TENNESSEE REGULATORY AUTHORITY

460 James Robertson Parkway
Nashville, Tennessee 37243-0505

Date: **11/24/2010**

TO: **Docket File**

From: **Pat Murphy, Deputy Chief**

RE: **Docket No. 10-00145 Petition Of Aqua Green Utility Inc. To Amend Its CCN And Expand Its Service Area To Include A Portion Of Jefferson County In Tennessee, Know As Stonebridge On Douglas Lake**

Copies of the attached letters concerning Stonebridge, Jefferson County, Tennessee (SOP 10042) from TDEC to Aqua Green were received by TRA Staff on November 16, 2010.

TENNESSEE DEPARTMENT OF ENVIRONMENT & CONSERVATION
DIVISION OF WATER POLLUTION CONTROL
401 CHURCH STREET
6th FLOOR L & C ANNEX
NASHVILLE, TENNESSEE 37243

CERTIFIED MAIL

August 10, 2010

Mr. Bob Faulhaber, P.E., LEED AP
Faulhaber Engineering & Sustainability
1045 E. 10th Street – 106
Cookeville, TN 38501

RE: Revised Engineering Report for Stonebridge
SOP-10042, Jefferson County, Tennessee

Dear Mr. Faulhaber:

I have received and reviewed your revised engineering report (signed 8/6/2010) for above reference project along with your letter dated August 6, 2010. I acknowledge the changes you made to your original engineering report (signed 7/20/10) and offer the following comments:

- Over the past 4 years, significant revisions have been made to our *State Design Criteria for Sewage Works*. Much time was spent working with a technical advisory group made up of consultants, utilities, municipalities, contractors, soil scientists, academia and regulators. During this time, much effort was spent researching the issues that you have just delved into recently. We looked at what other states were doing, what manufactures were recommending and listened to national experts like Dr. Richard Otis, Dr. Bob Rubin, Dr. Jerry Tyler and others.

  You referenced work by Dr. E. J. Tyler—this was a paper by E. Jerry Tyler and Laura Kramer Kuns entitled: "Designing with Soil: Development and Use of a Wastewater Hydraulic Linear and Infiltration Loading Rate Table". This paper was used as a source for the suggested hydraulic and organic loading rates for sizing infiltration surfaces contained in EPA's "Onsite Wastewater Treatment Systems Manual" (EPA/625/R-00/008, February 2002). In fact, the format of Table 4-3 in that manual was used in Chapter 17 of our design criteria and in the rules promulgated by our Division of Groundwater Protection (GWP). However, in the Tyler and Kuns paper the statements were made that "*values for infiltration loading rates and for hydraulic linear loading rates are estimates based primarily on experience*" and that "*further research and testing is needed to verify the values*". Furthermore, I have spoken with Dr. Jerry Tyler on

several occasions and learned that all of the values were obtained from individual septic tank systems, not large subsurface drip dispersal or surface spray systems. Thus, one must be careful with any translation and/or extrapolation of these values. This is one of the reasons we are taking a rather conservative approach to the decentralized wastewater treatment systems and will rely on empirical data to make any adjustments in the future. Until we have systems built out and operating at design capacity will we not know the answers to these questions.

- With regard to estimated design flows, please be advised that ever since July 27, 2007, the Division of Water Pollution Control (WPC) has consistently required that projects involving only residential units be designed on the basis of 300 gallons per day per unit (GPD/Unit). We know that the actual water use records for the most part show values lower than 300 GPD/Unit.

  Please keep in mind that GWP uses 150 GPD/Bedroom and requires a 100% duplicate area for the sewage disposal system (see Regulations to Govern Subsurface Sewage Chapter 1200-01-06). These GWP rules cover Advanced Treatment Systems (ATS) that are separate and distinct from the disposal field and are used to improve the quality of septic tank effluent to secondary levels. These ATSs are essentially the same type of treatment units used in decentralized systems regulated by WPC, but on a smaller scale.

