CHATHAM COUNTY

NORTHEAST CHATHAM COUNTY

WASTEWATER STUDY

FINAL REPORT AND RECOMMENDATIONS

PRESENTED TO:
CHATHAM COUNTY BOARD OF COMMISSIONERS
DATE: SEPTEMBER 19TH 2022

NORTHEAST CHATHAM WASTEWATER STUDY COMMISSION

Members:	Lee Bowman	Victor D'Amato	Francis DiGiano
	James C. Flood	Halford House	David Moreau
	Denise O'Gorman-Nowak	Robert Waldrop	Jason Welsch
Chairpersons:	Perry James	Scott Peck	Liz Rolison

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1.0 PURPOSE AND SCOPE OF THIS STUDY

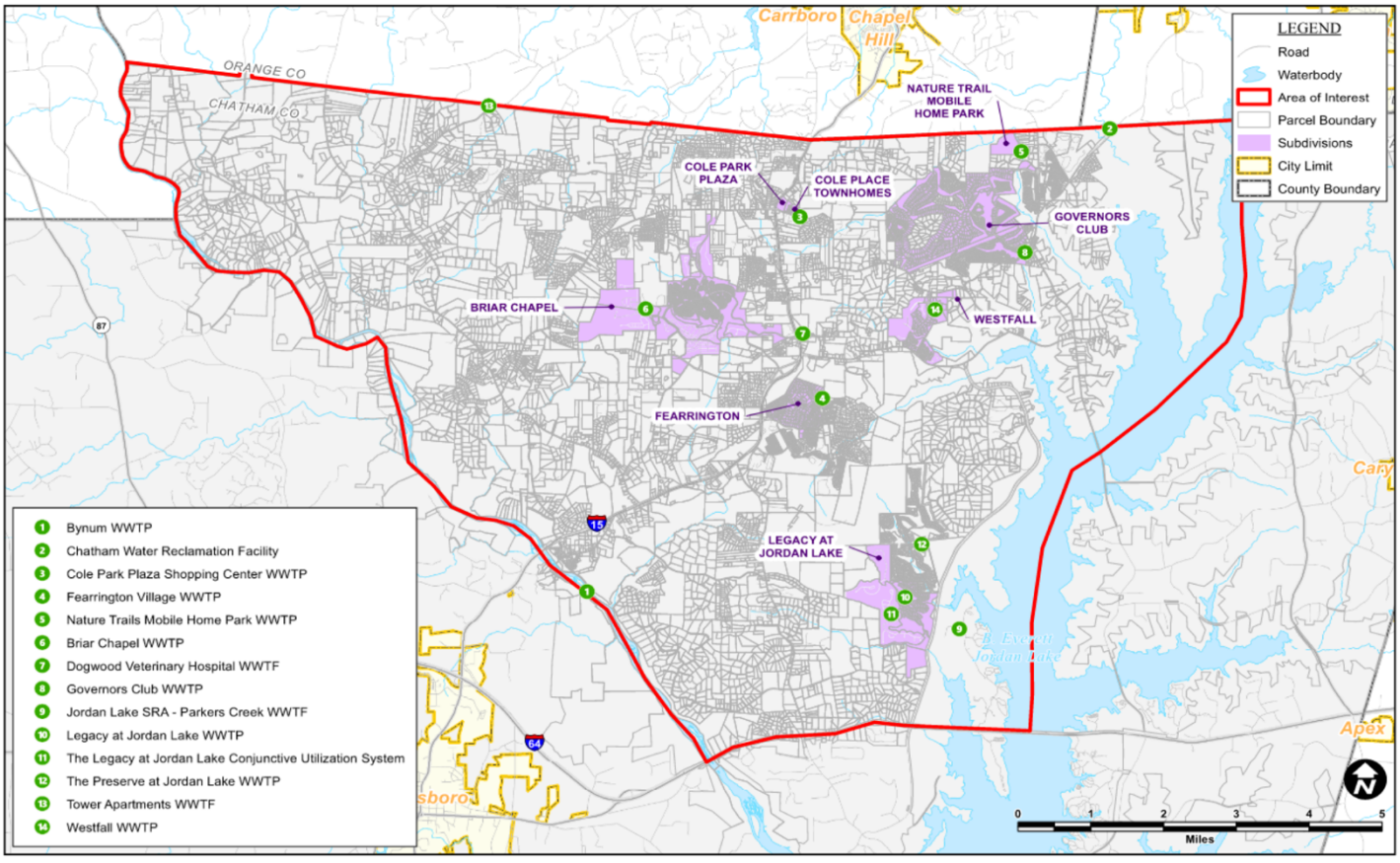
The proposal for the Northeast Chatham County Wastewater Study Commission was presented by Dan LaMontagne, County Manager, and approved by the Chatham County Board of Commissioners (CCBOC) in September 2021.

This proposal describes our purpose as:

- Define the "problem" and hopes for the outcomes from the study
- Identify a list of options to explore.
- Identify additional information needed or desired.
- Reach consensus on information to be included in a Phase 1 final report that will capture the viable options to inform work on Phase 2.
- Develop a final report and recommendations.

The scope of the study is Northeast Chatham County defined as the area south of Orange County, west of Jordan Lake, north of US 64 and east of the Haw River (see Map 1). The study area includes approximately 100 sq. miles with approximately half of this area considered part of the 15/501 corridor where development is more dense. Map 1 also includes the location of the 14 package wastewater treatment plants currently in operation.

Map 1 - NE Chatham County WWSC Study Area Map



2.0 STUDY COMMISSION MEMBERS

In fall of 2021, Chatham County posted a notice for volunteers to serve on the newly approved Wastewater Study Commission (WWSC). The following resident volunteers were appointed to serve on the WWSC at the November 15th 2021 Chatham County Board of Commissioners meeting.

Perry James, co-chair	Scott Peck, co-chair	Liz Rolison, co-chair
Lee Bowman	Victor D'Amato	Francis DiGiano
James Flood	Halford House	David Moreau
Denise O'Gorman-Nowak	Robert Waldrop	Jason Welsch

These volunteers represent a wide range of educational and professional backgrounds related to the wastewater industry, including:

- Academic leaders in area of environmental sciences and engineering with expertise and practical experience in wastewater management
- Experience in engineering of wastewater facility construction
- Involvement in the development of public and private wastewater systems
- Local Government management experience
- Financing of $ hundreds of millions in water and sewer projects
- Experience in best practice utility partnering by public jurisdictions
- Leadership in current state efforts to assist viable utility system improvements
- Leadership over community engagement on wastewater issues

3.0 EXECUTIVE SUMMARY

The Northeast Chatham Wastewater Study Commission (WWSC) unanimously agreed in its initial Problem Statement (Section 4) that Chatham County's current strategy for managing wastewater in the Northeast study area is not sustainable for the long-term. Sustainability, in the Commission's view, is generally characterized by a steady state of quality wastewater operations that continuously meets the highest standards of regulatory compliance and environmental responsibility, has reasonable customer costs, and is able to be responsive to future growth and quality of life needs.

With no master plan for Northeast Chatham County's wastewater services, a patchwork of decentralized wastewater plants (see Map 1) and septic facilities evolved here over time. Currently this comprises 14 privately owned package plants and over 5,300 residential septic tank installations. The private package plants currently operate with an average daily flow of just over 1MGD and a capacity of roughly 1.5 MGD (Table 1). Five of the plants are discharge facilities, discharging treated effluent into local tributaries which feed into Jordan Lake. The other nine are non-discharge facilities which discharge treated effluent through land application (spray irrigation).

Table 1 shows that over the last five years, these privately owned package plants have received 121 violations from NCDEQ, most notably for not meeting permitted nutrient levels for discharge and sewage spills. Treatment units constructed of steel are typical of smaller, package plants. They are know to have a shorter expected lifespan than concrete tanks. Three of these, are approaching end of life for at least a portion of their plant within the next 5-15 years (Fearrington Village, Governor's Club and The Preserve). Additionally, three other plants have documented capacity issues: Briar Chapel, Cole Park Plaza and Westfall.

Through a combination of Study Commission meetings, discussions with County Officials, and County Manager led contacts with various public jurisdictions, potential solutions to the area's wastewater needs were identified and reviewed. This report reviews those potential solutions and recommends the following three long-term solutions for a Phase 2 study:

- **Extension to Durham County** (Triangle WWTP)
- **Extension to City of Durham** (South Durham WWTP)
- **NE Chatham County Regional Wastewater System**

A wide range of issues were considered in the WWSC deliberations and above recommendations. The following general questions and responses summarize a number of the key issues and include summary notes on the Commission's findings:

1. What is a realistic projection of the wastewater service demands in the northeast county area considering existing guidelines of Plan Chatham in addition to accounting for continuing growth demands within the 15-501 corridor and the need for a proper balance of the residential and commercial property bases?

   Study Commission's summary comments on issue: There are varying estimates of likely development and growth but our projections indicate a likely increase in service demands to 3 - 4 MGD by 2050 (Section 6).

2. Can a combination of private package plants and septic tank services provide a sustainable wastewater solution in NE Chatham County?

Study Commission's summary comments on issue: There is support for improving the current decentralized situation while a longer-term, sustainable solution is pursued. However, the WWSC's overall recommendation is to pursue a more centralized, public solution. As noted in the Report, Tables 2 and 3, the Commission's research shows that municipal operations in surrounding counties have significantly lower violation rates and 50% lower sewer rates. There was also interest in linking issues like agricultural needs in Chatham County to potential wastewater options that the NE county area would pursue. The Commission recommends continuing to look at that and any similar options while a longer-term, sustainable solution is pursued.

3. How would this area transition its current service environment to a longer-term, sustainable solution?

   Study Commission's summary comments on issue: While the answers to this question depend on a Phase 2 study, the Study Commission was particularly encouraged by the interest of Durham County officials in reviewing a "win-win" partnership that could involve the Durham County Triangle wastewater facility serving as a processor for all or parts of the NE county service area. If the Chatham County Board of Commissioners and Durham County Board of Commissioners were to agree to study this further, transitional issues would be identified in such a Study regarding infrastructure requirements, financial components, and potential options for converting, purchasing, or closing existing private operations. The timeline for such a project is estimated at 8-10 years, with possible phasing of components. An option to establish a Northeast Chatham Sewer District was discussed and is suggested as one option in linking eventual project costs with the related customer base.

In Section 9.0 of this report, the Study Commission has laid out recommended next steps for Phase 2, including:

- Engineering Demand study to confirm the wastewater demand projected in the study area over the next 30-50 years.
- Discussions with the current private wastewater system owners: Aqua NC, ONSWC, and Fearrington Utilities to explore their willingness/interest in transitioning their service areas to achieve a better long-term solution.
- Further discussions with Durham County and City of Durham to work out potential partnership arrangements.
- Assessment of whether there is adequate demand to make a regional plant economically feasible.
- A hydraulic study to determine the feasibility and cost of moving wastewater from the study area (or a portion of the study area) to the selected WWTP (once the options are reduced to a leading alternative).

As the Wastewater Study Commission ends its Phase 1 work, our advice is clear: "the time to act is now". The current status of wastewater treatment in NE Chatham County is precarious and cannot meet the service needs of currently approved or pending development projects or anticipated ones in the future. Privately owned package plants have also significantly inhibited the achievement of a proper balance of residential and commercial property to support this area with desirable quality of life features.

Wastewater services are a **vital** utility that will impact the quality of life of this county for years to come. To fail to achieve a sustainable wastewater system poses significant **risks** to the county: quality

of service risks, environmental risks, economic constraints/risks, and even tax burdens from unbalanced commercial and residential representation.

We urge the Chatham County Board of Commissioners to move forward with Phase 2, taking the necessary steps to fully explore and plan for the implementation of one of these long-term options, providing NE Chatham County with a long-term sustainable wastewater solution.

4.0 PROBLEM STATEMENT

The WWSC concluded that the current strategy for wastewater management in NE Chatham County was not sustainable for the long-term. This was based on a number of factors, including:

- Significant number of violations for the privately owned package plants
- Concerns with lack of adequate management oversight
- Negative environmental impact from package plants (regularly exceeding permitted nutrient levels and sewage spills into surface waters)
- Compounding of these problems as development along the 15/501 corridor continues

To confirm and document this conclusion, we developed the following problem statement which was unanimously approved by the WWSC at our second meeting. This statement explains why we do not feel the continued growth in privately owned package plants is a sustainable strategy.

> Wastewater Study Commission Problem Statement
>
> The growth in NE Chatham County is undeniable and Chatham County's current strategy for managing wastewater in this area is not sustainable long-term. To date, wastewater services have been provided either through privately owned package plants with limited treatment capacity that service the larger housing and commercial developments or by individual, often aging, residential onsite systems. The current approach has well documented problems and is not considered an adequate solution for the future. The NE Chatham County Wastewater Study Commission supports continued review of all options based upon smart growth principles, properly balanced residential and commercial property components, sound business practices and environmental sensitivity.

Balancing development and growth along the 15-501 corridor with preservation of the County's rural characteristics is a major challenge. Despite the top goal from Plan Chatham (2017) being to "Preserve the rural character and lifestyle of Chatham County", development and growth persists in the study area. With the growth in Chapel Hill/Durham to our north and the planned growth in Chatham Park/Pittsboro to our south, we anticipate that the 15/501 corridor between these two areas will see increased interest by developers resulting in more growth. While the WWSC members had different opinions on whether Chatham County should support or deter growth, **we are in consensus that NE Chatham County must have a wastewater strategy that ensures adequate infrastructure for the future development being approved in this area.**

5.0 CURRENT STATUS OF STUDY AREA

In Northeast Chatham County there are currently two mechanisms for treatment of wastewater: privately owned package plants and privately owned septic systems.

A Summary of Wastewater Management in NE Chatham County has been provided in Appendix 1. The subdivisions are listed along with number of homes, septic or sewer, owner of treatment facility, treatment capacity, type of treatment tank material (steel or concrete), age of treatment facility, and problems and issues in treatment performance.

Private Owned Package Plants

There are 14 privately owned package plants in operation within the study area producing a total average daily flow of just over 1 MGD and having a treatment capacity of about 1.5 MGD. Of these plants, five are discharge facilities that require a National Pollution Discharge Elimination System (NPDES) permit issued by NC DEQ. Treated effluent is discharged into local tributaries that feed into Jordan Lake. The other nine facilities have been issued a Non-discharge Permit by NC DEQ. These plants apply treated effluent to land (spray irrigation) such as golf courses, green areas, school fields, residential lawns and wooded areas. Most of them were designed and built by developers for specific residential or commercial development and later sold to private utility owners.

