



ORANGE WATER AND SEWER AUTHORITY

*A public, non-profit agency providing water, sewer and reclaimed water services
to the Carrboro-Chapel Hill community.*

January 29, 2019

Mayor Pam Hemminger
Town of Chapel Hill
405 Martin Luther King Jr. Blvd
Chapel Hill, NC 27514

Mayor Lydia Lavelle
Town of Carrboro
Post Office Box 8181
Carrboro, NC 27510

Chair Penny Rich
Orange County Board of
Commissioners
301 West Main Street
Hillsborough, NC 27278

Dear Mayor Hemminger, Mayor Lavelle and Chair Rich:

We are pleased to submit this annual report on our services, projects and initiatives in calendar year 2018. This report includes information on the following items:

1. System resiliency, emergency response
2. Water supply
3. Water quality
4. Agua Vista/Advanced Metering Infrastructure
5. New rates, system development fees
6. Affordability Outreach Program
7. Wastewater and biosolids quality
8. Sewers for the Historic Rogers Road Area
9. Equal employment opportunity annual report 2017-18
10. Diversity & Inclusion Program
11. Energy management
12. Annual fiscal report 2017-18
13. Infrastructure Investments

1. System resiliency, emergency response

In the latter part of 2018, OWASA responded to three emergencies, accelerating existing plans and new initiatives to increase system resiliency. OWASA provided continuous water and wastewater service throughout two hurricanes: Florence in September and Michael in October. In November, a water main break on Jones Ferry Road in Carrboro resulted in system-wide conservation and boil water advisory. The event prompted OWASA to take new actions to further increase system resiliency.

Hurricane Florence

In the lead-up to [Hurricane Florence](#), OWASA reviewed its response, safety, and staffing plans; secured back-up fuel and treatment chemicals; lined up contractors to assist with repairs as needed; assigned Incident Command responsibilities; and coordinated with community partners. On September 14, Florence made landfall in North Carolina as a Category 1 Storm. University Lake peaked at 54.5 inches above the spillway triggering the first stage in OWASA's Dam Emergency Action Plan (EAP). At this first stage, there is no real danger of the dam failing; however as per EAP protocol, OWASA notified Orange County Emergency Management, the dam's engineer, and the state. The State Department of Environmental Quality's Dam Safety Division inspected the dam and noted no issues. Cane Creek Reservoir's water levels peaked at 27.5 inches above the spillway; this did not require OWASA to activate the Dam EAP. OWASA responded to two water main breaks and restored service to affected community members (88 customers) within the day. Stormwater inadvertently entered the wastewater collection system resulting in one wastewater overflow (estimated at 8,300 gallons).

Hurricane Michael

With preparations for Hurricane Florence still intact, OWASA was ready for Hurricane Michael. On October 11, power outages started to occur in Carrboro and Chapel Hill. By 6:30 pm that evening, OWASA had twelve facilities running smoothly on back-up power generation: the Cane Creek Reservoir raw water pump station, the water and wastewater treatment plants, and 9 wastewater pumping stations. Throughout the storm, all water and wastewater systems remained fully operational. On October 13, recreation was closed at Cane Creek Reservoir due to power limitations. By October 14 at 1:15 pm, utility power was restored and we returned to normal operations at all locations.

Jones Ferry Road Water Main Break

On November 5, 2018, a [water main break on Jones Ferry Road](#) in Carrboro affected water storage levels and system pressure. Customers in OWASA's service area were asked to conserve water for 24 hours and boil water (before consuming it) for 31 hours. Immediately following the event, OWASA commissioned engineering firm Hazen and Sawyer to conduct an independent review of what caused the break and why it took 7.5 hours to stop the leak. According to Hazen and Sawyer, the root cause of the main break was a manufacturing defect in the pipe. The area where the pipe cracked was significantly thinner than other areas of the pipe. This defect, compounded with the age and material of the pipe, resulted in localized cracking. To stop the leak, OWASA had to close a series of valves. Some valves were found to be inoperable requiring OWASA to move further away from the break to close more valves. The [report](#) noted that the complexity of turning 31 valves overall resulted in 7.5 hours passing before OWASA slowed the leak to a point where the necessary repairs could be made.

