



# ORANGE WATER & SEWER AUTHORITY



Quality Service Since 1977

ATTACHMENT 7

January 28, 2004

## ODOR ABATEMENT IMPROVEMENTS FOR THE MASON FARM WASTEWATER TREATMENT PLANT

Dear Customer:

Enclosed is a report that we recently provided to the Town of Chapel Hill regarding our odor abatement program for the wastewater (sewage) collection system and the Mason Farm Wastewater Treatment Plant. We provided this information in connection with our application to the Town for a Special Use Permit to upgrade and expand the treatment plant.

As you may already know from a recent mailing by the Town, our special use application will be under consideration at Town meetings including a public hearing by the Town Council on Monday, February 16, 2004 at 7:00 pm in the Chapel Hill Town Hall.

We invite you to read the enclosed report and contact us with any questions or comments you may have. In addition, we invite you to attend and participate in a discussion of our odor abatement program at a meeting of the OWASA Board of Directors on Thursday, February 12, 2004 at 7:00 pm in the Community Room at our Operations Center, 400 Jones Ferry Road, Carrboro. At the February 12<sup>th</sup> OWASA Board meeting, we will present a staff report including information about a consultant's odor study of odor sources at the Mason Farm Wastewater Treatment Plant.

The agenda materials for the February 12<sup>th</sup> Board meeting will be posted on our website, [www.owasa.org](http://www.owasa.org), by the Monday (February 9<sup>th</sup>) before the Board meeting and we will be glad to mail you a copy on request. If you will be unable to attend the OWASA Board meeting, we would welcome your comments by letter, e-mail, etc. (Our e-mail address is [webmaster@owasa.org](mailto:webmaster@owasa.org).)

We look forward to seeing you at the OWASA Board meeting or other public meetings about the Mason Farm Wastewater Treatment Plant upgrade and expansion, and we welcome your comments and questions at any time.

Sincerely,

Ed Kerwin  
Executive Director

Enclosure



34

# ORANGE WATER & SEWER AUTHORITY

*Quality Service Since 1977*

January 21, 2004

Mr. W. Calvin Horton  
Town Manager  
Town of Chapel Hill  
306 North Columbia Street  
Chapel Hill, NC 27516

**SUBJECT: STATUS REPORT ON OWASA'S ODOR ABATEMENT  
PROGRAM FOR THE WASTEWATER COLLECTION AND  
TREATMENT SYSTEM**

Dear Cal:

Enclosed is the Status Report on OWASA's Odor Abatement Program for the Wastewater Collection and Treatment System to address the very important feedback we recently received regarding odor control at our Mason Farm Wastewater Treatment Plant.

I would like to make a brief presentation about our many odor control improvements at the Town's February 16, 2004 Public Hearing on our Special Use Permit.

Thank you.

Sincerely,

Ed Kerwin  
Executive Director

Encs: Status Report on OWASA's Odor Abatement Program for the Wastewater  
Collection and Treatment System

c: (w/Encs.) OWASA Board of Directors



# ORANGE WATER & SEWER AUTHORITY -

*Quality Service Since 1977*

## **STATUS REPORT ON OWASA'S ODOR ABATEMENT PROGRAM FOR THE WASTEWATER COLLECTION AND TREATMENT SYSTEM**

### **Purpose**

This report provides an overview of OWASA's existing and planned odor abatement program for the wastewater collection system and the Mason Farm Wastewater Treatment Plant.

### **Overall scope and purpose of the wastewater collection and treatment system.**

Approximately 90 percent of the water delivered to the homes and businesses of OWASA's customers is returned as wastewater (sewage) through 290 miles of collection pipes and 25 pump stations, which collect and direct the wastewater to the Mason Farm Wastewater Treatment Plant (Mason Farm WWTP), located near the Finley Golf Course. The Mason Farm WWTP removes virtually all the contaminants from the incoming wastewater and returns the treated water (effluent) to Morgan Creek, which is a tributary to Jordan Lake. Attachment #1 is a map of the OWASA service area showing locations of wastewater pump stations and the Mason Farm WWTP.

