

STATEMENT OF THE LEON COUNTY COUNTY-WIDE WATER RESOURCES CITIZENS ADVISORY COMMITTEE

The Leon County County-Wide Water Resources Citizens Advisory Committee (WRC), at the request of the County Administrator, has reviewed the Onsite Sewage Treatment and Disposal (OSTD) and Management Options/Final Report commissioned by Leon County, the City of Tallahassee, and Wakulla County. The WRC's comments are attached in response to this request.

The issues addressed in the Lombardo Associates Report will be ongoing for many years. The levels of nitrates and other pollutants in the aquifer that the citizens of Leon County, the City of Tallahassee, and Wakulla County absolutely depend upon have been building for at least several generations. And it will likely take a generation or more to rectify this situation. It is the duty and task of our leaders to begin that process for the unincorporated areas of Leon County.

The City of Tallahassee has the advantage of having only a single facility to upgrade to account for the vast majority of their wastewater. The City will spend some \$220 million dollars to do so. However, there are literally thousands of individual residential and other wastewater facilities within the county that will have to be addressed at some level as they age from time and use. The final cost to do so is estimated in the Final Report as \$165 million. Thankfully, unlike the City, the County will not have to do so all at once. But the process to do so must begin now.

The Final Report provides a plan for addressing the implementation of this task. It clearly and logically identifies the issues, a strategy and options for addressing these issues, and states the "lowest hanging fruit" where corrective action can begin. The WRC recommends the following first three tasks that the Board should focus on:

1. Establish a vigorous and effective inspection program for all OSTDs (septic tanks) in Leon County to ensure that they are functioning properly and protecting public health. Priority should be given to the Primary Springs Protection Zone (PSPZ) and those vulnerable areas identified in the LAVA study.
2. Establish a Responsible Management Entity (RME) for the oversight of the permitting, installation, operation, maintenance, and repair in full compliance with wastewater treatment standards for all OSTDs and related cluster systems in Leon County.
3. Create and capitalize a funding system that will enable citizens to meet the costs of repairing and/or improving their wastewater systems, or to afford the required connections to a sewer system.

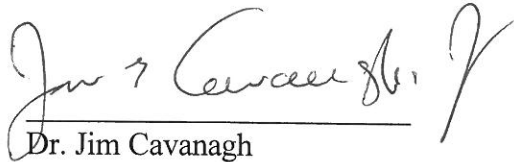
The WRC looks forward to working with the Board to realize these goals and to help provide access to safe, affordable drinking water for the people of Leon County.

Leon County Citizens Water Resources Committee
Onsite Sewage Treatment and Disposal (OSTD) and Management Options/Final Report Comments

I HEREBY CERTIFY that the above statements were duly approved by the Leon County
Countywide Water Resources Citizens Advisory Committee following its meeting on
June 4, 2012.



Mr. Robert Scanlon, Chair



Dr. Jim Cavanagh



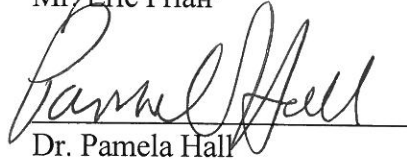
Mr. Grayal Farr



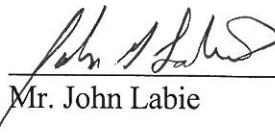
Mr. John Folks



Mr. Eric Friall



Dr. Pamela Hall



Mr. John Labie

cc: Leon County Board of County Commissioners
Vincent S. Long, County Administrator

Leon County County-Wide Water Resources Citizens Advisory Committee

Review and Recommendations

Onsite Sewage Treatment and Disposal and Management Options – Final
Report for Wakulla Springs, Leon County, Wakulla County and City of
Tallahassee

Lombardo Associates, Inc., November 4, 2011

June 4, 2012

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A. Statement of Tasks and Response:

1. To determine if the report *Onsite Sewage Treatment and Disposal and Management Options – Final Report for Wakulla Springs, Leon County, Wakulla County and City of Tallahassee*, by Lombardo Associates, Inc. (LAI), November 4, 2011 is sufficiently sound to provide a basis for making policy about onsite sewage treatment and disposal management.

The Water Resource Committee concludes that the LAI report provides a sound basis for the establishment of policies and regulations for the reduction of nitrogen to the aquifer and springs and for the management of sewage treatment and disposal. The report relies upon and appropriately interprets the existing published information of the hydrology, nutrient transport and sources of those nutrients in the Florida Aquifer and Wakulla Springs on which to draw its conclusions.

2. To make recommendations based on the LAI report for the next steps in the management of nitrogen reduction for the aquifer and Wakulla Springs.

The Water Resource Committee herein submits its recommendations for the nitrogen reduction to the aquifer and Wakulla Springs. This is a complicated issue. There is no simple, straightforward solution. However, we have identified a clear goal and a series of steps that should be taken. If we do this, we can, as a community, assure ourselves, and future generations a sustainably protected aquifer, springs and drinking water.

B. Policy Recommendations

Based on extensive review, the Water Resource Committee (WRC) concludes that the LAI report is sound and is adequate for the establishment of policies and regulations for the reduction of nitrogen to the aquifer and springs and for the management of sewage treatment and disposal.

The LAI report identifies that nitrogen loading from onsite sewage treatment and disposal systems (OSTDS) is a significant contributor to the nitrogen pollution of the springs and aquifer and is currently the highest priority controllable nitrogen source. It is essential that existing and future OSTDS reduce nitrogen loading to the aquifer and springs in order to protect water quality and to meet regulatory water quality targets. It has taken decades for the impact of human development to exceed the assimilative capacity of the local ecosystems and for nitrogen to accumulate in the aquifer and springs. These impacts cannot be effectively mitigated over a short period of time, therefore; it will take a number of years and substantial changes in wastewater management to reverse these impacts. The mitigation of these impacts will require matching treatment standards and technology to the aquifer vulnerability, existing development conditions and future land use capacity.

