

Aqua North Carolina, Inc.
Docket No. W-218, Sub 526
Public Staff Data Request No. 116
Date Sent: May 1, 2020
Date Requested: May 8, 2020

Public Staff Technical Contact:

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Subject of Data Request: Direct Testimony – Becker Non-ROE Follow-up to DR 99

Question 3

- Q. Regarding the Company's response to DR 99 Q7, please provide the assumptions of future usage (i.e., growth by year and capacity per SFRE) that the WWTPs' built-out capacities were "appropriately sized" for. In addition, please indicate whether the balance of risk and contract terms between the utility and developer for systems that have an excess capacity adjustment are different from the "regularly enter[ed] into arms-length transactions" and provide supporting documentation (i.e., contract terms).
- A. There are three wastewater treatment plants, Carolina Meadows, The Legacy and Westfall to be specifically discussed regarding appropriate sizing.

With respect to Carolina Meadows, attached please find PS DR 116 Q3 Carolina meadows WWTP NPDES AdInfo.pdf - a submission from November 4, 1993 to Ms. Colleen Sullins, NC Division of Environmental Management NPDES Supervisor from the development company and their engineers. This letter specifies the growth plan to 357,000 gallons per day. There is a specific schedule of facilities to be constructed at each phase of development. The justification for the flow was vetted by four well-qualified Division of Environmental Management staff.

With respect to The Legacy, the NPDES permit issued on March 22, 2005, included the following verbiage:

FOR THE

construction and operation of a 165,000 gallons per day (GPD) wastewater treatment and reclaimed water irrigation system consisting of the following:

a 120,000 GPD Phase I wastewater treatment system serving up to 999 bedrooms and a 100 GPD guardhouse and consisting of a 42,000 gallon flow equalization tank with two (2) 135 gallon per minute (GPM) pumps and one (1) 175 cubic feet per minute (cfm) blower, a manually cleaned bar screen, a flow splitter box, two (2) 98,000 gallon aeration basins with two (2) 500 cfm blowers each, two (2) 15,400 gallon clarifiers each with one (1) variable rate sludge pump, one (1) 31,600 gallon sludge holding basin, two (2) 7.5 feet by 7.5 feet tertiary filters, a clearwell with three (3) 425 GPM pumps, a mudwell with two (2) 150 GPM pumps, two (2) UV disinfection units with eight (8) bulbs each, a chlorine contact basin, dechlorination, and an ultrasonic effluent flow measuring device;

a 60,000 GPD Phase II wastewater treatment system serving up to 363 additional bedrooms and a 1,450 GPD tennis/swim amenity area and consisting of a 20,600 gallon flow equalization tank and one (1) 175 cubic foot per minute (cfm) blower, one (1) 98,000 gallon aeration basin with one (1) 500 cfm blower, one (1) 15,400 gallon clarifier with one (1) variable rate sludge pump, one (1) 15,800 gallon sludge holding basin, one 7.5 feet by 7.5 feet tertiary filter, a 4,222 gallon clearwell, and 5,000 gallon mudwell, a 2,975 gallon chlorine contact chamber, and a 1,775 dechlorination chamber;

This document provided for The Legacy Wastewater Treatment Plant to serve up to 1362 bedrooms, a guardhouse, and an amenity center. In accordance with 15A NCAC 02T .0114, each bedroom is rated at 120 gallons per day. The pertinent section of the rule is provided below:

15A NCAC 02T .0114 WASTEWATER DESIGN FLOW RATES

(a) This Rule shall be used to determine wastewater flow rates for all systems governed by this Subchapter unless alternate criteria are provided by a program-specific rule or for flow used for the purposes of 15A NCAC 02H .0105. Higher flow rates shall be required where usage and occupancy are atypical, including those in Paragraph (e) of this Rule. Wastewater flow calculations shall take hours of operation and anticipated maximum occupancies and usage into account when calculating peak flows for design.

