

**Leon County Does Not Need Performance-Based Treatment Systems For All  
Of Southern Leon County; It Needs To Extend Central Sewer In The More  
Densely Populated, Urbanized Areas**

## **ERRATUM**

The purpose of an exposure draft is to solicit comments on the factual presentation, not necessarily the author's conclusions. Typically, the author would use the comments to correct or update preliminary data and information when finalizing the draft. In this case, for one piece of information, the author felt compelled to correct the mathematical calculation about the population densities of the Woodville community and the Oak Ridge Sector (page 4). Although the corrected calculation is significantly less than originally reported, it does not change the author's conclusions. The corrected text at the top of page 4 should be as follows:

Instead of continuing to use conventional on-site disposal systems or requiring conversion to performance based treatment systems for everyone in the southern Leon County, the county should work to extend central sewer throughout the south side where population density would justify it, such as the Woodville community and the Oak Ridge Sector. Within one mile radius of Woodville Elementary School, there are approximately 11,016 people, or a little about 1,116 people per square mile.<sup>1</sup> Within a one mile radius of the intersection of Balkin and Ballard Roads, there is a population of about 10,644, or about 1,078 people per square mile.

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<sup>1</sup> Population density is a measure based upon area. The area within a one mile radius of a particular point is calculated using the formula  $A = \pi r^2$ , where  $A$  = area = miles<sup>2</sup>;  $\pi$  = Pi = 3.14159; and  $r$  = radius = 1 mile. Therefore, the area of circle with a radius of one mile is  $A = \pi r^2 = (3.14159 * 1)^2 = (3.14159)^2 = 9.86792$  square miles. Population density is then calculated by  $d = P / A$ , where  $d$  = density;  $P$  = population, and  $A$  = area. Therefore, for Woodville's population density,  $d = P / A = (11,016 \text{ people} / 9.86792 \text{ square miles}) = 1,116.34$  people per square mile. Oak Ridge's density would be  $d = P / A = (10,644 \text{ people} / 9.86792 \text{ square miles}) = 1,078.64$  people per square mile.

# Exposure Draft

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LEON COUNTY DOES NOT NEED PERFORMANCE-BASED TREATMENT

SYSTEMS FOR ALL of SOUTHERN LEON COUNTY; IT NEEDS TO EXTEND

CENTRAL SEWER IN THE MORE DENSELY POPULATED, URBANIZED

AREAS

By

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Chronically high nitrate levels have adversely affected Wakulla Springs. As a result of excessive nitrogen in the groundwater feeding the springs, water clarity has been reduced, significant growth of nutrient-dependent vegetation has occurred, resulting in the possible the loss of some bird species and the reduced recreational value of the springs. Leon County has responding by creating the Primary Springs Protection Zone and included the south side of the county. For property owners inside the zone, the county is trying to require performance-based treatment systems to be installed. However, the county is proposing an unnecessarily expensive, ineffective, inequitable solution. Instead, what the county should be doing is promoting the extension of central sewer in at least two densely populated south side urban areas: the Woodville community and the Oak Ridge Sector.

### Government Intervention is Needed

Urban policies should guide the private sector in preserving and redeveloping existing urban cores and promoting the adequate provision of infrastructure.<sup>2</sup> The success of those policies depends upon local governments, which should provide incentives to promote urban infill and redevelopment. Existing programs and incentives should be used to

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<sup>2</sup> Urban Infill and redevelopment, section 163.2511, *Florida Statutes*. This paragraph draws heavily on that law, which was retrieved August 6, 2009, from [http://www.leg.state.fl.us/Statutes/index.cfm?App\\_mode=Display\\_Statute&Search\\_String=&URL=Ch0163/SEC2511.HTM&Title=-%3E2009-%3ECh0163-%3ESection%202511#0163.2511](http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=Ch0163/SEC2511.HTM&Title=-%3E2009-%3ECh0163-%3ESection%202511#0163.2511).

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the extent possible to promote urban infill and redevelopment and to achieve the goals of urban policy.

However, when existing programs and incentives are not sufficient to achieve urban policies, local governments should develop additional program and incentives that can increase the likelihood of success. Such programs and incentives should be available to ensure that concurrency requirements are achieved.

Concurrency requirements are intended to preserve and redevelop existing urban cores and promote, among other things, the provision of infrastructure.<sup>3</sup> Concurrency requirements were intended to deal solely with sanitary sewer, solid waste, drainage, potable water, parks and recreation, schools, and transportation facilities. Although the growth management law deals extensively with transportation facilities and schools, other sometimes more important requirements should not be overlooked.