The WRC recommends that Leon County adopt a multi-faceted approach that reduces current pollution, provides protection of water resources and allows our community to grow and develop. This approach needs to include: new wastewater treatment standards for new and existing development, construction of wastewater facilities, inspection of all systems on a regular basis to assure that they are maintained and performing as designed, and re-evaluation of systems on a regular basis in order to ascertain whether they are effectively treating water and reducing nitrogen.

Protecting the aquifer will require a unified effort across political and geographic boundaries. These steps/actions must be done in a deliberate, incremental, cost effective and timely manner, if we are to protect water as an essential resource for our communities' health and economic development.

Recommendations:

1. Establish an inspection program for all OSTDS throughout Leon County as allowed by current Florida law. Our recommendation is to “opt in” to the new State inspection program as an initial step towards creating a county-wide wastewater management system.
2. Establish new standards for wastewater treatment.
 - A. Establish an Advance Wastewater Treatment (AWT) nitrogen standard for nitrogen in the Land Development Regulations for all new development in the Primary Springs Protection Zone (PSPZ), as provided by Comprehensive Plan Policy 4.2.5[C].
 - B. Establish an AWT nitrogen standard that will apply to all existing OSTDS in the PSPZ upon retrofit. Retrofit includes creating accesses to the COT AWT sewer system and construction of AWT nitrogen standard cluster systems.
3. Develop a Wastewater Management Plan (WWMP)
 - A. The RME should have oversight of cluster systems. Inclusion of oversight of OSTDS will be added when allowed by State.
 - B. The RME should be structured as a hybrid of the Management Models 4 and 5, found in the LAI report, with emphasis on utilizing private contractors to provide an economic opportunity for expansion of the local wastewater industry and to create jobs. We recommend exploring the development of a Government Utility Authority which is authorized under Section 163.01(7)(g)1, Florida Statutes.
 - C. Task 3 of the LAI report provides options for management structure and responsibilities of an RME and Item E herein for the WRC’s suggestions about the RME.
4. Develop a Wastewater Facilities Plan (WWFP)
 - A. Complete engineering and cost analysis for both COT sewer connections and large cluster systems for the existing Woodville Rural Community (Woodville RC) and the unincorporated area inside the USA (which includes Lake Munson target location in the COT 2030 Master Water and Sewer Plan (MWSP) and other locations). Retrofitting these two areas will provide mitigation for approximately 15.8% and 31.2%, respectively of the existing OSTDS in the PSPZ.
 - B. Initiate engineering and cost analysis to determine the most appropriate location and service areas for AWT nitrogen standard cluster systems for the retrofit of the existing OSTDS in the Urban Fringe and Rural Area of the PSPZ based on existing land use and future land use. The remaining 47% of the OSTDS are located in these areas.
 - c. Connect existing OSTDS to new sewer or cluster facilities, as appropriate to their location, as part of the WWFP.
5. Develop a long term financing plan for all aspects of wastewater management to include: construction of new facilities, retrofitting of existing OSTDS and management. A variety of financing sources should be sought.

- A. Design and implement a Municipal Service Taxing Unit (MSTU) or Municipal Service Benefit Unit (MSTB). The critical political decision must be made as to whether the MSTU or MSTB apply to those parcels with OSTDS within the PSPZ or all OSTDS within Leon County.
- B. Seek additional funding for the wastewater management of unincorporated Leon County by developing a proposal to be considered by the Committee for the Extension of the Leon County Infrastructure Sale Tax (aka BP2000 tax).

We recommend that this proposal seek assistance in meeting the costs of studies needed to determine how to retrofit of OSTDS, by providing access to COT sewer, construction of AWT nitrogen standard cluster systems, and funds for construction or financing for AWT nitrogen standard OSTDS. The proposal should include all possible solutions for nitrogen reduction and wastewater management and not just be a request to fund a sewer system for some portion of the PSPZ. Sewer is not a panacea.

- 6. Expand stormwater water treatment regulations in the PSPZ to improve nitrogen removal efficiency. The high aquifer vulnerability of the PSPZ is due, in part to the high percolation rates of soils, which could result in very ineffective nitrogen removal in stormwater facilities. The provision of COT sewer connections in the PSPZ will allow increase development densities and stormwater may become a significant source of nitrogen to the aquifer if treatment is not effective at removal

C. Policy Recommendations: Details and Reasoning

1. OSTDS Inspection Program:

- 1.1: Establish an inspection program for all OSTDS in Leon County. Wastewater treatment systems perform well only when they are well designed, installed, regularly inspected, maintained, repaired and replaced when needed. Recognize that the State regulations governing wastewater management can change and be prepared to take advantage of any improvement in the regulations. This is a recommendation to “opt into” the State Inspection Program.
- 1.2: Inspections will provide the owner with essential information about their systems: its location, condition and help maintain its function.
- 1.3: An inspection program will provide the RME with information about the location, type and condition of the existing OSTDS and will determine when they need to be repaired or replaced. This will also establish baseline data for assessing the effectiveness of OSTDS technologies.

