineering standards for construction, operation, and maintenance.

Encourage implementation of best management practices for non-point sources pollution abatement in the Upstate.

ReWa and local satellite collection systems continue to improve and provide funding for SSES activities and sewer rehabilitation programs within the three river basin areas.

ReWa and satellite system operators should continue to update and implement their respective “Annual Operations, Maintenance and Rehabilitation Work Plan.” The ongoing consideration of available new technology and changing conditions within the collection system should be encouraged.

Evaluate and adopt by 2012, where feasible, software that integrates the current computer-based Geographical Information Systems (GIS)/SSES data management system, and maintenance management system, into a comprehensive asset management program for buried infrastructure.

Once a TMDL is developed, the load allocation and waste load allocation should be made according to the 208 Area Wide Planning Process as described in the 208 Water Quality Management Plan. If more stringent limits need to be met, entities responsible for point and non-point sources should be given appropriate compliance schedules to upgrade facilities or implement Best Management Practices. Consideration of pollutant trading should be given whenever the environmental protection achieved for the cost expended is

more favorable than traditional solutions. There may be some scenarios where contaminated non-point pollution should be routed to a treatment plant rather than being treated on site.

#### **D. Growth and Renewed Water Product**

These sections were jointly developed with the Policy and Community Issues Committee and the combined work is presented in sections C and E.

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# **Regulatory and Legislative Policy Committee**

## **REGULATORY & LEGISLATIVE POLICY COMMITTEE REPORT**

### **A. Multiple Uses of Rights-of-Ways**

ReWa conveys waste to its wastewater plants through piping buried in rights-of-way. These rights-of-way could facilitate irrigation of golf courses, industrial parks, residential areas or commercial areas by the installation of what is known as purple pipe. Public demand for passive recreational facilities such as hiking and biking trails has increased dramatically. These sewer rights-of-way could also accommodate public access trails for walking, hiking, or biking. Additionally, reduction of open space through development has become a major issue in Upstate planning. Loss of trees and vegetative cover, as well as intrusion on riparian lands, jeopardizes the quality of life in some areas of the Upstate. Purchase of tracts of land around existing and future treatment facilities minimizes encroachment of development on these facilities while protecting the open space provided by these lands.

#### **Recommendations:**

ReWa should:

Investigate opportunities related to multiple uses of rights-of-way, especially as related to reuse conveyance.

Develop formal policies regarding land usage which promote treatment plant buffer land, wetlands enhancement, maintenance of open space, and joint recreational use of trunk sewer rights-of-way.

Partner with other agencies to implement multiple-use rights-of-way opportunities via intergovernmental agreements.

### **B. Land Use Policies**

Determining where and when growth will occur is one of the most important factors in planning wastewater treatment infrastructure needs. Since the ReWa service area incorporates the populated area of Greenville County and portions of Spartanburg, Anderson, Pickens, and Laurens Counties, it is imperative that all parties join together to establish growth priorities, evaluate issues, work through alternatives, and determine the best solution for everyone. Land use policies in all counties should be evaluated to support established goals of the counties and region. A lower growth ratio, i.e., the percent change in developed land divided by the percent change in population, would minimize sprawl and thus decrease the need for more outlying wastewater infrastructure. This means that proactive land use planning based on availability of facilities will reduce overall infrastructure costs and reduce impact on existing facilities. Planning should also address wastewater transportation and treatment facilities for areas within the ReWa boundaries that do not currently have sewer service. Consideration should be given to temporary and permanent facilities to accommodate initial and progressive growth, as well as, the ultimate build-out of these areas.

**Recommendations:**

ReWa should:

Encourage evaluation of land use policies by Greenville, Anderson, Laurens, Pickens, and Spartanburg Counties.

Support county and regional policies that maintain or reduce the ratio of land development increase to population increase through higher density infill development:

Work closely with Greenville and surrounding counties to develop land use policies that provide for greater density within existing and planned sewer areas, thereby minimizing the costs to ReWa and, ultimately, ReWa customers.

Encourage growth in areas with planned wastewater infrastructure.

Strategically plan how to provide wastewater transportation and treatment facilities for areas within the ReWa boundaries that do not presently have sewer service.

**C. Residential Capacity Allocation**

Residential capacity allocations are based on a method devised more than fifty years ago. Currently, the SCDHEC UCL allocates 400 gallons per day (GPD) per residence. This is an appropriate design value for sizing local collector sewers and pump stations but is very conservative for wastewater treatment processes and facilities. SCDHEC will allow for adjustments as low as 300 GPD per residence for treatment plant sizing through an approved process called Unit Loading Adjustment. Studies, however, have indicated actual UCLs for residential developments range from 250 to 280 GPD per residence. Many suggest that actual quantities measured at treatment plants may be decreasing due to significant improvements made to ensure water efficiency. The public has been urged to use more efficient fixtures, showers, toilets, and washing machines to conserve water. Further advancements have been made in the materials used for construction of new development. Utilities are using more reliable materials in new construction and continually focusing their efforts on improving existing collection systems. The UCL per residence will continue to impact ReWa as wastewater treatment standards become more stringent and new residential developments arise. Future adjustments to UCL per residence to the actual, rather than the handbook, quantities will allow ReWa to generate a more manageable and affordable capital improvement program for plan capacity, as well as operate both the collections and treatment systems more efficiently.

**Recommendations:**

In order to more accurately determine Residential Capacity Allocation, ReWa should investigate service area UCL per residence to ensure the accuracy of system capacity analysis, long-range planning, and permit compliance.

ReWa in concurrence with SCDHEC, should investigate opportunities for adjustment to ensure that flows allocated to each new residential development are more closely aligned with actual usage.

ReWa should discuss needed revisions to regulation Rule 61-67 with SCDHEC in order to reduce UCL for residential development from 400 to 300 GPD per residence or even lower if justified by data.

To minimize major capital investment for infrastructure in advance of actual need, SCDHEC should allow utilities to initiate planning, design, and construction of new treatment plants or upgrades of existing plants based upon actual influent flow rather than the cumulative flow of all development that has been permitted.

To minimize major capital investment for regional wastewater processing facilities in advance of actual need, SCDHEC should allow utilities to propose alternative UCL factors to those listed in R 61-67, Appendix A. This would allow for projected processing facility flows from homes, shops, restaurants, etc., to be based upon local conditions and experience.

#### **D. ReWa as a Purchaser of Wholesale Electricity**

According to a recent energy study done for ReWa, using an alternative energy source would allow ReWa to reduce its electric power costs approximately \$600,000 annually. This could be achieved by contracting with Duke Energy to utilize ReWa's standby generation under the new PowerShare rate rider, as well as by developing local generators to use the digester gas and selling the output.

At this time, statutes do not allow ReWa to purchase electric power and energy on the open market from wholesale suppliers. These statutes could be changed to allow ReWa to buy and sell in a wholesale market. Digester gas at the five anaerobic plants is a Renewable Energy Resource and has value to ReWa as both a source of economical energy and as Renewable Energy Credits (RECs). RECs are tradable environmental commodities which represent proof that 1 megawatt-hour (MWh) of electricity was generated from an eligible renewable energy resource. If ReWa develops generators to use the digester gas, ReWa will also be able to sell RECs for the facilities.

ReWa produces sufficient methane gas at all five anaerobic plants to support some electric power generation. Currently, ReWa uses some of the methane produced for necessary heating of the anaerobic process and burns the excess off. Methane, more commonly referred to as natural gas, is the principal component of digester gas. The relative abundance of digestive gas at wastewater treatment facilities and its clean burning properties, make digestive gas a very attractive fuel. There is a potential to capture additional methane gas from the old landfill adjacent to the Mauldin Road plant and the Enoree Landfill. Duke Energy has also opened options to allow us to connect cogeneration facilities either directly to the grid or to our internal distribution system, wherein we could still sell the surplus power.

### **Recommendations:**

ReWa should:

Evaluate the viability of becoming a wholesale purchaser of electricity, the appropriate timing of such action, and the steps needed.

Seek support for legislation that addresses Renewable Energy Resources.

Seek support for legislation that would allow public water and wastewater facility generators to be operated in parallel with the electric utility grid under appropriate circumstances (e.g., testing periods associated with electric utility standby capacity programs).

Seek support for legislation that would allow the operation of public water and wastewater facility generators for peak demand shaving.

Research the potential benefits of legislation that would allow ReWa (or certain water and wastewater utilities in general) to purchase electric power as a wholesale customer to achieve competitive prices.

### **E. ReWa as a Retail Business**

The ultimate goal for ReWa becoming a retail business is to reduce costs for users. Revenue-generating services that ReWa could offer include: renewed water, biosolids, methane, retail sewer, and as a supplement to drinking water. ReWa should look for opportunities to educate all customers on effluent reuse and grey water reuse. ReWa should also identify opportunities to reuse effluent from plants internally and externally. Effluent uses outside of wastewater plants should be communicated and promoted to potential users. ReWa needs to create a market for renewed water to encourage the utilization of renewed water and allow ReWa to charge a competitive fee for such usage. Government could assist with increased utilization of renewed water by offering tax incentives, low-interest loans, etc., for businesses installing reuse infrastructure. ReWa could also partner with Home Builders Associations to evaluate requiring water reuse capabilities in future residential and/or commercial construction.

Recently, unincorporated areas have expressed an interest in sewer service. However, no sewer subdistricts have been willing to provide full service sewer. ReWa could address this need by providing this service for a fee, provided the development is properly permitted. Currently, ReWa land applies biosolids for local farmers free of charge. The waiting list for land-applied biosolids shows the emerging market for sales of biosolids. ReWa should also bring treatment plant effluent to state standards sufficient to enable unrestricted reuse for possible sale to reuse customers.

**Recommendations:**

ReWa should:

Identify opportunities and the related legislative actions needed to expand into businesses that complement our primary services.

Support an amendment to our legislation or general law to encourage the sale of renewed water.

Create incentives to utilize water through business tax credits, sales refunds, or low-interest loans.

# **Finance Committee**

## **FINANCE COMMITTEE REPORT**

### **A. Market Overview**

To maintain its sound financial footing and high credit ratings, ReWa must, first and foremost, ensure both adequate system capacity for future growth and strict compliance with environmental rules through long-range capital planning, the implementation of manageable and affordable capital improvement programs, rigorous attention to system maintenance issues, increased operational efficiencies and, increasingly, more inter-governmental partnering.

### **Recommendations:**

To provide adequate funding for its efforts, ReWa should consider written policies related to rates and charges for its services so that they meet the following requirements:

- a. Sufficient recurring revenues are generated so as to maintain debt service coverage at a defined minimum level well above the 110% legally required by ReWa's rate covenant;
- b. A percentage of infrastructure requirements are to be funded internally;
- c. Contingency and capital reserves are maintained at defined levels;
- d. Growth pays for growth – i.e., connection and other initial service charges are established to generate sufficient revenues to pay a portion of capital expansion costs;
- e. Services and the pricing thereof are aligned with the growth and environmental requirements of the service area;
- f. A rate study is commissioned every three to five years to ensure rate adequacy for operations and new construction and consideration of the economic viability of alternate rate structures; and
- g. Water use is a critical factor in locating and expanding capital projects. Billing based on water use factors would motivate controlled growth and preserve water resources. Therefore, Upstate utilities and the communities should be encouraged to adopt a long-range commitment to planned growth (addressing zoning and development types), including water use factors in each utility's rate study protocol.

Funding strategies are reviewed for providing renewable water service to non-serviced areas in the Upstate.

## **B. State Water Pollution Control Revolving Fund**

The State Water Pollution Control Revolving Fund is a long-term debt financing program offered by the State of South Carolina to provide local communities with low-interest loans for publicly owned wastewater facilities. Created under the Federal Clean Water Act Amendments of 1987, the program is commonly known as the Clean Water State Revolving Fund (SRF, or the CWSRF).

The CWSRF offers the following major benefits:

- Substantially below-market interest rates.
- Fixed rate financing for up to 20 years.
- Availability of principal and interest deferral through construction.
- Option to capitalize interest at the end of the deferral period.
- Minimal issuance costs.
- Removal of most federal requirements, except environmental, with recycled funds.

In the first year of the program, ReWa received a CWSRF loan and has subsequently obtained ten additional loans. Having borrowed a total of over \$158.7 million, ReWa is, by a considerable margin, the largest recipient of CWSRF financing. Over the next 20 years the CWSRF will continue to be a significant source of affordable financing for local wastewater facilities in South Carolina. The total magnitude of available funding will depend on whether federal capitalization continues beyond FY2010 and at what level. However, even if federal funding is received for only one more year, the CWSRF will remain a huge and growing resource for financing local sewer infrastructure.

### **Recommendations:**

ReWa should:

Continue to maintain and review annually a current capital improvements plan to enable proposed projects to be included on the SRF priority list.

Pursue financing of capital projects through CWSRF prior to considering other alternatives.

## **C. Public Funding Sources for Capital Improvement**

ReWa is too large and financially strong to be able to directly utilize public funding mechanisms other than the established programs such as the SRF loan program. However, these public funding programs could be utilized by the subdistrict entities that are tied into ReWa. The subdistrict or the public entity for the area where the subdistrict is located could be an applicant to borrow funds for infrastructure projects. These entities could access programs from the USDA's Rural Utilities Service, HUD's Community Development Block Grant, Appalachian Regional Commission's Utility Grant, and Economic Development Administration's Infrastructure Grant.