Of particular concern in this paper is the infrastructure for sanitary sewer. For new development, sanitary sewer should be in place and available no later than the issuance of a certificate of occupancy. Local government may meet the requirement for sanitary sewer by using onsite sewage treatment and disposal systems, which it has been doing for years. On-site systems, like any sewer system, collect and treat waste effluent before discharging the treated waste water back into the ground and, eventually, the water table. When properly used and operating optimally, on-site systems reduce the amount of nitrogen extracted from effluent by about 20% to 25%.<sup>4</sup>

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<sup>3</sup> Concurrency, s. 163.3180, F.S. This paragraph draws heavily on that law, which was retrieved August 6, 2009, from [http://www.leg.state.fl.us/Statutes/index.cfm?App\\_mode=Display\\_Statute&Search\\_String=&URL=Ch0163/SEC3180.HTM&Title=-%3E2009-%3ECh0163-%3ESection%203180#0163.3180](http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=Ch0163/SEC3180.HTM&Title=-%3E2009-%3ECh0163-%3ESection%203180#0163.3180).

<sup>4</sup> See Joseph E. Costa, George Heufelder, Sean Foss, Newton P. Milham, and Brian Howes, "Nitrogen Removal Efficiencies of Three Alternative Septic System Technologies and a Conventional Septic System," *Environment Cape Cod* (Volume 5: No. 1: pp. 15-24), September 2002, retrieved May 3, 2009, from <http://www.buzzardsbay.org/etistuff/results/costaenvccarticle2.pdf> and Jeanne L. Darby and Harold Leverenz, "Virus, phosphorus, and nitrogen removal in onsite wastewater treatment processes" (September 1, 2004), University of California Water Resources Center, Technical Completion Reports, retrieved May 3, 2009, from <http://repositories.cdlib.org/wrc/tcr/darby/>. Heufelder et. Al. reported that septic tanks remove less than 25% of nitrogen. Darby and Leverenz studied on-site wastewater treatment systems in operation at the University of California-Davis. Among the systems they studied was a traditional septic tank followed by sand drain fields, which is similar to the nature of the soil overlying the Floridan Aquifer in the Woodville plain. They found that traditional septic systems remove less than 12.5 to 23.4 percent of nitrogen and that sand beds removed another 12.8 percent of the nitrogen. To determine the percentages here, I calculated a range of values, using the formula

$$N = \{ ( t / 2 ) + s \},$$

where N = percent of total nitrate reduction, t = percent of nitrate reduction due to tank only, and s = percent of nitrate reduction due to sand only, which is  $s = (1-t)*p$ , where p = percent of nitrate reduction due to sand filtration alone. Thus, for the first calculation, using t = 0.125 (12.5%) and p = 0.128 (12.8%), one arrives at a lower value of 17.4%; for the second calculation, substituting t = 0.234 (23.4%) and p = 0.128 (12.8%), one arrived at a high value of 21.5%. Because the calculations may not be as precise as their decimals would suggest, for reporting purposes in the text, I use about 20%.

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Conventional on-site disposal and soil absorption systems are a viable alternative whenever a central system is not available.<sup>5</sup> Conventional septic systems have several advantages for property owners, including their relative ease of operation (they are passive systems), reliability, low cost, and they return nutrients to the soil.<sup>6</sup> With proper care and maintenance, conventional septic systems could last 20 to 40 years.

However, according to the U.S. Environmental Protection Agency, most on-site systems are not well maintained and probably have a useful life of less than 20 years.<sup>7</sup> This is a principal weakness: on-site system owners are too often untrained and uninformed about their system to operate and maintain their relatively simple, gravity-based systems. As a result, system performance can vary significantly, with operation and maintenance functions driven mostly by complaints of failures. Typically, owners do not repair and maintain their system until they start experiencing system failures. When these systems are not functioning properly, they can introduce elevated levels of nitrogen, phosphorus, organic matter, and bacterial and viral pathogens into the surrounding area and groundwater. Also when systems fail, odors can occur if sewage is left untreated for an extended period of time. On-site disposal systems may also have the limitations with the site, such as inappropriate soil type and permeability, bedrock, groundwater elevations, and site topography. In addition, regulations pertaining to set-backs from water supply, lot lines, and drainage lines must be taking into account. When planning a septic system, planners should also take into consideration restrictions on the character of influent.

Performance based treatment systems do have some advantages over conventional septic tanks. They make use of recent developments to tailor system technologies appropriate for the estimated flow and strength of the wastewater at the site where treatment is to occur.<sup>8</sup> Depending upon soil, ground water characteristics, slopes, and other features, an appropriate system with subsurface wastewater infiltration systems might be the best option. However, performance-based systems are not without their disadvantages. The principal disadvantage of performance based treatment systems are that they require a higher level of management and maintenance and are much more expensive to buy, install, and operate. resulting in recurring costs for the system owner.

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<sup>5</sup> U.S. Environmental Protection Agency, "Decentralized Systems Technology Fact Sheet: Septic System Tank-Soil Absorption Systems," Publication number EPA 932-F-99-075, September 1999, retrieved May 3, 2009, from <http://www.epa.gov/owm/septic/pubs/septicfc.pdf>.

<sup>6</sup> *Ibid.*

<sup>7</sup> *Ibid.*

<sup>8</sup> U.S. Environmental Protection Agency, "Chapter 1: Background and Use of Onsite Wastewater Treatment Systems," US Environmental Protection Agency: National Risk Management Research Laboratory, Publication EPA 600/R-00/008, January 2000, retrieved May 4, 2009, from <http://www.epa.gov/nrmrl/pubs/625r00008/html/600R00008chap1.htm>.