### **What does OWASA currently do to manage odors from the wastewater collection system?**

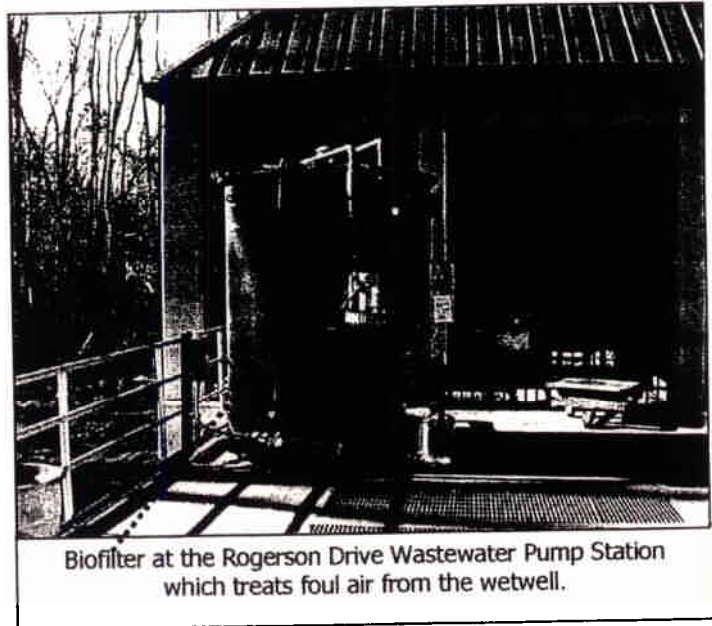
The wastewater collection system is designed so that the wastewater flows by gravity (downhill) to the Mason Farm WWTP. Where gravity flow is not possible (uphill), wastewater pumping stations lift the wastewater a sufficient distance to begin gravity flow again. The wastewater collection system can produce odor, particularly in locations that allow the wastewater to reside for long periods of time. Odors can also be generated in the small holding tanks where the wastewater pumping stations are located.

To minimize nuisance odors from the wastewater collection system, OWASA has taken the following actions:

- ◆ In 1994, facilities were installed to feed hydrogen peroxide at selected locations in the collection system. Hydrogen peroxide is a chemical oxidant which helps reduce odor release in the collection system. OWASA's hydrogen peroxide program has been expanded since 1994 and it currently costs about \$140,000 annually.
- ◆ From 2000-2002, a series of odor control improvements were made at the Rogerson Drive Wastewater Pump Station -



OWASA's largest station – which is located behind the Rainbow Soccer fields near Cleland Drive. Improvements included the addition of mechanical mixers in the wetwell (holding tank) and the installation of a biofilter to capture and treat the foul air before its release to the outside. A biofilter effectively removes odor through natural biological processes in a controlled environment. These improvements have been very effective at minimizing odors from the Rogerson Drive Pump Station.



Biofilter at the Rogerson Drive Wastewater Pump Station which treats foul air from the wetwell.

- ◆ In 2002, a biofilter was installed on a wastewater collection system air relief valve near the Chapel Hill Fire Department on Hamilton Road in the Glen Lennox area.

**What additional plans does OWASA have for controlling odors from the wastewater collection system?**

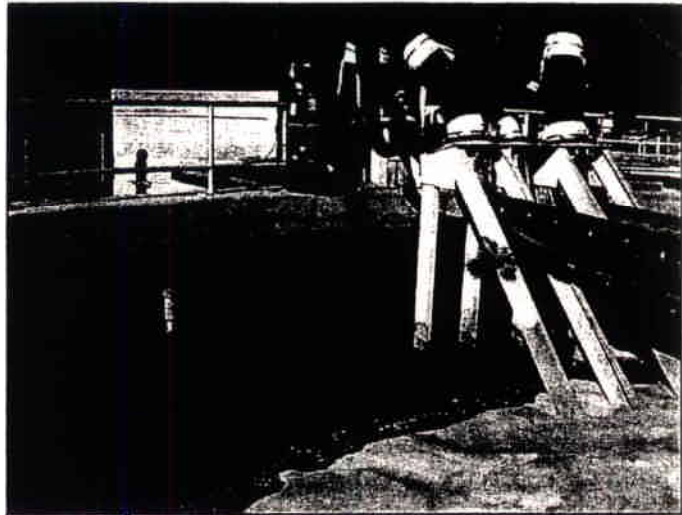
OWASA believes that the improvements taken to date have effectively minimized nuisance odors from the wastewater collection system. There have been very few customer complaints about odor from the collection system during the past year, although we have received complaints about the Mason Farm WWTP, which are addressed later in this report. Even though OWASA believes the collection system odor control objectives have been met, we will continue to monitor the system very closely and will make additional improvements if necessary.