Table 1 - Package Plants in the Study Area

	Facility	Owner	Permit Type	Permitted Operational Capacity (MGD)	Average Daily Flow (MGD)	Enforcement Violations NOVs
1	Bynum	Chatham Cty	Discharge	0.025	0.006	
2	Chatham Water Reclamation	Aqua NC	Discharge	0.350	0.103	15
3	Cole Park Plaza	Aqua NC	Discharge	0.050	0.050	18
4	Fearrington Village	Fearrington Utilities	Discharge	0.270	0.149	34
5	Nature Trails Mobile Home Pk	Nature Trails	Discharge	0.040	0.033	26
6	Briar Chapel	ONSWC	Non-Discharge	0.250	0.234	25
7	Dogwood Veterinary Hospital	Sandy Pond Enterprises	Non-Discharge	0.0008	0.0006	
8	Governors Club	Aqua NC	Non-Discharge	0.220	0.107	1
9	Jordan Lake SRA - Parkers Crk	State of NC	Non-Discharge	0.029	0.004	
10	Legacy at Jordan Lake	Aqua NC	Non-Discharge	0.095	0.047	0
11	Legacy at Jordan Lake - Conjunctive Utilization System	Aqua NC	Non-Discharge			
12	The Preserve at Jordan Lake	Aqua NC	Non-Discharge	0.190	0.072	1
13	Tower Apartments		Non-Discharge	0.0011	0.0003	
14	Westfall	Aqua NC	Non-Discharge	0.066	0.211	1
			Total	**1.587**	**1.016**	**121**

Sources: Freese & Nichols with updates for Discharge - EPA ECHO DB and Non-Discharge - NCDEQ Online Document Library

MGD - Million gallons per day

In addition, two new developments have been approved in the study area. Each includes a plan to construct a privately owned package plant using land application (spray irrigation) for discharge for the exclusive use of their communities: Vickers Village (0.035-0.040 MGD) and Herndon Farms (0.090 MGD). Another development, Fearrington Preserve, is expected to seek approval for a residential/commercial development along 15/501 with approximately 750 residential units. Their

wastewater plans have not been finalized, but we estimate NC DEQ will require approximately 0.200 MGD capacity for this development.

Over the last five years Table 1 indicates that the privately owned package plants in the study area have received 121 violations from NCDEQ, most notably for not meeting permitted nutrient levels for discharge and sewage spills. The three package plants with the highest numbers of violations for exceeding permitted nutrient levels (Cole Park Plaza, Fearrington Village and Chatham Water Reclamation) are all facilities that discharge into local tributaries entering into Jordan Lake. The majority of violations were issued to five of the facilities, including the four largest package plants in our study area: Chatham Water Reclamation (servicing Carolina Meadows), Cole Park Plaza, Fearrington Village and Briar Chapel. A listing of the violations is provided for the Fearrington Village WWTP (Appendix 2) and for the Briar Chapel WWTP (Appendix 3).

Other important issues of management concern are physical integrity of the treatment plant structures and available capacity to handle increases in wastewater flowrate in the future. Three facilities have steel treatment tanks: Fearrington Village, Governor's Club and The Preserve at Lake Jordan. Steel tanks have a shorter lifespan. We conclude that a portion of the tankage at these three facilities will be approaching end of life within the next 5-15 years. Finally, limitations in treatment capacity have been documented for facilities at Briar Chapel, Cole Park Plaza and Westfall.

The WWSC has found that management oversight is lacking in many of these facilities. NCDEQ allows private owners of these facilities to share staff across multiple facilities that are spread geographically. The Operator Responsible in Charge (ORC) is the lead position, but because of the number of facilities they are managing, is often only onsite for 1-2 hrs per day. NC DEQ oversight is mainly focused on review of monthly Discharge/Non-Discharge Monitoring Reports (DMR/nDMR). Each package plant is responsible for self-reporting and providing NC DEQ a report of flow rates, nutrient testing (typically twice a month) and discharge/non-discharge information. Most of the violations are generated from exceeding nutrient levels self-reported in the (DMR/nDMR). Onsite visits by NC DEQ ranged from 1-2 per year to none depending on the facility and availability of NC DEQ staff. While NC DEQ is responsible for both permitting of wastewater facilities and compliance monitoring, in practice their focus and staffing is more on the former than the latter.

Table 2 - Comparison of Violations in Study Area vs Municipal Wastewater Systems

	Study Area Wastewater Systems - Privately Owned Package Plants						Municipal Wastewater Systems in the Surrounding Area				
	Facility	Permitted Operation Capacity (MGD)	Average Daily Flow (MGD)	Enforcement Violations NOVs	Fines / Penalties		Facility	Permitted Operation Capacity (MGD)	Average Daily Flow (MGD)	Enforcement Violations NOVs	Fines / Penalities
1	Bynum	0.025	0.006				Town of Pittsboro WWTP	0.750	0.447	8	$ 4,268
2	Chatham Water Reclamation	0.35	0.103	15	$ 19,482		Siler City WWTP	4.000	3.339	48	$ 119,971
3	Cole Park Plaza	0.05	0.05	18	$ 86,297		Big Buffalo (Sanford) WWTP	12.000	4.161	2	$ -
4	Fearrington Village	0.27	0.149	34	$ 25,598		OWASA Mason Farm WWTP	14.500	5.200	1	$ -
5	Nature Trails Mobile Home Pk	0.04	0.033	26	$ 1,868		South Durham WWTF	20.000	10.637	4	$ 538
6	Briar Chapel	0.25	0.234	25	$ 11,917		Triangle (Durham Cty) WWTP	12.000	4.750	1	$ -
7	Dogwood Veterinary Hospital	0.0008	0.0006								
8	Governors Club	0.22	0.107	1	$ -		**Totals**	**63.250**	**28.534**	**64**	**$ 124,777**
9	Jordan Lake SRA - Parkers Crk	0.029	0.004								
10	Legacy at Jordan Lake	0.095	0.047	0							
11	Legacy at Jordan Lake - Conjunctive Utilization System										
12	The Preserve at Jordan Lake	0.19	0.072	1	$ -						
13	Tower Apartments	0.0011	0.0003								
14	Westfall	0.066	0.211	1	$ -						
	Totals	**1.587**	**1.016**	**121**	**$ 145,162**						

Source: Discharge WWTPs - EPA ECHO DB and Non-Discharge WWTPs - NCDEQ Online Document Library

The WWSC compared the number of violations at the privately owned package plants in our study area with municipally owned wastewater systems in the surrounding area. The results are shown in Table 2. We found that the violations at the municipal plants (with the exception of Siler City WWTP) were significantly lower than the package plants in our study area, despite the much larger flow rates (volume) that the municipal wastewater treatment plants were processing.

In Table 3 the WWSC compared the monthly sewer rates for the privately owned package plants in the study area for residential and commercial use to the rates charged by municipal wastewater systems in the surrounding area. Rates averaged 50% higher for the privately owned package plants than the surrounding municipal systems. We believe there are two contributing factors: 1) larger economies of scale that the larger municipal systems are able to achieve and 2) differences in the business models for private (for profit) ownership vs. municipal ownership.

Table 3 - Comparison of Monthly Sewer Rates – Study Area vs. Surrounding Municipalities

	Study Area Wastewater System - Privately Owned Package Plants						Municipal Wastewater Systems in the Surrounding Area					
	Facility	Permitted Operation Capacity (MGD)	Average Daily Flow (MGD)	Residential Rates	Commercial Rates		Facility	Permitted Operation Capacity (MGD)	Average Daily Flow (MGD)	Service Population	REU (3,000 gals) Rates	
1	Bynum	0.025	0.006				Town of Pittsboro WWTP	0.750	0.447	4,401	$	49.33
2	Chatham Water Reclamation	0.35	0.103	$ 65.21	$ 91.29		Siler City WWTP	4.000	3.339	8,501	$	32.75
3	Cole Park Plaza	0.05	0.05	$ 65.21	$ 91.29		Big Buffalo (Sanford) WWT	12.000	4.161	41,831	$	30.09
4	Fearrington Village	0.27	0.149	$ 23.14			OWASA Mason Farm WWT	14.500	5.200	83,300	$	40.61
5	Nature Trails Mobile Home Pk	0.04	0.033	$ 26.00			South Durham WWTF	20.000	10.637		$	32.12
6	Briar Chapel	0.25	0.234	$ 42.30			Triangle (Durham Cty) WW	12.000	4.750		$	31.27
7	Dogwood Veterinary Hospital	0.0008	0.0006									
8	Governors Club	0.22	0.107	$ 65.21	$ 91.29		**Totals**	**63.250**	**28.533**			
9	Jordan Lake SRA - Parkers Crk	0.029	0.004									
10	Legacy at Jordan Lake	0.095	0.047	$ 65.21	$ 91.29							
11	Legacy at Jordan Lake - Conjunctive Utilization System											
12	The Preserve at Jordan Lake	0.19	0.072	$ 65.21	$ 91.29							
13	Tower Apartments	0.0011	0.0003									
14	Westfall	0.066	0.211	$ 65.21	$ 91.29							
	Totals	**1.587**	**1.016**									

Sources: Discharge WWTPs - EPA ECHO DB, Non-Discharge WWTPs - NCDEQ Online Document Library, Study area rates - NCUC Online Rate Orders, Municipal rates - Freese and Nichols

The WWSC wanted to examine how Chatham County's approach to wastewater compared to other rural counties. Table 4 shows a comparison of the number of NC DEQ permits in Chatham County to other rural counties in North Carolina by owner type and NPDES discharge permit. We selected surrounding rural counties (Granville, Harnett, Randolph, Orange and Alamance) and a rural county proximal to the Charlotte area (Iredell).

Chatham County has a higher proportion of individual and non-government owned discharge and non-discharge permits than other comparable rural counties. In other words, a smaller portion of Chatham County's wastewater is handled by government owned wastewater treatment plants. In addition, Chatham County is permitted for less NPDES discharge volumes (6.9 MGD) than comparable and surrounding counties (9 – 30.1 MGD). We believe this is largely due to the restrictions placed on nutrient loads to tributaries and rivers that flow into Jordan Lake. The privately owned package plants in our study area use technologies that provide Type 1 level treatment. Type 1 level treatment is a lower level of treatment that results in higher levels of nutrient load in the treated effluent. This is an important factor for discharge facilities that discharge directly into tributaries and rivers that flow into Jordan Lake. While the municipal systems typically use Type 2 level treatment which requires a higher level of treatment and results in lower levels of nutrient load in their treated effluent.

Table 4 - NCDEQ Permits by County / Owner Type

Information source: NCDEQ Online GIS Data

County	Population		Total # Discharge Permits	Govt - State/Fed	Govt - County	Govt - Municipal	Non-Govt	Individual	Total NPDES Discharge (in MGD)
Chatham	74,470	Discharge Permits	120	0	5	4	24	87	6.9
		Non-Dischrg Permits	250	5	2	9	52	182	
Lee	61,779	Discharge Permits	10	0	0	3	4	3	13.8
		Non-Dischrg Permits	9	0	0	3	4	2	
Granville	60,443	Discharge Permits	17	1	2	1	3	10	9
		Non-Dischrg Permits	25	0	0	2	3	20	
Harnett	135,976	Discharge Permits	5	0	3	2	0	0	26.3
		Non-Dischrg Permits	7	0	2	2	3	0	
Randolph	143,667	Discharge Permits	30	0	3	6	8	13	11.5
		Non-Dischrg Permits	11	0	3	3	2	3	
Orange	148,476	Discharge Permits	133	2	2	1	25	103	17.7
		Non-Dischrg Permits	77	2	3	1	11	60	
Alamance	169,509	Discharge Permits	29	0	0	6	12	11	30.1
		Non-Dischrg Permits	33	0	0	3	2	28	
Iredell	181,806	Discharge Permits	29	0	1	4	20	4	21.8
		Non-Dischrg Permits	10	1	0	5	4	0	

Finally, the WWSC took a look at Chatham County's tax base and the relationship to wastewater. From the 2017 Chatham Plan, we found:

- *"Chatham County's total tax base is approximately 84% residential, 8% agricultural/forestry, and 8% commercial/industrial. By comparison adjacent counties Lee, Durham, and Wake have commercial/industrial segments of the tax base in the range of 20% to 40%."*

- *"Research studies across the nation have shown that while residential properties cost more for governments to serve than the tax revenue those properties generate; commercial and industrial properties tend to bring in more tax revenue than the government's cost to provide services to those properties.*

- *"According to a 2007 study by NC State it was estimated that commercial/industrial land uses contribute $3.01 in revenues for each dollar of public services they receive. In contrast, residential development contributes only $0.87 for every dollar of services received."*

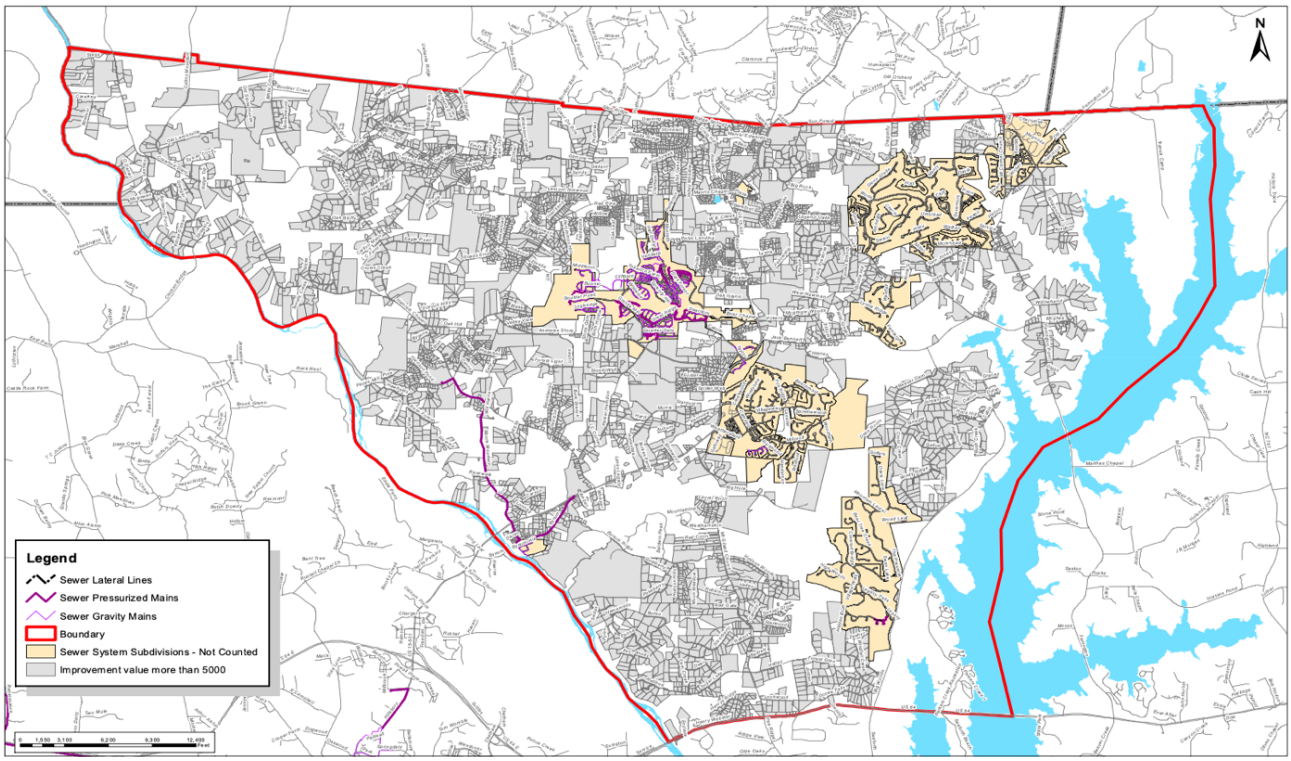
Jen Williams of the Chatham County Tax Office confirmed that as of 2022, the Chatham County tax base is 82% residential, 8% agricultural/forestry and 10% commercial/industrial.