Other possible sources of funds for the subdistricts include the Community Reinvestment Fund, USA, which will make market rate loans, and Farm Credit with its Rural America Bond program.

More potential strategies to help pay for improvements to enhance the integrity of subdistrict collection systems would be to consider ReWa (a) serving as a conduit lender to a subdistrict by loaning the proceeds of ReWa borrowing to the subdistrict, or (b) making grants to distressed subdistricts.

**Recommendations:**

Evaluate individual public programs as possible sources of project revenue for partnering subdistricts. Use the Collection System Alliance group as a platform to educate the groups as to the availability of these programs.

Assess new construction designs to identify innovative processes which would qualify for grant funding.

Support the use of South Carolina constitutional debt limit capacities of subdistricts for “general obligation” borrowings (limited to 8% of subdistrict’s assessed value, without referendum).

Encourage subdistricts to impose sufficient user fees to support revenue bond borrowings.

Evaluate what types of controls and remedies ReWa should retain as to subdistrict operations to secure loans or grants from ReWa and develop criteria to be used when considering these loans and grants.

Consider amendment to ReWa enabling legislation to position ReWa to absorb distressed subdistricts seeking such assistance.

Partner with the Legislative Delegation and other local governments to determine the appropriate strategy for dealing with subdistricts that are not economically or operationally viable i.e., loans, assistance in obtaining grants and/or other funds.

**D. Obtaining Carbon Credits for Greenhouse Gas Emission Reductions**

Carbon credits are permits that allow the holder to emit one ton of carbon dioxide per unit of time. Credits are awarded to entities that have reduced their greenhouse gases below their emission quota. Carbon credits can be traded in the international market at their current market price. Projects to reduce the emission of carbon may be eligible to receive carbon credits if they can successfully argue the offset projects are not standard industry practices.

A potential approach for ReWa to obtain carbon credits/offsets is to become a member of the CCX. CCX is the world’s first and North America’s only active voluntary, legally binding integrated trading system to reduce emissions of all six greenhouse gases (water vapor, carbon

dioxide, methane, nitrous oxide, ozone, and chlorofluorocarbons) with offset projects worldwide. It is an international rules-based greenhouse gas emission reduction, audit, registry, and trading program based in the US. Members are allocated annual emission allowances in accordance with their emissions baseline and the CCX Emission Reduction Schedule. Members who reduce beyond their targets have surplus allowances to sell or bank; those who do not meet the targets comply by purchasing CCX Carbon Financial Instrument® (CFI®) contracts.

**Recommendations:**

Assess ReWa's ability to successfully argue that the methane offset projects should be granted carbon credits.

Evaluate becoming a member of CCX or similar groups and/or join with sister agencies to combine membership in the CCX in order to pool carbon credits.

Evaluate the economic impact of selling the carbon credits (if authorized) as a stand alone versus selling the carbon credits, RECs, and generated electric energy as a package.

Calculate how many potential carbon credits ReWa generates.

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# **Communications Committee**

## **COMMUNICATIONS COMMITTEE REPORT**

### **Sustainability and Public Education**

ReWa should increase public education about its sustainability initiatives; educate the community on the necessity for implementing the long-range plan; promote and encourage active cooperation among all essential entities, both governmental and private; implement the plan under the guidance of the 208 Water Quality Plan for the three river basins ReWa serves; and present the completed approved plan to various entities, both governmental and private, by November 1, 2009.

Additionally, ReWa should seek resolutions of support for this plan within six months of publication from various county councils, delegations, and local governments.

### **Recommendations:**

Include sustainability in appropriate ReWa communications pieces. As part of this effort, develop a sustainability logo to “brand” this idea for association with ReWa.

Develop or include a sustainability section in a ReWa newsletter and other communications pieces and media.

Develop an employee level program where ReWa employees are encouraged to submit Pollution Prevention Pays ideas, and include this in existing ReWa awards programs.

Develop a “Sustainability Slide Set” with accompanying notes for presentation at various grade levels in Greenville schools and similar venues. ReWa should explore incorporation of this material into curriculum elements at various levels throughout the area.

# **New Plant and Trunk Sewer Capacity**

## **NEW PLANT AND TRUNK SEWER CAPACITY**

Data for projecting needed trunk sewer and wastewater treatment capacity were obtained from the three basin planning studies and the Combined Growth Committee. Needed capacities for the Upstate and for ReWa are presented in Tables 2 and 3, respectively, and in Figure 3.

### **Saluda Basin**

- The Marietta WWTP may be upgraded late in the planning period from a lagoon process to a 1 MGD advanced secondary or tertiary process plant.
- The Georges Creek WWTP may expand from 3 to 6 MGD late in the planning period and has the potential for industrial growth.
- The Piedmont Regional WWTP may begin construction soon as a tertiary process plant at 4 MGD and expand late in the planning period to 8 MGD. It, too, has the potential for industrial growth.
- The cities of Pelzer and West Pelzer have the opportunity to be pumped to Piedmont Regional.
- Williamston may continue to treat its wastewater.
- Easley Combined Utilities may continue to treat its wastewater; however, Pickens County will direct some flow to Georges Creek.
- ReWa's existing Piedmont and Grove Creek Plants will be closed.

### **Reedy Basin**

- ReWa's Mauldin Road WWTP will continue at a wet weather capacity of 70 MGD and a load allocation capacity of 40 MGD (this is for SCDHEC permitting purposes) through the planning period.
- ReWa's Lower Reedy WWTP will have adequate capacity at 11.5 MGD through the planning period but may need expansion shortly thereafter. A pump station is projected to be constructed by mid planning period to transfer the flow from the Hollingsworth Development and CUICAR from the Lower Reedy trunk system to the Mauldin Road plant.
- Growth downstream of the Lower Reedy WWTP should be directed to Lower Reedy plant via pump stations and regional pump stations until later in the planning period.
- A new Huff Creek WWTP near Fork Shoals may be built later in the planning period at 2 MGD. Land will be needed.

### **Enoree**

- ReWa's Taylors WWTP will be closed in 2009.
- ReWa's Pelham WWTP may need another 5 MGD by the end of the planning period.
- ReWa's Gilder Creek WWTP may need another 4 MGD within the first half of the planning period.
- ReWa's Durbin Creek WWTP may need to expand from 5.2 to 8.2 late in the planning period.

**Table 2. Projected Publicly Owned Wastewater Treatment Plants and Capacities Through Year 2030**

Basin	Plant	Current Permitted Capacity (MGD)	Current Flow* (MGD)	Capacity Needed in MGD				Site Acreage	
				Projected 2015	Projected 2020	Projected 2025	Projected 2030	Curent	Needed
Saluda	ReWa's Marietta	0.7	0.28	0.7	0.7	1	1	6.3	100.0
	Easley Combined Utility's Georges Creek	0.8	0.4	0.8	0.8	0.8	0.8		
	ReWa's Georges Creek	3.0	1.1	3.0	3.0	3.0	6.0	123	123
	Easley Combined Utility's Middle Branch	3.5	2.0	3.5	3.5	6	6		
	ReWa's Piedmont	1.2	0.15	C	C	C	C	47.7	
	ReWa's Piedmont Regional	P	P	4.0	4.0	4.0	8.0	101	101
	City of West Pelzer	0.2	0.07	0.2	0.2	0.2	0.2	7	7
	City of Pelzer	0.2	0.09	0.2	0.2	0.2	0.2	100	100
	ReWa's Grove Creek	2.0	0.94	C	C	C	C	56.6	
	City of Williamston	1.0	0.52	1.0	1.0	1.0	1.0		
		12.6	5.6	13.4	13.4	16.2	23.2		
Reedy	ReWa's Mauldin Road	70	15.7	70	70	70	70	322	322
	ReWa's Lower Reedy	11.5	5.5	11.5	11.5	11.5	11.5	77.7	100
	ReWa's Huff Creek	P	P	P	P	2.0	2.0		100
		81.5	21.2	81.5	81.5	83.5	83.5		
Enoree	ReWa's Taylors	7.5	2.6	C	C	C	C		
	ReWa's Pelham	22.5	6.2	22.5	22.5	22.5	27.5	44.0	100
	ReWa's Gilder Creek	11.3	3.7	11.3	15.3	15.3	15.3	108	108
	ReWa's Durbin Creek	5.2	1.4	5.2	5.2	5.2	8.2	357	357
		46.5	14.0	39.0	43.0	43.0	51.0		
<b>Total</b>		<b>140.6</b>	<b>40.7</b>	<b>133.9</b>	<b>137.9</b>	<b>142.7</b>	<b>157.7</b>		

Notes:

C = closed

P = proposed

Existing non-ReWa facility information was gathered through EPA's ECHO service.

**Table 3. Projected ReWa Wastewater Treatment Plants and Capacities Through Year 2030**

Basin	Plant	Current Permitted Capacity (MGD)	Current Flow Allocated to Development, (MGD)	Current Flow* (MGD)	Capacity Needed in MGD			
					Projected 2015	Projected 2020	Projected 2025	Projected 2030
Saluda	Marietta	0.7	0.5	0.28	0.7	0.7	0.7	1
	Georges Creek	3.0	1.9	1.1	3.0	3.0	3.0	6.0
	Piedmont	1.2	0.7	0.15	C	C	C	C
	Piedmont Regional	P	P	P	4.0	4.0	4.0	8.0
	Grove Creek	2.0	1.5	0.94	C	C	C	C
		<b>6.9</b>	<b>4.6</b>	<b>2.5</b>	<b>7.7</b>	<b>7.7</b>	<b>7.7</b>	<b>15.0</b>
Reedy	Mauldin Road	70	27.1	15.7	70	70	70	70
	Lower Reedy	11.5	10.1	5.5	11.5	11.5	11.5	11.5
	Huff Creek	P	P	P	P	P	2.0	2.0
		<b>81.5</b>	<b>37.2</b>	<b>21.2</b>	<b>81.5</b>	<b>81.5</b>	<b>83.5</b>	<b>83.5</b>
Enoree	Taylors	7.5	7.5	2.6	C	C	C	C
	Pelham	22.5	15.6	6.2	22.5	22.5	22.5	27.5
	Gilder Creek	11.3	7.5	3.7	11.3	15.3	15.3	15.3
	Durbin Creek	5.2	3.3	1.4	5.2	5.2	5.2	8.2
		<b>46.5</b>	<b>33.9</b>	<b>14.0</b>	<b>39.0</b>	<b>43.0</b>	<b>43.0</b>	<b>51.0</b>
<b>Total</b>		<b>134.9</b>	<b>75.7</b>	<b>37.6</b>	<b>128.2</b>	<b>132.2</b>	<b>134.2</b>	<b>149.5</b>

Notes:

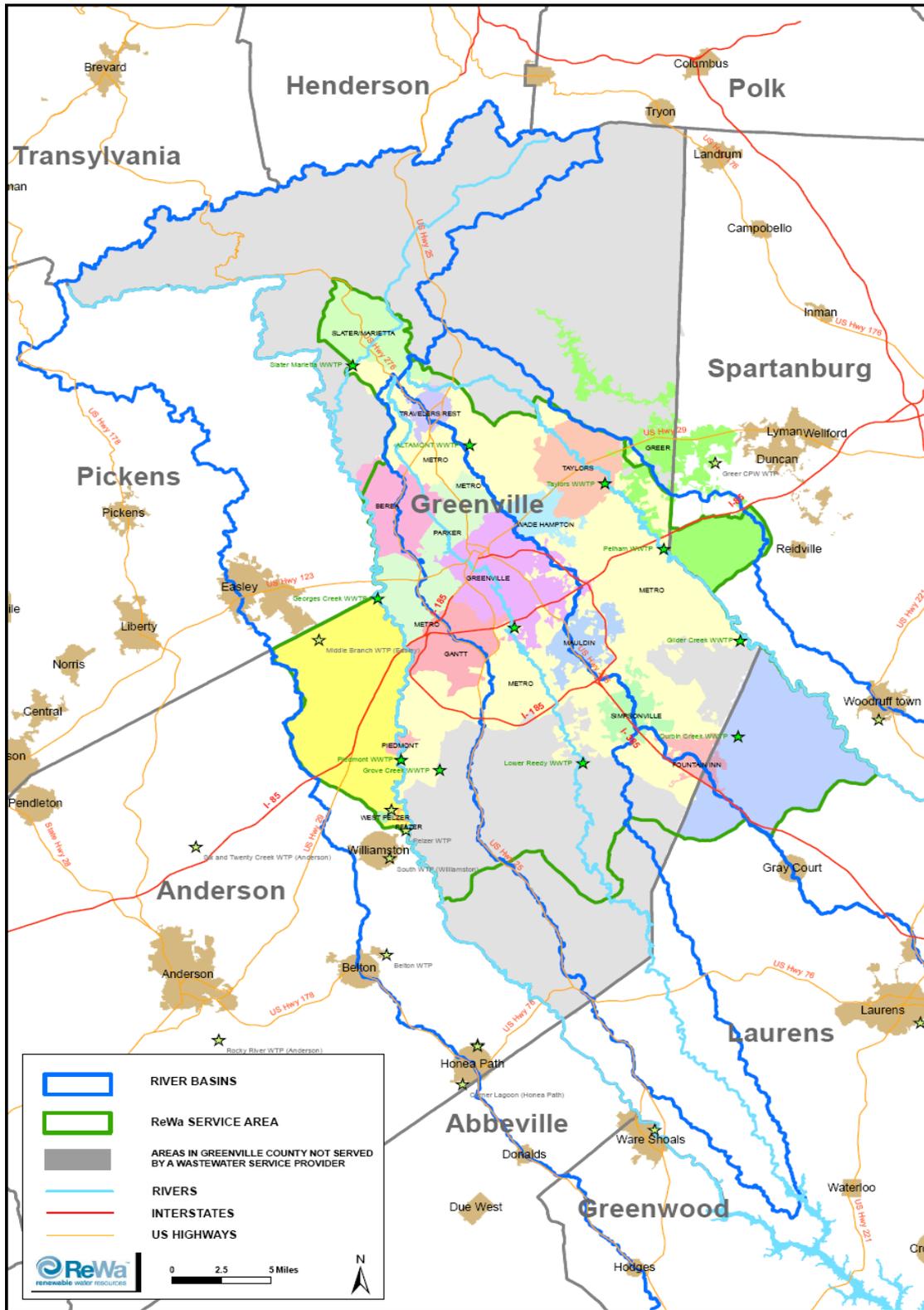
C = Closed

P = proposed

Existing non-ReWa facility information was gathered through EPA's ECHO service.