**What are the potential sources of odor at the Mason Farm WWTP?**

Incoming wastewater is treated at the Mason Farm WWTP through a series of physical, chemical and biological processes which work together to clean the wastewater to a very high degree before it is discharged to Morgan Creek. In the process of cleaning the wastewater, solids are removed and must also be treated at the plant. After these solids have been treated at the plant they are called biosolids and they are safely recycled on local farmlands. Since wastewater is odorous by its very nature, each of the treatment processes at the Mason Farm WWTP can be a potential source of odor. However, this report focuses primarily on the solids processing and biosolids storage because they have been the substantial source of odor at the Mason Farm WWTP.



The tanks that treat the wastewater solids are called digesters. These digesters retain the solids under anaerobic conditions (without free oxygen) for 30 days or more, during which time the solids decompose and become stabilized. A by-product of this process is methane gas, a portion of which is captured and used as an alternative fuel source at the plant. Each of the four digesters has a floating cover, with an air gap along its perimeter. These air gaps allow odors to escape.



Picture is the floating cover of one of the digesters. The dark material is solids, which escape from the tank through an air gap which creates odor problems.

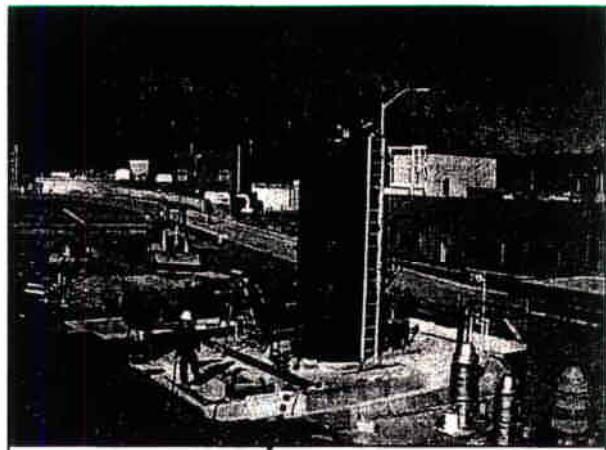
As noted above, the treated solids which leave the digesters are called biosolids, which are pumped into two tanks to be stored temporarily until they are transported from the plant in tanker trucks for beneficial reuse on local farm lands. These biosolids storage tanks have been identified as the greatest source of odor at the plant and are a top priority – along with the digester covers – for odor control.

**What's being done to abate these odor problems from the digesters and biosolids storage tanks?**

In March, 2003 OWASA started a fast track project to install covers over the biosolids storage tanks and to treat the captured foul air in an odor control scrubber before releasing it to the atmosphere. The odor control scrubber acts to remove odorous components from the air and removes them as a liquid. Installation of the tank covers was completed in October, 2003. The



New covers installed in October, 2003 over the biosolids storage tanks.