OWASA is acting on recommendations from the report to increase system resiliency. For example, we are establishing a dedicated valve maintenance crew, working with a consultant to improve the organization's water pipe assessment and replacement prioritization model, and developing plans to improve piping infrastructure leaving the Water Treatment Plant (WTP) on

Jones Ferry Road. OWASA is also meeting with community partners to understand their unique needs and collaborate on solutions.

2. Water supply

The North Carolina [Drought Monitor](#) currently does not have any drought advisories issued in North Carolina. The OWASA Board and staff continuously monitor conditions and always encourage wise use of water resources.

In 2018, OWASA recorded the highest year of local rainfall on record (as compared to 128 years of rainfall data that OWASA has on file). Rainfall at the WTP in Carrboro measured at 74.74 inches. This is 27.57 inches above the 128-year average of 47.17 inches per year. OWASA has also measured rainfall at Cane Creek Reservoir since 1992, which has averaged 44.64 inches annually. 2018 was also the wettest year at Cane Creek where rainfall measured at 67.67 inches. As of January 22nd, our reservoirs (Cane Creek Reservoir, University Lake and Quarry Reservoir) were 100% full.

While experts believe the southeastern United States will receive in the future about the same amount of rainfall as 2018, on average, the rainfall will likely be provided in more severe storms and flooding events with more severe and prolonged droughts in between. OWASA has a Water Shortage Response Plan and a Drought Response Operating Protocol which guides our decisions to ensure we work proactively with the community in case of drought conditions.

In 2018, OWASA continued to work with utility neighbors through the [Jordan Lake Partnership](#). The JLP began work on regional drought and emergency response planning in 2018 and will continue this work under the newly formed [Triangle Water Supply Partnership](#). OWASA is also updating its [Long-Range Water Supply Plan](#) to ensure we have water to meet our needs through 2070.

3. Water quality

OWASA published its annual [water quality report card](#) and was pleased to share that in 2017, we met or surpassed all Federal and State standards for drinking water quality, including requirements to test for over 150 substances. Throughout the reporting year, OWASA treated about 2.5 billion gallons of water, an average of 6.8 million gallons per day.

Elsewhere in North Carolina, some utilities reported in their water high levels of GenX, a compound belonging to a group of man-made chemicals called [per- and polyfluoroalkyl substances](#) (PFASs). In January 2018, [OWASA proactively tested local water samples for PFASs levels](#) in our treated drinking water, as well as our raw water sources (reservoirs). Results showed that GenX was not present in any sample.

For treated drinking water, the Environmental Protection Agency (EPA) has established a lifetime [health advisory level](#) for two PFASs (PFOS and PFOA) at a combined level of 70 parts per trillion (ppt). Low levels of PFOS and PFOA, below the EPA's advisory level, were detected in OWASA's treated water samples.

For raw water (at point of source and not yet treated), the EPA does not have a health advisory level, nor any other guidance in place. OWASA's raw water sample from Cane Creek Reservoir measured 120 ppt (PFOS and PFOA combined). The upstream sources of PFOS and PFOA at this site are not certain at this time. There are no facilities typically associated with elevated levels of PFASs in the watershed (although we do not have historical information on past land use). We do know that other utilities have applied biosolids in the watershed; OWASA does not.

PFASs can be found in everyday products such as carpet, clothing, and cookware because they increase resistance to water, grease, and stains. As these products are treated, washed, or degrade, PFASs can enter wastewater systems and then travel onward to lakes and rivers. They are used in manufacturing processes for a variety of reasons including repelling moisture and reducing mechanical wear. Through these uses, PFASs can also enter water through industrial releases or discharges from wastewater treatment plants. Studies indicate that the use of powder activated carbon (PAC) is successful in the removal of some PFASs but not all. Consistent with these studies, OWASA's use of PAC has also resulted in the removal of some PFASs but not all.