(b) In determining the volume of sewage from dwelling units, the flow rate shall be 120 gallons per day per bedroom. The minimum volume of sewage from each dwelling unit shall be 240 gallons per day and each additional bedroom above two bedrooms shall increase the volume by 120 gallons per day. Each bedroom or any other room or addition that can function as a bedroom shall be considered a bedroom for design purposes. When the occupancy of a dwelling unit exceeds two persons per bedroom, the volume of sewage shall be determined by the maximum occupancy at a rate of 60 gallons per person per day.

The design flow rate of 1362 bedrooms at 120 gallons per day (163,440 gallons for bedrooms), a guardhouse rated at 100 gallons per day, and an amenity center rated at 1450 gallons per day is 164,990 gallons. The facility as constructed is currently permitted for 120,000 gallons per day. It must be noted that The Legacy is not a typical neighborhood, and many homes have 5 bedrooms and at least one has seven bedrooms. At this time, there are 241 residential homes, a guardhouse, and an amenity center. We currently do not have a count of the number of bedrooms in each home; however, based on a 70 percent survey of The Legacy homes, the average number of bedrooms is 4.5 bedrooms per home. 242 homes at 4.5 bedrooms each is 1089 bedrooms. 1089 bedrooms with a design flow of 120 gallons per bedroom is 130,680 gallons per day. 130,680 gallons per day from the residences plus 100 gallons per day (guardhouse) and 1450 gallons per day from

the amenity center equals 132,230 gallons per day in a facility rated for 120,000 gallons per day. On a design flow basis, the wastewater treatment plant is over its design flow capacity. To consider this plant as having excess capacity, is absolutely incorrect. Due to the difficulties in tracking the number of bedrooms and ancillary buildings, the NCDEQ Division of Water Quality monitors actual flows and effluent quality. If the actual hydraulic flows reach 80% of permitted capacity, then a plan is required. If effluent limits cannot be met due to excessive wastewater conventional pollutant load, the regulators will take enforcement action. To date, The Legacy wastewater treatment plant has not had compliance issues.

Lastly, with respect to Westfall, below is an excerpt from the current Non-Discharge Permit for the facility.

operation of a 20,000 gallon per day (GPD) reclaimed water generation and dedicated utilization facility consisting of the:

The wastewater treatment plant as currently constructed is only constructed to treat 20,000 gallons per day, and the permit limits Aqua to no more than 20,000 gallons per day. The design flow calculations, were based on 15A NCAC 2H .0219. Specifically, per a permit application on May, 4, 2005, it was based on 180 lots at 360 gallons per day per lot plus 1200 gallons per day for amenities for a total wastewater flow of 66,000 gallons per day. 15A NCAC 2H .0219 was repealed September 1, 2006. Based upon my (Joe Pearce) memory, 15A NCAC 2H .0219 was very similar if not identical to the current 15A NCAC 2T .0114 regulations, which became effective on September 1, 2006. Please note that the wastewater treatment plant 12-month rolling average flow is 10,583 (as of March 2020) gallons per day, and the community is currently in a growth phase.

To address the data request component of Question #3 regarding, the balance of risk and contract terms between the utility and developer for systems that have an excess capacity adjustment are different from the “regularly enter[ed] into arms-length transactions” and provide supporting documentation (i.e., contract terms), Aqua provides the following:

Witness Becker did not provide a position on the risk between contract terms between varying developer contracts. It is difficult to fully assess the reasoning behind the use of varying contracts used at a time in history as consideration must be given to influences within the business and regulatory environment at the time of contract.

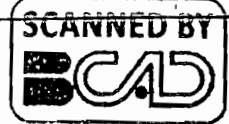
As noted in Aqua’s response to DR #99 Q7, Aqua’s assumptions are “based on Aqua’s considerable experience working with engineers who review the size and cost of a WWTP capacity and in the negotiation of developer contracts”. Given that experience, contracts are entered into between two parties as an arm’s length transaction. The parties review and agree to the terms and conditions set forth in the agreements upon the parties contemplating and negotiating through various scenarios.