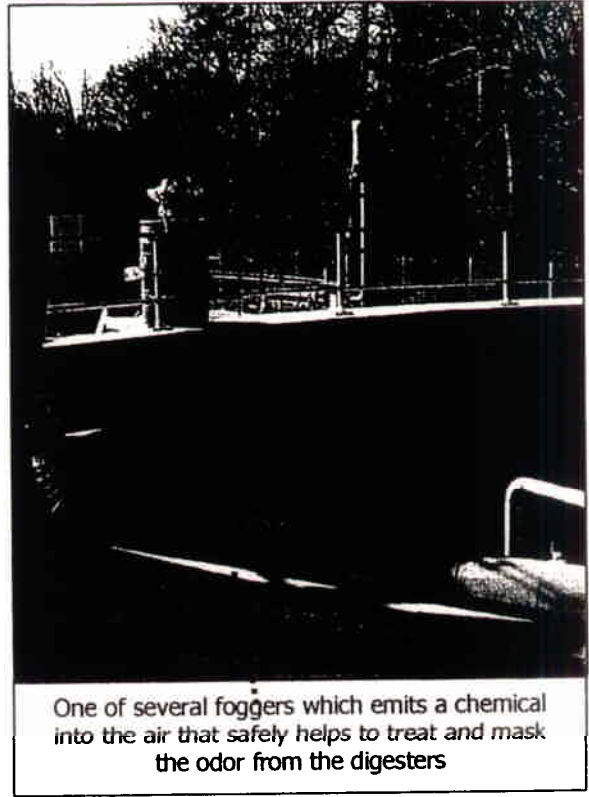


New odor control scrubber to treat foul air collected under the biosolids storage tank covers to be operational by February, 2004.

scrubber installation is nearly complete and is expected to be operational in February, 2004 which will control the single greatest source of odors at the plant. The total capital cost of these improvements is approximately \$650,000.

The other top priority – reducing odor from the digesters – will be accomplished by replacing and renovating all four digester covers. The new fixed (rather than floating) covers will resolve the air gap problem and eliminate this source of odor. This improvement is part of the Mason Farm WWTP upgrade and expansion project that is expected to begin in the spring of 2004. Because of the complexity of this improvement and the fact that only one digester can be out of service at a time (to enable uninterrupted operation), the contractor will need an estimated 18 months to complete this portion of the project, which will cost approximately \$3 million.

In the meantime, plant operators will continue to operate foggers, which emit a chemical into the air that helps to safely treat and mask the digester odors.



One of several foggers which emits a chemical into the air that safely helps to treat and mask the odor from the digesters

As mentioned previously, the digesters also produce methane gas, which is captured and used in part as an alternate energy source at the plant. Currently, unused methane is burned. When unused methane is not fully burned, the gas can be a significant odor source which is what occurred in December, 2003 and January, 2004 when we had difficulties keeping one of the two methane burners in continuous operation. We recently added a natural gas supply pipe to help ensure the methane burner will stay ignited.

**Are there odor problems from the Mason Farm WWTP's other treatment process?**

As stated previously, odor problems offsite are primarily caused by the solids processing (digesters) and biosolids storage tanks.

Below is a basic summary of how wastewater flows through the plant and is treated.

Wastewater enters the treatment plant through "preliminary treatment" where the flow volume is measured and small objects carried in wastewater are screened out. Heavy particles (grit and sand) are also separated by settling from the wastewater. The "preliminary treatment" is an open-air area where some low-level odor may be noticed at times but in our experience it is not the source of offsite odor problems.

Wastewater then flows to settling tanks called "primary sedimentation" where lighter solid particles are separated from the water and pumped away to the solids processing part of the plant. Grease floating on the surface of wastewater is also removed. The primary clarifiers have not been an offsite odor source in our experience.

In past years, OWASA used some open-air facilities called trickling filters as a next step in the process. Due to odor from these facilities and limited treatment benefits, they were taken out of service in January, 2002.

Wastewater then flows to open tanks called "aeration basins" where we use a biological process to treat the wastewater. While these basins can be a source of odor, our experience is that they have not been an important source of offsite odor.

From the aeration basins, the wastewater is "polished" to final clarity with a final stage of solids settling in open tanks called final sedimentation. These tanks have not been odor sources. The wastewater is then disinfected with chlorine in the form of bleach, and the bleach is then neutralized just before the treated wastewater (effluent) is recycled into Morgan Creek.

**Are there any other odor control improvements planned as part of the Mason Farm WWTP upgrade and expansion project?**

Yes. Two improvements in the Mason Farm WWTP's biological treatment process will also reduce odors. The first will significantly improve the quality of a supplemental feed source (fermented waste), which is injected into the aeration basins, which perform most of the plant's biological treatment processing. This improvement will reduce odors from these aeration basins at an estimated cost of \$1.1 million. The second improvement will be the addition of a foam removal system that will allow odorous floating materials to be quickly removed from the aeration basins. The capital cost of this improvement is about \$150,000.