We believe that lack of public wastewater service is a key factor in Chatham County's inability to achieve a more favorable balance between commercial and residential tax base. By providing this essential service, Chatham County could attract the needed commercial tax base to help fund these improvements.

Privately Owned Septic Systems

Map 2 below was provided by Anne Lowry (Chatham County Public Health Dept.). It shows there are roughly 5,321 privately owned septic systems in the study area. We do not know the age or condition of these systems.

Map 2 - Areas Served by Septic vs. Package Plants



Subdivision developments from 2005 to the present using septic systems as recorded on the Chatham County website under Subdivisions, are listed in Appendix 1. The grand total is 1,465 subdivision homes with septic systems have been built in the study area since 2005. Homes built outside of a subdivision, homes built before 2005 or in commercial developments are not included.

6.0 PROJECTED WASTEWATER DEMAND

In order to consider high-level viability of options, the WWSC needed a rough estimate of projected daily wastewater demand for the study area. The estimates provided below do not represent a comprehensive engineering Demand study, but provided us with a rough estimate for Phase I purposes.

We estimated wastewater demand for the study area based on two factors: projected population growth and available land for development.

- The population in the study area in 2016 was 19,385 (based on 2016 census data). Chatham County is projecting 1.8% annual population growth with faster growth in NE Chatham County and the Chatham Park areas.
- From Map 3 provided by Jason Sullivan (Chatham County Planning Director), we have estimated roughly 12,000 acres of undeveloped land (50 acres and greater) in the study area with 85 parcels (50 -100 acres) and 45 parcels (100 acres +). Note, this does not include any of the 770 parcels that are undeveloped between 10 – 49 acres.

Map 3 – Undeveloped Land (50 acres or greater) in Study Area

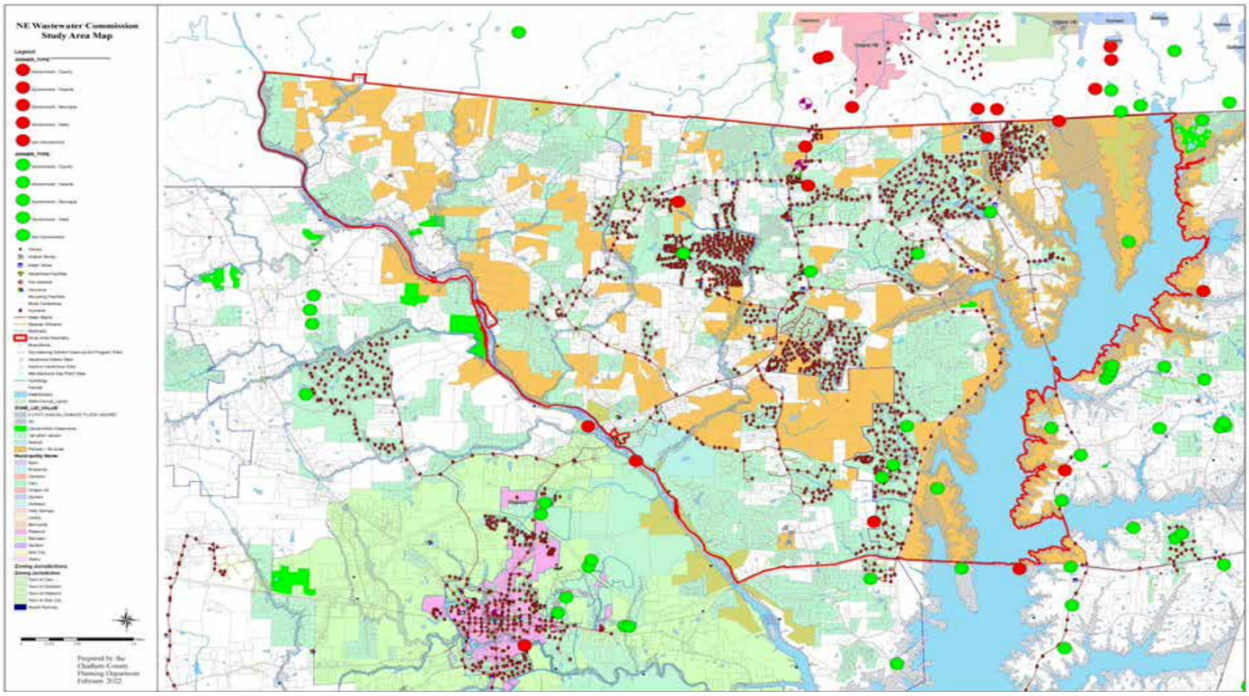


Table 5 summarizes our estimates on daily wastewater demand in the study area using both population growth and land availability information, The results are daily wastewater demand ranging from 2.8 to 4.0 MGD by 2050.

Table 5 - Projected Daily Wastewater Demand in the Study Area

Projected Growth Based on Population Growth						Projected Growth Based on Land Availability				
Year	Chatham County Population Growth (1.8%/Yr)	Study Area Population Growth (3%/Yr)	Projected Wastewater Demand Based on 3% Pop Growth (MGD)	Study Area Population Growth (4%/Yr)	Projected Wastewater Demand Based on 4% Pop Growth (MGD)		Total Available Acreage	Potential Homes on Acreage (50% R-1 & CCO)	Population from New Homes (3/Home)	Projected Wastewater Demand Based on Land Availability (MGD)
2016	70,928	19,385		19,385		New Dev - Residential	12,000	9,000	27,000	1.620
2020	76,174	21,818	1.016	22,678	1.016	New Dev - Commercial				0.405
2030	91,051	29,322	1.466	33,569	1.669	Existing Development				1.016
2040	108,834	39,406	2.071	49,690	2.637					
2050	**130,089**	**52,958**	**2.884**	**73,553**	**4.069**	**Total Projected WW Usage**				**3.041**
Sources:	Chatham County Population Data - 2020 US Census									
	Jason Sullivan - 2016 Chatham County (70,928) & Study Area (19,385) Population, population growth for Chatham County 1.8% with NE CC & CP growing more rapidly									
	2017 Chatham Plan - Annual population growth of 2.4% for county with total population for Chatham County projected at 128,327 by 2040									
	15A NCAC 02T.0114 Wastewater Design Flow Rates - 60 gals/capita/day (gpcd)									
	Jason Sullivan - Land Use available tracts in study area (tracts 50 - 100 acres (85), tracts > 100 acres (45) -									
	Avg residents per household (3.0) - US Census data for Briar Chapel									
	Home per acre: assumed 50% R-1 (1/acre) and 50% compact residential (2/acre)									
	Assumed 80:20 ratio of residential to commercial									

7.0 SUMMARY OF POTENTIAL OPTIONS

From Meeting 3 to Meeting 4 of the WWSC, a range of potential options were identified for evaluation and assessment. These options are not exclusive, but were classified as interim and long-term solutions:

Current Situation

- Maintain Status Quo – Private package plants and septic systems

Interim Measures to Consider while LT Solution is Pursued

- Managed Decentralized systems – Responsible mgmt. entity (RME) oversees package systems
- Agricultural Use of Reclaimed Water – Partial solution to reduce discharge into creeks

Long-Term Solutions

- Expanded Town of Pittsboro system
- Extended Town of Sanford system
- Expanded Siler City system
- Extended OWASA system
- Extended South Durham system
- Extended Triangle (Durham County) system
- NE Chatham County Regional WW system

A general description of each option is provided below:

1. Maintain Status Quo – Current privately owned decentralized systems
    - Denser development - privately owned package plants built by developers discharging treated effluent into local streams or land application discharge via spray irrigation.
    - Less dense development – privately owned septic systems discharging underground.

2. Managed Decentralized systems
    - Short-term transitional option; bridge from the current wastewater strategy to any future long-term options.
    - Utilize existing package plants and onsite systems with a new centralized management entity (e.g., county, public authority, public/private partnership) suggested by EPA's management guidelines in Appendix 8.

3. Agricultural Use of Reclaimed water
    - Involves collection of biosolids and small amount of reclaimed water to provide a slurry providing nitrogen and phosphorus to cattle ranchers and farmers in Chatham and surrounding counties (Appendix 9).

4. Expanded Town of Pittsboro system
    - Extend service from Town of Pittsboro system to NE Chatham County (15/501 corridor).
    - Could involve forming a public authority between Town of Pittsboro and NE Chatham County for wastewater.

5. Extended Town of Sanford system
    - Extend service from Town of Sanford to NE Chatham County (15/501 corridor).
    - Could involve forming a public authority between Town of Sanford, Town of Pittsboro and NE Chatham County for wastewater.
    - Could connect through the Moncure Mega-site to shorten pipeline needed to connect.

6. Expanded Siler City system
    - Extend service from Siler City to NE Chatham County (15/501 corridor).

7. Extended OWASA system
    - Extend service from OWASA to NE Chatham County (15/501 corridor).

8. Extended South Durham system
    - Extend service from South Durham WRF to NE Chatham County (15/501 corridor).

9. Extended Triangle (Durham County) system
    - Extend service from Triangle WWTP to NE Chatham County (15/501 corridor).

10. NE Chatham County Regional wastewater system
    - Build regional wastewater system for NE Chatham County.
    - Consider sizing and siting of system for projected new growth and minimal conveyance from existing package systems and aging septic systems.
    - Involves formation of either a public authority or a public/private partnership.
    - Requires NPDES permit or land for irrigation discharge.
    - Buy-out and decommissioning of privately owned package plant

8.0 EVALUATION OF OPTIONS

WWSC members were able to do individual research on each option that could be distributed to the other members of the study commission. Research was done on all of these options using the NCDEQ Online Document Library, the NCUC Online Documents, EPA Echo DB, and a number of professional contacts.

We also had meetings arranged by the County Manager, Dan LaMontagne, with potential partners from Town of Sanford, City of Durham (South Durham WWTP) and Durham County (Triangle WWTP) with 2-3 members from the WWSC present at each of these meetings. Meetings were not held with Siler City and Town of Pittsboro on the advice of the County Manager. Siler City WWTP has significant operational and capacity issues. Town of Pittsboro and Town of Sanford have signed a recent agreement where they are intending to move Town of Pittsboro wastewater treatment from the Pittsboro WWTP to the Town of Sanford (Big Buffalo WWTP). We requested a meeting with OWASA, but they cited their 4-party agreement with Chapel Hill, Carrboro, Hillsborough and Orange County that does not allow them to consider an extension of their service area without prior agreement from the four parties.

A brief summary of the findings from these three meetings:

- Town of Sanford – Big Buffalo WWTP (Victor Czar – Sanford Public Works Director)
    - Willing to discuss, but Town of Sanford is more interested in partnerships that involve both water and wastewater. Water is more profitable and offsets the costs of wastewater.
    - Existing plan is for a 2 MGD pipeline between Town of Pittsboro and Town of Sanford and is already permitted. Agree that incremental cost of expanding pipeline is less expensive than running a second pipeline, but would require a new permit and would result in a delay for this pipeline that Town of Pittsboro/Chatham Park do not want.
    - Opportunity to join in this effort was missed, time to have gotten involved would have been 2-3 years ago.
    - Conclusion: Not likely

- City of Durham – South Durham WWTP (Sydney Miller – Water Resources Manager)
    - Plant is located south of NC 54 and east of Fearrington Road.
    - Willing to discuss, but would need an engineering demand study and hydraulics study of the study area and a study on their side to assess capacity needed, size of collection system and costs to move forward. Costs for these studies would need to be covered by Chatham County.
    - Their NPDES permit (20 MGD) is a constraint. They are currently operating at an average daily flowrate of 10.6 MGD, but do not believe they can increase their NPDES in the future.
    - Plant is located south of NC 54 and east of Fearrington Road.
    - Conclusion: Possible, but doesn't fit into City of Durham's plans.

- Durham County – Triangle WWTP (Jay Gibson – Deputy County Manager)
    - Plant is located off NC 55 south of NC 54, close to the Duke power easement that runs through NE Chatham County.
    - Current NPDES permit is 12 MGD, but their plant has potential to treat up to 18-24 MGD. They have a 5-stage treatment process and have testing that shows they are improving the water quality downstream with their discharge into Northeast Creek.
    - They want a partnership that would support them in making a case to NCDEQ/EPA to expand their current discharge permit.

- Would require an engineering demand study and hydraulics study to confirm the potential demand and assess what would be needed to convey wastewater from NE Chatham County to Durham County.
- Durham County Manager is aware and supports our discussion.
- Conclusion: Offers a win/win for Chatham County/Durham County

A full summary of the findings for these meetings is included in Appendix 6 – Summary of Potential Partner Meetings.

During Meeting 5, the WWSC did a high-level assessment of each option based on the input from these meetings, individual findings and study commission member expertise. This assessment included: benefits, challenges, and an assessment of whether the option addressed the Problem Statement. After discussion, the WWSC voted on whether to recommend the option for Phase 2.

Assessment criteria to rank each option as a candidate for Phase 2 study were developed as shown in Appendix 7 – Assessment of Options.

9.0 RECOMMENDATIONS

At the final meeting of the WWSC, votes were taken for each of the ten options described above to reach agreement on our recommendations for Phase 2 of this study. Based on WWSC voting, we recommend further study for the following three long-term potential solutions (listed in order by highest to lowest number of votes):

- Extended Triangle (Durham County) system (Vote 9-0)
  - Extend service from Triangle WWTP to NE Chatham County (15/501 corridor).

- Extended South Durham (City of Durham) system (Vote 8-1)
  - Extend service from South Durham WRF to NE Chatham County (15/501 corridor).

- NE Chatham County Regional wastewater system (Vote 5-4)
  - Build regional wastewater system for NE Chatham County
  - Consider sizing and siting of system for projected new growth and minimal conveyance from existing package systems and aging septic systems.
  - Involves formation of either a public authority or a public/private partnership.
  - Requires NPDES permit or land for irrigation discharge.
  - Buy-out and decommissioning of privately owned package plants.