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Instead of continuing to use conventional on-site disposal systems or requiring conversion to performance based treatment systems for everyone in the southern Leon County, the county should work to extend central sewer throughout the south side where population density would justify it, such as the Woodville community and the Oak Ridge Sector. Within one mile radius of Woodville Elementary School, there are approximately 11016 people, or a little over 3,550 people per square mile. Within a one mile radius of the intersection of Balkin and Ballard Roads, there is a population of about 10,644, or almost 3,400 people per square mile.

### **High Nitrate Levels Are Endangering Wakulla Springs**

Chronically high nitrate levels in Wakulla Springs have adversely affected Wakulla Springs. As a result of excessive nitrogen in the groundwater feeding the springs, water clarity has been reduced, significant growth of nutrient-dependent vegetation has occurred, resulting in the possible the loss of some bird species and the reduced recreational value of the springs.<sup>9</sup>

Nitrate levels around the state have been increasing since 1970. Prior to 1980, the decade before the City of Tallahassee opened its Southeast spray field, FDEP reported nitrate levels in Wakulla Springs of less than 0.2 milligrams per liter (mg/l).<sup>10</sup> By the mid- to late-1980s, within a decade of the city opening the southeast drain field, nitrate levels rose to almost 1.5 mg/l.<sup>11</sup> By the end of the last century, with more environmental awareness, sensitivity, and policies, nitrate levels had dropped to around 0.58 to 0.60 mg/l. For the past decade or so, nitrate levels have been holding around 0.5 milligrams of nitrogen per liter (mg/l).

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<sup>9</sup> Jan Mandrup-Poulsen, "The Wakulla Springs TMDL & a Proposed Nitrate Standard for Springs," Florida Department of Environmental Protection, undated presentation, retrieved April 17, 2009, from <http://www.1000fof.org/water/WakPowerPoits/Mandrup-Poulsen-Wakulla%20Springs%20Symposium%20TMDL%20Talk%20JMP.ppt.pdf> and Jennifer Portman, "Working together to bring Wakulla spring back: Conference set to find ways to reduce pollution," Tallahassee Democrat, February 15, 2009, retrieved April 17, 2009, from <http://www.tallahassee.com/article/20090215/NEWS01/902150321/1010>. Nitrate levels of 0.23 to 0.263 milligram per liter (mg/l) cause elevated growth in nutrient-dependent vegetation with environmental imbalances occurring around 0.441 to 0.454 mg/l. To improve water quality, the state has set a goal to reduce nitrate levels to no more than 0.35 mg/l, or about 30% less than current levels.

<sup>10</sup> *Wakulla Springs: Yesterday, Today, and Tomorrow* (2009), retrieved April 17, 2009, from [http://www.fwfonline.org/documents/wakulla\\_slide\\_show.pdf](http://www.fwfonline.org/documents/wakulla_slide_show.pdf) (slide 6 in particular).

<sup>11</sup> 1000 Friends of Florida, *Follow-up Report to the Wakulla Spring Restoration Workshop* (draft report), February 25 through 26, 2009, Antique Car Museum, Tallahassee, Florida, Figure 2: Data Table (page 5), retrieved April 18, 2009, from <http://www.1000friendsofflorida.org/water/WakPowerPoits/WakullaWkshopReportMaterials2009.doc.pdf>.

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The concern of local government and the public is that, left unchecked, high levels of nitrogen could choke off Wakulla Springs. In part to inventory non-point sources of nitrogen pollution, the Northwest Florida Water Management District (NWFWD) has studied the St. Marks-Wakulla Rivers watershed.<sup>12</sup> NWFWD investigated six significant factors by which nitrogen is introduced into the St. Marks-Wakulla watershed:

- atmospheric deposition results from human activity such as burning fossil fuels, which, in part, give off nitrogen, which is then washed out of the atmosphere and deposited onto the ground;
- wastewater treatment facilities (WWTF) are primarily operated by the City of Tallahassee and produce both treated wastewater, which is returned to ground after treatment, and which solidified wastewater residuals;
- on-site domestic disposal systems (OSDS), which consists of septic tanks, primarily, but also cesspits and other methods of disposing of domestic wastewater;
- commercial fertilizer application, which is a significant source of inorganic nitrogen;
- livestock and barn yard animals, such as dairy animals, feed lots, and chicken sheds, is a significant source of organic nitrogen; and
- sinking streams, which are features by which surface water seeps into the aquifer.