2. Wastewater management in the Primary Springshed Protection Zone:

- 2.1: The form of wastewater treatment in the PSPZ should be consistent with the need to mitigate existing wastewater systems for nitrogen reduction and with current and future land use. The PSPZ has been adopted by COT and Leon County as the designated for springs protection because it is a high aquifer vulnerability area. Therefore the PSPZ needs a higher standard of wastewater treatment than other less vulnerable areas. It is also an area of a wide range of existing and future development densities.
- 2.2: Adopt an Advance Wastewater Treatment (AWT) nitrogen standard in the Land Development Regulations for all new development in the PSPZ.
 - 2.2.1: The PSPZ covers the most aquifer vulnerable area of Leon County south of the Cody Scarp and is similar in location to Scenario 1 of the LAI report. According to the LAI report, the amount of nitrogen reduction that needed to restore Wakulla Springs and to meet the TMDL of 0.35 mg/l, will require an AWT nitrogen standard for all wastewater treatment systems that discharge in the PSPZ. The contribution of COT sewer to the nitrogen pollution of Wakulla Springs will be substantially reduced when the wastewater treatment plant is AWT compliant by 2014. At that time, existing OSTDS in the PSPZ will be the largest contributors of nitrogen to the aquifer and springs. Therefore, retrofitting OSTDS to AWT nitrogen standards in the PSPZ represents the “biggest bang for the buck” in cost effective and technologically feasible nitrogen reduction.
 - 2.2.2: AWT nitrogen reduction technology exists for all scales of wastewater treatment including single family on-site systems, across all scales of cluster systems that provide treatment for a few to many parcels and for centralized sewer.

2.2.3: Adopt regulations that require new development in the PSPZ to meet an AWT nitrogen standard for wastewater treatment. There is no reason to continue to add to the accumulation of nitrogen by allowing what is now known to be inadequate wastewater treatment methods to be built for new development.

This standard could be met with any form of technology that is appropriate to the size and nature of a new development including OSTDS, cluster or connection to COT sewer.

2.3: Adopt regulations that require existing development in the PSPZ to meet AWT nitrogen standard as retrofitting capacity becomes available.

2.3.1: It is not sufficient to only reduce nitrogen from new development or from the COT sewer. The LAI report states that nitrogen reduction must also come from existing development. Existing OSTDS in the PSPZ are now the greatest source of nitrogen.

2.3.2: Identify the appropriate form of AWT nitrogen standard treatment (OSTDS, cluster or sewer) given the existing and future land use of areas within the PSPZ. The LAI report provides maps of areas where cluster and/or sewer connections could be considered. These maps are ONLY based on existing development and do not reflect future land use nor transportation planning. They are suggestive, not prescriptive. (AWT refers to AWT nitrogen standard.)

Location within PSPZ	Type of wastewater treatment facility
Woodville Rural Community	AWT sewer or AWT large cluster
Inside USA	AWT sewer or AWT large cluster
Urban Fringe and Rural	AWT cluster or OSTDS

2.3.3: The Comprehensive Plan states that development should be directed to the Urban Services Area (USA) and Woodville RC. In addition, transfer of development rights from the Urban Fringe and Rural areas to the USA and Woodville RC is encouraged to further concentrate development and retain open space and aquifer recharge areas. We strongly recommend that wastewater management in the PSPZ be completely consistent with these linked Comprehensive Plan policies: concentrating high density and mixed use development in the PSPZ USA and Woodville RC and minimizing future development in the Urban Fringe and Rural area.

- 2.3.4: Perform feasibility and engineering studies for the PSPZ unincorporated Urban Services Area (USA) and the Woodville RC, to determine how to provide AWT nitrogen standard wastewater treatment that will provide retrofitting capacity for existing development and allow future development at densities consistent with their Future Land Use designation. The alternatives of AWT nitrogen standard cluster and COT sewer should be considered. Included in this study should be an assessment of requiring connection to a centralized system (sewer or cluster) for existing OSTDS.
- 2.3.5: In order for retrofit to AWT nitrogen standard facilities to produce a reduction in nitrate load in the PSPZ, some existing OSTDS will have to be abandoned and connected to sewer or cluster systems in a reasonable amount of time. For instance, the extension of sewer to a portion of Killlearn Lakes in 2008 cost \$5,300,000 in capital costs and provided connections for 1365 residences. As of April 2012, 4 years later, only 198 homes or 14.5% have connected, predominately due to failures. This is a lot of public funding intended to alleviate a very serious public health problem that has not been well utilized. Therefore, provision needs to be made to require rapid connection to sewer or cluster facilities once they are available in order to actually achieve nitrogen reduction in a reasonable time frame and to efficiently utilize public capital infrastructure expenditures.
- 2.3.6: Perform a feasibility and engineering study of the Urban Fringe and Rural areas in the PSPZ to determine how to provide AWT nitrogen standard wastewater treatment. The choice of wastewater treatment systems should only provide retrofit capacity for existing development, support only low density future development and encourage the transfer of development to the USA and Woodville RC. The alternatives of AWT nitrogen standard cluster systems or onsite systems should be considered. Connection to COT sewer should not be extended to these areas.
- 2.3.7: We also recommend that if COT has not done so already, they should perform a feasibility study to determine whether the existing OSTDS within its jurisdiction and in the PSPZ can be connected to the COT sewer or should be retrofitted AWT nitrogen standard with onsite or cluster systems.
- 2.3.8: The LAI report computes of the amount of nitrogen reduction required takes into account estimates of population growth rates only to 2018. Any development will add some nitrogen to the aquifer even when in compliance with an AWT nitrogen standard. After 2018, even with full retrofit of OSTDS to an AWT nitrogen standard, nitrogen loading will increase over the values in the report due to population growth. This is not a reason to fail to act, but a recognition that wastewater treatment needs to be done in a more sustainable manner, adhering to current land use density allowance and with great vigilance in order to protect ecosystem and human health.