For Phase 2, we recommend starting with an engineering demand study to project daily wastewater demand projected in the study area over the next 30-50 years. Aqua NC, ONSWC, and Fearrington Utilities should be contacted to explore their willingness/interest in transitioning their service areas to the potential long term solution. Phase 2 will also need to further explore potential partnership arrangements with Durham County and City of Durham.

In addition, Phase 2 will need to assess whether the projected daily wastewater demand is sufficient to make building a regional wastewater system in NE Chatham County financially viable. This option will require exploration of the feasibility of acquiring an NPDES permit to a surface water or sufficient land area for spray irrigation. At this stage, options could be further pared down.

Once the options are reduced to a leading alternative, Phase 2 will likely require a hydraulic study to determine the feasibility and cost of conveying wastewater from the study area (or a portion of the study area) to the selected WWTP. This should include an assessment of costs for building the trunk line to the selected WWTP and costs to convey wastewater from the participating package plants to the trunk line.

Full implementation of the long-term options could take 8-10 years (for the Triangle and South Durham extension) and longer for the regional wastewater system. To be responsive to multiple needs and projects that we are aware of, we recommend that the project be structured to allow phasing of infrastructure improvements (for example, main line hook up, private system conversions or tie-in's and collection system additions) whenever possible.

While work is progressing on the long term option, we are recommending that Chatham County attempt to improve current private system operations and management oversight where feasible as detailed in Appendix 8, and to consider developing ideas on agricultural uses for biosolids and discharge as discussed in Appendix 9. The time restrictions of Phase I did not allow for full vetting of either of these options.

10.0 POTENTIAL FUNDING OPTIONS

Phase 2 of this project will require an engineering demand study to more precisely calculate the projected wastewater demand for the study area. Based on input from Freese & Nichols, we estimate the costs for a this study will range between ($20,000 - $100,000) depending on the level of detail requested.

We offer the following potential sources of funding for Phase 2:

- Merger and Regionalization Feasibility (MRF) Study grants are available from the State of North Carolina Reserve (grants are limited to $50,000).
- Other available allocations from existing or new State or Federal grant programs.

APPENDICES

APPENDIX 1

Summary of Wsstewater Management in NE Chatham County

Subdivision	Projected # of Homes (REUs)	Septic Vs. Sewer	Owner	Size of WWTP	Concrete vs Steel	Age of WWTP	Problem & Issues
Fearrington Village	1,448 homes (C) 2,178 homes (F)	Sewer	Fitch Creations/ Fitch Utilities Rate: $23.14(REU)	.270mgd NC0043559 With discharge of up to .500mgd into Bush Creek	Steel	31-40 yrs .060mgd (1981) .180mgd (1990)	• WWTP is reaching end of life • 26 NOVS - Treated effluent is not meeting nutrient requirements for discharge into Bush Creek (tributary of Lake Jordan) • 2021 – fined $20K for not meeting Phosphorus rqmts for four years • Planning repairs
Carolina Meadows & portions of Governor's Village	525 homes in Carolina Meadows + assisted living + nursing home 242 apts in Governor's Village + 11 commercial businesses + 525 homes in Governor's Forest and Governor's Park	Sewer	Aqua NC Rate: $65.21 (REU) $91.29 (Comm)	.350mgd NC0056413 with discharge of up to .350 mgd into Morgan Creek (Cape Fear River Basin) Note permit has not been renewed since 2016 due to legislative dispute	Concrete	Built in @1985 when Carolina Meadows was built	• 21 NOVS - WWTP is not meeting nutrient requirements for discharge into Morgan Creek • Aqua NC has attempted to get a Special Order by Consent (SOC) and it has been denied due to legislative dispute • DMR are regularly showing that plant is exceeded discharge limits for BOD, Fecal coliform, Nitrogen, Phosphorus and Ammonia Nitrogen since 2015. • Plant requires modifications to allow it

							to meet nutrient requirements
Governor's Club & portions of Governor's Village	1,250 homes + Commercial in Governors Village – 150k sqft	Sewer	Governors Club LP/ Aqua NC Rate: $65.21 (REU) $91.29 (Comm)	.300mgd built in 3 phases WQ0000088 With spray irrigation	Steel	Phase I – 1992 Phase II – 2004 Phase III - 2009	• Portions of WWTP is reaching end of life • nDMR reporting deficiencies • 1 NOV - ORC for facility was not registered with NCDEQ
North Chatham Village (Cole Park Plaza), includes: Walmart and Chatham Crossing	88 homes (Mobile Home Park) Commercial North Chatham Village (74k sqft), Walmart (148k sqft), Chatham Crossing (96k sqft)	Sewer	Aqua NC Owner & Operator Rate: $65.21 (REU) $91.29 (Comm)	.050mgd NC0051314 With discharge into Cub Creek, a tributary of Lake Jordan 2/2022 approved to construct expansion to 0.090 mgd	Steel	1999 (Data is incomplete on NCDEQ website – shopping center was built in 1999)	• Unlikely to be able to expand plant or increase discharge permit • Size of plant is limiting growth in this shopping center • 22 NOVs - Numerous violations since 2014 for exceeding nutrient limits for discharge • In 2017 agreed to pay $184,761 in settlement agreement to NCDEQ • Plant is approaching end of life in 10-15 years
The Preserve at Jordan Lake	515 homes	Sewer	Aqua NC Owner & operator Rate: $65.21 (REU) $91.29 (Comm)	.062-.069mgd .194mgd permitted WQ0018146	Older portion – steel Newer portion - concrete	2003	• Odor issues due to non-functional aerators in storage pond • 1 NOV - ORC and backup ORC were not designated with NCDEQ • Gauges were missing or not installed correctly in 5-day upset and irrigation storage pond

							• Older portion of plant has 10-15 yrs left
Westfall	375 homes	Sewer	Aqua NC Rate: $65.21 (REU) $91.29 (Comm)	.020mgd .090mgd permitted WQ0028798 with spray irrigation	Concrete	Phase I – 2006 Phase II - 2017	• Plant is nearing capacity • Increased flow is causing solids buildup • 1 NOV for permit expiring • Limited amount of land for additional spray irrigation • Odor problems with spray irrigation and evidence of overirrigation
Chapel Ridge (includes other surrounding residential communities such as The Parks at Meadowview	840 homes (F) + 600 homes (F) (Meadowview)	Sewer	Aqua NC Owner & operator	.500mgd permitted WQ0022870 with spray irrigation	Concrete	2008	• Reclaimed water has a strong, offensive odor since 2018 • Numerous violations for not submitting irrigation records and missing some DMR reporting requirements
Briar Chapel Includes future development of Blue Heron Apts & Liberty Apts & Assisted Living	2,200 homes (C) 2,777 homes (F)	Sewer	ONSWC Rate: $42.30 (REU)	.250 mgd .750mgd permitted WQ0028552 with spray irrigation	Concrete	11 yrs .250mgd (2009)	• Reached 85-90% of capacity; needs expansion to complete Briar Chapel • Expansion to .500mgd underway • 25 NOVs - Numerous violations for sewage spills and permit violations • Poorly managed by ONSWC/Envirolink

The Legacy at Jordan Lake	463 homes (F)	Sewer	Aqua NC Owner & operator Rate: $65.21 (REU) $91.29 (Comm)	.095mgd .180gpd permitted WQ0024844	Concrete	Phase 1 .120mgd 2016	• Problems with preparation of spray irrigation zones
Chatham Park	22,000 homes (F) + Commercial 22,000k sqft (F)	Sewer	Not clear since August 2020 when Town of Pittsboro terminated their contract with ONSWC	.250mgd MBR under construction .500mgd permitted WQ0039375 with spray irrigation Application filed to be able to use NC0020354 for discharge into Robeson Creek	Concrete	Not yet in service	• Under construction (Phase I .250mgd) • Plans include large spray irrigation systems • NPDES application was recently submitted to use Town of Pittsboro's NC0020354 discharge permit into Robeson Creek (tributary of Lake Jordan)
Jordan Lake SRA – Seaforth	Recreation facility	Sewer	NC Dept o NCR Operator – William Baker	WQ0004988 5,000 gpd with spray irrigation		Built in 1988	• Odor issues with spray irrigation
Seaforth High School	High School	Sewer	Chatham County Board of Education	WQ0040571 13,800 gpd with spray irrigation		Built in 2019	• Certified in Feb 2021

Chatham Downs	Commercial 80k sqft	Septic					• Near capacity – owners studying ability to expand capacity to provide more flexibility for tenants
Polks Village	Commercial 129k sqft	Septic					• Must be cautious with tenants and new users whose use could harm septic system (e.g., medical, restaurants)
Polks Landing	90 homes	Septic					
Legend Oaks (off 15/501)	132 homes	Septic					
Wilder Ridge (off Lystra Rd)	17 homes	Septic					
Lystra Preserve (off Lystra Rd)	12 homes	Septic					
Lystra Estates (off Lystra Rd)	19 homes	Septic					
Lystra Hills (off Lystra Rd)	8 homes	Septic					
The Hamptons (off Mt. Gilead Church Rd)	89 homes	Septic					
Sunset Grove (off Mt. Gilead Church Rd)	55 homes	Septic					
The Woods at Wilkinson Creek (off Tobacco Rd/Manns Chapel)	23 homes	Septic					
Arcadia (off Lamont Norwood/Manns Chapel)	13 homes	Septic					

Monterrane (off Mt. Gilead Church Rd)	12 homes	Septic					
Valley View (off Andrews Store Rd	22 homes	Septic					
Scarlet Oak (located off Polks Landing Rd)	7 homes	Septic					
Persimmon Hill (off Manns Chapel)	30 homes	Septic					
Valley Meadows (off Manns Chapel)	25 homes	Septic					
Bingham Ridge (off Lamont Norwood Rd/north on Manns Chapel)	24 homes	Septic					
Cedar Grove & Cedar Mountain (off Jones Ferry Rd)	88 homes (F)	Septic					
Cottages at Stonegate (off Poythress Road)	23 homes (F)	Septic					
Heartland Grove (off Manns Chapel)	34 homes	Septic					
Brookside at Fieldstone (off Mann's Chapel)	13 homes (C) 40 homes (F)	Septic					
Bonterra (off Manns Chapel – ¼ mile past	22 homes (F)	Septic					

Great Ridge Pkwy)							
Hobby Farm (off Andrews Store Rd)	11 homes (F)	Septic					
Ryans Crossing (off Manns Chapel across from Tobacco Rd)	61 homes (F)	Septic					
Stonecrest At Norwood (off Manns Chapel)	49 homes (F)	Septic					
Windfall (off Big Woods Rd)	73 homes (F)	Septic					
The Summit (off Mt. Gilead Rd)	48 homes (F)	Septic					
Morgan Ridge (off Jones Ferry Rd)	16 homes (F)	Septic					
Chestnut Creek (off Jones Ferry Rd)	14 homes (F)	Septic					
The Retreat at Haw River (off Bynum Ridge Rd)	395 homes (F)	Sewer					

APPENDIX 2

Fearrington Village WWTP Violations Sourced from NCDEQ Online Document Library

Permit	Date	Summary of Violation	Link to Violation
NC0043559 Discharge permit allowing Fearrington Village WWTP to discharge up to 500,000gpd into Bush Creek	4/10/2018	Dec 2017 discharge monitoring report shows they exceeded the annual load of Phosphorus in their wastewater discharge	Notice of Violation
	4/13/2018	Nov 2017 discharge monitoring report shows they exceeded the daily maximum of FCOLI BR and Solids in their wastewater discharge	Notice of Violation and Penalty
	8/2/2018	May 2018 discharge monitoring report shows they exceeded the daily maximum of FCOLI BR and BOD in their wastewater discharge	Notice of Violation and Penalty
	8/10/2018	Jan 2018 discharge monitoring report shows they exceeded the daily maximum of FCOLI BR in their wastewater discharge	Notice of Violation and Penalty
	10/23/2018	Failed to submit a monthly discharge monitoring report for August 2018	Notice of Violation
	11/15/2018	May 2018 discharge monitoring report shows they exceeded the daily maximum of FCOLI BR in their wastewater discharge	Notice of Violation and Penalty
	11/15/2018	April 2018 discharge monitoring report shows they exceeded the daily maximum of FCOLI BR in their wastewater discharge and failure to properly monitor FCOLI BR.	Notice of Violation and Penalty
	11/15/2018	March 2018 discharge monitoring report shows they exceeded the daily maximum of FCOLI BR and BOD in their wastewater discharge	Notice of Violation and Penalty
	3/14/2019	Nov 2018 discharge monitoring report shows they exceeded the monthly average Flow in their wastewater discharge	Notice of Deficiency
	3/14/2019	Dec 2018 discharge monitoring report shows they did not monitor temperature 5xweek	Notice of Violation

	9/17/2019	May 2019 discharge monitoring report shows they exceeded the daily maximum of BOD and did not monitor nitrogen and phosphorus on a monthly basis	Notice of Violation and Penalty
	11/6/2019	March 2019 discharge monitoring report shows they exceeded the daily maximum and average monthly allowed for solids in their wastewater discharge	Notice of Violation and Penalty
	11/13/2019	April 2019 discharge monitoring report shows they did not monitor Nitrite plus Nitrate and Nitrogen frequently enough (2xmonth)	Notice of Violation and Penalty
	11/19/2019	May 2019 discharge monitoring report shows they exceeded the daily maximum of BOD and failure to properly monitor nitrogen and phosphorus in their wastewater discharge	Notice of Violation and Penalty
	1/17/2020	Sept 2019 discharge monitoring report shows they did not monitor temperature 5xweek	Notice of Violation and Penalty
	4/20/2020	February 2020 discharge monitoring reports shows they did not meet the frequency reqmt for monitoring nitrite plus nitrate total, nitrogen kjeldahl, and total nitrogen in their wastewater discharge	Notice of Violation
	6/24/2020	December 2018 discharge monitoring reports shows they exceeded annual load limits for Total Phosphorus in their wastewater for 2018	Notice of Violation
	6/24/2020	December 2019 discharge monitoring reports shows they exceeded annual load limits for Total Phosphorus in their wastewater discharge in 2019	Notice of Violation
	6/24/2020	Compliance evaluation inspection conducted on 6/11/2020 with findings including: digesters were almost full (only able to direct waste to digester train #1), overflow from secondary clarifiers was cloudy, sludge blanket was more than 8 feet high in all three trains, only 1 pump operational for sodium aluminate feed, only 1 pump worked sporadically for caustic feed (needs	

		repair) causing pH to be less than 6 in Train #1 & Train #3, diffusers were clogged and not working causing dead spots in aeration basins, large amounts of foam in Train #3 and facility has exceeded annual load limits for Total Phosphorus by end of April 2020 and has done so for the last three years.	Notice of Violation
	7/15/2020	May 2020 discharge monitoring report shows they exceeded daily maximum for BOD 5-day concentration in their treated wastewater	Notice of Violation
	8/11/2020	June 2020 discharge monitoring report shows they exceeded daily maximum for fecal coliform in their treated wastewater	Notice of Violation and Intent to Assess Penalty
	9/21/2020	July 2020 discharge monitoring reports shows they exceeded daily maximum for BOD, ammonia nitrogen (on multiple days), and fecal coliform and exceeded monthly average for BOD and ammonia nitrogen.	Notice of Violation and Intent to Assess Penalty
	11/18/2020	November 2020 discharge monitoring report shows testing frequency violation for dissolved oxygen, pH and temperature.	Notice of Violation and Intent to Assess Penalty
	2/9/2021	December 2020 discharge monitoring report shows annual load for total phosphorus was exceeded.	Notice of Violation and Intent to Assess Penalty
	3/16/2021	January 2021 discharge monitoring report shows daily maximum exceeded for fecal coliform and testing frequency violation for dissolved oxygen and pH.	Notice of Violation and Intent to Assess Penalty
	8/18/2021	June 2021 discharge monitoring report show daily maximum exceeded for fecal coliform	Notice of Violation and Intent to Assess Penalty