The speed at which a liquid, in this case, treated waste water containing nitrogen, finds its way into the watershed depends upon the nature of the soil into which it is deposited. Soils with a high concentration of clay, such as that in the northern part of Leon County, tend to confine the movement of water through the ground into the water table (i.e., "confined" conditions). Soils with more of a sandy consistency, and very little clay, do not confine the flow of liquid into the water table (hence, "unconfined" conditions). Other soils fall somewhere in between those two, depending upon their clay-sand mixture (i.e., "semi-confined" conditions). It is primarily depositions into the semi-confined soils that pose a significantly higher risk for the Floridan aquifer than confined conditions, and unconfined soils pose the highest risk. Although the numbers are

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<sup>12</sup> Angela Chelette, Thomas R. Pratt, and Brian G. Katz, *Nitrate Water Resources Special Report 02-1, Loading as an Indicator of non-point source of pollution in the Lower St. Marks-Wakulla Rivers Watershed*, April 2002, Northwest Florida Water Management District, retrieved April 18, 2009, from <http://www.nwfwmd.state.fl.us/pubs/nitrate/wrsp02-1.htm>. The district's study tried, in part, to estimate nitrogen loading and is often the principal source for efforts to require performance-based on-site disposal systems. It primarily describes conditions found in the Woodville plain, which is the area south of the Cody Scarp, which generally runs east to west in Leon County and includes southern Leon and northern Wakulla counties. The study also mentioned as possible sources of nitrogen 49 active and inactive landfills in Leon and Wakulla counties, but did not investigate them because there was no data available with which to estimate total nitrogen from them. However, the investigators believed that landfills were not a significant source of nitrogen in the Floridan Aquifer (p. 99).

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dated, Exhibit 1 shows the relative nitrogen loading in both the semi-confined and confined soils in the county by source.

<u>Source of Loading</u>	<u>Permeable Condition</u>		<u>Total</u> (Kg-N/Year)	<u>%</u>
	<u>Semi-confined</u>	<u>Unconfined</u>		
	(Kg-N/Year)	(Kg-N/Year)		
Atmospheric deposition	619,000	675,000	1,294,000	48.9%
Wastewater treatment facilities-effluent*	8,000	363,000	371,000	14.0%
Wastewater treatment facilities-residual*	0	154,000	154,000	5.8%
On-site disposal systems	172,000	111,000	283,000	10.7%
Commercial fertilizer	211,000	104,000	315,000	11.9%
Livestock	124,000	33,000	157,000	5.9%
Sinking streams	0	72,000	72,000	2.8%
<b>Total</b>	<b>1,134,000</b>	<b>1,512,000</b>	<b>2,646,000</b>	<b>100%</b>

*\*NOTE: Effluent is the liquid resulting from the treatment of sewage; residuals are the solids remaining after treatment.*

*Source: Angela Chelette, et. Al, Op.Cit. p. 100; percentage calculations by Curtis Baynes.*

According to NFWFMD, in 1999, on-site disposal systems discharged about 42,000 kilo-grams of nitrogen per year into the ground, assuming each household discharges about 4.2 kilograms per capital.<sup>13</sup> At that time, NFWFMD estimated that there were about 17,498 on-site disposal systems in areas of Leon County with semi-confined soils and about 4,290 such systems in area comprised of unconfined soil. Exhibit 2 shows the number of on-site disposals systems NFWFMD estimated for the semi-confined and unconfined topography in Leon County, assuming 2.34 persons per household and 4.2 kilograms of nitrogen per capital per year.

<sup>13</sup> *Ibid.*, page 91.

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**Exhibit 2**  
**Estimated 1999 Nitrogen Loads from On-Site Disposal Systems (OSDS) in Semi-confined and Unconfined Areas of Leon County (1999)**

<u>Area</u>	<u># OSDS</u>	<u>Kg-N /Yr</u>	<u>#age</u>
Leon Semi-confined	17,498	172,000	80.4%
Leon Unconfined	4,290	42,000	19.6%
Total	21,758	214,000	100.0%

**Source:** Angela Chelette, et. Al, *Op.Cit.* Table 8, p. 91.

The purpose of requiring performance-based on-site disposal systems is to reduce the amount of nitrogen discharged into the ground by treated wastewater from on-site disposal systems. Conventional on-site disposal systems remove about 20% of the nitrogen from wastewater.<sup>14</sup> The proposed design standards for performance-based treatment systems should, at a minimum, reduce nitrogen releases from the performance-based system by 70%.<sup>15</sup> If performance-based treatment systems work as well as the design standards require, systems in the Primary Springs Protection Zone could reduce nitrogen loading by about 37,000 kilograms per year.<sup>16</sup>

### **On-Site Systems May Not be Enough In Densely Populated Areas**

In Leon County, continued reliance on on-site disposal systems illustrates yet another weakness: on-site disposal systems require more land than necessary to meet housing needs, contributing to urban sprawl. Many areas of the southern county are zoned R-5, which allows up to eight units per acre. From a practical standpoint, often because of unnecessary storm water requirements, the county would

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<sup>14</sup> Costa, Heufelder, Foss, Milham, and Howes, "Nitrogen Removal Efficiencies of Three Alternative Septic System Technologies and a Conventional Septic System," and Darby and Leverenz, "Virus, phosphorus, and nitrogen removal in onsite wastewater treatment processes," *op.cit.*

<sup>15</sup> Parwez Alan, Vincent S. Long, Homer J. Rice, et. al., "Workshop Item: Additional Information Regarding On-Site Sewage Disposal Systems and Establishment of Standards within the Primary Springs Protection Zone Consistent with the Comprehensive Plan, May 12, 2009, retrieved from <http://www.leoncountyfl.gov/admin/agenda/Workshops/WS120090512.pdf>.