3. Wastewater management outside the Primary Springshed Protection Zone:

- 3.1: Retain the current wastewater standards for OSTDS north of the PSPZ until further study determines that different standards are needed. Due to what appears to be significant natural attenuation, there is limited value in adding substantial nitrogen removal capability to OSTDS in areas north of the PSPZ. Areas classified as most vulnerable in the LAVA study should be evaluated to determine whether higher nitrogen removal standards should be implemented in such areas.
- 3.2: Perform a study to determine the components of the nitrogen inflow from north of the PSPZ. Consideration should be give to contributions from those areas of high aquifer vulnerability, including input from OSTDS and stormwater ponds. Quantification of seepage rates in stormwater receiving water bodies, sinkhole seepage and large volume discharge should be included.
- 3.3: Differentiate among the areas north of the PSPZ based on aquifer vulnerability and future land use. Higher standards of treatment are needed for areas with aquifer vulnerability that is equivalent to the PSPZ, but such standards are not needed in less vulnerable areas. Areas inside the USA need wastewater management that allows for higher development density than can be treated with OSTDS. Much of the unincorporated USA cannot be developed or redeveloped at current Future Land Use densities due to the lack of appropriate wastewater treatment. This impedes urban infill and contributes to urban sprawl. (AWT refers to AWT nitrogen standard.)

Aquiver Vulnerability	Inside USA	Outside USA
Equivalent to PSPZ	AWT COT sewer or AWT cluster	AWT cluster for retrofit or AWT OSTDS for new development
Less than PSPZ	Lower than AWT cluster or sewer	Conventional OSTDS

- 3.4: Re-evaluate the areas north of the PSPZ for extension of COT sewer as depicted in the COT MWSP with consideration of minimizing transporting nitrogen produced north of the PSPZ where there is low aquifer vulnerability into the PSPZ via the COT sewer spray field. There are many cluster alternatives to sewer that can provide effective wastewater treatment and support high development density. Treatment of wastewater for these locations is best left to discharge locally, north of the PSPZ.
- 3.5: Do not allow or provide wastewater systems, of any given level of treatment, that encourage growth outside the USA.
- 3.6: Communicate with all holders of DEP wastewater treatment permits in Leon County to understand status of their facilities. COT, Leon County Schools, Talquin and four other private owners have DEP permits for wastewater treatment facilities in Leon County.

4. Stormwater management in the Primary Springshed Protection Zone.

- 4.1: We recommend review of stormwater water treatment regulations and management in the PSPZ in order to evaluate the actual nitrogen removal capacities of these facilities.
- 4.2: Stormwater runoff contains significant amounts of nutrient pollutants. The biochemical process of denitrification is the same in stormwater as it is in wastewater. The location of denitrification is usually in stormwater ponds and receiving bodies of water. Research completed by FDEP indicates that the size of the standard stormwater retention detention ponds is insufficient to remove nitrates. They do not provide for enough biota to consume/capture/remove nitrate from the stormwater. These ponds will need to be designed to propagate and maintain sufficient biota to remove the nitrate inflows.
- 4.3: The length retention time in a stormwater facility and/or receiving water body is an important factor in the amount of denitrification that can occur. This is driven by size.
- 4.4: The geology and soils of the PSPZ often lead to very rapid percolation in stormwater ponds and therefore, limited treatment time of stormwater and lower levels of denitrification.
- 4.5: Providing COT sewer connection to communities in the PSPZ will increase development, the amount of impervious area and subsequently, stormwater runoff. While increasing concentration of development is a sound policy for many reasons, nitrogen load from increased stormwater runoff could significantly increase as load from wastewater decreases.
- 4.6: We recommend that the stormwater water treatment engineering options in the PSPZ be reviewed for ways to increase the above ground retention and water treatment time in order to reduce nitrate contribution from stormwater runoff.

5. Financing wastewater management to protect the aquifer and Wakulla Springs.

- 5.1: Reducing nitrogen, improving and expanding wastewater treatment facilities is an investment in our community, which will protect the springs, aquifer and drinking water, provide for future development and control public and private future costs. This is an opportunity to improve the quality of life, increase the value of our properties and limit a potentially very large financial risk that continuing pollution of our water resources could create.
- 5.2: The capital costs of retrofitting OSTDS in the PSPZ to appropriate AWT nitrogen standard facilities are estimated by the LAI report to be \$165,000,000. Additional costs would accrue for financing and operations and management of these facilities and all the OSTDS in Leon County.
- 5.3: The nitrogen in the aquifer and springs has been accumulating for many years and it will take time to remove it. It will take time to determine what the most appropriate and cost effective nitrogen reducing technologies are for the wide variety of existing land uses, densities and future development capacities in the PSPZ that currently use OSTDS. It will take time to create funding mechanisms, seek external funding and to build facilities that are needed. However, this retrofitting task does not require

replacing a single very large facility and financing it all at once as COT had to do to expand and upgrade their WWTF. Thus, retrofitting OSTDS can be done in phases. This must be done in a deliberate, incremental, effective and timely manner.