Prepared by:

Joseph Pearce, P.E.
Shannon V. Becker



Carolina Meadows
100 CAROLINA MEADOWS • CHAPEL HILL, NC 27514-8505



November 4, 1993

Ms. Coleen Sullins, PE
Supervisor, NPDES Permits Group
Division of Environmental Management
Post Office Box 29535
Raleigh, North Carolina 27626-0535

Re: Carolina Meadows Wastewater Treatment Plant
NPDES Permit No. NC0056413
CMI-9250

Dear Ms. Sullins:

The following is a restatement of Carolina Meadows' request for a renewal of NPDES Permit No. NC0056413 for 350,000 gpd at the Carolina Meadows Wastewater Treatment Plant in Chatham County.

The original application letter, dated March 29, 1993, included a completed application form (in triplicate), a check for the processing fee, an Engineering Alternatives Analysis for future phases of the treatment plant, and a copy of the contract between Carolina Meadows and their sludge hauler.

Pursuant to subsequent discussions and meetings with DEM regarding our wastewater allocation and the permit renewal in general, we herewith provide the following:

- 1) Additional documentation concerning Carolina Meadows' need for the full 350,000 gpd allocation; and

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- 2) Additional documentation concerning engineering alternatives.

Carolina Meadows' need for the full 350,000 gpd allocation is addressed in this letter. Item 2) is addressed in the attached Engineering Alternatives Analysis prepared by The John R. McAdams Company:

Carolina Meadows' need for a wastewater allocation of 350,000 gpd is based on the following:

- an ultimate land use plan which shows that we are in the midst of a total development plan that has been firmly committed to; and
- wastewater flow projections for the ultimate land use plan which show that a wastewater allocation of 350,000 gpd has been relied upon since the inception of the plan.

The Carolina Meadows Retirement Community is in the midst of a phased development. Phases I and II have been completed, and Phase III is approximately half way through construction with completion targeted for 1995. Phase III will bring the retirement community to 429 units, and with amenities will generate a wastewater projection of 108,960 gpd (please see attached spreadsheet). We have a conditional use permit from Chatham County to build an additional 421 units (Phase IV), which will bring the Carolina Meadows projected wastewater flow to 194,000 gpd.

An ultimate land use plan produced in 1979, for Chatham Farms, of which Carolina Meadows is a part, shows an additional 482 units which Carolina Meadows had planned to serve at the treatment plant. The total projected wastewater flow including these units is 357,000 gpd.

As you can see, it is necessary that our full wastewater allocation of 350,000 gpd is preserved in the permit renewal.

The attached Engineering Alternatives Analysis recommends that the Carolina Meadows Wastewater Treatment Plant ultimately discharge to

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Ms. Coleen Sullins, PE
November 4, 1993
Page Three

Morgan Creek with tertiary treated effluent. We agree with this assessment, however, due to the large costs involved, Carolina Meadows will find it necessary to make the recommended improvements in stages.

We propose the following schedule for implementation of the recommended improvements to the Carolina Meadows Wastewater Treatment Plant.

As a first stage, Carolina Meadows would construct a second 90,000 gpd treatment train with flow equalization and an effluent pump station and force main to relocate the discharge point to Morgan Creek.

The second stage would begin with expansion of the plant beyond 180,000 gpd, at which time the entire plant would be improved to tertiary treatment.

It is our hope that, after review of this letter and the Engineering Alternatives Analysis, DEM will support the expansion of the Carolina Meadows Wastewater Treatment Plant to a 350,000 gpd tertiary plant and that our new permit will be written accordingly. Please call us if you have any questions or require further information.

Sincerely,



Robert J. Boening
Executive Director

RJB/lm

cc: John McAdams

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CAROLINA MEADOWS WASTEWATER FLOW PROJECTIONS**EXISTING DEVELOPMENT (PHASE 1 AND 2)**

PHASE 1	—	125 DU	@	240 GPD/DU	30,000 GPD
PHASE 2	—	163 DU	@	240 GPD/DU	39,120 GPD
CLUB		3 DU	@	240 GPD/DU	720 GPD
HEALTH		50 BEDS	@	80 GPD/BED	4,000 GPD
EXTRACTORS		2 EA	@	1000 GPD/EA	<u>2,000 GPD</u>