<sup>16</sup> Assuming current, conventional systems reduce nitrogen in wastewater by about 20% (see footnote 8), and the result of that reduction is the introduction of about 42,000 kilograms of nitrogen into the ground every year, the amount of nitrogen generated must be about 53,000 kilograms per year {i.e.,  $42,000 / (1.00 - 0.20) = 52,500$ , rounded to 53,000}. Accordingly, conventional on-site disposal systems probably reduce nitrogen by about 9,000 kilograms per year. If performance-based systems are capable of reducing wastewater nitrogen by 70%, the newer systems should be able to reduce the nitrogen load by about 37,000 kilograms per year, resulting in total nitrogen loading of about 16,000 kilograms per year.

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probably only permit five units per acre in R-5 zoning.<sup>17</sup> However, for property without central sewer, development is limited to two units per acre. As a result, using on-site disposal systems requires about 2½ more land than if central sanitary sewer were available. Because more land is required to meet housing needs, development is pushed further from the urban core, resulting in more urban sprawl.

As a result of growing concerns over the water quality in Wakulla Springs, efforts to better control nitrogen discharges have taken many forms by state, county, and local governments. To improve water quality, the state has set a goal to reduce nitrate levels to no more than 0.35 mg/l, or about 30% less than current levels.<sup>18</sup> To provide Leon and Wakulla counties and others a means to assessing the risk posed to drinking water wells and surface water bodies, the Northwest Florida Water Management District investigated nitrate loading in the lower Saint Marks-Wakulla Rivers watershed. The intent was to augment the St. Marks River Surface Water Improvement and Management Program to restore and preserve the watershed.

In efforts to reduce nitrogen loading, Tallahassee and Leon County have submitted over \$190 million in sanitation projects as economic stimulus projects.<sup>19</sup> Starting within a decade of opening its southeast drain field, once the extent of the environmental consequences became more readily apparent, the City of Tallahassee started taking steps to reduce nitrogen loading at both its wastewater treatment facilities and at its southeast drain field. As a result of those efforts, in part, Wakulla Springs started showing significant declines in nitrates from a high of around 1.5 mg/l in the mid-1980s to about 0.5 mg/l currently. Most recently, in January 2008, the

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<sup>17</sup> In Leon County, R-5 zoning allows up to eight mobile homes or single family homes per acre with lot sizes of at least 50 feet x 100 feet (5,000 square feet). However, requirements for holding ponds to accommodate storm water would probably only result in being permitted for five units. A single acre of land is 43,560 square feet. Allowing about one-third for storm water and other required infrastructure (i.e., 14,520 square feet = 43,560 / 3 ), which reduces the available buildable land of about 29,040 square feet. Assuming the configuration of the acre is such that 50-foot x 100-foot lots could be carved out, the property owner would probably be permitted five units on their acre of land (i.e., 29,040 / 5,000 = 5.808, which would be rounded down to 5).

<sup>18</sup> Jennifer Portman, *Op. cit.* For the past decade or so, nitrogen in Wakulla Springs has been holding steady around 0.5 mg/l. The percentage reduction is a fairly straight-forward calculation,  $p = ( l - g ) / l$ , where  $p$  = percentage reduction,  $l$  = current levels of nitrogen in kilograms per liter (i.e., 0.5),  $g$  = the desired goal in kilograms per liter (i.e., 0.35), which reduced to  $p = (0.50-0.35)/0.50$ , which is 0.15/0.50, or 0.30; that is, 30%.

<sup>19</sup> Tallahassee Capital Region Economic Stimulus Projects: Regional Economic Stimulus Project Descriptions: Phase 1 Within 120 Days (page 13), retrieved August 6, 2009, from [http://www.leoncountyfl.gov/Admin/PIO/pdf/2-24-09\\_Final\\_Project\\_Descriptions.pdf](http://www.leoncountyfl.gov/Admin/PIO/pdf/2-24-09_Final_Project_Descriptions.pdf). According to the City of Tallahassee's budget documents, one of the biggest challenges facing the sewer operating fund is likely to be the implementation of advanced wastewater treatment improvements at the Lake Bradford Road and the Thomas P. Smith Wastewater treatment facilities. The estimated total capital cost is \$160 million. The improvements are required by a December 2006 settlement with petitioners who objected to renewal of the city's operating permits for both facilities. The improvements should produce treated wastewater that meets quality standards for public access reuse. One of the projects to be conducted in conjunction with the improvements is a feasibility study to determine the extent and cost of a reuse system, as well as consideration of residential irrigation use.

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city's new operating permits for its two wastewater treatment facilities contained an Administrative Order from the Florida Department of Environmental Protection to construct major advanced wastewater treatment improvements within six-year. As part of its economic stimulus package, the city included over \$191.4 million in water projects of which \$160.9 million was for replacing the sanitary sewer at Cascades Park (\$891,930) and \$160 million of renovations to its two wastewater treatment facilities.