- 5.4: The customers of COT sewer are currently paying for the expansion and upgrade of their WWTF to AWT nitrogen standards, which cost \$227,000,000 and will be completed by 2014. This represents a huge decrease in the nitrogen contribution to the aquifer that was funded entirely by the municipality and its' customers
- 5.5: The cost of retrofitting the OSTDS in the PSPZ may not be immensely different in total capital and maintenance expenses compared to existing COT sewer, but the personal financial responsibilities for wastewater treatment are structured very differently for OSTDS owners. There are no shared expenses, infrastructure nor responsibilities. These differences in experience in payment form, not necessarily in the actual cost, need to be taken into account when devising a funding system for retrofit and management of OSTDS.
- 5.6: Develop a funding mechanism to manage wastewater treatment in unincorporated Leon County and initiate the necessary capital projects and engineering studies for wastewater management for nitrogen reduction.
 - 5.6.1: All OSTDS owners contribute to the increased nitrogen in the aquifer and Wakulla Springs and rely upon the aquifer for drinking water. Some OSTDS contribute more than other due to their location. A decision must be made how to distribute the costs of retrofit and how that distribution will affect the actual rate and amount of nitrogen reduction and improvement in wastewater management throughout Leon County.
 - 5.6.2: Develop a plan for a Responsible Maintenance Entity (RME) that manages wastewater treatment systems for unincorporated Leon County. We recommend an RME of Management Model 4 or 5, or a hybrid of the two.
 - 5.6.3: Explore a MSTU or an MSTB form of revenue for the RME generation for managing OSTDS and providing owners with services to maintain, replace and retrofit the OSTDS.
 - 5.6.4: Include all forms of retrofit to AWT nitrogen standards: onsite, cluster and sewer connections, for funding consideration.
 - 5.6.5: Seek additional funding that will help accelerate the retrofit of OSTDS. For Example submit a proposal to the Committee for the Extension of the Leon County Infrastructure Sale Tax (aka BP2000 tax) for funding. We recommend that this proposal be comprehensive and seek assistance in meeting the costs of Wastewater Facilities Plan and a Wastewater Management Plan including engineering and construction. These plans include all possible solutions to OSTDS retrofit and not just be a request to fund connection to COT sewer for the PSPZ.

D. Significant Facts, Observations and Recommendations

1. There is overwhelming evidence that the nitrogen loading from OSTDS is a significant contributor to the nitrogen pollution of the springs and aquifer and is currently the highest priority controllable nitrogen source. (LAI, Table ES-1 and ES-4).
2. The hydrology of the Wakulla Springs basin includes an unusual amount of underground connection between Wakulla Springs and the Spring Creek Springs via tunnels in the porous limestone base. Spring Creek Springs discharge into the Gulf of Mexico and is in direct contact with seawater. In short, there are two flow regimes for Wakulla Springs. These regimes are referred to as Scenario 1 and 2. The estimates of their extent are provided in Figures ES-3a and ES-3b.
3. Scenario 1 is when water from the aquifer is flowing out of both Wakulla Springs and Spring Creek Springs. At this time, the catchment for Wakulla Springs includes area to its north, encompassing the COT sewer, OSTDS south of the Cody Scarp in Leon County and some in Wakulla County. Flow rates at the springhead are lower, the concentration of nitrogen is higher, and the nitrogen load (concentration x volume) is lower than during Scenario 2. (Figure 3-6a, Task 1)
4. Flow can slow and stop at Springs Creek Springs, which occurs during low rainfall and consistent higher tides. Rising tides due to low rainfall and increasing sea level can create a very durable “plug” in the tunnels blocking flow out of Spring Creek Springs. The aquifer water backs up and flows out of Wakulla Springs. The catchment for Wakulla Springs expands and includes all of the area from Scenario 1 and a large area south of Wakulla Springs. Flow rates at the Wakulla Spring head are higher, the concentration of nitrogen is lower and the nitrogen load (concentration x volume) is higher than during Scenario 1. (Figure 3-6b, Task 1).
5. The flow patterns switch between Scenario 1 and 2 when long periods of drought or very short rainfall occur and reverse back from 2 to 1 when rainfall “cleans out” the aquifer tunnels and flow returns to Spring Creek. Sinkholes very closely connected to these tunnels play a significant role in delivering rainfall runoff, which “cleans out” the plug.
6. The Wakulla Springshed is one of the most thoroughly studied springs systems in the entire world. Consequently, reports have used various divisions and names for parts of the springshed. In the LAI report, Scenario 1 and 2, areas of “unconfined aquifer”, area south of the Cody Scarp and the PSPZ are used to describe areas of greatest interest in controlling nitrogen reduction. These designations do not exactly overlap, but the differences are small relative to the issue of nitrogen source and reduction effects. The Leon County PSPZ is the designation of the area adopted for springshed protection.
7. The COT sewer and the OSTDS in the PSPZ of Leon County always contribute to the flow at Wakulla Springs regardless of which scenario is active.
8. In the LAI report, estimates of the nitrogen contribution of OSTDS located in the unconfined aquifer use a value of 50% attenuation due to drain field denitrification processes. The LAI authors state that this is an optimistic estimation and therefore, the amount of nitrogen reduction from OSTDS that needs to be accomplished may be substantially higher than the values used for planning purposes in this report. This means that the actual amount of

nitrogen that needs to be removed from the aquifer and springs system could be substantially higher than what is used in this report.

9. The sources of nitrogen and their percent contribution to the nitrogen at Wakulla Springs are (Scenario 1 is very similar to PSPZ):

Nitrate Source	Nitrate (kg/yr) 2018	Percent of total	Number OSTDS
OSTDS			
Leon County	44,651	28.7%	7,500
Wakulla County	6,549	4.3%	1,100
Total OSTDS	51,200	33.0%	8,600
Inflow north of scarp all from Leon County	47,800	31%	31,017
COT sewer when AWT compliant	30,100	19%	
Fertilizer	9,400	6%	
Creeks/Sinks	7,800	5%	
Livestock	6,800	4%	
Atmospheric Deposition	2,400	2%	
Total at Wakulla Springs	155,500	100%	39,087*

LAI, Table ES-7 and ES-1

* an addition 570 OSTDS are south of the Cody Scarp but not in Scenario 1.