The EPA does not provide formal guidance on PFASs mitigation, though the agency has announced its intention to publish a PFASs management plan in the future. In the absence of formal guidance, we are in the process of implementing a PFASs monitoring plan – consisting of quarterly sampling of Cane Creek Reservoir and our treated drinking water – to ensure we have localized data. We will continue to share results and action plans with the community.

4. Agua Vista/Advanced Metering Infrastructure

OWASA has upgraded more than 21,000 [meters](#) across Chapel Hill and Carrboro with remote read capability, representing more than 95% of our installation target. The [Agua Vista](#) project remains on time and on budget. Leveraging the nearly real-time data the meters provide, OWASA is communicating with customers when we observe increased water use beyond normal consumption patterns that suggest a water leak. As a result of these proactive notifications and customer service outreach, the number of customers making requests for OWASA to come and do on-site checks for leaks have greatly decreased. For example, service requests were 50% lower in September 2018 than in September 2017.

To enable customers to track their own water use, we are in the process of implementing a web portal where customers will be able to track their water use data and learn conservation tips. The Agua Vista customer portal is scheduled to launch in March 2019.

5. New rates, system development fees

OWASA's Board of Directors adopted the budget for July 2018 through June 2019, which included a 2% increase in [monthly water and sewer \(wastewater\) rates](#) as of October 1, 2018. As a result, a monthly water and wastewater bill for a single-family residence (using 4,000 gallons each month) increased \$1.41 per month. This was the first increase in OWASA's monthly water and sewer rates in six years. The fiscal year budget included a \$21 million [Capital Improvements Plan](#), representing critical investments in the community's water and wastewater infrastructure.

Effective July 1, 2018, system development fees (one-time fees charged for new connections to OWASA's system) were reduced between 10% and 40%, depending on meter size and property type. A new tier for single family homes less than 800 square feet in size was also added.

6. Affordability Outreach Program

2018 marked the third full year of OWASA's [Affordability Outreach Program](#). Through this program, we engage with over 20 social service agencies to empower low-income customers and local agencies that serve them with information and tools to better manage their water consumption, and reduce bills.

In addition, OWASA continued to invite customers to contribute to [Care to Share](#), the customer assistance program administered in partnership with the Interfaith Council for Social Services (IFC). In 2018, on-bill contributions totaled over \$7,650, representing a 44% increase over the year before (about \$2,350 more). Individuals and businesses also donated \$790 directly to IFC to support Care to Share. These combined customer, individual, and business contributions provided funding for approximately 64% of utility bill assistance needs that IFC administered to families in 2018.

7. Wastewater and biosolids quality

OWASA published its annual [Wastewater Quality Report Card](#) and was pleased to report that from July 2017 to June 2018, we surpassed all Federal and State standards for treated wastewater quality. The phosphorus level in our treated wastewater was 45% below the regulatory limit, and nitrogen was 67% below the limit. Throughout the reporting year, OWASA's wastewater system treated about 2.8 billion gallons of wastewater, an average of 7.8 million gallons per day.

Following OWASA's extensive wastewater treatment process, the treated water output is returned to Morgan Creek or reclaimed as non-drinking water for use in commercial cooling units and other systems to support sustainable water use. In 2017-18, the University and UNC Healthcare used about 265 million gallons of reclaimed water (about one-third of the University's overall water use).

Solids that remain after the treatment process are anaerobically digested. These organic materials, called [biosolids](#), are beneficially recycled via composting or through land application in partnership with local farms in Orange, Chatham and Alamance Counties. OWASA biosolids are designated exceptional quality per EPA standards. Some biosolids are also recycled at a private composting facility in Chatham County.

8. Sewers for the Historic Rogers Road Area

The [Historic Rogers Road Area Sewer Extension Project](#) was approved and funded jointly by three local governments: Orange County, Town of Carrboro, and Town of Chapel Hill. OWASA is providing project management services to oversee the construction of 18,000 feet of sewer pipes; 70% of the pipes for this project have been installed.

Along the path of the piping in the Rogers Road area, the contractor encountered underground rock which is requiring low intensity blasting to the south and north of Tallyho Trail in Carrboro.