Leon County has no water treatment facilities, so its efforts to reduce nitrogen loading have been limited its efforts to modify its health, sanitation, and building codes. Several years ago, it reduced the density permitted on land served by on-site disposal system to no more than two units per acre. In 2005, the county entered into a water and sewer management agreement with the City of Tallahassee.<sup>20</sup> In the agreement, which expires September 30, 2030, Leon County stated its preference for central sanitary sewer and granted an exclusive franchise to the City of Tallahassee to provide such services in the unincorporated areas of Leon County.

Where sewer is not available, the county has taken other steps to regulate nitrogen loading. One of its more recent actions was, in early 2009, to designate the southern part of Leon County, lying in the Woodville Plain (i.e., the south side of Leon County), the Primary Springs Protection Zone. In the Primary Springs Protection Zone, developers, builders, and property owners will have to use greater care in developing property, building homes, or replacing conventional septic systems. One of the requirements the county is considering is requiring new develop or building occurs or existing conventional septic tanks fail, property owners in the Primary Springs Protection Zone would have to use performance-based treatment systems for collecting and treating waste water. However, mandating the use of performance-based treatment systems proved to be controversial and the county, at this writing, has delayed a decision about that proposed requirement.

In addition, as part of Leon County's public works projects under the stimulus plan, sanitary sewer is planned for the Woodville Area. This \$30-million project would extend the city's sewer trunk line along the eastern half of Oak Ridge in the vicinity of Woodville Highway, making possible there conversion to central sewer.<sup>21</sup> Presumably, if constructed, property owners between the existing trunk line and the proposed terminus in Woodville would be required to convert to central sanitary sewer if an existing septic fails. Except for the planned terminus in Woodville, much of the area along Woodville Highway is industrial and commercial in nature, so the

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<sup>20</sup> "City of Tallahassee and Leon County Water and Sewer Agreement," May 10, 2005, retrieved April 29, 2009, from <http://www.leoncountyfl.gov/ADMIN/PIO/pdf/interlocalagreement/water&sewer.pdf>.

<sup>21</sup> "Tallahassee Capital Region Economic Stimulus Projects," *Op. Cit.*

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principal residential area to be served by the extended trunk line would be in the Woodville Area.

## **Policy Conflicts and Expectations Need To Be Reconciled**

There are a number of factors contributing to community tension and conflict about performance-based treatment systems. Before solutions are found to resolve disparities between policies and expectations, differing views have to be resolved and reconciled to develop consensus. Some of those causative factors are government policies and public and resident expectations.

### **Government Policies**

On the policy front, in 1998, Tallahassee and Leon County adopted a "southern strategy." The purpose of the strategy was to relieve growth pressure on the northeast side of the county by promoting more growth on the south side.<sup>22</sup> As part of the southern strategy, Tallahassee and Leon County adopted five sector plans: South Monroe, Capital Cascade (including the South Central area), Lake Bradford, West Pensacola, and Oak Ridge. The Oak Ridge Sector Plan governs the southern-most part of the southern strategy area.<sup>23</sup> About 75% of the population in the 17½ square mile southern strategy area is inside the city; the remaining 25% are in the county most of that is in the Oak Ridge Sector. Unlike the other four sector plans, the Oak Ridge Sector consists of about 70% county population and 30% city population. Also unlike the other four sector plans, the Oak Ridge Sector Plan contains no policy direction or action plan for implementing any of the plan's provisions. As a result, the Oak Ridge Sector Plan simply clarifies a set of common goals and aspirations for the community.

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<sup>22</sup> Tallahassee-Leon County Planning Department, "2007 State of the Southern Strategy Report," December 2007, retrieved May 4, 2009, from <http://www.talgov.com/planning/pdf/npss/stat07.pdf>.

<sup>23</sup> Tallahassee-Leon County Planning Department, *Oak Ridge Section Plan*, accepted by the Leon County Board of County Commissioners, September 8, 2005, and by the City of Tallahassee City Commission, September 28, 2005, retrieved May 4, 2009, from [http://www.talgov.com/planning/pdf/sectorplans/oak\\_ridge/oakridge\\_report\\_final.pdf](http://www.talgov.com/planning/pdf/sectorplans/oak_ridge/oakridge_report_final.pdf). For more information about the Oak Ridge Sector, see the *Oak Ridge Sector Plan*. The plan was accepted by Leon County and the City of Tallahassee on September 20 and 28, 2005, respectively. The plan is also available on CD-ROM. For a copy of the CD version, or for questions about the plan, contact the planning department at (850) 891-6400.

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So, at the same time local governments are trying to encourage development in the southern part of the county, they are fretting over and wondering about moratoriums until a more comprehensive policy can be developed to further protect the Floridan Aquifer and, ultimately, Wakulla Springs.