10. LAI report estimates that 45,500 kg/yr of nitrogen needs to be eliminated in order to achieve an average concentration of 0.35 mg/l nitrogen at Wakulla Springs. This means 29% of the total needs to be removed from the springshed. Recall that this estimated amount could be substantially higher due to optimistic assumptions about average attenuate rates of wastewater from OSTDS in the PSPZ.
11. The upgrading of COT sewer to AWT nitrogen standards (3 mg/l) will greatly reduced the nitrogen loading from this source. Further reduction in nitrogen load is possible but prohibitively expensive. Reduction in nitrogen must come from other sources.
12. The largest sources of nitrogen are OSTDS (33%) and Inflow from the north of the PSPZ (31%). The inflow is a composite of nitrogen from OSTDS, stormwater facilities, lake and sinkhole seepage and other sources. The exact composition of the inflow is unknown but it is likely that the OSTDS north of the PSPZ contribute a substantial portion to the total.
13. The large nitrogen source from OSTDS in the PSPZ should be addressed first because these systems add the greatest amount of nitrogen per system than in other locations in Leon County. Due to what appears to be significant natural attenuation, there is limited value in adding substantial nitrogen removal capability to OSTDS in areas north of the Cody Scarp, excepting the areas classified as Most Vulnerable in the LAVA study.

Aquifer vulnerable areas north of the Cody Scarp should be evaluated at a later date to determine whether higher nitrogen removal standards should be implemented in such

areas.

14. The efficacy and reliability of achieving reduction of Fertilizer, Creeks/Sinks, and Livestock contributions are unknown. Extensive analysis will be required to determine what is required and the ability, if at all possible, to do so to achieve this requirement. This is also true of any part they compose of Inflow.
15. The OSTDS in the PSPZ due the hydrology, geology and soils of their location contribute far more than any other source and any other OSTDS in Leon County. There are many technologies that can reduce nitrogen in wastewater. The amount of removal can be controlled, quantified and costs can be computed. Therefore, nitrogen reduction efforts should be concentrated on existing and future development in this area.
16. The estimation of how much nitrogen needs to be removed only includes development growth up to 2018. After that, reduction in nitrogen would logically have to come from the other inflow sources, such as the OSTDS north of the PSPZ despite their apparently high attenuation rate. These other inflow sources and their mitigation options should be identified prior to 2018.
17. Removal of nitrogen to the extent needed will require that all wastewater treatment facilities in the PSPZ reducing wastewater effluent to 3 mg/l. This is possible with Advance Wastewater Treatment (AWT) a tertiary treatment that is achievable by innovative on-site, cluster and centralized facilities. The appropriate wastewater technology should be matched to the treatment volume, spatial configuration and development density needs.
18. The COT 2030 SWMP identified the Lake Munson and Woodville areas as candidates for sewer extensions. These areas proved to be comparable to cluster AWT nitrogen standard OSTDS on a life cycle \$/kg/yr nitrogen removal basis. The cost effectiveness of retrofitting existing OSTDS by providing connection to COT sewer vs. large cluster AWT nitrogen standard for these areas should be investigated. The costs provided in the SWMP for sewer do not include the cost of hooking individual houses into the system.
19. Cluster systems can be configured to serve a wide range of number and distribution of residential and nonresidential development. They can also provide for much greater development density than onsite systems. However, the onsite AWT nitrogen standard systems are relatively new. The issues of performance certification and sampling frequency will need to be addressed if they are to be relied upon for AWT levels of nitrogen removal.
20. The life cycle cost of AWT nitrogen standard systems (onsite, cluster and COT sewer connection) are higher than conventional and the advanced secondary treatment systems. However, the cost per kg of nitrogen removed per year is lower for all AWT nitrogen standard options compared to conventional and advanced secondary treatment systems. (from Task 2, Table 3-1 and 3-3).
21. The customers of COT sewer are currently paying for the expansion and upgrade of their WWTF to AWT nitrogen standards, which cost \$220,000,000 and will be completed by 2014. This cost is being borne by the customers of COT sewer.
22. LAI estimates that the total retrofit cost for each OSTDS in the PSPZ to AWT nitrogen standard wastewater treatment, for all types are extremely similar: approximately \$20,000 for connection to COT sewer; \$21,000 to \$23,000 for cluster systems and \$22,000 for onsite

systems. The report uses an average value of \$22,000 for any upgrade of OSTDS to AWT nitrogen standard.

23. The location of OSTDS in the PSPZ:

Location of OSTDS	Number of OSTDSs	% of PSPZ	% of Leon County
Woodville RC	1,274	15.8%	
Lake Munson Unincorporated USA	2,520	31.2%	
Other locations in the PSPZ	3,706	45.9%	
Other locations within the unconfined aquifer area	570	7.1%	
Total in PSPZ	8,070	100%	21%
North of PSPZ	31,017		79%
Total in Leon County	39,087		100%

24. Providing COT sewer to Woodville RC and the Lake Munson area represents approximately only 55% of the OSTDS in the PSPZ.

25. LAI states that the average cost of retrofitting existing OSTDS to AWT nitrogen standard, through whichever form is most appropriate for the location and future land use the costs are approximately \$22,000 per unit. Though the actual costs will vary among the OSTDS, this is a sufficiently consistent value for the purposes of planning. It also points out that costs are not radically different among onsite, cluster or COT sewer connections. Removing nitrogen is expensive and costs the same everywhere.

26. Using \$22,000 per OSTDS, the total costs for retrofitting to the AWT nitrogen standard is:

- “ \$44,000,000 for Woodville
- “ \$50,000,000 for Lake Munson (unincorporated USA)
- “ \$220,000 for the few OSTDS within COT
- “ \$66,000,000 for the Urban Fringe and Rural area

This totals approximately \$165,000,000, plus the cost of financing, etc. for existing OSTDS in Leon County (values do not sum due to rounding).