APPENDIX 3

Briar Chapel WWTP Violations Sourced from NCDEQ Online Document Library

Permit	Date	Summary of Violation	Link to Violation
WQ0028552 Construction/operation of Briar Chapel WWTP and reclaimed water utilization system	8/22/2018	Spraying of effluent on sports courts, sidewalks entering sports courts and benches in picnic area	Notice of Violation/Intent to Enforce
	6/10/2019	Overdue payment for Permit WQ0028552	Notice of Violation
	9/23/2019	Compliance evaluation inspection in which there were numerous findings	Notice of Violation
	1/21/2020	Follow up inspection for the September 2019 violation. While some issues from Sept had been resolved, additional issues were found	Continuing Notice of Violation
	2/20/2020	Direct discharge of filter backwash water onto Briar Chapel property	Notice of Violation and Intent to Enforce
	8/5/2021	Unauthorized bypass/discharge from the spray irrigation system resulting in 345,000 gallons of reclaimed water being spilled and flowing into surface waters	Notice of Violation and Intent to Assess Civil Penalties
WQCS00372 Operate and maintain a wastewater collection service for Briar Chapel	1/30/2017	Sewage overflow that occurred 10/8/2016 of 27,000 gallons due to severe natural conditions and 11/21/2016 of 5,000 gallons due to pipe failure	Notice of Violation
	6/6/2017	Sewage overflow that occurred 3/31/2017 of 5,000 gallons due to pipe failure	Notice of Violation
	10/30/2017	Sewage overflow that occurred 7/12/2017 0f 5,000 gallons due to pipe failure	Notice of Violation
	8/13/2019	Sewage overflows totaling 4,000 gallons from April – June 2019	Notice of Violation
	9/24/2019	Volume of self-reported spills by ONSWC totaling 23,000 gallons from 7/12/2017 – 9/7/2019	Notice of Violation
	12/19/2019	Penalty for 23,000 gallons of waste water spills	Notice of Violation and Penalty

	3/2/2020	Sewage spill of 1,000 gallons that occurred 2/11/2020	Notice of Violation
	5/19/2020	Three sewage spills: 3/12/20 (50 gallons), 4/8/20 (75 gallons) and 4/16/20 (315 gallons) due to force main pipe breaks	Notice of Violation
	6/22/2020	Sewage spill of 100 gallons occurred at 4:30pm at Lift Station B with no discharge into surface waters.	Sanitary Sewer Overflow Report
	6/22/2020	Sewage spill of 5,000 gallons occurred at 7:00pm at manhole behind Lift Station A with 4,000 gallons discharged into Pokeberry Creek (a tributary to Lake Jordan)	Sanitary Sewer Overflow Report
	6/22/2020	Sewage spill of 2,000 gallons occurred at 10:00pm at manhole behind Lift Station A with 2,000 gallons discharged into Pokeberry Creek (a tributary of Lake Jordan)	Sanitary Sewer Overflow Report
	7/27/2020	Three sewage overflows that occurred on 6/22/20: 4:30pm 100 gallons, 7:00pm 5,000 gallons, and 10:00pm 2,000 gallons with 6,000 gallons of discharge into Pokeberry Creek	Notice of Violation and Intent to Issue Penalty
	8/14/2020	Two sewage overflows that occurred on 1) 7/23/2020 with 2,000 gallons at manhole at Pump Station B and 2) 7/26/2020 with 8,400 gallons at dry well at Pump Station A discharged into Pokeberry Creek (a tributary of Lake Jordan)	Notice of Violation and Intent to Issue Penalty
	9/14/2020	Sewage spill that occurred on 8/20/2020 with 800 gallons at Pump Station E on Quarter Gate Trace due to debris in line/pump station equipment failure	Notice of Violation and Intent to Issue Penalty
	10/22/2020	Sewage spill that occurred on 9/26/2020 with 200 gallons at Pump Station A by dog park on Great Ridge Parkway due to pump station equipment failure	Notice of Violation
	11/17/2020	Sewage spill that occurred on 10/30-10/31/2020 with 6,167 gallons spilled and 300 gallons discharged into Pokeberry Creek due to pipe failure of force main A	Notice of Violation & Intent to Issue Civil Penalty

	4/9/2021	Sewage spill that occurred on 3/3/2021 on Hill Creek and Great Ridge Parkway with 1,500 gallons spilled and 500 gallons discharged into Pokeberry Creek due to pipe failure of force main A	NCDEQ has not posted NOV. Letter referencing NOV
	5/20/2021	Sewage spill that occurred on 4/12/2021 with 1,000 gallons spilled from manhole at intersection of Great Ridge Parkway and Copper Leaf Avenue.	Notice of Violation
	1/28/2022	Sanitary Sewer Overflow (SSO) 5-Day Report that occurred on 12/20/2021 which lasted for 40 minutes. Volume unknown. The location was Hill Creek Road. Incident Number 20210228.	Notice of Deficiency

APPENDIX 4

Old North State Water Company – Briar Chapel WWTP Sanitary Sewer Overflows

Sourced from NCDEQ Online Document Library

Incident Number	Incident Start Date	Incident Location	Self-Estimated Volume (Gallons)	Self-Estimated Volume to Surface Waters (Gallons	Cause
201601820	10/8/2016	Manhole at Pollard Middle School	27,000	27,000	Severe natural conditions
201602557	11/21/2016	Force main behind Lot 692 Wildwind Dr	5,000	5,000	Pipe failure
201700435	3/31/2017	Force main behind 75 Hill Creek Blvd	5,000	5,000	Pipe failure
201701165	7/12/2017	Force main behind 75 Hill Creek Blvd	5,000	5,000	Pipe failure
201701784	12/24/2017	Pump Station A	500	500	Pipe failure
201801334	8/15/2018	Force main behind 380 & 390 Beacon Ridge Rd	1,000	300	Other
201803141	10/12/2018	Pump Station A	200	200	Pump station failure
201803499	11/14/2018	Force main behind 440 Old Piedmont Circle	2,000	1,000	Other
201900237	1/27/2019	Pump Station A	100	100	Pump station failure
201900781	4/18/2019	Pump Station B	1,000	200	Grease
201901001	6/5/2019	Force main behind 480 Beacon Ridge Rd	1,000	500	Other
201901062	6/11/2019	Manhole behind Pump Station A	2,000	2,000	Pipe failure
201901249	7/16/2019	Force main behind 75 Hill Creek Blvd	4,000	4,000	Pipe failure
201901312	7/31/2019	Force main behind 52 Hill Creek Blvd	500	500	Other
201901350	8/12/2019	Force main behind 75 Hill Creek Blvd	200	200	Pipe failure
201901423	9/1/2019	Force main behind 300 N Serenity Hill Circle	1,500	0	Pipe failure
201901481	9/7/2019	Force main behind 75 Hill Creek Blvd	4,000	4,000	Pipe failure
	9/15/2019	Manhole on Great Ridge Pkwy and behind Pump Station A	250	250	Pump station failure
202000627	2/11/2020	Pump station A	1,000	1,000	Severe natural conditions
202001012	3/12/2020	Force main behind 75 Hill Creek Blvd	50	50	Pipe failure
202001166	4/8/2020	Force main behind 75 Hill Creek Blvd	75	0	Pipe failure

202001213	4/16/2020	Force main behind 75 Hill Creek Blvd	315	0	Pipe failure
202002053	6/22/2020	MH at Pump Station B	100	0	Other
202002054	6/22/2020	Force main at Pump Station A	5,000	4,000	Pipe failure
202002056	6/22/2020	MH at Pump Station A	2,000	2,000	Pipe failure
202002220	7/23/2020	MH at Pump station B	2,000	0	Other
202002233	7/26/2020	Dry Well at Pump Station A	8,400	8,400	Pipe failure
202002456	8/20/2020	Dry Well at Pump Station E	800	500	Pump station failure
202002690	9/26/2020	MH at Pump Station A	200	200	Pump station failure
202002890	10/30/2020 – 10/31/2020	Force main at Pump Station A	6,167	300	Pipe failure
DV20210018	11/9/2020	Force main A behind Beacon Ridge	100	0	Pipe failure
202100979	3/3/2021	Force main A under Hill Creek Rd	1,500	500	Pipe failure
202101170	4/12/2021	Manhole at Great Ridge Pkwy & Copper Leaf Ave	1,000	0	Pipe plugged
	9/28/2021	Bypass connection to SD-East force main off Great Ridge Parkway	900	0	Cracked clean out pipe off force main
202102288	12/20/2021	Force main A under Hill Creek Rd	Unknown	unknown	Pipe failure
Totals	**35 SSOs**		**89,857**	**72,700**	

APPENDIX 5

Old North State Water Company – Briar Chapel WWTP
Reclaimed Water Spray Irrigation System Spills

Incident Number	Incident Start Date	Incident Location	Self-Estimated Volume (Gallons)	Self-Estimated Volume to Surface Waters (Gallons	Cause
	3/21/2021	Off Great Ridge Pkwy & Catullo Run near walking trail	60	60	Pipe break
	5/2/2021	Adventure Park on Wilburn Avenue	1,500	1,500	Irrigation valve leak
	07/11/2021	Off Catullo Rd at Flush Point	345,000	345,000	Human error; flush valve left open
	11/3/2021	Heatherwood and Treywood Lane	2,160	0	Solenoid malfunction
	7/21/2022	Encore	600	0	Failed ball valve and broken pipe
Totals	**5 Spills**		**349,320**	**346,560**	

APPENDIX 6

Summary of Meeting with Victor Czar – Sanford Public Works Director
Tuesday, June 7th at 10:00am

Attendees: Victor Czar, Dan LaMontagne, Kenneth Bruce, Scott Peck, Liz Rolison

Dan LaMontagne/Scott Peck provided context for our meeting.

Is there willingness to consider partnership opportunities with neighboring communities such as NE Chatham County in addressing their wastewater needs?

- Willingness to discuss – yes, but Sanford is more interested in partnerships that involve both water and wastewater.
- Water is more profitable and offsets the costs of wastewater – wastewater would likely be too costly.
- Dan noted that bundling water and wastewater for NE Chatham County was not likely.
- Town of Sanford is currently working on an agreement with Town of Pittsboro for water and wastewater with plans for 2 MGD pipeline.

Asked about potential of increasing the size of the 2mgd pipeline that is planned between Pittsboro and Sanford.

- Pipeline is permitted for 2 MGD (designed for 3 mgd), but still awaiting permitting for environmental impact issues (hope to have timeline for approval by end of summer).
- Agreed that increment cost of expanding pipeline to more capacity is less expensive than running a second pipeline, but delay in permitting is a significant issue.
- Delay in timing of this pipeline is creating issues for Town of Pittsboro and Chatham Park.
- Town of Pittsboro is responsible for the approval/installation of the pipeline and cost of the pipeline has been an issue.
- To increase the permitted capacity of the pipeline would require re-permitting which would further delay the pipeline, which Town of Sanford/Town of Pittsboro do not want.
- Further it could require additional Intrabasin Transfer approval, which would further delay the pipeline. (Note, with Town of Sanford providing water and wastewater, depending on what the finalized agreement calls for the net impact on water transfer could be zero, which would leave up to 2 MGD before these additional approvals are needed.)
- Note, we missed an opportunity to be involved in this pipeline when Chatham County performed the Master Plan for Water/Wastewater and the needs for NE Chatham County were not included. 2-3 years ago was the time to get involved in the pipeline.

What is the Town of Sanford's long term plans for the Big Buffalo WWTP?

- Town of Sanford Big Buffalo WWTP is permitted at 12 MGD and is currently operating at just over 4 mgd. They have committed 2mgd to Town of Pittsboro and another 2 MGD to local economic development.
- They are currently estimating that their plant has capacity for 10 more years and are starting to work on a long-range plan that will consider the possibility of either expanding the Big Buffalo WWTP or building another large WW facility. Hope to have this plan by end of year.

Are there any other constraints/impediments that we should be aware of?

- Town of Sanford is debating how far they want to extend service.
- Intrabasin transfer approvals required years – this is a concern.
- Financials need to be considered, particularly if only wastewater is being considered.

Summary of Meeting with Sydney Miller – Water Resources Mgr for City of Durham
Tuesday, June 7th at 1:00pm

Attendees: Sydney Miller, Dan LaMontagne, Kenneth Bruce, Scott Peck, Liz Rolison

Dan LaMontagne/Scott Peck provided context for our meeting.

Is there willingness to consider partnership opportunities with neighboring communities such as NE Chatham County in addressing their wastewater needs?

- Willingness to discuss – yes, but need to have an engineering study with assessment of capacity needed, size of collection system and costs to move forward with a more meaningful discussion. City of Durham would also need to do a study on their side with the cost of the study covered by Chatham County.
- We provided our current average flow from our 14 package plants (just over 1 mgd) and our rough estimate of 2-3 MGD by 2050. They would need to work off peak load rather than average flow.

Are there any other constraints/impediments that we should be aware of?

- City of Durham's South Durham WWTP is permitted at 20 MGD and currently running at an average flow of 10.6 MGD.
- The 20 MGD NPDES permit allowing discharge is a constraint. They do not expect that they can increase that permit with the restrictions on nutrient loads into Jordan Lake.
- There are no political constraints. City of Durham already has a partnership with Chatham County for water. Currently City of Durham does not have any partnerships for wastewater.

What is the City of Durham's long-term plans for the South Durham WWTP?