A public meeting was coordinated by the project partners before blasting commenced. Low intensity underground blasting is currently underway. The project is now anticipated to be complete in the Spring of 2019.

9. Equal employment opportunity annual report 2017-18

At the end of the fiscal year, OWASA's workforce was comprised of 23.2% Women and 76.8% Men, representing an increase in gender diversity from last year (when OWASA's workforce was comprised of 21.9% Women and 78.1% Men).

In terms of racial representation, at the end of the fiscal year, OWASA's workforce was 74.4% White, 12.8% Black, 6.4% Two or More Races, 3.2% Hispanic, 2.4% Asian, and 0.8% American Indian or Alaska Native. Overall, minority representation at OWASA at fiscal end was 25.6%, remaining generally the same as the year before when minority representation was 25.8%. OWASA has the opportunity to improve diversity at all levels of the organization and will continue to strive to do so.

10. Diversity & Inclusion Program

OWASA's Diversity and Inclusion (D&I) program has two goals: 1) to foster diversity in our workforce reflecting the communities we serve, and 2) enable an inclusive environment that encourages and supports each team member to contribute to their full ability towards OWASA's mission. OWASA's Diversity Resource Group, Diversity Recruitment Group, Diversity Leadership Group, and supervisors have received 16 hours of training. Voluntary employee trainings have also occurred.

OWASA has also completed a review of its recruitment processes, career development programs, mentoring program and promotional opportunities. With learnings from this review and input from the D&I groups, D&I activities now include: the development of recruitment plans for each recruitment incorporating local census data (to develop applicant targets for under-represented groups), training on new standard processes for interview panels, and training for supervisors. The Board of Directors has also had four training sessions.

11. Energy management

In April 2017, the Board adopted an [Energy Management Plan](#). Goals included reducing OWASA's use of purchased natural gas by 5% by 2020 (compared to a 2010 baseline), reducing use of purchased electricity by 35% by 2020 (compared to a 2010 baseline), and beneficially using all Wastewater Treatment Plant biogas by 2022 (provided the preferred strategy is projected to have a positive payback within the expected life of the required equipment).

For the first time since these goals were set, OWASA reached its natural gas use reduction goal of 5%. From December 2017 to November 2018, we used 7.3% less natural gas than we did in 2010, in large part due to our use of the methane generated by anaerobic digestion at the Wastewater Treatment Plant (rather than pipeline natural gas). This repurposed energy was used

to heat the boilers that heat our anaerobic digesters. In addition, the new HVAC system in the Administration Building has eliminated OWASA's use of natural gas for building heating, also supporting our decreased use of natural gas.

12. Annual fiscal report 2017-18

In September, OWASA presented its [Comprehensive Annual Financial Report \(CAFR\) for Fiscal Year 2018](#) (beginning July 1, 2017 and ending June 30, 2018). OWASA's financial position improved during the fiscal year with net income less debt service being about \$10.7 million. The financial reserves will be used for planned capital improvements needs.

About 69% of OWASA's \$19.2 million capital expenditures for fiscal year 2018 were invested in replacing and rehabilitating existing infrastructure. The remaining 31% of capital expenditures were invested in expanding or enhancing the community's water and wastewater systems, for example, to increase the size of some pipes and install new meters.

OWASA is a special purpose local government entity organized under state law. We are a public, non-profit agency and are required by law to use cost-of-service rates, meaning we set our rates, fees, and charges to cover the cost for each of our services. We do not levy or collect taxes, nor do we receive funding from taxing authorities. OWASA's credit ratings from Fitch of AA+ and Aa1 from Moody's remain unchanged. Standard & Poor's increased OWASA's rating to AAA during the year.

13. Infrastructure investment

OWASA maintains 750 miles of water and wastewater pipes, a water treatment plant, a wastewater treatment plant, pump stations, and other infrastructure. Meeting the community's needs and increasing system resiliency requires ongoing rehabilitation of the water, wastewater, and reclaimed water systems. Capital investments, including debt payments for capital projects, account for about half of our costs. In the last fiscal year, we invested about \$19.2 million to renew, replace and improve infrastructure. Our five-year Capital Improvements Program can be viewed [here](#).