\*2007 calendar year average for ReWa facilities. All other facilities are an average of the most recent 12 months available.

**Figure 3. Wastewater Service Providers in ReWa's Service Area**



- Additional land may be needed for the Pelham and Gilder WWTP.

Table 4 summarizes the capacities and anticipated plant costs for the three river basins.

### **Future Water Quality Standards**

Future water quality standards will likely be higher than they are today. Additional requirements for increased treatment for removing phosphorus, nitrogen, metals, pharmaceuticals, and personal care products are expected.

Projected capital costs for these unknown requirements are labeled in Table 5 as Technology Upgrade. These costs were estimated by assuming that the capacity of processes in place will be expanded or enhanced at a cost of \$2 per gallon for each gallon of capacity that is already in place. The concept is that all or most of the existing plant facilities will be useful but that additional processes and equipment will be added to remove the substances needing further treatment.

Adequate land for additional processes will be needed in some cases. The ReWa plant of the future is projected to need at least 100 acres to enable future processes and provide buffer space between the processes and future development.

It is possible that providing additional processes for removing a constituent may be more expensive than handling it in an alternative manner. A potential example is the case of a substantially lower phosphorus and/or nitrogen limit on the Reedy River basin resulting from the TMDL study currently being evaluated by SCDHEC. Constructing a force main to convey the existing tertiary effluent (or renewed water) from the Mauldin Road treatment plant to the Saluda River might be an affordable alternative. The renewed water could be tapped along the route for irrigation, industrial non potable, or construction purposes.

### **Trunk Sewers**

I&I are lower than they were at the time of the 1994 Upstate Roundtable report. Rehabilitation by ReWa and Agreements with satellite collection systems have led to reduced I&I. The need to further rehabilitate, however, still exists. Local satellite collection systems have committed to a 15-year target of eliminating excess wet weather flows from the sewer.

ReWa has identified trunk sewers that have limitations in capacity and is planning to provide relief to those segments.

ReWa, in partnership with satellite collection systems and developers, will be constructing trunk sewers to address growth as it occurs.

### **Costs**

Based on these assumptions and decisions, the total capital costs for (1) expanding the treatment plants for new capacity, (2) technology upgrades to meet higher water quality standards, and (3) providing needed trunk sewer capacity are summarized in Table 5.

**Table 4. Projected Capital Costs for ReWa’s Wastewater Treatment Plants Through Year 2030, in 2009 Dollars**

Basin	Plant	Permitted Capacity		Additional Plant Capital Expenditures Needed By				Total
		Current	2030	2015	2020	2025	2030	
				[in millions \$]				
Saluda	Marietta	0.7	1				\$ 10.00	\$ 10.00
	Georges Creek	3.0	6.0				\$ 30.00	\$ 30.00
	Piedmont	1.2	C					
	Piedmont Regional	P	8.0	\$ 40.00			\$ 40.00	\$ 80.00
	Grove Creek	2.0	C					
		6.9	15.0	\$ 40.00		\$ -	\$ 80.00	\$ 120.00
Reedy	Mauldin Road	70	70					
	Lower Reedy	11.5	11.5					
	Huff Creek	P	2.0	P	P	\$ 20.00		\$ 20.00
		81.5	83.5			\$ 20.00	\$ -	\$ 20.00
Enoree	Taylors	7.5	C					
	Pelham	22.5	27.5				\$ 50.00	\$ 50.00
	Gilder Creek	11.3	15.3		\$ 40.00			\$ 40.00
	Durbin Creek	5.2	8.2				\$ 30.00	\$ 30.00
		46.5	51.0		\$ 40.00	\$ -	\$ 80.00	\$ 120.00
<b>Total</b>		<b>134.9</b>	<b>149.5</b>	<b>\$ 40.00</b>	<b>\$ 40.00</b>	<b>\$ 20.00</b>	<b>\$ 160.00</b>	<b>\$ 260.00</b>

Notes:

New plant capacity projected at \$10.00 per gallon in 2009 Dollars

C = closed

P = proposed

\*2007 calendar year average for ReWa facilities. All other facilities are an average of the most recent 12 months available.

**Table 5. Total Projected ReWa Capital Costs for Wastewater Treatment Plants and Trunk Sewers Through Year 2030, in 2009 Dollars**

Basin	Permitted Plant Capacity, MGD		Additional Capital Expenditure Needed By				Sub Totals	% of Total
	Current	2030	2015	2020	2025	2030		
			[in millions \$]					
Saluda	6.9	15						
o New Plant Capacity			\$ -			\$ -		
o Technology & Sustainability Upgrade			\$ -	\$ -	\$ -	\$ -		
o Collection System			\$ 6.51	\$ 6.51	\$ 9.51	\$ 12.51		
			\$ 6.51	\$ 6.51	\$ 9.51	\$ 12.51	\$ 35.02	
Reedy	81.5	83.5						
o New Plant Capacity					\$ -			
o Technology & Sustainability Upgrade *			\$ -	\$ -	\$ -	\$ -		
o Collection System			\$ 15.38	\$ 17.38	\$ 19.38	\$ 21.38		
			\$ 15.38	\$ 17.38	\$ 19.38	\$ 21.38	\$ 73.51	
Enoree	46.5	51.0						
o New Plant Capacity				\$ -		\$ -		
o Technology & Sustainability Upgrade			\$ -	\$ -	\$ -	\$ -		
o Collection System			\$ 20.12	\$ 24.12	\$ 21.12	\$ 25.12		
			\$ 20.12	\$ 24.12	\$ 21.12	\$ 25.12	\$ 90.47	
o New Plant Capacity			\$ -	\$ -	\$ -	\$ -	\$ -	0%
o Technology & Sustainability Upgrade			\$ -	\$ -	\$ -	\$ -	\$ -	0%
o Collection System			\$ 42.00	\$ 48.00	\$ 50.00	\$ 59.00	\$ 199.00	100%
<b>Sub Totals</b>	<b>134.9</b>	<b>149.5</b>	<b>\$ 42.00</b>	<b>\$ 48.00</b>	<b>\$ 50.00</b>	<b>\$ 59.00</b>	<b>\$ 199.00</b>	199.00
<b>% of Total</b>			21%	24%	25%	30%		

Notes:

New plant capacity projected at \$10.00 per gallon in 2009 Dollars.

Technology & Sustainability Upgrade construction projected at \$2.75 per gallon in 2009 Dollars.

Technology & Sustainability Upgrade includes unknown future water quality requirements and sustainability initiatives

Technology & Sustainability Upgrade is calculated by multiplying the 2030 Capacity by an upgrade cost per MGD and then spreading it over the four incremental periods at 10%,25%,30% and 35%.

<b>Twenty Year Total</b>	<b>\$ 199.00</b>
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\*Technology & Sustainability Upgrade for Mauldin Rd Plant is based on a 40 MGD rather than 70 MGD capacity

Collection System includes trunk sewers, pump stations, appurtenances and planning

The eight hundred nine million, six hundred ninety thousand dollar costs (\$809,690,000) are preliminary and will need revisions as ReWa proceeds through the planning periods. Additionally, new technology and environmental permitting requirements will likely change these numbers.

**1994**  
**Recommendation**  
**Update**

**CURRENT STATUS OF RECOMMENDATIONS FROM THE 1994  
UPSTATE ROUNDTABLE REPORT**

- (1) Future planning should not be based on the concept of one large regional wastewater treatment complex.

Planning and implementation has been based on the concept of multiple regional treatment facilities along the three river basins, Enoree, Reedy and Saluda.

- (2) Locate mid-size regional treatment plants on rivers just below major tributaries to maximize the assimilative capacity of the stream.

The one “greenfield” treatment facility built was located, as planned, just downstream from the discharge of Georges Creek into the Saluda River.

- (3) Upgrade into mid-size regional facilities older plants that are well-maintained and well-sited, particularly if open land is available.

Pelham, Gilder Creek, Durbin Creek, Mauldin Road, and Lower Reedy plants have been upgraded into regional facilities.

- (4) Consolidate older plants, upgrade well-sited plants into regional facilities, and build regional treatment plants on the schedule indicated.

Schedule has been met.

- (5) Upstate sewer utilities should continue their current policy of allocating capacity on a first-come, first-served basis.

ReWa continues to allocate capacity on a first-come, first-served basis.

- (6) Permitted capacity for existing industrial users should be based on actual average discharge with provisions for short-term peak flows.

This is the practice.

- (7) Existing users should pay an access/reservation fee if they desire to reserve capacity beyond that permitted. The reservation fee should be based on fixed costs plus debt service cost.

Existing ReWa industry pays an Unused Capacity Fee if it wants to reserve capacity beyond its current permitted capacity. The Fee is one half the current Industrial User Charge.

- (8) The providers of water and wastewater treatment services should develop and implement a program to educate the community on water conservation issues.

Water conservation education has been provided by Greenville Water System (GWS) and ReWa.

- (9) A comprehensive and continuing program of maintenance and rehabilitation of sewer lines must be carried on throughout the area.

Programs for comprehensive and continuing sewer maintenance and rehabilitation have been implemented by ReWa and most local collection systems. Additional effort is still needed by others.

- (10) Separate storage basins should be constructed at wastewater treatment plants to collect excess flows during storm events. The basin contents can then be managed at controlled rates.

ReWa has built storage basins at Georges Creek, Gilder Creek, Pelham, Mauldin Road, and Lower Reedy.

- (11) The Roundtable supports the concept of multiple mid-size regional treatment plants along Upstate rivers to optimize the use of river capacity.

This is the practice.

- (12) Sewer utilities in the Upstate should seek relief from DHEC in those cases where permit limits less stringent than those based on strict application of the national criteria will not impair the existing and classified uses of receiving streams.

ReWa has sought relief from some permit limits with DHEC and has obtained some success.

- (13) Relief under DHEC's site-specific regulation should not be conditioned upon conducting extensive studies in the immediate vicinity of the plant discharge when data at other points on the same or similar streams support the conclusion that relief should be granted.

Not fully supported by DHEC.

- (14) Through the cooperative efforts of DHEC, Upstate sewer utilities, and water quality experts, an improved nutrient model for Lake Greenwood should be developed, and additional studies should be carried out to assess the impact of other point and nonpoint sources in the lake's watershed before more stringent phosphorus limits are imposed on treatment facilities in the Reedy and Saluda River basins.

A TMDL plan is being developed by DHEC. The modeling is complete and DHEC is starting to develop management options to achieve water quality goals, primarily for phosphorus, but also for other pollutants.

- (15) As a condition for reissuance of their NPDES permits, smaller, inefficient, and outdated domestic wastewater treatment facilities should be required to connect to regional plants. The 1994 Upstate Roundtable Report is the 208 Water Quality Plan for the three basins.

ReWa has connected 6 smaller and/or outdated plants into regional plants.

- (16) Each treatment plant within the region should evaluate alternate strategies for treatment and discharge.

Required by DHEC before expansion.

- (17) The individual plant strategies should be evaluated together in a Best Management Practices Plan that not only optimizes the capacity of individual treatment plants, but also considers the needs of the entire basin.

The basin managers evaluate all variance requests to the 208 Plan.

- (18) The Basin Manager for each of the three basins should work closely with the various stormwater management entities to ensure protection and best use of the rivers.

Has not been fully implemented. Greenville County has an active stormwater management program underway and is addressing issues of concern to the basin managers.

- (19) Upstate sewer providers should be actively researching alternative approaches to treating and handling biosolids; moreover, these efforts should focus primarily on alternatives which emphasize recycling and reuse. Such alternatives might include land application, composting, recycling, and ground cover for landfills.

ReWa is developing a Biosolids Environmental Management System (EMS) that ensures environmentally responsible recycling and reuse.

- (20) At least two alternatives should be available to control the entire biosolids flow. This will provide Upstate sewer utilities a choice: if one biosolids disposal alternative—for example, landfilling or incineration—should encounter regulatory problems, then another approach—land application of lime-treated biosolids—would be permitted and ready to go.