- City of Durham is working on a water resources plan which will include wastewater planning. They expect to have answers by next year. They use Community Biz (sp?) to project future growth.

Summary of Meeting with Jay Gibson – Durham County Deputy County Manager
Thursday, June 9th at 3:30pm

Attendees: Jay Gibson, Dan LaMontagne, Kenneth Bruce, Scott Peck, Perry James, Liz Rolison

Dan LaMontagne/Scott Peck provided context for our meeting.

Is there willingness to consider partnership opportunities with neighboring communities such as NE Chatham County in addressing their wastewater needs?

- Willingness to discuss – Yes.
- Durham County's Triangle WWTP is permitted for 12 MGD (with discharge into Northeast Creek), but has the potential to treat up to 18-24 MGD. Their average flow is between 5-6 MGD. In addition to their NPDES permit for 12 MGD they have a reclaimed water permit for land application and industrial uses of up to 5.6 MGD.
- Their wastewater treatment involves a 5-stage process that results in a high level of water quality that exceeds the current requirements for Jordan Lake. Based on their testing, the water they are discharging into Northeast Creek is improving the water quality of Northeast Creek (which flows into Jordan Lake).
- They would like a partnership that would support them in making a case to NCDEQ to expand their current permit for plant capacity. By taking wastewater from other areas that currently discharge into Jordan Lake into their plant they could reduce the nutrient load going into Jordan Lake.
- They are also interested in a partnership for use of their reclaimed water for spray irrigation of golf courses and other green spaces (i.e., Governors Club, The Preserve and Briar Chapel.
- Note, in the last five years the Triangle WWTP has received only one NOV. Operational record of this plant shows that it is well managed.

What would be needed to move this discussion forward?

- Chatham County Board of Commissioner's would need to support moving forward to investigate this option.
- An engineering Demand Study would be needed to confirm the potential demand from NE Chatham County (rough estimate $100,000). This would include talking to private owners to determine if their service areas could be included in this project.
- An engineering Hydraulic Study would be needed to assess what would be needed to convey wastewater from NE Chatham County to Durham County.
- If the findings from these studies makes a case for a partnership, then an agreement would need to be developed between Durham County and Chatham County.

What is the Durham County's long-term plans for the Triangle WWTP?

- Durham County is working on long term plans for the Triangle WWTP so timing is good for these discussions.

Are there any potential constraints or impediments that we should be aware of?

- No constraints or impediments from Durham County's perspective. New County Manager is aware of this meeting and Jay felt that she and the Durham County board would be supportive.
- There is sufficient headroom/capacity at the Triangle WWTP.

- There should not be any Intrabasin Transfer issues since we are part of the same river basin.

Options for connection to Triangle WWTP?

- Need results of engineering studies before this can be decided, but location of the plant near where Durham County, Wake County and Chatham County meet offers a good connection location.
- Discussed proximity of Duke Energy power easement that runs close to Triangle WWTP and into NE Chatham County as an opportunity to explore for pipeline between NE Chatham County and the Durham County Triangle WWTP.

Summary of Response from Ruth Rouse – OWASA Planning & Development Manager

Dan LaMontagne sent an email on June 7th to Ruth Rouse of OWASA introducing context on the Wastewater Study Commission currently underway in Chatham County and requesting a ½ hour meeting to discuss responses to questions (provided below).

Questions:

1. Is there a willingness to consider partnership opportunities with neighboring communities such as NE Chatham County in addressing their wastewater treatment needs?
2. If yes, is your utility willing to extend collection systems to NE Chatham County or would you prefer a wholesale treatment arrangement (collection system by others) or some other type of arrangement?
3. Do you have an idea where might be the best place(s) for a potential connection?
4. Are there any constraints/impediments to accepting wastewater – capacity, permitting or political?
5. In considering a potential partnership with Chatham County for the northeast area's service needs, what is needed to say Yes? How can we help?
6. Does your utility have a Wastewater Master plan/Vision for providing wastewater services for your jurisdiction into the future? If so, could serving portions of NE Chatham County be a possibility in future updates?

On June 8th, we received a response back from Ruth Rouse:

> I had an opportunity to discuss internally yesterday. Basically, we do not want to discuss beyond question 1. OWASA cannot provide service beyond a boundary established by the Water and Sewer Management, Planning and Boundary Agreement. Modifying our service area will require changes to this Agreement that must be approved by the governing Boards of Chapel Hill, Carrboro, Hillsborough, Orange County, and OWASA. If you would like to pursue working with OWASA, you will need to gain the approval of the other local governments and then OWASA staff would present the proposed changes to its Board of Directors for approval. OWASA staff will not assist in obtaining the approval of the other local governments, and it will likely be an arduous process.
>
> After that process is completed (assuming successful), OWASA staff will discuss the other questions which would likely require some study. Any studies and infrastructure requirements would need to be funded by means other than OWASA rates.

Based on this response and the political issues it raises to get agreement between Chapel Hill, Carrboro, Hillsborough, and Orange County, we decided not to continue to pursue a meeting with OWASA.

APPENDIX 7

SUMMARY DESCRIPTION OF POTENTIAL SOLUTION:

1. **Status Quo – Current privately owned decentralized systems**
   - Denser development - privately owned package plants built by developers discharging treated effluent into local streams or land application discharge via spray irrigation.
   - Less dense development – privately owned septic systems discharging underground.

DOES THIS SOLUTION ADDRESS THE PROBLEMS STATEMENT?

- [ ] DOES OPTION REDUCE DEQ VIOLATION FROM EXISTING PLANTS?
- [ ] DOES OPTION SUPPORT ON-GOING GROWTH AND DEVELOPMENT?
- [ ] IS OPTION SUSTAINABLE?
- [ ] IS OPTION ENVIRONMENTALLY RESPONSIBLE?
- [x] IS OPTION VIABLE?

BENEFITS:

1. **Currently operational and processing.**
2. **Provides reclaimed water (water reuse).**
3. **Keeps undeveloped areas undeveloped.**

CHALLENGES:

1. **Lack of management oversight.**
2. **Need to establish oversight/control.**
3. **Maintenance of existing plants is lacking.**
4. **Smaller plants lack economies of scale.**
5. **No local enforcement power.**
6. **Large number of plants - eyesores.**
7. **Lack of operator training for advanced technology.**
8. **Various operating organizations.**
9. **Higher number of NCDEQ violations that most municipal plants.**
10. **Detracts/discourages commercial growth.**

RECOMMEND FOR PHASE 2	ONE OF TOP THREE OPTIONS	DO NOT PURSUE FURTHER
X (9 votes for Interim Solution linked with Mgd Decentralized)		

SUMMARY DESCRIPTION OF POTENTIAL SOLUTION:

2. Managed Decentralized system

- Short-term transitional option; bridge from the current wastewater strategy to any future long-term options.
- Utilize existing package plants and on-site systems with a new centralized management entity (e.g., county, public authority, public/private partnership).

Utilize centralized internet monitoring of existing plants to provide additional management oversight.

PROBLEM STATEMENT

- ☐ DOES OPTION REDUCE DEQ VIOLATION FROM EXISTING PLANTS?
- ☐ DOES OPTION SUPPORT ON-GOING GROWTH AND DEVELOPMENT?
- ☐ IS OPTION SUSTAINABLE? **(Some members felt it could be sustainable if paired with Managed Decentralized)**
- ☐ IS OPTION ENVIRONMENTALLY RESPONSIBLE?
- ☐ IS OPTION VIABLE?

BENEFITS:

1. **Provides additional monitoring and oversight to the privately owned package plants.**

CHALLENGES:

1. **Who will be responsible for monitoring and oversight? (Chatham County, public/private partnership)**
2. **What authority will this entity have on the private owners/ package plants?**
3. **Will private owners cooperate/allow online monitoring by a third party?**

RECOMMEND FOR PHASE 2	ONE OF TOP THREE OPTIONS	DO NOT PURSUE FURTHER
X (9 votes for Interim Solution linked with Status Quo)		

SUMMARY DESCRIPTION OF POTENTIAL SOLUTION:

10. Agricultural Use of Reclaimed Water and Reduce Discharge into Streams

- Improve functionality of Community wastewater treatment and reuse systems.
- Combine Bio-solids with excess irrigation water to create a liquid slurry.
- Distribute content-rich liquid slurry to agricultural operations for use as fertilizer

DOES THIS SOLUTION ADDRESS THE PROBLEMS STATEMENT?

- ☐ DOES OPTION REDUCE DEQ VIOLATION FROM EXISTING PLANTS?
- ☐ DOES OPTION SUPPORT ON-GOING GROWTH AND DEVELOPMENT?
- ☐ IS OPTION SUSTAINABLE?
- ☐ IS OPTION ENVIRONMENTALLY RESPONSIBLE?
- ☐ IS OPTION VIABLE?

BENEFITS:	CHALLENGES:
1. Interesting potential - needs more information. 2. Potential partial solution for biosolids/improvement 3. Potential fit with other two interim solutions 4. Sustainable 5. Cost of fertilizer has increased, making this more viable. 6. Recycling of biosolids (use in agriculture) is long established. 7. Provides water and fertilizer (all-in-one) 8. Move via pipeline to perimeter of community for transport to central processing (located near agricultural areas.	1. Needs more research/information. 2. Need proof of concept. 3. Seasonal demand? 4. Still have to denitrify. 5. Increased cost of trucking compared to current sludge hauling due to increased volume of slurry.

RECOMMEND FOR PHASE 2	ONE OF TOP THREE OPTIONS	DO NOT PURSUE FURTHER
X (5 votes for Interim Solution)		(4 votes for Interim Solution)

SUMMARY DESCRIPTION OF POTENTIAL SOLUTION:

3. Expanded Town of Pittsboro system

- Extend service from Town of Pittsboro system to NE Chatham County (15/501 corridor).
- Could involve forming a public authority between Town of Pittsboro and NE Chatham County for wastewater.

DOES THIS SOLUTION ADDRESS THE PROBLEMS STATEMENT?

- ☐ DOES OPTION REDUCE DEQ VIOLATION FROM EXISTING PLANTS?
- ☐ DOES OPTION SUPPORT ON-GOING GROWTH AND DEVELOPMENT?
- ☐ IS OPTION SUSTAINABLE?
- ☐ IS OPTION ENVIRONMENTALLY RESPONSIBLE?
- ☐ IS OPTION VIABLE?

BENEFITS:

1. **Once these plans are implemented, Town of Pittsboro will have two discharge permits (.750 MGD into Robeson Creek and 1.970 MGD into Haw River). Our understanding is that the Chatham Park WWTP will be using the Robeson Creek discharge permit. Will the other discharge permit become available?**

CHALLENGES:

1. **Town of Pittsboro recently entered into a Water / Wastewater agreement with Town of Sanford. The agreement calls for building a 2 MGD pipeline between Pittsboro and Sanford's Big Buffalo WWTP for processing of their wastewater. It also includes Town of Sanford providing water to Town of Pittsboro.**
2. **The 2 MGD pipeline has been permitted and does not require an intrabasin transfer approval. Town of Pittsboro is eager to get this built as quickly as possible and does not want any delays to the pipeline.**
3. **To include NE Chatham County, the pipeline would need to be expanded or a second pipeline built which would delay construction or significantly increase the costs. Problems Town of Pittsboro does not want at this point.**
4. **Town of Pittsboro plans to shut down the Pittsboro WWTP once these plans are implemented.**

RECOMMEND FOR PHASE 2	ONE OF TOP THREE OPTIONS	DO NOT PURSUE FURTHER
		X (9 votes)

SUMMARY DESCRIPTION OF POTENTIAL SOLUTION:

4. Expanded Town of Sanford system

- Extend service from Town of Sanford system to NE Chatham County (15/501 corridor).
- Could involve forming a public authority between Town of Sanford, Town of Pittsboro, and NE Chatham County for wastewater.
- Could connect through the Moncure Mega-site to shorten pipeline needed to connect

DOES THIS SOLUTION ADDRESS THE PROBLEMS STATEMENT?

- [x] DOES OPTION REDUCE DEQ VIOLATION FROM EXISTING PLANTS?
- [x] DOES OPTION SUPPORT ON-GOING GROWTH AND DEVELOPMENT?
- [x] IS OPTION SUSTAINABLE?
- [x] IS OPTION ENVIRONMENTALLY RESPONSIBLE?
- [x] IS OPTION VIABLE?

BENEFITS:

1. **Big Buffalo WWTP is permitted for 12.0 MGD with discharge permit into Deep River. As of March 2022 average daily flow was 4.2 MGD.**
2. **Discharge is below Jordan Lake (intra-basin transfer).**
3. **Big Buffalo WWTP has excellent track record with 2 violations from NC DEQ in last five years.**
4. **Larger customer base lowers cost of service.**

CHALLENGES:

1. **Town of Sanford is more interested in partnerships that include water and wastewater, particularly since an intra-basin transfer of water is involved.**
2. **Agreed that increment cost of expanding pipeline would be less expensive than building a second pipeline, but would require further delay to change the permitting. Delays in timing are a problem for Town of Pittsboro/ Chatham Park.**
3. **If wastewater only, it could require additional intra-basin transfer approval which would further delay the pipeline.**
4. **We missed an opportunity to be involved in this option. The time to have gotten involved was 2-3 years ago.**
5. **Dr. House was not comfortable with additional discharges to surface waters and noted an issue with arsenic.**

RECOMMEND FOR PHASE 2	ONE OF TOP THREE OPTIONS	DO NOT PURSUE FURTHER
(4 votes)		**X (5 votes)**

NORTHEAST CHATHAM COUNTY WASTEWATER STUDY COMMISSION | **DATE: July 25, 2022**

SUMMARY DESCRIPTION OF POTENTIAL SOLUTION:

5. Expanded Siler City system

- Extend service from Siler City system to NE Chatham County (15/501 corridor).
- Could potentially provide source of reclaimed water for agricultural/commercial uses in western Chatham County.

DOES THIS SOLUTION ADDRESS THE PROBLEMS STATEMENT?

- ☐ DOES OPTION REDUCE DEQ VIOLATION FROM EXISTING PLANTS?
- ☐ DOES OPTION SUPPORT ON-GOING GROWTH AND DEVELOPMENT?
- ☐ IS OPTION SUSTAINABLE?
- ☐ IS OPTION ENVIRONMENTALLY RESPONSIBLE?
- ☐ IS OPTION VIABLE?

BENEFITS:

CHALLENGES:

1. **Siler City WWTP has a significant number of problems, including 48 NC DEQ violations in the last five years.**
2. **Siler City has capacity issues, not meeting nutrient limits discharge to the Rocky River, not meeting toxicity levels on discharge and not passing pre-treatment audits.**
3. **Siler City WWTP is planning an upgrade to 6 MGD, but has restrictions on their discharge permit.**

RECOMMEND FOR PHASE 2	ONE OF TOP THREE OPTIONS	DO NOT PURSUE FURTHER
		X (9 votes)

SUMMARY DESCRIPTION OF POTENTIAL SOLUTION:

6. Extend OWASA system

- Extend service from OWASA system to NE Chatham County (15/501 corridor).