  The rationale for WPC's use of the 300 GPD/Unit is anchored in the fact that this is the only conservative factor used in our evaluation and permitting of these systems. We do not require a duplicate or reserve area and we do not use 150 GPD/Bedroom, if we did the drip dispersal areas would be two to three times larger. Furthermore, a hydraulic loading rate of 0.2 gallons per day per square foot (GPD/SF) is 2.25 inches per week and equivalent to 117 inches of rainfall annually. When you add approximately 50 more inches of natural rainfall, the drip dispersal area is required to handle about 167 inches of equivalent rainfall per year. A loading rate of 0.25 GPD/SF is 2.81 inches per week and equivalent to over 146 inches of rainfall annually. When you add the natural rainfall, this loading rate approaches 200 inches of rainfall annually. These loading rates (0.2 and 0.25 GPD/SF) produce equivalent rainfalls to that of typical rainfall in a tropical rain forest. That's a lot of water to handle and we want to ensure that these systems, at design capacity, do not over load the soil component of the treatment system and/or cause water quality, environmental, or human health problems. We believe that while this is somewhat conservative it is not unreasonable and we have scores of treatment systems that have been designed and built on this basis.

  For 107 homes you have used the correct design flow rate of 32,100 GPD.

- With regard to soils, you stated in your revised engineering report (ER) that a soil report and map was prepared by Mr. Kevin Davis of S&ME. This map was attached to your ER and is dated August 8. 2008. It is my understanding that Mr. Davis no longer works for S&ME and that a new soils map has been prepared by him. In any event, my comments relative to soils will be based upon what you have submitted in your ER.

Mr. Billy Roach, Soil Consultant Supervisor with GWP completed a "Field and Activity Report" dated 7/28/10 in which he stated:

> "The Dandridge map units had hard shale located at depths ranging from 14 inches to 24 inches. The Dandridge units do not meet the requirements from Chapter 17. The Muskingum and Sequoia units do meet the requirements from Chapter 17. The steep slopes on the Muskingum and Sequoia units should be considered when determine the line spacing and loading rates."

Based upon Mr. Roach's report, all of the Dandridge soil must be excluded from consideration for use in this project. Dandridge appears to take up the majority of the areas 97, 98, 99 and 100 shown on the August 8, 2008, soil map prepared by Mr. Davis. The other soil areas shown may meet the Chapter 17 requirements but will be restricted for hydraulic loading rate due to slope.

- With regard to slope, line spacing should be increased to 5 feet up to about 30% slope and to 10 feet where slopes exceed 30%, according to Dr. Bob Rubin, North Carolina State University and Review Team Member for EPA's Onsite Wastewater Treatment Systems Manual. Additionally, Dr. Rubin says that a significant reduction in hydraulic loading is necessary when steep slopes (greater than 30%) are present. Dr. Rubin says that a reduction of the liquid load to 30 inches/acre/year (0.06 GPD/SF) is needed even in soils that based upon texture the loading could have been 0.25 GPD/SF.

  Dr. Rubin's comments are consistent with requirements in Chapter 17 (17.1.3) and fortified by GWP's rules. Under GWP's rules, when slopes exceed 9% a slope correction factor is used to adjust disposal area requirements (see Regulations to Govern Subsurface Sewage Chapter 1200-01-06). For soil depths less than or equal to 23 inches, disposal area shall increase as follows:

  - Increase 15% for slopes between 10% and 20%
  - Increase 35% for slopes between 20% and 30%
  - For sites with slopes between 30% and 50% a special investigation shall be conducted to evaluate those soils to determine: depth to rock, kind of rock and particle size class designation to a depth of six feet or to hard rock, whichever is shallower.
  - Slopes of more than 50% shall be considered unsuitable.

  Therefore, for your design of this proposed system for Stonebridge, you will need to adhere to the above recommendations. Based upon my review of your ER and the two year old soils map you submitted with it, there is no where close to 3.06 acres (Note that the new SOP application shows 2.99 acres—the ER and SOP application must match).

  Unless something is dramatically different in the new map being prepared by Mr. Davis, there is only a fraction of the areas 96, 97, 98, 99 and 100 that meet Chapter 17 requirements. (Please note that the soil mapping must be done in accordance with Chapter 17.2.2). Additionally, of the remaining acceptable soil, the loading rates are

going to have to be reduced/drip dispersal area increased because of slopes. For slopes between 30% and 50%, you must use Dr. Rubin's recommendation of 0.06 GPD/SF for the hydraulic loading rate in these areas of extremely steep slope.