ReWa utilizes land application and landfill disposal of biosolids.

- (21) Sewer providers that handle biosolids should encourage demonstration and development projects, particularly those aimed toward regional or basin biosolids management projects.

Currently practiced by most utilities.

(22) A policy should be implemented which would:

- prohibit direct discharge of non-industrial sources of heavy oils and grease into sewer lines
- require the installation and regular cleaning of grease traps wherever excessive grease is produced
- establish fees to cover the cost of inspection and disposal.

Implemented by ReWa.

(23) Regional sewer authorities should consider privatizing the handling and disposal of oil and grease.

Not yet economical.

(24) Upstate sewer utilities, local planning agencies, and other regulatory entities should require all septic tank users to connect to collector lines when and where they are available.

Not formalized yet.

(25) Local sewer authorities should accept septage from areas where local sewer service is not available. The costs of this service should reflect the capital and operating costs of providing the service.

ReWa accepts domestic septage. Costs are being reevaluated.

(26) A Basin Manager should be established for each of the three river basins. It should play the lead role in Section 208 coordination.

Implemented. ACOG administers the 208 Water Quality Plan and it draws upon the basin managers for decisions on these issues.

(27) The Basin Manager should be a single entity consisting of the major stakeholders in each basin. The Saluda Basin management entity should consist of a representative from each of the following: Anderson County, Pickens County, the Laurens County Water and Sewer Commission (LCWSC), and ReWa. The Enoree River Basin Manager should consist of a representative from each of the following: Greer Commission of Public Works, Spartanburg County, LCWSC, and ReWa. The Reedy River Basin would be managed by ReWa and LCWSC. Each basin manager would have an advisory council composed of a representative from each publicly-owned treatment works within that basin. ACOG would act as a mediator to forge a consensus in situations where conflicts exist. In this manner, plans will be developed in the interest of the region as a whole.

ACOG has implemented this.

- (28) Future capacity may require construction of wastewater treatment facilities by multi-governmental entities. The construction and operating costs should be divided among the entities based on capacity requirements.

The Georges Creek Plant Project was an example of this.

- (29) To determine the size of a new facility, each entity must decide the amount of capacity needed to meet its projected growth over the next 20 years, coupled with its ability to pay for that capacity.

This is the practice at Gilder Creek and Lower Reedy.

- (30) If future needs exceed the initial allocation of capacity to a particular entity, that entity may buy capacity from another participant at replacement cost, or participate in the cost of a plant expansion.

This has been incorporated into intergovernmental agreements and is now the practice.

- (31) The cost of upgrades resulting from state, federal, or other regulatory requirements will be shared by all users and entities on an allocated capacity basis.

This has been incorporated into intergovernmental agreements.

- (32) Variable operations and maintenance costs will be charged to the user. Fixed costs should be charged to users and to those holding capacity commitments.

This has been incorporated into intergovernmental agreements and is now the practice.

- (33) The most practical way for political subdivisions to solve common problems is for them to enter into intergovernmental agreements. Such agreements would essentially leave local responsibilities in place with the local districts, while regional problems could be addressed by a cooperative effort. The contracts by their terms would set forth the responsibilities among the parties and provide for the funding, management, and operation of the systems, without obtaining legislative or county approval in most cases.

This approach was used with the Georges Creek project and Greer CPW Update projects.

- (34) The identity of the Upstate Roundtable should be retained, and its members should be responsible for continuing the review and coordination of infrastructure projects and future updating and extension of the long-range plan.

This task has been accomplished.

- (35) The Roundtable should have a technical, long-range planning capability to provide ongoing updates on water quality, stream flow quantities, land use, infrastructure condition and GIS or computer mapping. This capability would be the best resource available to the three-basin area for addressing watershed management issues.

Partially implemented.

- (36) The Roundtable should designate a committee, composed of representatives from the five counties and the six utilities in the three basins, to be responsible for implementation of the plan.

Committee never formally appointed.

- (37) Political entities in the Upstate should undertake a comprehensive effort to find funding for the strategic planning and construction of wastewater treatment infrastructure. Such an effort should consider development of costs to be included in federal appropriations. Needs work but was successful in a \$950,000 grant to the Georges Creek.

This concept applied to Economic Stimulus Package.

- (38) The Roundtable supports the general concept of an access fee. Most sewer service providers in the Upstate charge a fee for new connections. The proposed fee would apply to new connections within the three basins.

Implemented by several entities.

- (39) The Governor's Office and the S.C. Department of Commerce should be encouraged to expand the Economic Development Set-Aside Fund to include all components of infrastructure related to economic development.

Infrastructure bank established but no funding.

- (40) An Economic Growth and Development Fund should be established, capitalized by relatively small annual contributions from multiple sources and capped at \$1 million. These funds would be allocated to specific projects on a "last resort" basis, that is, after all other avenues of funding had been exhausted and if the project had significant benefits for the development fund's contributors as well as the area economy in general. The following is a non-inclusive list of potential fund participants:

- ReWa
- Duke Power
- Greenville Water System
- Combined Utility System (Easley)
- Greer Commission of Public Works
- Piedmont Natural Gas
- Area Chambers of Commerce

- Upstate cities and counties in the three-basin area

Not yet implemented.

- (41) Upstate communities should be encouraged to adopt a long-range commitment to quality growth. County and municipal governments should explore innovative as well as traditional revenue sources to finance the infrastructure needed to make such growth possible.

Not yet implemented.

1994 UPSTATE ROUNDTABLE REPORT TABLE 3 UPDATE  
 PROJECTED PUBLICLY OWNED WASTEWATER TREATMENT  
 PLANTS AND CAPACITIES THROUGH YEAR 2015

\* Totals rounded off for  
 planning purposes

C=Consolidated/Closed  
 P=Planned

<u>Basin</u>	<u>Plant</u>	Capacity in MGD			
		<u>1994</u>	<u>Projected 2005</u>	<u>Projected 2015</u>	<u>Actual 2007</u>
Saluda	Marietta	0.7	0.7	0.7	0.7
	Saluda	0.5	C	C	C
	Parker	0.2	C	C	C
	Easley/Georges Creek	0.8	C	C	C
	Saluda/Georges Creek	P	6	6	3
	Lakeside	0.7	C	C	C
	Easley/Middle Branch	2.5	C	C	2.5
	Piedmont	0.6	C	C	0.6
	West Pelzer	0.2	C	C	0.2
	Pelzer	0.2	C	C	0.2
	Saluda/Brushy Creek	P	5	13	P
	Grove Creek	2	C	C	2
	Williamston	1.5	C	C	1.5
	Saluda/Grove Creek	P	2	4	P
	Belton	2.7	2.7	C	2.7
	Saluda/Mountain Creek	P	P	8	P
			12.6	16.4	31.7
Reedy	Mauldin Road	29	37	37	29
	Lower Reedy	5	7	10	11.5
	Huff Creek	P	3	6	P
		34	47	53	40.5
Enoree	Taylors	4	6	8	7.5
	Pelham	6	8	13	22.5
	Gilder Creek	4	5	8	8
	Durbin Creek	3	4	5	3
	Woodruff	0.7	0.7	C	0.7
	Enoree/Dildine	P	P	2	P
	Lower Enoree	P	2	3	P
		18	26	39	41.7
TOTAL:		65*	89*	124*	95.6

## **REFERENCES**

Brown and Caldwell, 2008 Wastewater Planning Study: Reedy River Basin.

Columbia, South Carolina. Prepared for ReWa, 2009.

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Campbell, C.E., Allen, J. and Lu, K.S., Modeling Growth and Predicting Future Developed Land in the Upstate of South Carolina, Strom Thurmond Institute, Clemson University, November 2007, Submitted to the Saluda-Reedy Watershed Consortium.

Hayes, Seay, Mattern & Mattern/AECOM, 2007 Enoree River Basin Study (Taylors, Pelham, Gilder Creek, and Durbin Creek). Columbia, South Carolina. Prepared for ReWa, 2008.

GPATS Long Range Transportation Plan, Kimley – Horn and Associates, Raleigh NC. Adopted by The GPATS Policy Committee November 5, 2007.

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# Appendix

## **ENOREE RIVER BASIN STUDY EXECUTIVE SUMMARY**

### **Purpose**

This report has been requested by ReWa for the purpose of receiving information about:

1. The limits of the treatment plant basins served by the Gilder Creek WWTP, Pelham WWTP, Taylors WWTP, and Durbin Creek WWTP;
2. The current levels of wastewater flow being conveyed through interceptor pipes;
3. The ultimate development or "built-out" levels of wastewater flow to be conveyed through the interceptor pipes; and
4. The locations of pipes having the lowest relative hydraulic conveyance along the interceptors in the collection system. (2008, Hayes, Seay, Mattern & Mattern)

In addition to the above, the consultant is providing recommendations for proposed non-capital and capital projects, along with preliminary opinions of cost to implement these suggested projects.

### **Overview of the Treatment Plant Basins**

Each WWTP is presented as providing treatment for growth and development in its natural hydrologic basin, although existing deviations from this assumption are recognized. For example, wastewater generated and collected in the Rocky Creek and the Simpsonville "B" basins is discharged to neighboring basins for treatment and discharged to the Enoree River.

The Rocky Creek Basin is a wholly separate and distinct hydrologic basin, sandwiched in between the Gilder Creek and Pelham basins. Wastewater from Rocky Creek is currently conveyed to the Pelham WWTP. The Simpsonville "B" pump station, located at the south edge of the Gilder Creek basin, conveys wastewater out of the basin to the Durbin Creek WWTP.

The limits for the Gilder Creek WWTP have been configured to include:

1. The Gilder Creek basin as it is conventionally regarded;
2. The collection area served by the Simpsonville "B" sewage pumping station;
3. The Rocky Creek basin;
4. The area bounded by Anderson Ridge Road on the south and the Enoree River on the north;
5. An undeveloped drainage basin located in Spartanburg County which is on the opposite side of the Enoree River from the Gilder Creek basin; and
6. The "Orphan" Basin, which is located south of the Gilder Creek WWTP.

The Gilder Creek Basin has been and will continue to be an area subjected to intense development pressures. The reasons are: (1) the plentiful supply of land suitable for development and (2) the extent of unimproved acreage. The lower one-third of the basin is prime territory for absorbing future development.

Much of the Pelham basin is improved with residential development. The sense is that much of the Pelham basin was developed for all types of residential purposes in the last 50 years or so. In the east one-third of the basin, there are several large size undeveloped parcels designated by the Official Zoning Map as being locations for future residential and commercial development.

The Taylors WWTP basin is bounded by the suburban Taylors community on the south and the City of Travelers Rest on the north. The area located between Taylors and Travelers Rest is rural countryside. Residential settlements are randomly dispersed across this countryside. A plentiful supply of developable acreage is sufficient to attract new investment in residential and commercial projects. The location and the rate of development will be influenced, in part, by the pace at which new interceptor mains are brought on-line.

The Durbin Creek WWTP basin is situated at the southern extremity of Greenville's outwardly advancing urban fringe. In future years, development will continue to occur in and near Fountain Inn and along the margins of Interstate 385, which straddles the Greenville County/Laurens County line. It is likely that growth forecast for the lower portions of the Gilder Creek basin will be sufficiently fueled to spill over into the Durbin Creek basin. The extent, type, and location of growth are somewhat dependent upon the approaches to land use planning practiced by Laurens County.

### **Current and Ultimate/Built-Out Levels of Flow**

As a necessary prerequisite to assessing the hydraulic capacity of the interceptor lines, the consultant completed the following activities in the order listed:

1. Evaluated data provided by the Greenville County Information Alliance;
2. Evaluated data provided by ReWa;
3. Conducted on-site field surveys in all basins;
4. Prepared technical assumptions to create the basis for the assessment analysis; and
5. Confirmed the locations of sub-district points of hydraulic connection to the ReWa interceptor lines.

All basins were subdivided into a considerable number of smaller sub-drainage basins. These sub-basins, like their parent basins, were defined by contour elevations and the coverage provided by the subdistricts' collection pipes. Working at this larger scale made it possible to:

1. Prepare estimates of flow for current and future land uses;
2. Calculate levels of flow being conveyed by the principal and secondary interceptor mains; and
3. Define locations where flow enters the interceptor lines.

Estimates of wastewater level of flow are drawn from two patterns of land use in the basins; first, the pattern as it is seen today; and second, a future hypothetical pattern created by extrapolating current trends into a subsequent time. The date of the future pattern is unspecified, but it occurs when the supply of developable land is exhausted. The ultimate built-out condition makes it

possible to identify and fill any service gaps between existing interceptor capacities and anticipated demands for capacity.

The source document for deriving estimates of flow is SCDHEC Rule 61-67, Appendix A, Unit Contributory Loading for all Domestic Wastewater Treatment Facilities. This Appendix provides information about gallons of wastewater generated by residences and other types of establishments. These values are approximations, derived from the shared experience of many cities and towns throughout the United States. *These values are generally accepted as substitute values when water use records are not readily available.* A summary of the estimated built-out flows is given in Table A-ER1.