DOES THIS SOLUTION ADDRESS THE PROBLEMS STATEMENT?

- ☐ DOES OPTION REDUCE DEQ VIOLATION FROM EXISTING PLANTS?
- ☐ DOES OPTION SUPPORT ON-GOING GROWTH AND DEVELOPMENT?
- ☐ IS OPTION SUSTAINABLE?
- ☐ IS OPTION ENVIRONMENTALLY RESPONSIBLE?
- ☐ IS OPTION VIABLE?

BENEFITS:

1. **OWASA WWTP has 14.5 MGD capacity with discharge into Morgan Creek.**
2. **Average daily flow as of March 2022 was 5.2 MGD.**
3. **OWASA has an excellent track record, with 1 violation from NCDEQ in the last five years.**

CHALLENGES:

1. **OWASA's service area was established by a 4-party agreement between Town of Chapel Hill, Town of Carrboro, Town of Hillsborough and Orange County.**
2. **OWASA was not willing to meet with us to discuss possible extension of service into Northeastern Chatham County without the approval of the governing boards of Chapel Hill, Carrboro, Hillsborough and Orange County. Further OWASA told us they would not assist in obtaining this approval and cautioned it was likely to be an arduous process. Due to time constraints on Phase I, we decide to no longer pursue this option.**

RECOMMEND FOR PHASE 2	ONE OF TOP THREE OPTIONS	DO NOT PURSUE FURTHER
		X (9 votes)

SUMMARY DESCRIPTION OF POTENTIAL SOLUTION:

7. Extend South Durham (City) system

- Extend service from South Durham (city) Water Reclaimation system to NE Chatham County (15/501 corridor).

DOES THIS SOLUTION ADDRESS THE PROBLEMS STATEMENT?

- [x] DOES OPTION REDUCE DEQ VIOLATION FROM EXISTING PLANTS?
- [x] DOES OPTION SUPPORT ON-GOING GROWTH AND DEVELOPMENT?
- [x] IS OPTION SUSTAINABLE?
- [x] IS OPTION ENVIRONMENTALLY RESPONSIBLE?
- [x] IS OPTION VIABLE?

BENEFITS:

1. **South Durham WWTP is permitted at 20.0 MGD with discharge into New Hope Creek. Average daily flow is 10.6 MGD.**
2. **South Durham WWTP has a very good track record with 4 violations over the last five years.**
3. **Location of South Durham is accessible to NE Chatham County.**
4. **City of Durham already has a partnership with Chatham County for water.**

CHALLENGES:

1. **No obvious benefits to City of Durham for this partnership. Extending their service area is not currently part of the City of Durham's plans.**
2. **Sewer lines do not extend beyond City of Durham boundaries.**
3. **City of Durham does not believe they will be able to increase their discharge permit in the future. Risk that City of Durham would require all of this capacity in the future.**

RECOMMEND FOR PHASE 2	ONE OF TOP THREE OPTIONS	DO NOT PURSUE FURTHER
X (8 votes)		**(1 vote)**

SUMMARY DESCRIPTION OF POTENTIAL SOLUTION:

8. Extend Durham (County) Triangle system

- Extend service from Durham County system to NE Chatham County (15/501 corridor).

DOES THIS SOLUTION ADDRESS THE PROBLEMS STATEMENT?

- [x] DOES OPTION REDUCE DEQ VIOLATION FROM EXISTING PLANTS?
- [x] DOES OPTION SUPPORT ON-GOING GROWTH AND DEVELOPMENT?
- [x] IS OPTION SUSTAINABLE?
- [x] IS OPTION ENVIRONMENTALLY RESPONSIBLE?
- [x] IS OPTION VIABLE?

BENEFITS:

1. **Triangle WWTP is permitted for 12 MGD with discharge into Northeast Creek, but has the potential to treat up to 18-24 MGD. Their average daily flow is between 5-6 MGD.**
2. **Triangle WWTP has an excellent track record with 1 violation over the last five years.**
3. **Triangle WWTP has a 5-stage treatment process that results in a high level of water treatment that exceeds current requirements for Jordan Lake.**
4. **Durham County are interested in a partnership that would support them in making a case to NC DEQ to expand their current permit for plant capacity. By taking wastewater from other areas that currently discharge into Jordan Lake into their plant they could reduce the nutrient load going into Jordan Lake. Offers a win/win business case.**
5. **Location of Triangle WWTP near the Duke Energy power line easement that runs into NE Chatham County. Could provide right-of-way benefits for pipeline.**
6. **Durham County also offers reclaimed water for irrigation or industrial uses.**
7. **Indication that Durham County Manager is interested.**

CHALLENGES:

1. **For further exploration would require a demand study of the NE Chatham County study area.**

RECOMMEND FOR PHASE 2	ONE OF TOP THREE OPTIONS	DO NOT PURSUE FURTHER
X (9 votes)		

SUMMARY DESCRIPTION OF POTENTIAL SOLUTION:

9. NE Chatham County regional Wastewater system

- Build regional wastewater system for NE Chatham County, likely located along the Pokeberry Creek watershed.
- Consider sizing of system for:
  - Projected new growth
  - Secondary treatment from existing package plants or replacement of existing package systems, aging septic systems.
  - Would involve formation of either a public authority or a public/private partnership.

DOES THIS SOLUTION ADDRESS THE PROBLEMS STATEMENT?

- [x] DOES OPTION REDUCE DEQ VIOLATION FROM EXISTING PLANTS?
- [x] DOES OPTION SUPPORT ON-GOING GROWTH AND DEVELOPMENT?
- [x] IS OPTION SUSTAINABLE?
- [x] IS OPTION ENVIRONMENTALLY RESPONSIBLE?
- [x] IS OPTION VIABLE?

BENEFITS:

1. **Option which offers Chatham County the most control over wastewater in NE Chatham County.**
2. **Provides for long term capacity needs for the study area.**
3. **Managed by Chatham County or public/private partnership.**
4. **Sub-regional option**

CHALLENGES:

1. **Not clear if there is sufficient demand to make this economically viable.**
2. **Where to dispose of discharge (NPDES discharge permit into Jordan Lake or land for spray irrigation)? High level of treatment could drive up costs.**
3. **Permitting will be difficult and will take time.**
4. **This option will take the most time.**
5. **Where will the WWTP be located - difficult to find a suitable location that will be supported by local residents.**
6. **If discharge through land irrigation, collection system will require two pipes: one to carry wastewater and one to deliver reclaimed water. (Higher costs)**
7. **This option is likely the most expensive.**

RECOMMEND FOR PHASE 2	ONE OF TOP THREE OPTIONS	DO NOT PURSUE FURTHER
X (5 votes)		**(4 votes)**

APPENDIX 8

ENHANCED MANAGEMENT OF DECENTRALIZED WASTEWATER SYSTEMS

Authored by Vic D'Amato

Background: The Northeast Chatham County Wastewater Study Area (study area) is currently served by decentralized wastewater systems, which in this context includes individual onsite (e.g., septic) systems along with a variety of systems serving clusters of homes, businesses, and institutional facilities. In general, individual onsite systems have historically been the wastewater management option of choice for homes on relatively large lots in the study area, while "cluster" systems (sometimes also called, "small community", "package" or "decentralized" systems) have been favored to serve unsewered areas with more dense development, including the 15-501 corridor and associated residential and mixed-use developments within the study area.

(Note that the terminology around decentralized systems may be confusing. In North Carolina, "decentralized" or "onsite" systems are often assumed to be those systems that disperse effluent to the soil, typically using either a below-grade drainfield or an at/above-grade drip or spray irrigation system. However, this distinction mostly stems from North Carolina's regulatory structure. As used in this document, a decentralized system is better defined as a wastewater system that is not owned by, managed by, or connected with a publically owned system. A decentralized system, therefore, may disperse treated effluent to soil, or may discharge directly to surface waters under an NPDES permit.

In general, concerns about wastewater management within the study area have been focused on this latter population of cluster systems. Although not a focus of this study, it appears that individual onsite systems within the study area provide reliable, cost-effective wastewater management for users with sufficient land for effluent dispersal (e.g., a drainfield or sprayfield). It is further noted that most of the study area is located outside of the notorious "Triassic Basin" which features soils that can be severely hydraulically limited, resulting in difficulties siting onsite systems, and relatively high rates of malfunction. As illustrated in Figure 8-A (https://deq.nc.gov/guide-homeowners-triassic-basins-north-carolina, 2022), Triassic soils are present in the far eastern side of Chatham County, including Jordan Lake and areas adjacent to the lake. Concerns about management of the population of larger, decentralized cluster systems have been well-established in the formation of the Study Commission and are documented elsewhere within this report.

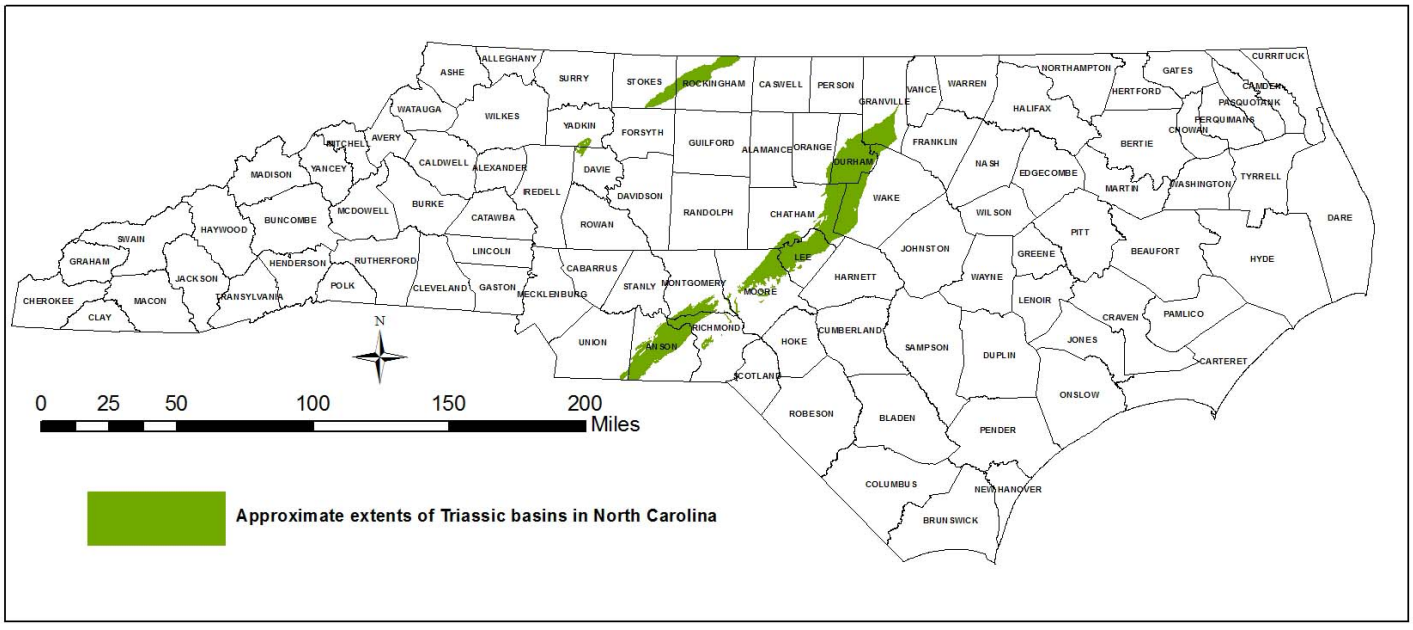


Figure 8-A. Approximate extents of Triassic basins in North Carolina (DWR, 2022)

Goals: The goal of this option is to enhance the management and improve the performance of existing (and potentially new) decentralized wastewater systems within the study area, with a focus on cluster systems. Management options in this context refer to activities that can be undertaken by, or with the assistance of, the County to improve system performance. System performance in this context may encompass a variety of attributes that have been identified as challenges or shortcomings of the existing cluster system management paradigm within the study area (e.g., effluent quality, regulatory compliance, line breaks or leaks, customer complaints).

This option therefore addresses potential management measures that could be implemented by Chatham County to enhance the performance of decentralized wastewater systems within the study area.

Discussion: In North Carolina and most other US states, "management" of decentralized systems involves the following:

- Siting and treatment standards are established by the State
- Design, construction and operation and maintenance are provided by the system owner (local/county environmental health specialists can design conventional septic systems for individual homeowners)
- Permitting and permit enforcement are provided by the relevant regulatory agency. In North Carolina, the regulatory authority depends on the type of system:
  - Wastewater systems with a design flow **under 3,000 gallons per day** and with **subsurface** (i.e., below grade) dispersal are permitted by the local health department (e.g., Chatham County Environmental Health)
  - Wastewater systems with a design flow of **3,000 gallons per day or more** and with **subsurface** (i.e., below grade) dispersal must be approved by the Department of Health and Human Services (DHHS) Onsite Water Protection Branch (OWPB), but are subsequently permitted by the local health department (e.g., Chatham County Environmental Health). Enforcement responsibility is shared.
  - Wastewater systems dispersing effluent to the **ground surface** (e.g., drip or spray irrigation) are permitted by the Non-Discharge Permitting Branch of the Division of Water Resources (DWR) within DEQ. Enforcement is typically left to DWR.
  - Wastewater systems discharging effluent to **surface waters** are permitted by the Municipal Permitting Branch of the Division of Water Resources (DWR) within DEQ. Enforcement is provided by DWR.

In the study area, the cluster systems of most concern fall into categories 3 and 4 above, and therefore have little direct oversight by the County.

Clearly, without overt action by a local government unit (town, county, etc.), management of these decentralized systems – particularly the larger, discharging, cluster systems within the study area – defaults to system owners and State regulators who may not have the time, resources, and imperative to ensure that systems are meeting their compliance standards, let alone implied community standards (e.g., no noxious odors, minimal service disruptions).

The effective, proactive management of decentralized systems has been identified as a historical shortcoming. Officially, USEPA's 1997 Response to Congress on the Use of Decentralized Wastewater Systems (USEPA, EPA 832-R-97-001b. April 1997) identified enhanced management as a critical need. Accordingly, Congress provided direction and funding to EPA to address this and other capciaty development needs within the decentralized wastewater field. Through the 2000s, USEPA produced several landmark decentralized wastewater management guidance documents, while funding research studies to fill gaps in knowledge.