27. Providing funding of OSTDS upgrades (regardless of solution type) can be done in a number of ways. Amortizing the costs of nitrogen removal systems can be done in a number of ways: over all owners of OSTDS, over all owners of OSTDS in the PSPZ or by other combinations.

28. The LAI report stated that the majority of project funding is best achieved through conventional municipal financing, either individually and/or collectively by the City and

Counties.

29. A combination of property taxes, user fees, and connection fees is frequently used to finance public projects. The Municipal Service Benefit Unit (MSBU) is based upon the cost providing the service or improvement. The Municipal Service Taxing Units (MSTU) is based upon an ad valorem tax levy imposed to cover the cost of providing a service or improvement, based upon taxable value.
30. State and Federal grants and loans should be further investigated; they should not be solely relied upon, at this time. The 319 grant program requires a 40% match and therefore local funding must also be provided. However, many external funding sources are limited and may be best for demonstration projects. Given the importance of aquifer and springs protection via nitrogen reduction to the State of Florida as well as all local governments, funding should be sought from both within and outside of Leon County.
31. The COT has demonstrated that a very expensive nitrogen reduction program can be funded locally from the users of the facilities.
32. The LAI report recommends a hierarchy for standards and treatment options:
 - A. AWT nitrogen standard for the PSPZ:
 - “ Connection to COT sewer where applicable
 - “ AWT nitrogen standard cluster systems in areas that appear to have density higher than their designated FLU and potential treatment and dispersal sites.
 - “ Individual OSTDS capable of meeting AWT nitrogen standard treatment levels.
 - B. Nitrogen removal systems for the most vulnerable areas north of the PSPZ.
 - C. Conventional OSTDS standards for the rest of Leon County.
33. The alternatives analysis for Most Vulnerable Areas north of the Cody Scarp will depend on whether these areas are determined to have relatively low natural attenuation of nitrates and are therefore economically feasible for implementing nitrate removal alternatives. If these areas are determined to be feasible for nitrate reduction, the alternatives will depend on the level of nitrate reduction required. Should AWT nitrogen standard be required, the same alternatives as those listed above will apply. If lower levels of removal are required, additional onsite and cluster alternatives will be evaluated. These determinations would be made through additional water quality data collection and modeling efforts.
34. The LAI report recommends creating detailed plans:
 - A. Wastewater Facilities Plan (WWFP): detailed engineering plan for retrofitting OSTDS to AWT nitrogen standard including connection to COT sewer, cluster and onsite systems.
 - B. Wastewater Management Plan (WWMP): development of RME, financing of the RME, managing all OSTDS and for WWFP This would provide the basis for any bonding/financing efforts needed to implement the WWFP and the RME.
35. Phasing of the WWFP: The following describes the estimated time frame for completing, adopting and implementing the Facilities Plan, per the previously stated hierarchy:

- A. Develop WWFP: 18 months
 - B. Adopt WWFP: 6 months
 - C. Implement Solutions Recommended in WWFP: 6+ years
36. Phasing for the WWMP: The following describes the estimated time frame for completing, adopting and implementing the Management Plan:
- A. Develop WWMP: 9 months
 - B. Adopt WWMP: 6 months
 - C. Implement Management Structure for Adopted WWMP: Ongoing immediately following adoption of WWMP.
37. Extensive public participation is a major component of the planning process for both plans to determine the optimal technical, economic and politically acceptable solution(s), along with continuing efforts at water quality monitoring and modeling to enable adaptive management.
38. Both plans will require detailed analysis of both the economic and non-economic factors affecting the feasibility of the respective treatment and management alternatives for achieving the nitrate removal necessary to meet the water quality standard.
39. Cluster treatment facilities are comparable to centralized treatment facilities when it comes to performance and reliability. As such, the determining factor in deciding between cluster treatment and centralized sewer is typically cost-effectiveness. Non- economic factors such as unwanted growth may also impact the decision between cluster and connection to COT sewer.
40. Connection to COT sewer as a means to retrofit OSTDS in the PSPZ will greatly decrease the amount of nitrogen in comparison to conventional OSTDS, but it will not remove it from the springshed.
41. Treatment of wastewater north of the PSPZ and in areas of low aquifer vulnerability is best left to being discharged locally in order to limit nitrogen loading to the PSPZ. Consideration should be given to providing cluster systems for areas inside the USA or even perhaps inside COT where attenuation rates are very high instead of sending the wastewater from such areas to the PSPZ via connection to COT sewer. Areas north of the PSPZ on low aquifer vulnerability sites will not need cluster systems with high nitrogen reduction capabilities due to high levels of natural attenuation.
42. The advantages and disadvantages of extending existing sewers and utilizing an existing centralized treatment facility are as follows. This is not intended to be an exhaustive list but to identify some of the most relevant pros and cons for Leon County:

Advantages

- A. Use of existing plant capacity eliminates costs associated with constructing new treatment facilities.
- B. Expansion of existing facilities is typically the most cost effective AWT nitrogen standard option, on a \$/kg/yr nitrate removed basis, particularly where unused capacity exists.