**Table A-ER1 Estimate of Built-Out Flow**

<b>Treatment Facility</b>	<b>Current Flow* (MGD)</b>	<b>Built-Out Flow (MGD)</b>
Taylor's	2.6	9.9
Pelham	6.2	6.9
Gilder Creek	3.7	16.4
Durbin Creek	1.4	4.7

\*2007 calendar year average

Locations where contributions of wastewater are aggregated and entered into the interceptor pipe are labeled as nodes on the system maps. Nodes are a means of tracking levels of flow at points of special interest. For this report, nodes are established at the following locations:

1. At selected changes in the diameter of the interceptor pipe, e.g., 10-inch to 12-inch;
2. At selected intersections of principal and secondary interceptors; and
3. At selected intersections of principal interceptors and utility subdistrict collection lines.

Spreadsheets were developed to create and monitor changes in the levels of flow being conveyed through the interceptors. These spreadsheets calculate:

1. Capacity of the pipe when flowing full;
2. Incremental and cumulative levels of flow at the nodes; and
3. Cumulative depth of flow to pipe diameter, for normal and peak flow conditions.

For assessment purposes, an interceptor flows at full capacity when the ratio of depth of flow to pipe diameter is equal to or greater than 0.90. Interceptors that meet or exceed the maximum limit of 0.90 are candidates for an additional interceptor main in parallel alignment. (Hayes, Seay, Mattern & Mattern/AECOM, 2007 Enoree River Basin Study)

## **Recommendations**

The recommendations resulting from our investigations are presented in Tables A-ER2 through 5 for each WWTP:

**Table A-ER 2: Pelham WWTP Improvements**

Time Frame for Improvement (Years)	Linear Feet of New/Replacement Sewer by Pipe Size							
	42"	36"	30"	24"	20"	16"	10"	8"
2010-2020	3,940	9,320	17,000		390			5,825
2020-2030								
Beyond 2030				9,930		4,280	5,180	21,915

**Table A-ER 3: Taylors WWTP Improvements**

Time Frame for Improvement (Years)	Linear Feet of New/Replacement Sewer by Pipe Size						
	72"	60"	24"	20"	12"	10"	8"
2010-2020	3,371					6,910	8,560
2020-2030		8,515			4,340		
Beyond 2030		2,545	2,080	56,680			

**Table A-ER4: Gilder Creek WWTP Improvements**

Time Frame for Improvement (Years)	Linear Feet of New/Replacement Sewer by Pipe Size											
	96"	60"	42"	36"	30"	24"	20"	18"	16"	14"	10"	8"
2010-2020					2,200	1,530		2,390		5,140		
2020-2030	30	12,600		23,790			1,020			2,080		
Beyond 2030			51,340		18,470	21,490	15,474		22,920		5,953	19,990

**Table A-ER 5: Durbin Creek WWTP Improvements**

Time Frame for Improvement (Years)	Linear Feet of New/Replacement Sewer by Pipe Size						
	30"	24"	18"	12"	10"	10" FM*	8"
2010-2020							
2020-2030	9,050	4,450	4,628	5,490			7,100
Beyond 2030		7,290			1,140	6,850	4,810

**\*Force Main**

### General Recommendations

In addition to the short-and longer-term recommendations, the consultant offers the below listed general recommendation’s for consideration. These recommendations are presented in the spirit of preserving the utility and timeliness of the base data used to prepare this report. The recommendations are:

1. Complete a topographic survey along the interceptor lines to record pipe invert elevations. Once obtained, insert this information into the ReWa GIS database.
2. Use the information gained in item 1 above to authoritatively establish remaining available capacity in the principal and tributary interceptor lines. Begin with an evaluation of the Gilder Creek principal interceptor.
3. Review subdistrict collection maps to ensure accuracy and completeness in locating points of connections to the interceptors.
4. Review property records to ensure the existence of recorded easements over the length of all interceptors. Acquire easements where none currently exist.
5. Investigate means of being electronically connected to Greenville Water System water use/billing. This connection will be helpful in submitting queries with the use of GIS technology. The expectation is to create the ability to:
  - a. Access the water user data base for specific areas and addresses and
  - b. Pose questions with respect to specific selection criteria.
6. Place recording flow meters at some or all of the nodal locations shown on the maps of the interceptor lines.

# **SALUDA RIVER BASIN STUDY EXECUTIVE SUMMARY**

## **Purpose**

The purpose of the 2008 Saluda River Basin Study is to identify capital improvement projects needed to support existing and planned future growth and development through 2030 and to build-out conditions in the portion of the Saluda River Basin serviced by Renewable Water Resources (ReWa).

## **Baseline Conditions**

### **Service Area**

ReWa conveys and treats wastewater from portions of Greenville, Pickens, and Anderson counties at one of four wastewater treatment plants (WWTPs) in the Saluda River Basin: Georges Creek WWTP; Grove Creek WWTP; Piedmont WWTP; and the Slater Marietta WWTP. Each of these WWTPs services a particular area within the Saluda River Basin and together form the Saluda River Planning Area.

### **Available Data**

Baseline data and information was gathered from Greenville, Pickens, and Anderson county Planning Departments, economic development agencies, and utility providers. Note: Greenville County will be updating its future land use by mid-2009. Build-out projections developed for this study should be verified at this time. Density assumptions should be checked annually to confirm projected growth and development patterns.

### **Service Area Water Demand**

The Greenville Water System (GWS) and the Powdersville Water District provide water to customers within these WWTP service areas and water provided from these utilities are the basis of wastewater flow generation in the Saluda River Planning Area. Additional wastewater flow is contributed to ReWa's system by the Anderson County Public Service Commission; which collects wastewater flow from other areas in Anderson County and sends it to ReWa for treatment.

The WWTP service areas in the Saluda River Planning Area include more residential customers than commercial/light industrial customers. Consequently, it was assumed that approximately 70% of the overall water demand may be attributed to residents and approximately 30% may be attributed to commercial/light industrial customers. This same percentage split was assumed for wastewater flow.

### **Treatment Regulations**

Assimilative capacity in the Saluda River is likely limited given the impaired water status of the receiving waters, the water quality based discharge limits of the major WWTPs, and the planned construction of the new Piedmont Regional WWTP. Future assessments of the assimilative capacity will be made by the South Carolina Department of Health and Environmental Control (SCDHEC) during National Pollutant Discharge Elimination System (NPDES) permitting and total maximum daily load (TMDL) development activities. It is anticipated that future permit

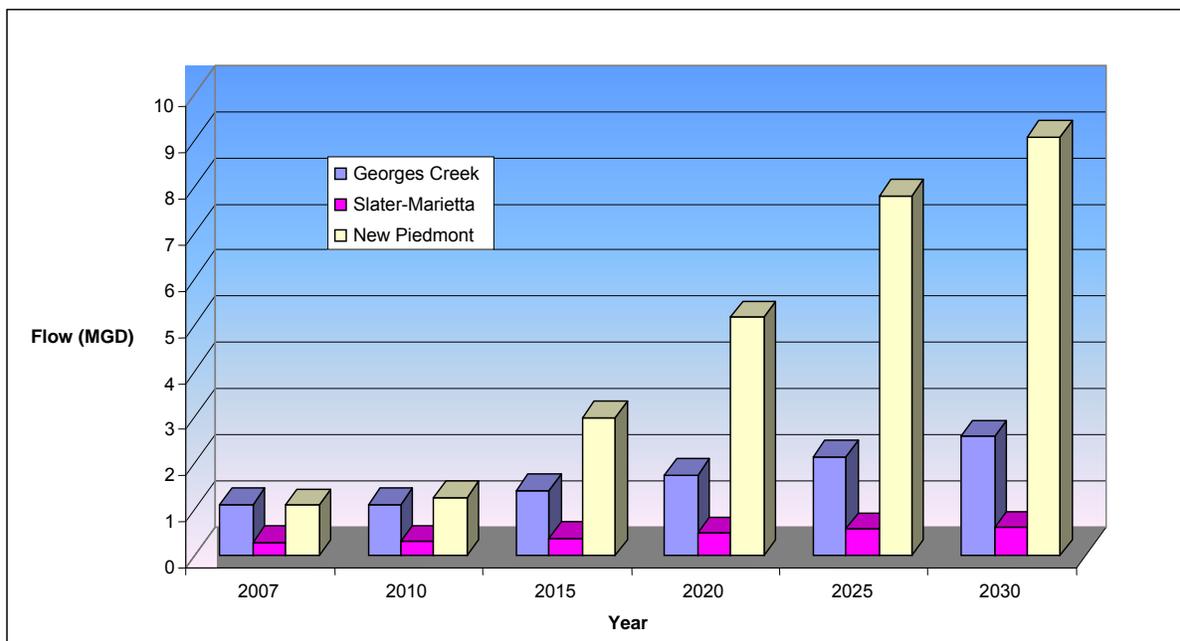
limits will include both nitrogen and phosphorus limits. Also, the current drought will impact the 7Q10 calculations and could reduce mass loadings into the various river segments. Emerging contaminants such as pharmaceuticals and endocrine disruptors may also play a role in future discharge limits.

### Forecasts of Probable Growth

Population projections for the WWTP service areas were based on existing projection data and on future average maximum densities, as discussed and verified with local area planners and zoning codes. Future industrial developments were identified through data and information obtained from local area economic development agencies.

Estimated future dry weather flows (DWFs) were calculated by multiplying estimated unit flow rates to WWTP service area population data and to the estimated percent served. The per capita rate developed by the Greenville Water System (GWS) was used as a basis in projecting domestic wastewater flows. Per capita rate information provided by the Powdersville Water District approximates a similar per capita rate as GWS. GWS water demand studies indicate that the overall system residential per capita demand rate is approximately 70 gallons per day (gpd) per resident. The additional flows beyond the current flows estimated for future development were based on a factor of 1.75 for peak day flows, based on available knowledge of system flows. The peak day peaking factor was used to evaluate WWTP capacity. System conveyance capacity was based on the 10-state standard for peak hourly conditions. A per area flow rate of 2000 gpd per acre was used to estimate potential future industrial flows in undeveloped areas.

Average day wastewater flow projections by WWTP service area are shown in Figure A-SR 1.



*A-SR 1 Average Day Wastewater Projections*

## Identified System Improvements and WWTP Upgrades

Tables A-SR1 and A-SR2 present recommended system and WWTP improvements in 5-year increments. Improvements are based on anticipated future growth and development and on existing system conditions, as determined through hydraulic modeling performed as part of this study. Planning level costs are also presented.

Table A-SR 1. Identified Future ReWa System Improvements- Saluda River Planning Area		
	Name	Planning Level Cost
<b>2010 - 2015</b>		
(1)	New conveyance system from the old Piedmont WWTP to the new Piedmont Regional WWTP	\$3,915,000
(2)	Grove Creek Pump Station improvements to include converting the station from an effluent pumping facility to a raw sewerage pumping facility with pump updated and force main extension to the Piedmont Regional WWTP	\$270,000
<b>2015 – 2020</b>		
(1)	Upgrade the Saluda Pump Station #1 with a new force main to the Saluda Pump Station #5 and upgrade the Saluda Pump Station #5.	\$13,155,000
<b>2020 - 2025</b>		
(1)	New gravity main from Lakeside Pump Station to the Piedmont Regional WWTP and parallel existing gravity upstream of the Piedmont Regional WWTP	\$17,712,000
<b>2025 - 2030</b>		
(1)	Parallel gravity main upstream of the Saluda Pump Station #1	\$3,478,000
(2)	Parallel gravity main west of Donaldson Center	\$1,376,000
<b>2030 - Beyond</b>		
(1)	Upgrade Powdersville Pump Station #2 and diversion of Powdersville Pump Station #1 to gravity	4,590,000

Table A-SR 2. Identified Future ReWa WWTP Upgrades – Saluda River Planning Area			
Treatment Plant	Year	Capacity Upgrade	Planning Level Cost
Piedmont Regional WWTP	2010	4 MGD	\$40M
Georges Creek	2020	2 MGD	\$30M
Slater Marietta	2015	1 MGD	\$13.3M
Piedmont Regional WWTP (Technology Upgrade)	2025	Tech Upgrade	\$8M

# **REEDY RIVER BASIN STUDY EXECUTIVE SUMMARY**

## **Purpose**

The purpose of the 2008 Reedy River Basin Study is to identify capital improvement projects needed to support existing and planned future growth and development through 2030 and to build-out conditions in the portion of the Reedy River Basin serviced by Renewable Water Resources (ReWa).

## **Baseline Conditions**

### **Service Area**

ReWa conveys and treats wastewater from portions of Greenville County and from a small portion of the Enoree Basin at one of two wastewater treatment plants (WWTPs) in the Reedy River Basin: the Lower Reedy WWTP and the Mauldin Road WWTP. Each of these WWTPs services a particular area within the Reedy River Basin and together form the Reedy River Planning Area.

### **Available Data**

Baseline data and information was gathered from various sources including the Greenville County Planning Department, Greenville, Travelers Rest, Mauldin, Simpsonville, Fountain Inn, the Greenville Area Development Corporation, and local utility providers. Note: It is anticipated that Greenville County, Greenville, Simpsonville and Fountain Inn will have updated future land use data by mid-2009. Build-out projections developed for this study should be verified at this time. Density assumptions should also be checked annually to confirm projected growth and development patterns.