Additionally, a new pumping station where the wastewater enters the Mason Farm WWTP with special odor control features will be built to replace a 36-year-old facility which currently has no odor control capabilities. The capital cost of the new pump station is estimated at \$2.7 million.

**Will the odor control improvements previously described significantly reduce the frequency and intensity of odor problems in the area surrounding the Mason Farm WWTP?**

Yes. OWASA believes that the odor abatement measures described above will greatly reduce nuisance odors from the Mason Farm WWTP. While some of the improvements in the Mason Farm WWTP upgrade and expansion project will take several years to complete, the top priority odor source will be solved by February, 2004 when the odor scrubber is placed in service to treat foul air from the biosolids storage tanks. Furthermore, OWASA will continue to use interim odor abatement measures such as the use of foggers and effective housekeeping.

**Are other odor control measures available to further reduce the possibility of future odor problems?**

Yes, it is technically feasible to cover, collect, and treat the potentially foul air from other treatment tanks. However, this would be extremely expensive and the benefits would be highly uncertain. OWASA believes that the proactive odor abatement measures outlined above will greatly reduce the potential for odor problems. OWASA does not believe that it would be prudent to spend an additional \$1.5 to 2.0 million to cover the aeration basins at this time, as they are not considered to be a source of off-site nuisance odors.

OWASA is committed to being a good neighbor and will take additional odor control measures if they're needed in the future.

**Will the new treatment processes being added as part of the Mason Farm WWTP upgrade and expansion create additional odors?**

No. As explained previously, the project includes a number of improvements designed specifically to reduce odors. New processes that will be added with the project which do not generate odors include a new water filtering process and a new disinfection system which uses ultraviolet light instead of chlorine to disinfect the effluent. These improvements will improve effluent quality sufficiently and make the water available for future use by the University of North Carolina at Chapel Hill for nonpotable purposes such as in cooling towers and for irrigation.

**What public outreach has OWASA done regarding odor control?**

In the last two years, we mailed letters on January 11 and October 24, 2002 and on March 27 and October 7, 2003 to about 700 customers within 4,000 feet of our Mason Farm Wastewater Treatment Plant site. These letters have reported to customers on short-term actions including closing of open air "trickling filters" early in 2002, the odor study in 2003, recent covering of biosolids storage tanks, pending installation and operation of an odor scrubber in February, 2004 and plans for significant odor control work including new covers for the sludge digesters within two years as part of the plant upgrade. Our letters have apologized for the odor conditions, expressed appreciation to customers for their considerable patience and reaffirmed our commitment to reducing and controlling odor through short-term plant improvements and operational controls as well as our plans for plant improvements with more substantial costs.

In our letters to the neighborhoods around the Mason Farm WWTP and in responding to individual citizens who contact us, we invite customers to call us (968-4421) at any time of the day when they notice odor from our facilities so that we can respond promptly to determine the cause whenever possible. In 2002, we received 67 calls about odor and in 2003 we received 25 calls.