Key accomplishments in 2018:

1. Construction of a chemical facility at Cane Creek Reservoir to improve the taste and odor of our treated water;
2. Completion of a risk and reliability study for the water treatment and wastewater treatment plants to identify risks that would prevent OWASA from meeting or exceeding federal, state, and local quality requirements;
3. Installation of upgraded security equipment at the water treatment plant, water supply reservoirs, and other critical water facilities;
4. Replacement of filter media and improvements to the filtering process at the water treatment plant;
5. Completion of water and wastewater pipe replacements along Hillsborough Street in advance of planned resurfacing by the Town of Chapel Hill;

6. Completion of water main replacement along part of Brandywine Road, and concurrent rehabilitation of sewer pipes and manholes throughout the Heritage Hills neighborhood;
7. Replacement and upsizing of a wastewater interceptor pipe in the easement behind Emory Drive;
8. Repairs to a large pressurized wastewater pipe along Prestwick Road;
9. Rehabilitation of over two miles of wastewater pipes; and
10. Improvements to a wastewater pump station near Providence Road.

Key projects planned in 2019:

1. Completion of the replacement of water pipes along Pritchard Avenue and Noble Street;
2. Replacement of water pipes within Manning Drive (from Ridge Road to Fordham Boulevard), Country Club Road, and Kensington Drive;
3. Replacement and upsizing of a water pipe along the Fordham Boulevard service road between Hardees and Eastowne Drive;
4. Updates to and expansion of a prioritization model and other decision support tools used to guide capital investments and operational management of the water distribution system;
5. Completion of a \$3.1 million project to rehabilitate and improve the wastewater pump station behind Cleland Drive;
6. Rehabilitation of over 6 miles of wastewater pipes;
7. Completion of a master planning study for the wastewater collection system, including consideration for any expected future growth within the service area;
8. Rehabilitation of a large pump station within the wastewater treatment plant; and
9. Rehabilitation of two large settling tanks (“clarifiers”) at the wastewater treatment plant.

We would be happy to provide you more detailed information on the items above or other topics of interest as desired. Please feel free to contact Ed Kerwin, Executive Director (ekerwin@owasa.org or 919-537-4211), or me.

Sincerely,



Yinka Ayankoya, Chair
OWASA Board of Directors

Attachments

cc: Mr. David Andrews, Carrboro Town Manager
Ms. Bonnie Hammersley, Orange County Manager
Mr. Maurice Jones, Chapel Hill Town Manager
OWASA Board of Directors
Ed Kerwin, OWASA Executive Director

**MONTHLY SUMMARY OF CALLS AND E-MAILS TO OWASA
FROM NEIGHBORS REPORTING ODOR
FROM THE MASON FARM WASTEWATER TREATMENT PLANT**

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018 Events
January	11	3	9	0	8	3	8	1	3	3	4	0	3	0	0	0	0
February	7	5	2	0	8	0	4	1	0	3	3	0	4	0	0	1	0
March	9	0	7	1	10	4	1	1	0	2	8	0	0	1	0	0	0
April	9	2	4	0	9	3	1	1	2	1	1	0	0	0	0	0	0
May	6	0	2	5	8	3	2	5	4	0	1	3	0	0	0	0	0
June	4	1	1	1	5	1	8	8	1	2	2	0	0	0	0	0	0
July	1	0	2	0	0	2	6	3	2	4	0	0	2	0	0	0	0
August	1	0	4	3	11	2	9	0	1	1	2	0	2	2	0	0	1
September	2	5	2	2	9	3	1	1	5	1	1	0	3	0	0	0	2
October	2	6	1	1	8	8	2	0	3	3	2	2	3	0	0	0	0
November	0	0	1	7	2	6	7	1	1	4	0	1	0	0	0	0	0
December	3	3	2	5	8	10	2	1	1	6	3	5	0	0	0	1	0
TOTAL	55	25	37	25	86	45	51	23	23	30	27	11	17	3	0	2	3

January-2002 to December-2017 History and 2018

An “odor event” is defined as: One or more odor reports received during a 24 hour period from WWTP neighbor(s). Each odor event shall be considered to be “verified” unless OWASA determines conclusively that an alternative source other than the WWTP created the odor.