### **Service Area Water Demand**

Greenville Water System (GWS) water demand studies indicate that the overall system residential per capita demand rate is approximately 70 gallons per day (gpd) per resident. GWS provides water to customers within the Lower Reedy and Mauldin Road WWTP service areas and water demand is the basis of wastewater flow generation. GWS studies on water demand indicate that approximately 55% of overall water demand may be attributed to residents and approximately 45% may be attributed to commercial/light industrial customers. This split represents conditions in the Mauldin Road WWTP Service Area due to its urban location and was assumed for purposes of projecting wastewater flow.

The Lower Reedy WWTP and Future Reedy service areas include more residential customers than commercial/light industrial customers. Consequently, it was assumed that approximately 70% of the overall water demand may be attributed to residents and approximately 30% may be attributed to commercial/light industrial customers. This same percentage split was assumed for wastewater flow in these areas.

### **Treatment Regulations**

The Reedy River has been included in the South Carolina Department of Health and Environmental Control's (SCDHEC) 2008 Integrated Report, Part 1: Listing of Impaired Waters.

The discharge locations of the Lower Reedy and Mauldin Road WWTPs are included on the list for elevated fecal coliform levels. Additionally, the discharge location for the Mauldin Road WWTP is included on the list for elevated copper concentrations.

It is anticipated that discharges from WWTPs on the Reedy River will be subject to additional nutrient limits in the future. SCDHEC is currently developing a total maximum daily load (TMDL) for phosphorus in the Reedy River Planning Area. It appears this could require a significant reduction in total phosphorus loadings.

It appears that current drought conditions may impact the 7Q10 flows calculated by United States Geological Service (USGS), possibly resulting in more stringent treatment plant discharge limits. This may be especially important in the Reedy River Planning Area as it is currently experiencing drought conditions. New federal laws may regulate the discharge of emerging contaminants from sewage treatment plants, requiring this issue to be addressed in the future. ReWa will need to revisit treatment and discharge options as regulations and discharge limits change, placing additional constraints on these facilities.

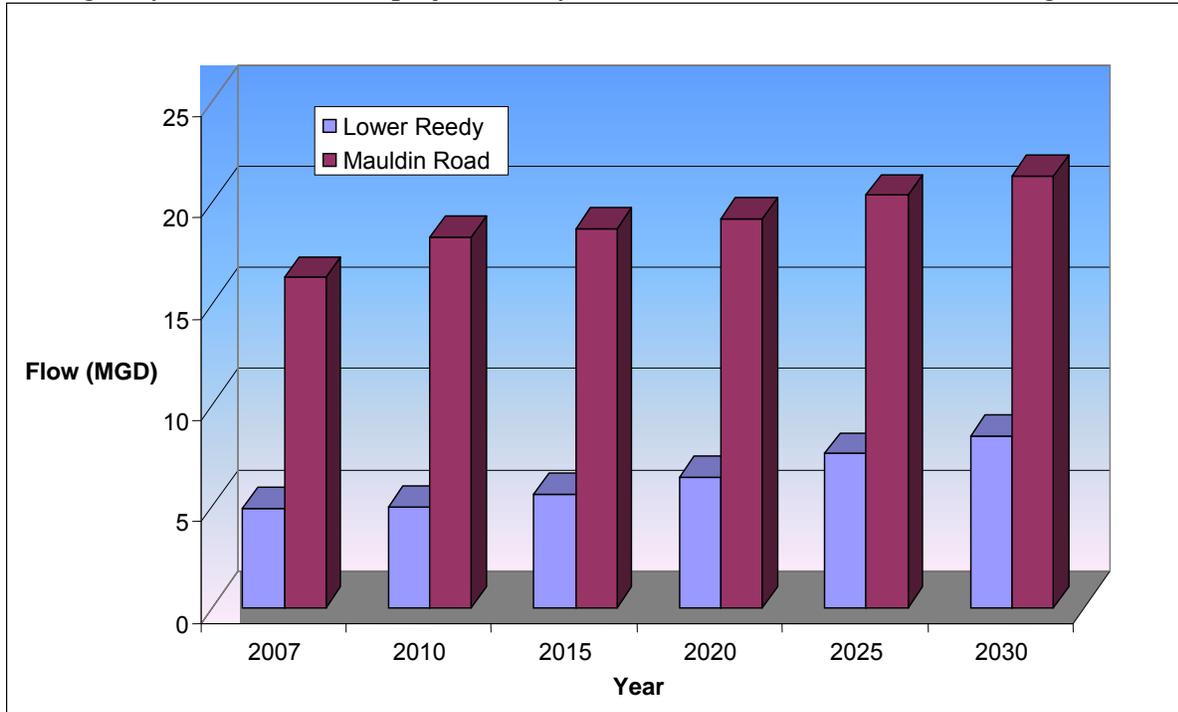
It is anticipated that future permit limits will include both nitrogen and phosphorus limits. Emerging contaminants such as pharmaceuticals and endocrine disrupters may also play a role in future discharge limits.

## **Forecasts of Probable Growth**

Population projections for the Lower Reedy and Mauldin Road WWTP service areas were based on existing projection data and on future average maximum densities, as discussed and verified with local area planners and zoning codes. Future industrial developments were identified through data and information obtained from local area economic development agencies.

Estimated future dry weather flows (DWFs) were calculated by multiplying estimated unit flow rates to WWTP service area population data and to the estimated percent served. The per capita rate of 70 gpd developed by GWS was used as a basis in projecting domestic wastewater flows. Additional flows beyond the current flows estimated for future development were based on a factor of 1.75 for peak day flows, based on available knowledge of system flows. The peak day peaking factor was used to evaluate WWTP capacity. System conveyance capacity was based on the 10-state standard for peak hourly conditions. A per area flow rate of 2000 gpd per acre was used to estimate potential future industrial flows in undeveloped areas.

Average day wastewater flow projections by WWTP service area are shown in Figure A-RR 1.



*A-RR 1 Average Day Wastewater Projections*

### **Identified System Improvements and WWTP Upgrades**

Tables A-RR 1 and A-RR 2 present recommended system and WWTP improvements in 5-year increments. Improvements are based on anticipated future growth and development and on existing system conditions, as determined through hydraulic modeling performed as part of this study. Planning level costs are also presented.

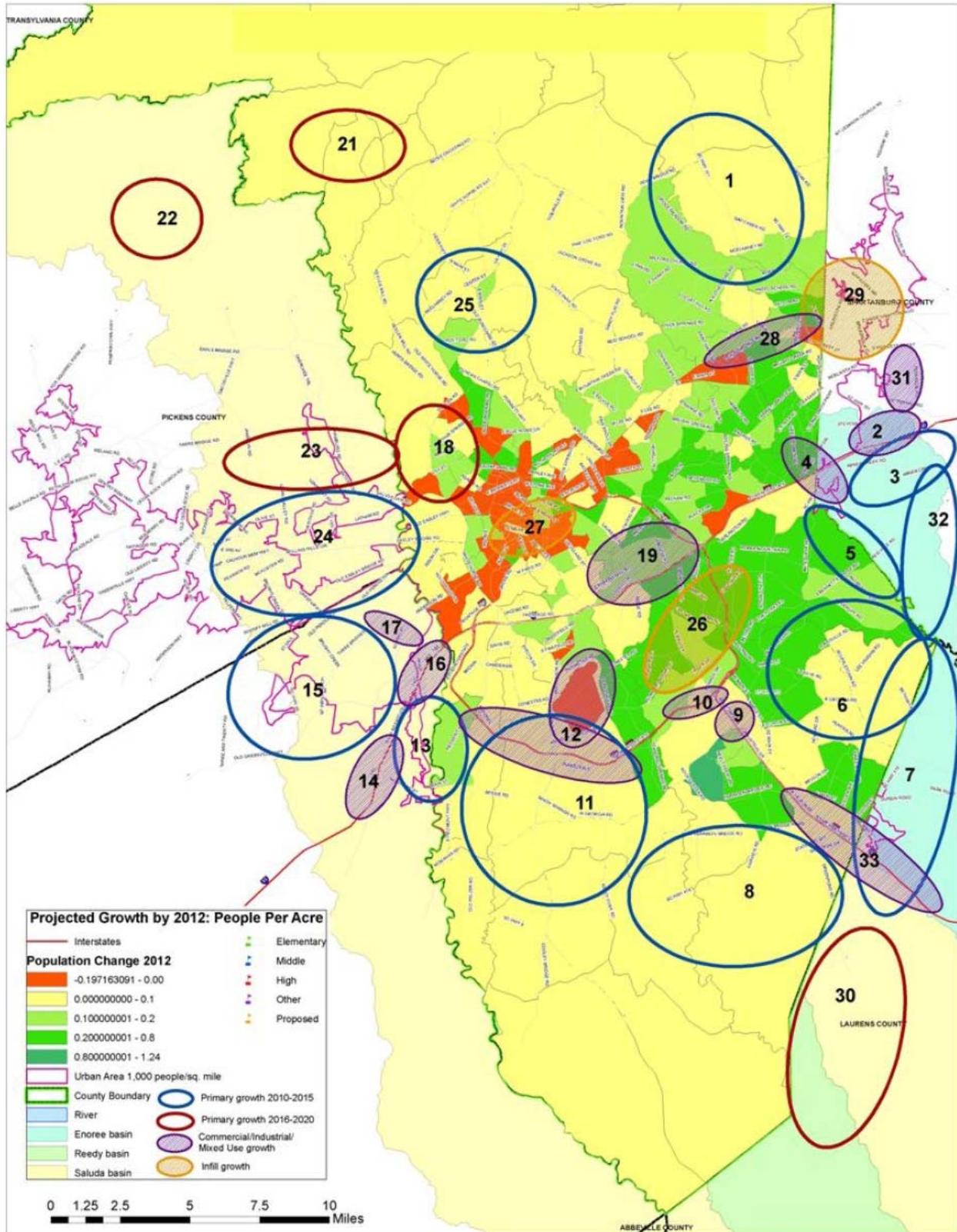
**Table A-RR 1. Identified Future ReWa System Improvements- Reedy River Planning Area**

	Name	Planning Level Cost
<b>2015 – 2020</b>		
(1)	Tubbs Mountain #1 and Tubbs Mountain #2 Pump Station and Force Main Upgrades	\$3,840,000
(2)	New Conestee Pump Station and Forcemain	\$10,680,000
(3)	Parallel Existing 24-inch Gravity Line in the Upper Mauldin system.	\$7,160,000
(4)	Parallel Existing 24-inch, 30-inch and 42-inch Gravity Lines in the Upper Mauldin System downstream of the Berea System Connection	\$12,600,000
<b>2025 – 2030</b>		
(1)	Travelers Rest East Pump Station Upgrade	\$4,320,000
<b>Post 2030 – Beyond</b>		
(1)	Huff Creek Improvements	\$22,400,000

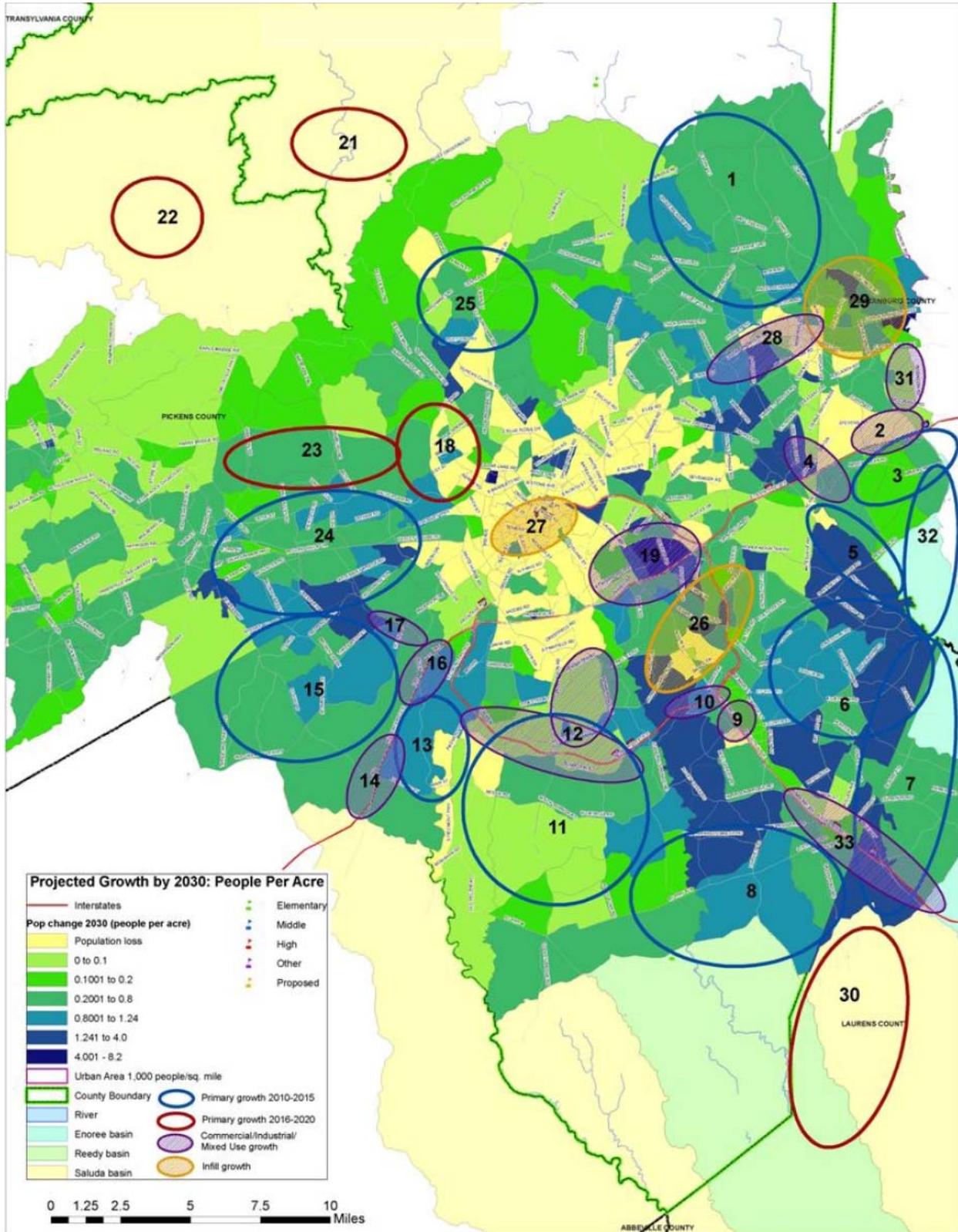
**Table A-RR 2. Identified Future ReWa WTP Upgrades – Reedy River Planning Area**