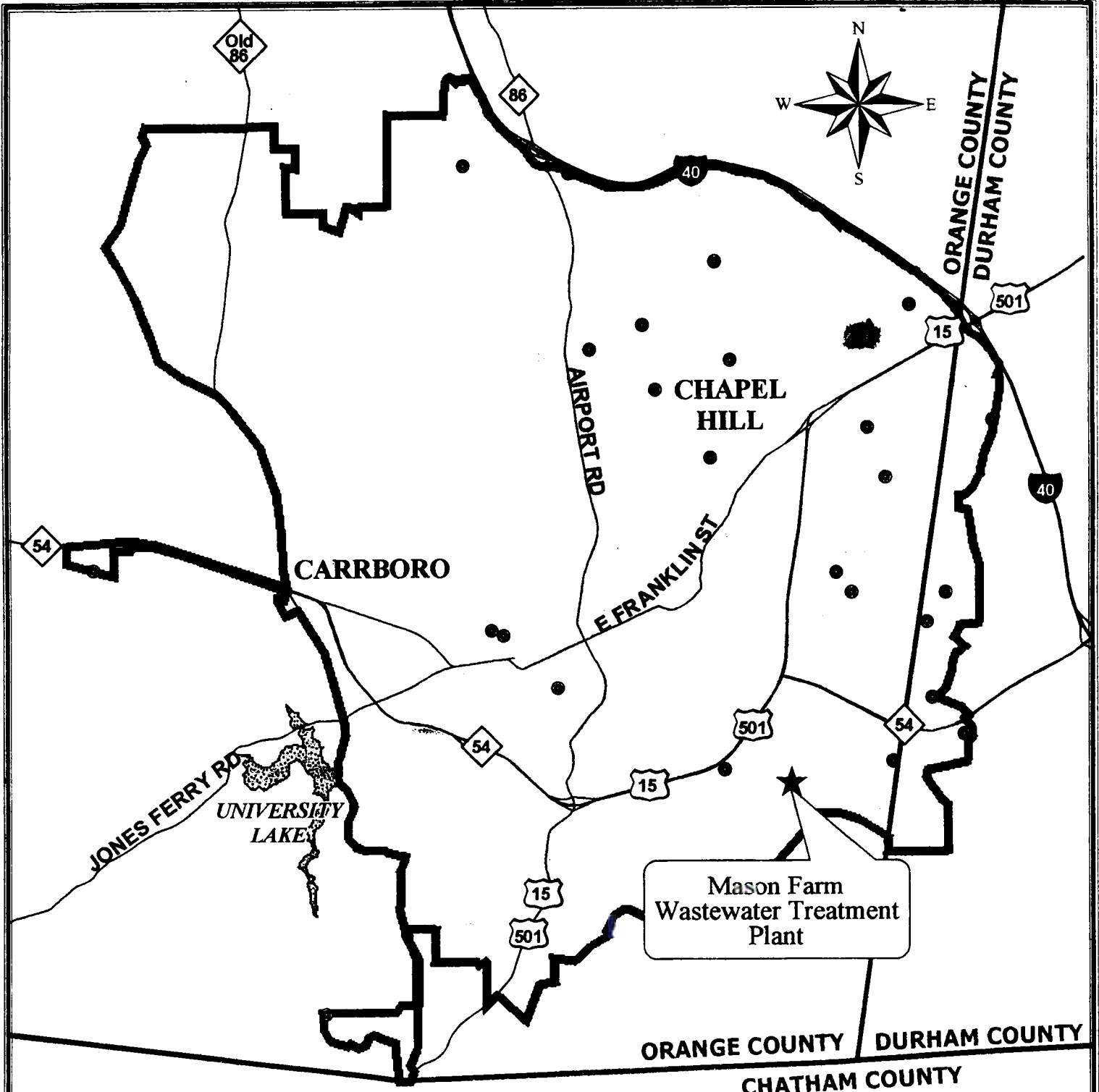


We also met with residents of the Highland Woods neighborhood on March 25, 2002 (with a follow-up letter on April 4, 2002) and with the Board of Directors of the Reserve Homeowner's Association in May, 2002 and on November, 2003.

**Conclusion**

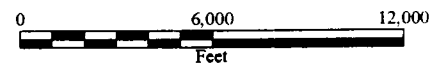
OWASA is committed to minimizing odors from our wastewater management systems. We acknowledge that the Mason Farm WWTP has at times been the source of unacceptably high odors in the past. We believe the short- and long-term odor control measures discussed above will substantially improve conditions for the neighborhoods near the Mason Farm WWTP.

42



**Legend**

- Wastewater Pump Stations
- ★ Mason Farm Wastewater Treatment Plant
- Major Roadways
- ▨ Lakes and Reservoirs
- Chapel Hill
- Carrboro
- County Lines
- ▭ OWASA Service Boundary



# Mason Farm Wastewater Treatment Plant 14.5 MGD Upgrade & Expansion – Odor Improvements

43