**LOG OF CALLS AND E-MAILS TO OWASA
FROM NEIGHBORS REPORTING ODOR IN THE MASON FARM
WASTEWATER TREATMENT PLANT (WWTP) AREA**

January 2018 – December 2018

Date call received	Time call received	Location
January 2018	No Reported Odors	N/A
February 2018	No Reported Odors	N/A
March 2018	No Reported Odors	N/A
April 2018	No Reported Odors	N/A
May 2018	No Reported Odors	N/A
June 2018	No Reported Odors	N/A
July 2018	No Reported Odors	N/A
August 2018	1	Highland Woods Road
September 2018	2	940 Carmichael Street 123 Old Mason Farm Road
October 2018	No Reported Odors	N/A
November 2018	No Reported Odors	N/A
December 2018	No Reported Odors	N/A

DISTRIBUTION OF OWASA E-MAILS ABOUT OFF-SITE ODOR ELIMINATION

Highland Woods	Paul Neebe
	Mary Turner
	Malcolm Forbes
	Natalia Lebedeva
	Gary Richman
	Gail Wood
	Robert and Melissa Porter
	Robin Casey
	Joseph Clancy
	Ann Schwab
	Seth Kingsbury
	Amanda Kingsbury
	Freeman and Angela Kirby
	Reed Johnson
	Kay Johnson
	Rex Bartles
	Lisa Bartles
	Ann Alexander
	Nortin Hadler
	Carol Hadler
	Frank P. Rexford
	Scott Brees
	Kendall Brees
	Rainer Blaesius
	Elisabeth Schweins
	Susannah Shearer
	Fred Hall
	Lawanda Rainey-Hall
	Katie Jamieson
	Richard Harrill
	Angel Smith
	Jordon Sharome
	Cameron Williams
	Marian Rice
	Janet McLamb
	Michael Henning
	Benjamin Duan-Porter
	Matthew Mauck
Finley Forest	Adam Kimplead
	Cindy Underwood
	Dan Puckett
	David J. Polewka
	Kathryn Conard
	Michael Sharpe
	Julie Maness
Laurel Hill	Bob Wendell
	Carol David
	Pat Evans

	Ewan Rodewald and Sharon Hodge
	Marcella Grendler
	Kay Goldstein
	Ann Wilson
	Louis Fogleman
St. Thomas More Church and School	St. Thomas More Church staff
Morgan Creek area	Ellen Johnson
	Aldersgate United Methodist Church
	Betsy Malpass
	Hanson Malpass
	Jeannie Cox
	Laura King Moore
	Jeanne Langley
	AW Carr
	Marilyn and Don Hartman
	Robert Huls
Ronald McDonald House Family House	Shelly Day
	Greg Kirkpatrick, Executive Director
	Janice Ross, Operations Manager
	Matt Hapgood
Reserve	Steve McPhail
	James F. Howard
	Steven and Susan Frye
	Doug Longman
	Barbara and Edward Paradise
	Jeanne and David Jarrett
	Nadine O'Malley
	Mark Witcher
	Ralph Abrahams
	Kathy Abrahams
Bayberry Drive area UNC	William Ware
	Johnny Randall, NC Botanical Garden
	Jennifer Peterson, NC Botanical Garden
	Phil Barner, Energy Services Director
	Margaret Holton, Water, Sewer & Stormwater Coordinator
	Mary Beth Koza, Director, Environment, Health and Safety
	Ross Fowler, Finley Golf Course
	Michael Wilkinson, golf pro
	Andrew Sapp, Men's Golf Coach
	UNC Tennis Center
	UNC parking
	Mike McFarland, University Communications
	Scott Ragland, News Services
	Linda Convisor, Director of Local Relations
	UNC Farm (Faculty Staff Recreation Association)
	Frank Maynard, Athletics/ Finley Golf Course
	Robert Costa, Athletics/ Finley Golf Course
	Mark Steffer, Athletics/ Finley Golf Course