Treatment Plant	Year	Capacity Upgrade	Total Cost
Lower Reedy	2015-2020	2.0 MGD	\$43M
Mauldin Road	2015-2020	N/A	\$140M
New Huff Creek	Post 2030	10 MGD	\$120M

**Figure A1. Combined Growth Committee Projections Compared to 2012 Census Bureau**



**Figure A2. Combined Growth Committee Projections Compared to GPATS 2030 Projections**



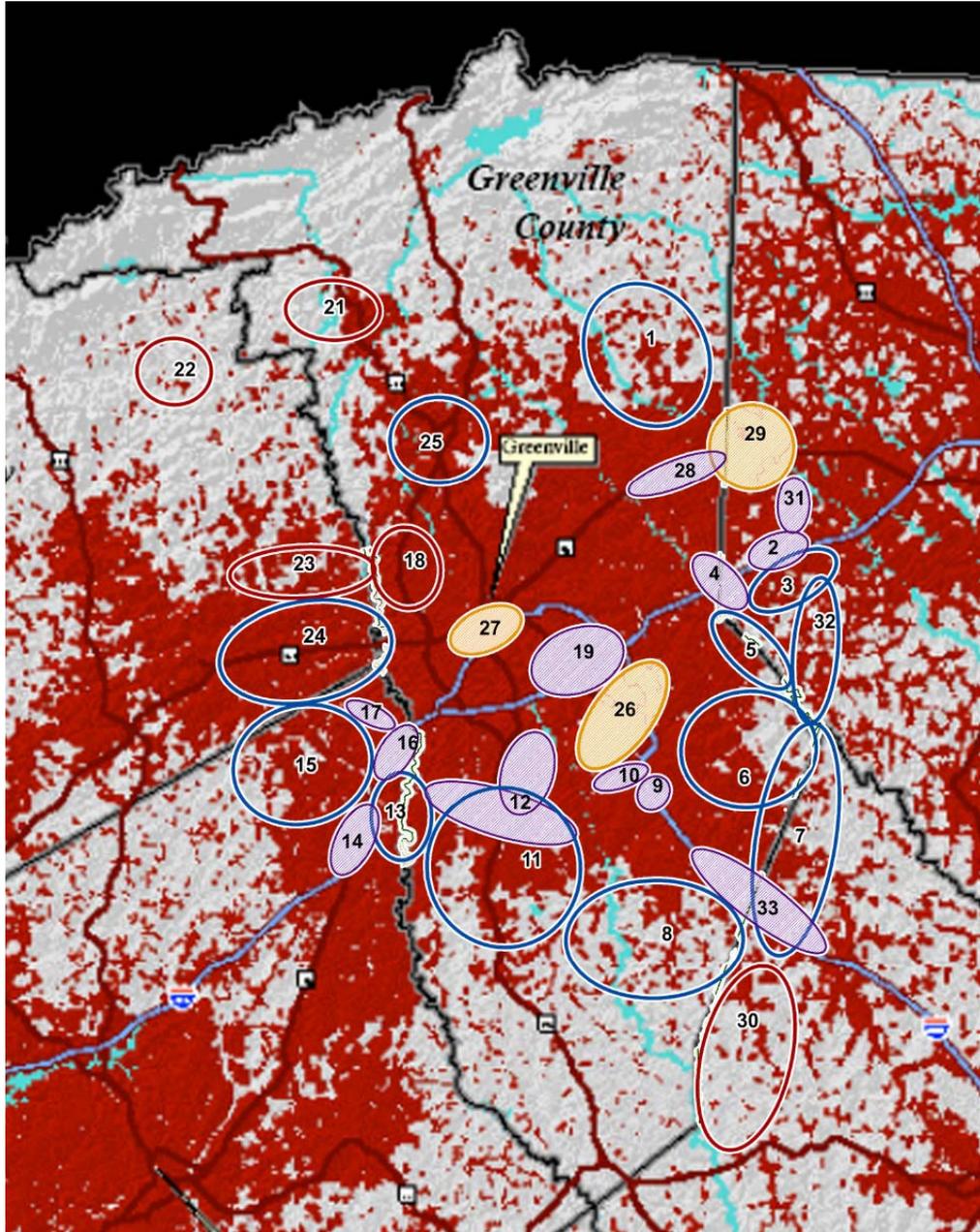
**SUPPLEMENTAL REVIEW OF GROWTH STUDIES**  
**UPSTATE FOREVER MAY 2009**

In early 2008, the Strom Thurmond Institute (STI) at Clemson University released a growth projection study for eight Upstate counties: Greenville, Spartanburg, Anderson, Pickens, Greenwood, Laurens, Abbeville and Newberry Counties. The STI study determined that the current “growth ratio” for the region is 5 to 1, that is, the rate of land development is five times the rate of population growth. The study shows what the region will look like in 2030 if this ratio remains unchanged, and it also shows the extent of development under four smaller growth ratios: 4 to 1, 3 to 1, 2 to 1, and 1 to 1. Each scenario accommodates the same number of people and the same amount of economic activity—the only difference is the amount of land that is developed relative to population growth. The difference is striking. For example, the extent of development in the Upstate under a 1 to 1 growth ratio is approximately 766,000 acres, while over 1.5 million acres would be developed under a 5 to 1 growth ratio.

Upstate Forever submitted the following review of these studies.

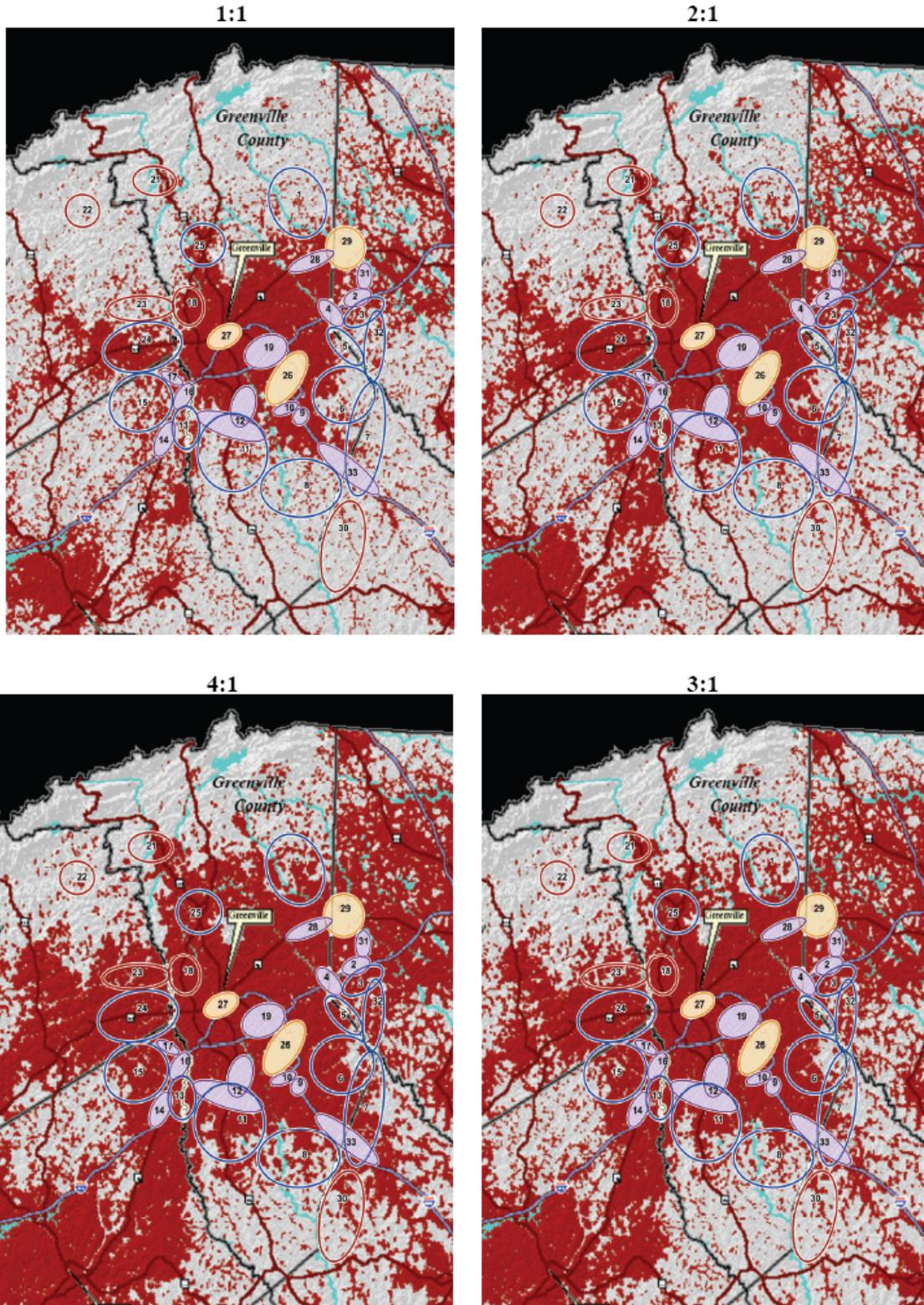
“The pattern of development has dramatic implications for the costs of wastewater collection and treatment services provided by ReWa. While the STI study did not quantify these costs, similar studies across the United States have shown that these costs are significantly greater in regions with sprawling patterns of development. Dr. Robert Burchell, the nation’s leading expert on the fiscal impact of sprawl, found that by merely shifting 10 per cent of future growth in the South between 2000 and 2025 to more urban and suburban locations and by increasing densities of all developments by 20 per cent, we would save \$5.5 billion in water and sewer infrastructure costs. Closer to home, Dr. Burchell’s study for Richland County, South Carolina showed that by redirecting just 10 per cent of future growth from rural areas to urban areas, the county would save \$24 million in sewer capital costs over 20 years. A study for the Salt Lake region in Utah showed that a growth scenario similar to the 5 to 1 projection would cost \$15 billion more in costs for roads, water, sewer and utilities than a scenario similar to the 1 to 1 projection.”