Disadvantages

- A. For conventional gravity sewers, large pump stations and force mains are required to convey wastewater over potentially long distances to connect to existing sewer systems. Alternative low pressure and septic tank effluent sewers have cost and non-economic advantages.
 - B. Energy use associated with pumping water over long distances.
 - C. Potential for unwanted growth for properties “along the way” between the new and existing service areas.
 - D. Moving water across watershed boundaries may not be desirable.
43. In areas where sewer extensions are not cost-effective, multiple, small clusters serving all but the most isolated lots may prove to be a cost effective option. This flexibility eliminates collection system pipes that traverse sparsely or unpopulated areas within the service area. By using multiple, small clusters, high density streets within otherwise low density areas may be cost-effectively served. The disadvantage to this approach is having multiple facilities to manage and monitor. Cluster system alternatives require that suitable treatment and dispersal sites exist. Cluster systems can be sited underground and in paved areas. This flexibility increases the number of candidate treatment and dispersal sites for these smaller systems.
44. Task 6 of the LAI Report provides suggestions of generalized areas where connection to COT sewer and cluster systems could be the most cost effective form of nitrogen reducing wastewater treatment. The identification of these areas was done based only on existing development. Provision of sewer or large AWT nitrogen standard cluster systems would increase the development density capacity in most cases of implementation. Criteria for determining the location of higher development density based on other environmental and financial impacts as provided by the Comprehensive Plan, Future Land Use Map or the Regional Mobility Plan was not used by LAI in demarcation of areas in Task 6.
45. LAI conclusions for the identification of generalized areas where connection to COT sewer and cluster systems would be the recommended option. Refer to Task 6, Figure 2-1 (overview):
- A. Connection to the COT system appears to be the most cost effective means for servicing the Woodville and Lake Munson areas, as designated in the COT MWSP.
 - B. The Lake Bradford area (Area 1) is recommended for evaluation as an addition to the COT Lake Munson expansion area.
 - C. Areas northeast of the COT sprayfields, Springhill Road south of the airport, and west of Woodville RC (Areas 2-4) are appear to be candidates for a mix of AWT nitrogen

standard cluster and AWT nitrogen standard onsite systems.

- D. The remaining areas of Leon County (not in Areas 1-4) are lower density areas that are likely to be best served by either AWT nitrogen standard onsite systems. A more detailed analysis may show portions of these areas that are candidates for AWT nitrogen standard cluster systems.
- E. Areas 5 and 6 are located solely within Wakulla County.

E. Suggestions for the creation of a Responsible Maintenance Entity

Herein we provide some characteristics of a Responsible Maintenance Entity (RME) that we, as potential customers of this entity, believe are important. We do not consider this a comprehensive list of RME characteristics. We suggest that:

1. The RME be an administrative organization that is responsible for oversight of the permitting, installation, inspection, operation, maintenance, repair, replacement and compliance with wastewater treatment standards for unincorporated Leon County that is not using central sewer.
2. The RME also takes a role in monitoring the effectiveness of wastewater treatment technologies to assure they can provide the AWT nitrogen standard, and the continuing research and investigation of aquifer impacts that is needed.
3. When Florida State law allows, the RME governs all OSTDS and cluster systems in the unincorporated area.
4. The RME uses private contractors as much as possible for the installation, operations, maintenance, repair and replacement of OSTDS and cluster systems.
5. The RME determines the appropriate engineering standards and type of wastewater treatment, e.g. OSTDS, cluster or sewer, for the unincorporated area.
6. The RME provides some form of license or approval of private contractors who have sufficient knowledge and capacity to provide installation; operation, maintenance and repair of the more advance OSTDS and cluster systems.
7. The RME collects a wastewater fee that would be used to provide for the administration of the RME and a source of revenue for subsidizing the replacement of OSTDS in order to reduce nitrogen load. The RME should be able to take enforcement action for non- payment of fees.

F. Glossary of terms, abbreviations and acronyms

AWT: Advanced wastewater treatment standard.

AWT can include specific standards for many constituents of wastewater. However, for the purposes of the LAI report and the WRC recommendations, AWT refers to a standard solely for nitrogen. The standard for central sewer and cluster systems for which performance can be measured and adjusted by operation protocols is less than or equal to 3 mg/l total nitrogen. For OSTDS the AWT standard is based on total nitrogen reduction in the effluent as a percentage of the influent. Current technology of the highest performing NSF 245 nitrogen reduction AWT systems OSTDS can achieve 85% reduction of total nitrogen.

COT: City of Tallahassee.

COT sewer: City of Tallahassee sewer refers to the entirety of the municipal wastewater treatment system including all sprayfields. This facility is planned to comply with AWT standards by 2014.

LAI: *Onsite Sewage Treatment and Disposal and Management Options—Final Report for Wakulla Springs, Leon County, Wakulla County and City of Tallahassee*, by Lombardo Associates, Inc, November 4, 2011: the report reviewed herein.

LAVA: Leon County Aquifer Vulnerability Assessment.

MSTU: Municipal Service Benefit Unit: a special assessment area to cover the cost of providing a service or improvement for that area.

MSTB: Municipal Service Taxing Unit: an ad valorem taxing area to cover the cost of providing a service or improvement for that area.

MWSP: COT 2030 Master Water and Sewer Plan.

OSTDS: Onsite Treatment and Disposal Systems (septic systems).

PSPZ: Primary Springshed Protection Zone, a planning area for springs protection as adopted by the local governments. The location of the PSPZ was mostly determined by the location of aquifer vulnerability areas as determined by the LAVA report. The LAI report refers to areas of “unconfined aquifer” and the area of Scenario 1 as described in Davis et.al., and also refers to the Cody Scarp as the dividing line of aquifer vulnerability. These three areas do not exactly overlap, but the differences are small. As the PSPZ is the adopted planning area where recommendations for nutrient reducing wastewater management would apply, this report uses PSPZ throughout.

Unincorporated: Area within Leon County outside of the COT jurisdiction.

USA: Urban Services Area as defined by the FLU and the Comprehensive Plan.

WRC: Leon County Water Resource Committee.

Woodville RC: Woodville Rural Community as defined by the Comprehensive Plan.

WWFP: Wastewater Facilities Plan.

WWMP: Wastewater Management Plan.

WWTE: Wastewater Treatment Facility.