However, as a practical matter, Leon County is unable to, or has chosen not to, commit any resources to extending central sewer throughout the Oak Ridge sector, or even undertaking any steps to ameliorate the effects of depositions in the southern section of the county. Part of the county's fiscal limitations is due to its policy preferences, such as building a joint dispatch center rather than dealing the wastewater issues. Another part of county's precarious fiscal position is the result of Proposition 1, which mandated increased homestead exemptions, restrictions on millage rate increases, and a roll back of property taxes in general. Consequently, the county can only mandate costly solutions to be borne by individual property owners because it does not have the wherewithal to do anything about the issue itself.

## **Residents' Expectations**

Another reason for the infrastructure dilemma is that resident expectations are changing. According to the planning department, the Oak Ridge sector contains about 80% of septic tanks in the area included in the Southern Strategy.<sup>24</sup> During the planning process, residents expressed conditional interest in extending the city's central sewer system throughout the area. While extending central sanitary sewer has been identified as an important issue, there is no consensus about it. Some residents are interested in being connected to sewer and object to the cost involved, especially where residents do not live within, or have any intention to be annexed by city. A second group is interested in central sewer but only if in there are nominal costs involved. Still, a third group has more immediate interest in connecting to sewer particularly where they may be adjacent to existing sewer lines.

Traditionally, areas such Oak Ridge, lying outside a municipality have been the low cost alternatives to buying or building inside the urban core. Historically, like any other place in Florida, people moving into the unincorporated areas of counties have done so expecting relatively few, if any, municipal services, such as central sewer. In the absence of an abundance of municipal services, buying, building, and living in the unincorporated areas of a county have proved to be economical alternatives to the relatively high cost of city life. Frequently, many seek jobs inside the city where jobs are more plentiful but choose to commute from their homes in the unincorporated area where is more economical to live.

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<sup>24</sup> *Oak Ridge Sector Plan, Op. Cit.*

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However, the nature of counties has changed not just in Leon County but throughout the state because residents' expectations of county governments have changed. There are a number of reasons for this, but one of the more common is that people buying, building, and living outside the municipalities where housing may be more affordable, have different expectations than their predecessors about the nature of services they expect from county government. Now, they expect a wider array of municipal services than has traditionally not been expected or available from county governments. County governments were never meant to provide municipal services. In Tallahassee and Leon County, we see dense, highly urbanized areas in the unincorporated areas of the Oak Ridge neighborhoods, most of which are served by on-site collection and disposal systems.

## **Public Expectations**

Public expectations for the Oak Ridge sector are also contributing to the conflict over the performance-based treatment system issue. Historically, the south side of Leon County has been viewed as an affordable alternative to living in Leon County. The south side has been much of the county's industrial area and the site of low-cost housing (e.g., mobile homes). Most of the western side of the unincorporated Oak Ridge Sector, generally, the area west of Crawfordville Highway, has not had ready access to a central sewer system. Much of the eastern side, the south side triangle, has had relatively more access to central sewer because of the serpentine boundaries delineating the city from the county. However, affordability has been an issue for connecting to the sewer system. Instead, on-site disposal systems have been the principal method of sewerage collection and treatment. The south side's permeable, sandy soil enables septic tanks to operate effectively.

## **Performance-Based Treatment Systems Are Not Always the Better Policy Option**

Requiring performance-based treatments for the south side of Leon County will result in unnecessarily costly, ineffective, and inequitable public policy.

There is evidence to indicate that performance-based treatment systems are not necessary at this time and that central sewer may have better policy outcomes. As we saw earlier, prior to 1980, nitrate levels in Wakulla Springs were less than 0.2 mg/l. Within a decade after the city opened the Southeast spray field, nitrate levels at the springs peaked 1.5 mg/l. With more environmental awareness and sensitivity about the spray field, new policies and practices were put in place that reduce nitrate levels to between around 0.58 to 0.60 mg/l. By the end of the turn of the century, and for most of the first decade of this one, nitrate levels have been holding steady around 0.50 mg/l. All of that occurred without the use of performance-based treatment systems. And with advanced wastewater treatment

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improvements on the horizon, we should see treated wastewater that meets quality standards for public reuse. One of the projects to be conducted in conjunction with the improvements is a feasibility study to determine the extent and cost of a reuse system, as well as consideration of residential irrigation use.<sup>25</sup> With advanced water treatment, we should see significant additional reductions in nitrates at Wakulla Springs, making the need for performance-based systems even less necessary.

Even if performance-based systems were necessary, they are significantly more expensive than conventional systems, which make the proposed solution uneconomical. There are two dimensions to the economic issue: capital and operating costs. The first dimension, capital costs, has to do with the initial cost and installation of the system itself. Estimates vary, but bandied about during the March 19 county commission meeting were system costs ranging from \$8,000 to \$12,000 although county staff estimates that the costs would probably somewhere about \$5,500 to \$8,500. However, even at the low end of the cost range, it makes performance-based system almost twice as costly as a conventional system.