**Figure A3. Combined Growth Projection Compared to Strom Thurmond Institute Predicted Urban Growth 5:1**

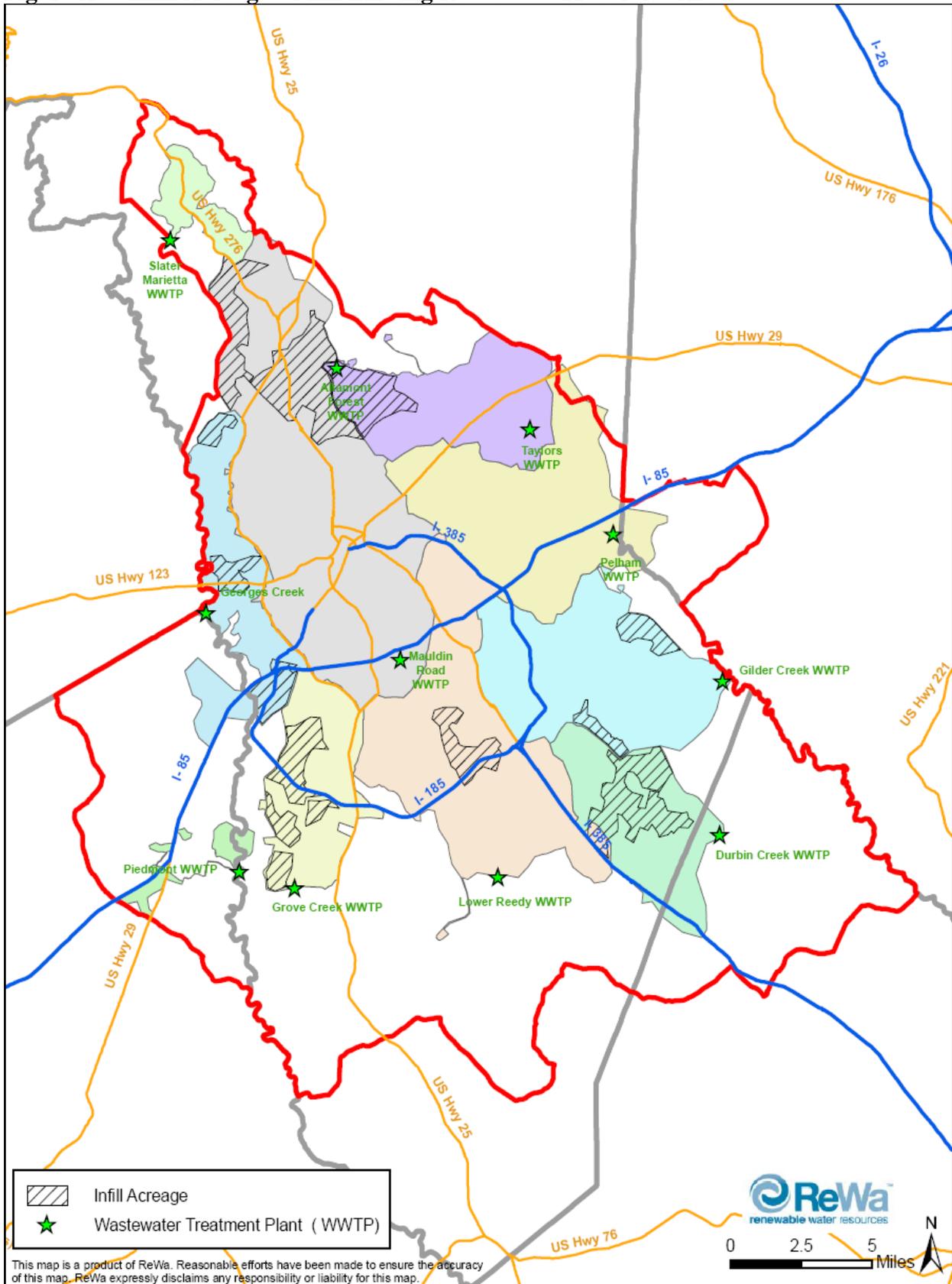


In addressing the issue of probable future Upstate growth, the Combined Growth Committee reviewed the 2012 Census Bureau study (Figure A1), the GPATS 2030 projection study (Figure A2), and the Upstate growth projection study conducted by the Strom Thurmond Institute (STI) at Clemson University (Figure A3). The STI study determined that the current “growth ratio” for the region is 5 to 1, that is, the rate of land development is five times the rate of population growth. The study shows what the region will look like in 2030 if this ratio remains unchanged, and it also shows the extent of development under four smaller growth ratios: 4 to 1, 3 to 1, 2 to 1, and 1 to 1. Each scenario accommodates the same number of people and the same amount of economic activity—the only difference is the amount of land that is developed relative to population growth. The difference is striking. For example, the extent of development in the Upstate under a 1 to 1 growth ratio is approximately 766,000 acres, while over 1.5 million acres would be developed under a 5 to 1 growth ratio.

**Figure A4. Combined Growth Projection Compared to Strom Thurmond Institute  
Predicted Urban Growth  
Clockwise 1:1, 2:1, 3:1, 4:1**



**Figure A5. Infill Acreage within Existing ReWa WWTP Service Areas**



This map is a product of ReWa. Reasonable efforts have been made to ensure the accuracy of this map. ReWa expressly disclaims any responsibility or liability for this map.

**Figure A6. Current and Projected Future Trunk and Collector Sewer Locations**

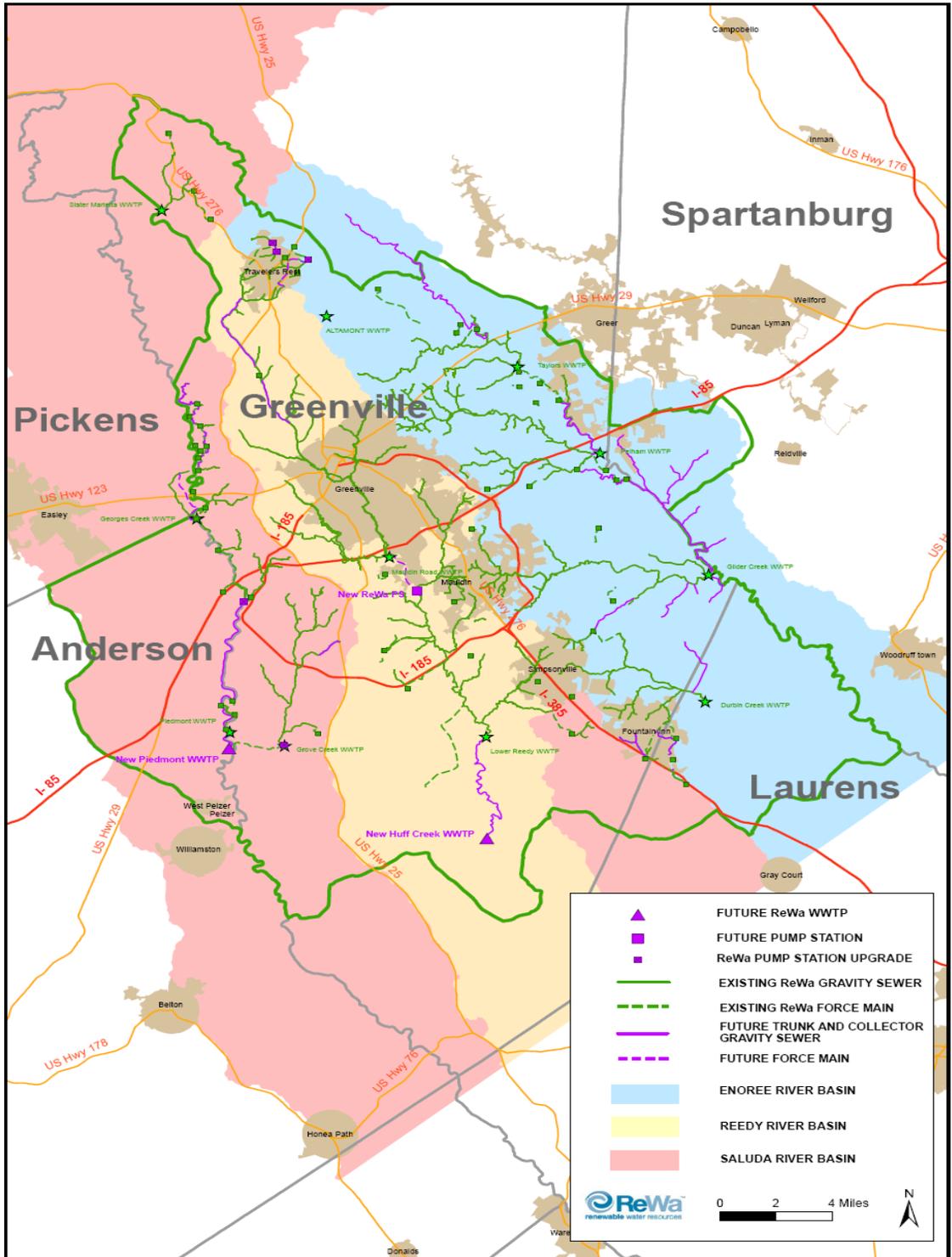


Table A 1

Combined Growth Committee Report: Factors Influencing Growth Projections and Wastewater Infrastructure Needs for 2030

Area	WASTEWATER TREATMENT CAPACITIES						OTHER FACTORS THAT WILL PROMOTE OR ENCOURAGE GROWTH						PROJECTED GROWTH						
	Collector Sewers		Trunk Sewers		Treatment Plant		Transportation		Land cost		Schools		Jobs		Water		Rate	Intensity	Influence
	Availability	Capacity	Availability	Capacity	Availability	Capacity	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No			
1: Blue Ridge area	2	4	2	4	2	5	✓		✓		✓		✓				2	3	5
2: BMW area	4	4	3	4	5	5	✓		✓		✓		n/a				3	4	5
3: Abner Creek area	2	3	3	4	5	5		✓	✓		✓		✓		✓		3	3 to 4	5
4: Pelham Mill area	3	3	5	4	5	4	✓		✓		✓		n/a	✓			2	2	3 to 4
5: Enoree	1	1	1	1	4	4		✓	✓		✓		✓		✓		3	2 to 3	5
6: Scuffletown	3	4	2	3	4	4		✓	✓		✓		✓		✓		2 to 3	2 to 3	4
7: Hwy 418/Fairview Rd.			1	1	4	4		✓	✓		✓		✓		✓		2	3	4 to 5
8: Fork Shoals	2	3	1	1	2	2		✓	✓		✓		✓		✓		2	3	4
9: Simpsonville			4	4	3	3	✓			✓		✓		n/a	✓		3	5	5
10: Southern Connector/385	3	3	4	3	3	3	✓			✓		✓		n/a	✓		2	4	4
11: Woodmont	2	4	2	3	2	3	✓		✓		✓		✓		✓		3	4	4
12: Southern Connector	3	5	2	3	2	3	✓			✓		✓		n/a			3	4	5
13: Piedmont	2	2	3	2	3	3	✓					✓	✓				2	2	4
14: I-85 and Route 86	2	3	1	1	2	3	✓			✓		✓		n/a	✓		2	3 to 4	4
15: Powdersville	1 to 2	3	1	1	2	3		✓	✓		✓		✓		✓		2	3 to 4	4
16: I-85/Route 153 interchange	3	3 to 4	2	2	4	4	✓			✓		✓		n/a	✓		3	4	4
17: 153 Corridor	3	3 to 4	2	2	4	4	✓		✓		✓		✓		n/a	✓	3	4	4
18: Berea area	3	2 to 3	4	2	5	5	✓			✓		✓	✓				1	2	2
19: ICAR (includes Verdae area)	4	3	2	3	4	3	✓			✓	✓	✓				✓	3	5	5
21: Marietta area	2	2	3	2	3	2		✓	✓			✓		✓	✓		1	2	4
22: Pumpkintown area	1	1	1	1	1	1		✓	✓			✓		✓			1	2	5
23: Dacusville	1	1	1	1	1	1		✓	✓			✓		✓	✓		1 to 2	2 to 3	4
24: Easley			3	4	2	4	✓			✓		✓		✓			3	3	4
25: Travelers Rest	3	3	4	4	5	5		✓	✓		✓		✓				2	3	4
26: Mauldin Urban Infill	3	3	5	3	4	4	✓			✓	✓		✓				2	3 to 4	4
27: Greenville Urban Infill	3	3	5	2	5	5	✓			✓	✓		✓		✓		2	5	3
28: Wade Hampton Commercial	3	3	1	4	4	3	✓			✓		✓		n/a	✓		2	3	4
29: Greer Urban Infill	4	3	2	4	5	5	✓			✓	✓		✓		✓		3	3	4
30: Hickory Tavern	1	1	1	1	1	1		✓	✓			✓		✓			1	1	5
31: Greer Int'l Industrial Park	4	4	3	4	5	5	✓			✓		✓		n/a			3	3	3
32: South Hwy 101	1	4	4	4	4	4		✓	✓			✓	✓				3	2	4
33: 385 @ county line	2	3	4	4	4	4	✓			✓		✓		n/a	✓		2	2	4

\* Need review by Greer CPW.

**Rate:** Speed of population change; 1 = Moderate growth thru 2030, 2 = Significant growth by 2030, 3 = Significant growth by 2020

**Intensity:** • Expected number of dwelling units per acre, with 1 being fewest and 5 being most  
• Commercial/industrial intensity is based on contributory loading

**Influence:** How presence or absence of sewer affects the rate or intensity of development, with 1 = least influence (will use septic tanks), 3 = other factors more important than sewers, and 5 = growth totally dependent on getting sewers

**Availability:** Presence or absence of facilities; 1 = nothing available, 5 = facilities present throughout specific growth area

**Capacity (Sewers):** Capacity in pipes to transport flows during wet weather periods; 1 = insufficient capacity (overflows will occur), 3 = capacity for current but not additional wet weather flows, 5 = capacity for all flows through 2030 or the builtout

**Capacity (Plants):** Ability of plant to treat wastewater from specific growth area to meet compliance standards; 1 = no plant available, 3 = meeting compliance for current flows, 5 = plant able to meet compliance for flows at buildout or 2030

**Transportation:** Rising transportation costs, possible future transit rail  
**Land costs/taxes:** Low rural land costs have traditionally pushed development here  
**Schools:** Excess capacity may encourage development of nearby subdivisions  
**Jobs:** Evaluated based on proximity to existing employment centers

**Water:** Evaluated based on availability of public water

**Table A 2**

Infill Acreage As % Of ReWa WWTP* Service Area				
River Basin	WWTP	Acreage		% Infill
		Infill	Total	
Saluda				
	Marietta	0	4049	0%
	Georges Ck	2664	12178	22%
	Piedmont	0	598	0%
	Grove Ck	3495	13013	27%
	Subtotal	6159	29838	21%
Reedy				
	Mauldin Rd	7388	42931	17%
	Lower Reedy	1711	38051	4%
	Subtotal	9099	80982	11%
Enoree				
	Taylors	2762	18379	15%
	Pelham	0	20784	0%
	Gilder Ck	1636	21665	8%
	Durbin Ck	3984	13804	29%
	Subtotal	8382	74632	11%
<b>* Wastewater Treatment Plant</b>				