- With regard to wastewater treatment system, you have proposed a decentralized wastewater system consisting of primary treatment in the form of septic tanks at each home, effluent pumps and pressure lines to transport the effluent and secondary treatment in the form of a fixed film trickle filter and drip dispersal of treated effluent. This is an acceptable system that conforms to our state rules and design criteria requirements.

  Please be advised that the Delta Environmental Bio-Pod system will not be approved as the secondary treatment unit. You will have to use something like a recirculating sand filter, BioClere, or AdvanTex treatment units.

If you have any questions, please contact me personally by Email: Robert.Odette@TN.GOV, or by telephone at (615) 253-5319.

Sincerely yours,

Robert G. O'Dette, M.S., P.E.
Assistant Manager
Municipal Facilities

cc: Woody Smith, TDEC-WPC, Knoxville Environmental Field Office
Permit Section, WPC-Central Office
Mr. Billy Roach, TDEC-GWP, Knoxville Environmental Field Office

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
401 CHURCH STREET
L & C ANNEX 6TH FLOOR
NASHVILLE TN 37243

November 15, 2010

Certified Mail # 7007 2680 0000 8142 6580

Mr. Dart Kendall, President
Aqua Green Utility Inc.
3350 Galts Road
Acworth, GA 30102

Subject: **SOP Permit No. SOP-10042**
Aqua Green Utility Inc.
Dandridge, Jefferson County, Tennessee

Dear Mr. Kendall:

The Division of Water Pollution Control acknowledges receipt of your initial and revised applications for a State Operating Permit (signed July 16, 2010, and August 6, 2010, respectively) for a sewerage system to serve 107 units in a residential development called Stonebridge on Douglas Lake and located at 1700 Stonebridge in Dandridge, Jefferson County, Tennessee. The engineering report required (by the application) for land application treatment systems was also submitted in initial and revised forms (signed July 20, 2010, and August 6, 2010, respectively). We consider the Year 2008 soils map attached to the revised application to be a preliminary soils map until the following actions are complete:

- The physical properties of the soil horizons and soil map units are confirmed via soil borings and pits,
- The confirmation is verified by a soil scientist representing TDEC, and
- The confirmation is certified by your soil scientist on a final map.

The division reviewed the engineering reports accompanying the applications and finds that the proposed drip area design prescribes soil types and areas that would not conform to the state design criteria. The design consultant who prepared and submitted the revised engineering report, Faulhaber Engineering & Sustainability in Cookeville, TN, was notified of this by letter dated August 10, 2010. Since August 10, 2010, we have had no response from Mr. Faulhaber. Additionally, your letter dated August 30, 2010 and email dated September 11, 2010 to Mr. O'Dette, do not provide a substantive response to Mr. O'Dette's August 10, 2010 letter. As such, your application for a permit is deemed incomplete and unacceptable for developing permit terms and conditions for the proposed sewerage system.

In order for us to proceed toward drafting and public noticing a favorable permit action, the sewerage system design must present a design conforming to state design criteria or have justication to support deviation from those criteria. Notations on the revised application that "this is a subdivision that is expected to contain many weekend residence[s]" and that it is a "typical second home subdivision" do not limit use by the prospective homeowners and therefore cannot serve as basis for allowing use of a soil area that would be insufficient at design flow rates recognized by the design criteria for residential units.

If no additional information is received within 60 days of receipt of this letter, the division may public notice its intent to deny a permit for the activity as proposed in the permit application. A copy of the August 10, 2010, comment letter is attached for your reference.

If you have questions, please contact the division at the Knoxville Environmental Field Office at 1-888-891-TDEC; or, at this office, please contact Wade Murphy at (615) 532-0666 or by E-mail at wade.murphy@tn.gov.

Sincerely:

Vojin Janjić
Manager, Permit Section
Division of Water Pollution Control

CC: DWPC, Permit Section, Municipal Facilities-Plans Review Section & Knoxville Environmental Field Office
Mr. Bob Faulhaber, P.E., Faulhaber Engineering & Sustainability, 57 W. Broad St., Ste. 200, Cookeville, TN 38501
Ms. Patsy Fulton, TRA