Distribution of OWASA E-mails About Off-Site Odor Elimination

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	Jeff McCracken, Public Safety
	Kate Luck
UNC Healthcare	Mel Hurston
	Karen McCall
	Keith Morris
Town of Chapel Hill	Roger Stancil, Town Manager
	Florentine A. Miller, Deputy Town Manager
	Ralph Karpinos, Town Attorney
	Lance Norris, Public Works Director
	Chris Roberts, Town Engineer
	Richard Terrell, Public Works Operations Superintendent
	Catherine Lazorko, Public Information Officer
	Jeanne Brown, Assistant to the Mayor
	Phil Mason, Planner
	Sabrina Oliver, Town Clerk
	Amy Harvey, Public Affairs and Communications
	Chris Blue, Police Chief
	Bryan Walker, Captain/Police Information
	Josh Mecimore, Police Information Officer
	Allison Weakley
	Kiel Harms
	Ran Northam
	Ross Tompkins
City Schools	Bill Mullin
	Todd LoFrese, Assistant Superintendent for Support Services
	Jeff Nash, Community Relations
	Crystal Jones
	Chris Liles
	Darlene Ryan
Other Utilities	Indira Everett, Duke Energy
	Brenda Duke, Duke Energy
	Steve Small, Duke Energy
	Billy Miller, PSNC
	Time Warner Cable
Orange County	Orange 911 Center Supervisor on duty
	Connie Pixley, Environmental Health Supervisor
Other	Bill Ferrell, Meadowmont Community Association
	Chamber of Commerce
	Michael Hughes
	Post Office

**SUMMARY OF ON-SITE HYDROGEN SULFIDE (H₂S)
ODOR MONITORING**

Month and year	Headworks Monitor			UNC Monitor			Digester Monitor			Switchgear Monitor		
	Average H ₂ S Reading (ppm)	Minimum H ₂ S Reading (ppm)	Maximum H ₂ S Reading (ppm)	Average H ₂ S Reading (ppm)	Minimum H ₂ S Reading (ppm)	Maximum H ₂ S Reading (ppm)	Average H ₂ S Reading (ppm)	Minimum H ₂ S Reading (ppm)	Maximum H ₂ S Reading (ppm)	Average H ₂ S Reading (ppm)	Minimum H ₂ S Reading (ppm)	Maximum H ₂ S Reading (ppm)
October 2018	0.0000	0.0000	0.0000 ¹	0.0000	0.0000	0.0000 ²	0.0000	0.0000	0.0000 ³	0.0000	0.0000	0.0000 ⁴
November 2018	0.0000	0.0000	0.0000 ⁵	0.0000	0.0000	0.0000 ⁶	0.0000	0.0000	0.0000 ⁷	0.0000	0.0000	0.0000 ⁸
December 2018	0.0000	0.0000	0.0000 ⁹	0.0000	0.0000	0.0000 ¹⁰	0.0000	0.0000	0.0000 ¹¹	0.0000	0.0000	0.0000 ¹²

Monitor Locations:

Headworks Monitor (#1) – Monitor located at Headworks Facility

Digester Monitor (#2) – Monitor located between Digester #1 and Digester #4

UNC Monitor (#3) – Monitor located at Primary Sludge PS

Switchgear Monitor (#4) – Monitor located at Switchgear Building

¹ Maximum reading zero all of October 2018

² Maximum reading zero all of October 2018

³ Maximum reading zero all of October 2018

⁴ Maximum reading zero all of October 2018

⁵ Maximum reading zero all of November 2018

⁶ Maximum reading zero all of November 2018

⁷ Maximum reading zero all of November 2018

⁸ Maximum reading zero all of November 2018

⁹ Maximum reading zero all of December 2018

¹⁰ Maximum reading zero all of December 2018

¹¹ Maximum reading zero all of December 2018

¹² Maximum reading zero all of December 2018