The second dimension, operating costs, has to do with the recurring nature of inspecting, licensing, operating, and maintaining the system. And because the filtering system of the performance based treatment system requires electricity to function properly, the property owner would have to provide electricity to the system 24 hours per day, seven days per week. During power outages, such as one that may accompany a significant hurricane, the system would be inoperable, meaning that the low-pressure disposal system would not work. Estimates for these continuing operating and maintenance costs range from \$300 to \$1,000 per year, representing a significant, recurring cost for many property owners. Furthermore, over the next twenty years, converting to performance based treatment systems could cost property owners \$30 to \$40 million in today's dollars.<sup>26</sup>

However, that \$30- to \$40-million estimate did not take into consideration any exemption from the proposed performance-based treatment system that, as it turns out, would be substantial, which raises questions about the potential effectiveness of the proposal. County staff estimate that there are 6,600 septic tanks in the Primary Springs Protection Zone and believe about 46% of those would be exempt from the requirement to convert to performance based treatment systems.<sup>27</sup> Exempt from the requirements would be any owner-occupied

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<sup>25</sup> City of Tallahassee, *Fiscal 2009 Approved Budget --- Fund Proforma Summary*, "500 Sewer Operating Fund," retrieved May 4, 2009, from <http://www.talgov.com/dma/budget/fy09/pdf/fundproformas.pdf>.

<sup>26</sup> Curtis Baynes, "Estimated Life Cycle Cost of Performance Based Treatment Systems in Leon County," C. E. Baynes & Associates LLC, P O Box 1203, Tallahassee, FL 32302-1203, unpublished.

<sup>27</sup> Leon County Commission, "Workshop Regarding On-Site Sewage Disposal Systems" (Handout), Board of Leon County Commissioners, Workshop, May 12, 2008. An online version of the handout

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home with a household income of less than \$38,191 per year or a homestead valued at less than \$204,000. Because of these exemptions, the people who would be saddled with this costly burden are a relatively few homesteaders, investors, and retail, commercial, and industrial property owners. With the exception of the few relevant homesteaders and investors, the minimum design standard of 70% micro-effective would translate roughly into 47% area-wide effectiveness.<sup>28</sup>

If performance-based treatment systems achieve their design standards of 70%, an overall 47% reduction in nitrogen loading is still a significant improvement over the current 20%, but there is something inequitable about demanding only a few property owners on the south side of Leon County pay the entire cost of reducing nitrate levels in Wakulla Springs. The idea of inequity is not new to the debate. At the county commission meeting on March 19, 2009, most people speaking at the meeting agree that water quality and nitrate loading in Wakulla Springs is much more than a southside issue and even much larger than a county issue. County commissioners and the speakers acknowledged that the problem is much larger than Leon County itself because a significant part of the problem stems from runoff in Georgia. However, the proposed county ordinance would only have affected property owners on the Southside, which is patently inequitable, and even more so, with 46% being exempt from the requirement.<sup>29</sup> Furthermore, exempting 46% of the septic tanks from such regulations would significantly reduce the macro effectiveness of nitrogen reduction efforts area- and county-wide.

Also at the county commission meeting on March 19, 2009, some speakers reported that the cost of extending a trunk line throughout the area affected by the PBTS proposal could be somewhere in the neighborhood of \$20 to \$30 million. That seems a little low to me. Nevertheless, even if the estimates of performance-based treatment systems and central sewer trunk lines are even close to one another, perhaps extending central sewer throughout the area is a more cost-effective alternative than some universal to convert to performance based treatment systems. It seems to me that if we going to expect people to investment such large sums, central sewer would be preferable to continuing the use of septic tanks. One of the biggest impediments to the transition would likely be the expense of running trunk lines and of connecting individual uses to them. Although converting the area to central sewer is a long term planning

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material was retrieved May 12, 2009, from  
<http://www.leoncountyfl.gov/ADMIN/Agenda/Workshops/WS120090512.pdf>.

<sup>28</sup> Macro-effectiveness is calculated simply enough by combining the expected effectiveness of the exempt systems plus the expected effectiveness of the non-exempt systems. Since 46% of the septic tanks would be maintain their current 20% micro-effectiveness and 54% of the septic tanks would achieve 70% micro-effectiveness, the macro effectiveness would be the sum of the two micro-effectiveness measures. Thus, we have the following: macro-effectiveness would be calculated by summing its parts: that is,  $(0.46 \times 0.20) + (0.54 \times 0.70) = 0.092 + 0.378 = 0.470$ , or about 47% area-wide effectiveness.

<sup>29</sup> *Ibid.*

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objective, the city does not have any provisions in its five-year plan to do so. And if the long-range plan were not an impediment in itself, another impediment to the conversion is the cost of connecting to existing lines.

## **Conclusion**

Nowhere, in my view, is there a more critical need for central sewer in southern Leon County, especially the Woodville community and Oak Ridge Sectors. No doubt, chronically high nitrate levels have adversely affected Wakulla Springs; the science is fairly clear on this point. However, off point is the county's proposed solution. Requiring all property owners to convert to performance based treatment systems would be unnecessarily costly, ineffective, and inequitable public policy. Instead, the county should be promoting the extension of central sewer throughout the two principal pollution centers on the south side: the Woodville community and the Oak Ridge Sector.