EPA's management guidance (see: https://www.epa.gov/septic/septic-systems-guidance) describes five main models, ranging from the modest Level 1 (System inventory and awareness of maintenance needs) to the most robust, Level 5 (Utility ownership and operation). The options are as the federal government has limited regulatory authority over soil-based (i.e., non-discharge) wastewater systems. The management models include:

1. System inventory and awareness of maintenance needs
2. Management through maintenance contracts
3. Management through operating permits
4. Utility operation and maintenance
5. Utility ownership and management

Decentralized systems in the study area (and most of North Carolina for that matter) generally fall within Levels 1-3. That is, all systems in North Carolina are issued operating permits (Level 3), certain systems require maintenance contracts depending on their size and complexity (Level 2), and Chatham County has effective programs for tracking systems under their jurisdiction and educating system owners (Level 1).

Management Models 4 and 5 involve the establishment of a utility to operate and maintain systems (Level 4) or to outright take ownership of the systems (Level 5). A utility in this context can include a private utility or a public utility. Although private utilities currently own and operate cluster systems in the study area, there are a variety of players with little coordination between them, defeating the purpose of centralized management. Accordingly, Chatham County could consider assuming direct management of systems within the study area. This could include operating systems that continue to be owned by a private party (Level 4) or assuming ownership of the systems (Level 5). For various reasons, a Level 5 model is preferable, particularly for a public utility addressing new construction.

Level 5 responsible management entities (RMEs) have been established in jurisdictions through the United States. Some notable examples with similarities to Chatham County include Loudoun County (VA), and the Mobile (AL) Area Water and Sewer System. These utilities each own and operate cluster wastewater systems outside of their main sewer service areas. Of course, Chatham County does not currently have a true wastewater utility, only operating one community system in Bynum, so this option represents a significant effort. Another serious challenge related to a Level 5 management option is that the County would potentially be buying/inheriting a number of different systems built to different standards, using different technologies, and with both known problems and many unknowns related to construction quality and asset condition. Successful Level 5 RMEs typically develop consistent design and construction standards, and require developers to build systems according to those standards before transferring ownership of the assets to the public utility. Nevertheless, an "ownership and operation" model should be considered as it would allow the county to make needed improvements directly and alleviate concerns about the viability of the existing wastewater management paradigm in the study area.

The USEPA management guidelines introduced above provide broad approaches for more effective decentralized wastewater system management. However, there are other ways to effect meaningful improvements in system management within the study area short of assuming control of cluster systems.

Prior to presenting suggestions, the importance of State law must be emphasized. The North Carolina Legislature, in recent years, has restricted the ability of local governments to implement more stringent environmental requirements. Other, historical impediments in State law may preclude certain proactive wastewater management activities, particularly as they pertain to privately owned systems. As the Study Commission does not purport to understand all such barriers, we strongly suggest that the County work with legal experts with experience in environmental management, utility management, and local ordinances as

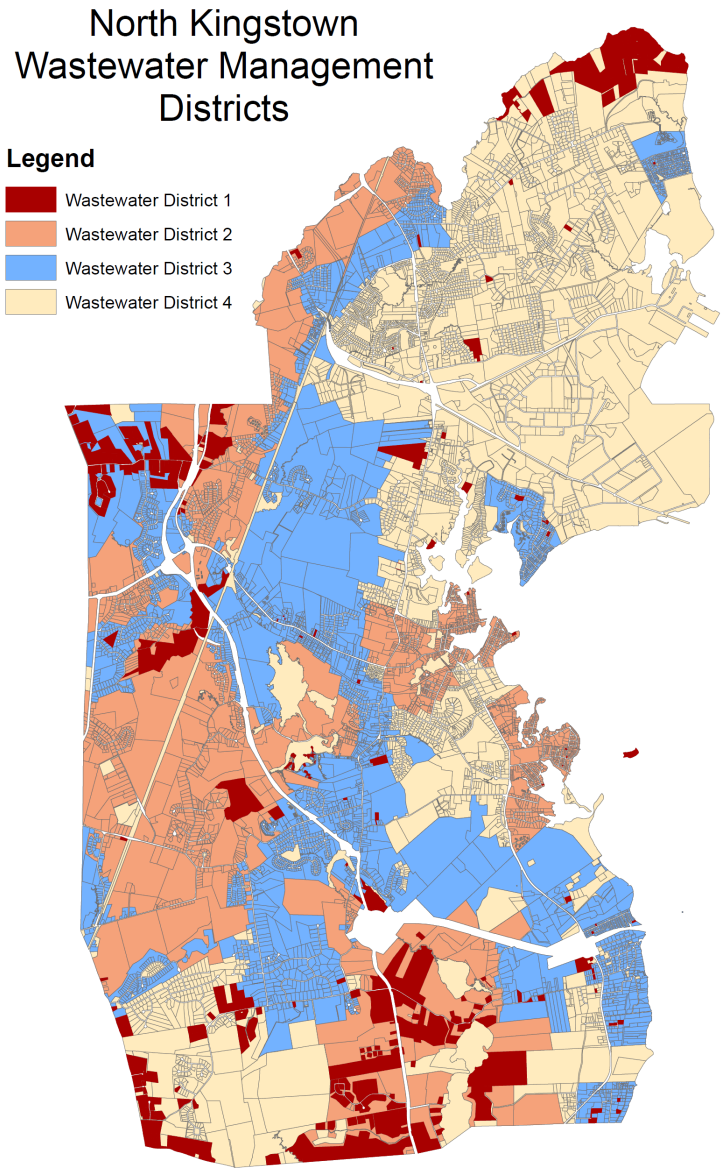


Figure 8-B. Town of Kingstown, RI decentralized wastewater management district map

options are considered moving forward. For example, the UDO consultant could be leveraged to address some of these options, and the UNC School of Government is an excellent resource on local government law.

Chatham County could consider establishing a district (sewer, overlay, etc.) whose boundaries align with the NE study area boundaries or a more narrow jurisdiction targeting the 15-501 corridor. Within district boundaries, Chatham County could implement standards for system design, performance, and management, within the constraints of state law.

The Town of North Kingston, RI provides a nice example showing how decentralized wastewater management districts can be nested or tiered in a way that prioritizes certain areas or even system types for enhanced management. This is illustrated by their map in Figure 8-B), where:

- *Wastewater District 1: All properties served by a private well and Individual Sewage Disposal System (ISDS) or cesspool*
- *Wastewater District 2: All properties located in Zone 1 Groundwater Protection Areas and all properties located adjacent to poorly flushed coastal areas*
- *Wastewater District 3: All properties located in Zone 2 Groundwater Protection Areas and properties located in densely settled coastal areas*
- *Wastewater District 4: All other properties in North Kingstown served by ISDS or cesspools*

For example, in the study area, we could envision the 15-501 corridor and adjacent dense development comprising a Tier 1 district featuring the most intensive management measures, onsite systems within the Triassic Basin comprising a Tier 2 district with lesser restrictions, and then a Tier 3 for onsite systems on large lots outside of the 15-501 corridor and Triassic Basin having basic/minimal additional requirements. Although this is just an example, it shows how the truly problematic systems or those systems predicted to be problematic, can be proactively addressed.

Within a management area, either voluntary or mandatory management measures can be implemented. Voluntary measures have the advantage of being (generally) legal – or at least less restricted – and minimally intrusive. The main disadvantage or challenge is that voluntary measures are far more difficult to compel than mandatory ones. Voluntary measures typically come with incentives of some type, but uptake of such measures can be difficult to predict and stand a strong chance of not being implemented by private system owners which may have disincentives for participating. Mandatory measures are, of course, far more effective; however, some such measures will likely be precluded by State law, and there may be push-back by the interests targeted. This balance between mandatory and voluntary measures should be vetted with legal

experts, and discussed with affected parties – both those who anticipate positive impacts and those who anticipate negative impacts.

With regard to voluntary management initiatives, the Town of Nags Head recently completed an update to their Decentralized Wastewater Management Plan (see: https://www.nagsheadnc.gov/280/Septic-Health-Initiative-Water-Quality). Although Nags Head, being at the coast, is not particularly similar to Chatham County, their program is probably the most developed in the State. Nags Head's program is focused on improving the management of individual onsite systems, and includes:

- A low interest loan program for homeowner repairs of individual onsite systems
- Free Town inspections of onsite wastewater systems
- Water bill rebates for homeowners documenting septic tank pump-outs
- Water quality monitoring and groundwater monitoring
- Mapping and risk assessment of existing systems
- Town-led engineering initiatives (for example, pumped lowering of the groundwater table in certain areas in town)

As illustrated, Nags Head's voluntary program directly targets their challenges – onsite system maintenance, and rising groundwater levels.

The main issues with existing systems in the NE study area include:

- Aging and/or poorly constructed infrastructure leading to repeated line breaks and other failures
- Failure to consistently comply with discharge permit standards
- Overall operation and maintenance shortcomings
- Lack of coordination and planning given increasing density particularly along the 15-501 corridor

Given the number of management entities involved, the breadth of problems with existing cluster systems, and the continuing demand for wastewater services within the study area, the County should consider a two-pronged approach:

1. For new cluster systems
    - Establish siting, design and management standards
    - Consider a Level 4 or 5 management model whereby the County operates new cluster systems within the study area
2. For existing cluster systems
    - Continue/complete process of documenting existing system inventory and condition
    - Enhance County oversight and data collection through increased monitoring of both existing systems and discharge/dispersal areas (note that online sensors for both systems and natural waterbodies are becoming more reliable, affordable, and integratable)
    - Work with DWR and the Public Utilities Commission to compel compliance with operating permits, and certificates of convenience (investigate whether Special Orders of Consent can be pursued)
    - Consider a Level 4 management model which could allow the county to properly manage systems and bill the owners for needed work (we do not recommend Level 5 unless a risk assessment, condition assessment, and valuation appraisal were completed for systems whose ownership would be transferred)
    - Consider potential incentives for cluster system owners to improve management by meeting certain performance milestones
    - Investigate whether more strigent performance standards within the district can be retroactively established and enforced

Recommendations: We recommend that Chatham County begin evaluating options for enhanced management of decentralized systems within the NE study area as soon as possible (i.e., during Phase 2). The scope of this portion of the Phase 2 work should include the following:

- Develop a study group or project team to look exclusively at this option, as it is fundamentally different from the long-term options suggested in this report (we do recognize that it is connected to some of the other options, particularly as it pertains to phasing, reuse of infrastructure, etc.). Team should include County staff (manager, environmental, utility, planning), study consultant, UDO consultant, UNC-School of Government representatives (or equal), volunteers (potentially).
- Complete study of existing system inventory and performance within the study area. Identify information gaps and how to fill them (simplifying assumptions, collect more data, etc.). Prepare summary clearly documenting persistent problems with the cluster systems in the study area.
- Develop scoping paper on the legal limits of County's potential authority over private cluster systems; also address legal procedures for establishing a Level 4 or Level 5 RME as part of the County's utility department.
- Engage broader group in discussion of existing system shortcomings and how to address, including system owners/operators, NC Utilities Commission staff, and DWR staff.
- Integrate findings and County action items with UDO process, as applicable. Flesh out other activities with the Utilities Department, Planning Department, etc.

APPENDIX 9

AGRICULTURAL OPTION: TO FACILITATE EFFECTIVE DOMESTIC WASTEWATER MANAGEMENT AND CONTRIBUTE TO AGRICULTURAL PRODUCTIVITY

Authored by Dr. Halford House

Background: I am exploring the science and engineering of the Agricultural Option in collaboration with (2) UNC Masters of Public Health students as a part of their summer Practicum and their faculty advisor from UNC Environmental Science and Engineering. In addition, I am pleased to have excellent advice from Chatham farmers and ranchers concerning the practical applications of this option to meet the needs of the local agricultural community.

Goals: Primary goals include the improved and complete function of community wastewater treatment and reuse systems in NE Chatham. In addition, these goals will be achieved by increasing the efficiency of wastewater management while managing odors, sewage spills, other environmental concerns and minimizing the intrusion of heavy equipment into the urban communities.

Larger regional goals include minimizing surface water discharges, minimizing the transfer of wastewater to outside utilities, improving the quality of life within NE Chatham communities and increasing agricultural productivity by providing cost affordable fertilizer.

Specifically, the Agricultural Option seeks to manage two matters by combining them and providing their inherent assets of irrigation water and fertilizer to nearby agricultural communities.

(1) Bio-solids Management: The transfer of bio-solids to tanker trucks for hauling to other locations is accompanied by odor, noise and traffic difficulties as large trucks utilize the often narrow streets not designed for heavy equipment and lined with high value residences.

(2) Excessive Irrigation: Currently the amount of treated water exceeds the capacity of the designated irrigation spaces within some NE Chatham communities. This results in runoff into nearby streams, dramatic use reduction of green space by the community for recreation, increases the potentials for the spread of disease by direct spray contact with poorly treated water and proliferates insect vectors such as mosquitoes and flies that thrive in flooded soils and standing water.

Proposed Solution Through the Combination of Bio-solids and Excess Irrigation Water: Combining part of the excessive irrigation water volume with bio-solids and distributing the liquid slurry to an enclosed structure designed to minimize odor and located on the perimeter of the communities. Alternatively, several tanker truck trailers with capacity of 10,000 gal may be located at the collection point and the slurry pumped directly to the tanks containing stabilization lime for temporary storage prior to pick up by the distributor.

The volume distributed to the tankers will be determined by the operator based on specific management needs determined by the amount of on site storage available and the need to remove biosolids from the treatment system.This will facilitate pump and haul operations with a minimal intrusion to the active living space of the community or the surrounding neighborhoods.

Nearby Agricultural Demand: The effective connection of supply and demand may be accomplished by the delivery of the water/bio-solids combination to a nearby centralized processing-distribution facilities and to individual farming or ranching operations by tanker trucks. Hauling to a maximum of 60 miles is a standard for the industry.

Agricultural Infrastructure and Economics: The price of fertilizer nitrogen has increased over 300% due to changes in supply within the world market. The bio-solids created within community wastewater treatment systems are .18 lbs./person/day. A community of 2,000 people creates 360 lbs. of bio-solids/day. A ton of bio-solids provides 3.5 lbs. of readily plant available nitrogen and 36.5 lbs. of slow release organic nitrogen or 40 lbs. of Total Nitrogen/ton of bio-solids.

Crop needs for nitrogen include 200 lbs./acre for corn and 150 lbs./acre for hay. Therefore, a crop of corn will need 5 tons/acre of bio-solids and 3.75 tons/acre for hay.

Liquid nitrogen now sells for $695/ton and pelletized fertilizer is $1000/ton.
Potential centralized distribution locations include Southern States in Siler City and Mebane. The Siler City facility has 16-18,000 gallon storage tanks. They have “nurse tanks” on wheels that hold 1000 gal and are available to take to the farm to load the spreader tanks. Spreader tanks range from 55 gallons to 300 gallons. A typical 3-point hitch spreader and pump run off the tractor Power Take Off (PTO).