SUBTOTAL PHASES 1 AND 2 75,840 GPD

PHASE 3 DEVELOPMENT

HOUSING		101 DU	@	240 GPD/DU	24,240 GPD
HEALTH		40 BEDS	@	80 GPD/BED	3,200 GPD
ASSISTED		40 UNITS	@	80 GPD/UNIT	3,200 GPD
CLUB		4 DU	@	120 GPD/UNIT	480 GPD
LAUNDRY		4 UNITS	@	500 GPD/UNIT	<u>2,000 GPD</u>

SUBTOTAL PHASE 3 33,120 GPD

PHASE 4 DEVELOPMENT

APARTMENTS		216 DU	@	240 GPD/DU	51,840 GPD
TH'S		105 DU	@	240 GPD/DU	25,200 GPD
ASSISTED		100 UNITS	@	80 GPD/UNIT	<u>8,000 GPD</u>

SUBTOTAL PHASE 4 85,040 GPD

CHATHAM COUNTY FARMS

PHASE 2		48 DU	@	400 GPD/DU	19,200 GPD
PHASE 3		88 DU	@	400 GPD/DU	35,200 GPD
PHASE 4		346 DU	@	300 GPD/DU	103,800 GPD
PHASE 5		204 DU	@	25 GPD/DU	<u>5,100 GPD</u>

SUBTOTAL CHATHAM COUNTY FARMS 163,300 GPD

TOTAL ENTIRE PROJECT 357,300 GPD

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001137-9 7/11/03

Request # 7652,7653

Facility Name: Carolina Meadows, Inc./Carolina Meadows Retirement Community
 NPDES No.: NC0056413
 Type of Waste: Domestic - 100%
 Facility Status: Existing
 Permit Status: Modification
 Receiving Stream: Morgan Creek
 Stream Classification: WS-IV NSW
 Subbasin: 030606
 County: Chatham
 Regional Office: Raleigh
 Requestor: Shanklin
 Date of Request: 4/15/93
 Topo Quad: D22SE

Stream Characteristic: yields from
 USGS # OWASA flow site
 Date: 1990
 Drainage Area (mi²): 46.1
 Summer 7Q10 (cfs): 1.1
 Winter 7Q10 (cfs): 3.4
 Average Flow (cfs): 48
 30Q2 (cfs): 6.3
 IWC (%): 33

Wasteload Allocation Summary
 (approach taken, correspondence with region, EPA, etc.)

This request is for a relocation of the discharge pipe to Morgan Creek and a reinstatement of the 0.35 MGD permit limit. Since this facility could continue to discharge at their existing point (UT to Morgan Creek) with no changes in limits, identical limits will be given for the 0.18 MGD flow when the pipe is relocated to Morgan Creek with the exception of total residual chlorine (TRC). A TRC limit of 28 µg/l will be given for flows above 0.09 MGD. The limit for total phosphorus may be lowered upon basinwide management strategy for the Cape Fear River (1996).

Special Schedule Requirements and additional comments from Reviewers:

Recommended by: David J. Smith Date: 12/8/93

Reviewed by

Instream Assessment: Carla Anderson Date: 12/8/93

Regional Supervisor: John D. Smith Date: 12/10/93

Permits & Engineering: John H. Smith Date: 12/10/93

RETURN TO TECHNICAL SERVICES BY: JAN 07 1994

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FROM THE REGIONAL RO

PARAMETERS

W-218 Sub 526

Existing Limits:

Monthly Average

Wasteflow (MGD):	0.35
BOD5 (mg/l):	23.0
NH3N (mg/l):	14.0
DO (mg/l):	6.0*
TSS (mg/l):	30.0
Fecal Col. (/100 ml):	1000.0
pH (SU):	6-9
Residual Chlorine (µg/l):	monitor
Temperature (°C):	monitor
TP (mg/l):	2.0**
TN (mg/l):	monitor

*Minimum daily average

**Quarterly average limitation

Recommended Limits:

	Monthly Average (except for TRC, applies to both sites)	Monthly Average (applicable for the discharge to Morgan Creek only)		
		Summer	Winter	WQ/EL
Wasteflow (MGD):	0.18	0.35	0.35	
BOD5 (mg/l):	23.0	5.0	10.0	WQ
NH3N (mg/l):	14.0	2.0	4.0	WQ
DO (mg/l):	6.0*	6.0*	6.0*	WQ
TSS (mg/l):	30.0	30.0	30.0	EL
Fecal Col. (/100 ml):	200.0	200.0	200.0	
pH (SU):	6-9	6-9	6-9	
Residual Chlorine (µg/l):	28.0***	28.0	28.0	WQ
Temperature (°C):	monitor	monitor	monitor	
TP (mg/l):	2.0**	2.0**	2.0**	WQ
TN (mg/l):	monitor	monitor	monitor	

*Minimum daily average

**Quarterly average limitation

***Monitoring only for TRC will be given until the plant is physically expanded above 0.09 MGD.

PLEASE NOTE THAT THE DISCHARGE SHALL BE RELOCATED TO MORGAN CREEK UPON EXPANSION. THIS SHOULD BE MADE CLEAR IN THE PERMIT.

x Parameter(s) are water quality limited. For some parameters, the available load capacity of the immediate receiving water will be consumed. This may affect future water quality based effluent limitations for additional dischargers within this portion of the watershed.

INSTREAM MONITORING REQUIREMENTS

Upstream Location:	Morgan Creek approx. 50' upstream of the outfall
Downstream Location:	Morgan Creek at Morgan Creek Road
Parameters:	Temperature, DO, Fecal, Conductivity

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CITY OF PEARCE
WATER & SEWER DEPT.

12/17/93
BIOLOGICAL

From: Dave Goodrich
Date: Sat, Dec 4, 1993 3:18 PM
Subject: CAROLINA MEADOWS
To: Susan Wilson
Cc: Coleen Sullins

Susan -

In case I don't get a chance to talk with you about this one, here's the deal as I see it:

- Their existing WWTP has been designed for 0.09 MGD.
- They go into a zero-flow stream, so I said they can't expand to the zero-flow stream above the 0.09 MGD even though they have a permit for 0.35 MGD and an ATC for 0.18 MGD.
- Timmy D. and Babette said they can discharge up to 0.18 MGD to the zero-flow stream because they had an ATC for that amount.
- These guys met with us and said they absolutely have to have the 0.35 MGD. We said ok we believe you, but do an alternatives analysis to see what can be done with the discharge. They're close to OWASA but OWASA won't take them. Their golf course doesn't provide them with much relief, so they have convinced us of a discharge to Morgan Creek.

Now, I said they need to meet tertiary limits at 0.18 MGD if they go to Morgan Creek but Raleigh R.O. said they could have existing limits after the relocation until they expand above 0.18 MGD. I agree with that since we're treating the 0.18 MGD flow as existing in the zero-flow stream, so technically, they could stay in the zero-flow stream at existing limits anyway. I'm ready to get this one out of here.

- Dave

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**Staff Review and Evaluation
NPDES Wastewater Permit****FACILITY INFORMATION**

Facility Carolina Meadows
NPDES No. NC0056413
Design Flow (MGD) 0.09/0.18/0.35
Facility Class II?

STREAM CHARACTERISTICS

Stream Name Morgan Creek
Stream Class WS-IV NSW CA
Sub-basin 030606
Drainage Area (mi²) 46.1
S7Q10 (cfs) 1.1
W7Q10 (cfs) 3.4
30Q2 (cfs) 6.3
IWC (%)

Proposed Changes	Parameters Affected	Basis for change(s)
None		

Compliance Schedule: N/A

Special Condition(s):

Permits & Engineering Comments:

The current permit has 3 limit pages; one for 0.09 MGD with discharge to an UT to Morgan Creek, one for an expansion to 0.18 MGD with relocated discharge to Morgan Creek, and one for an expansion to 0.35 MGD. This facility has difficulty maintaining compliance with the fecal effluent limit and instream fecal levels fluctuate wildly although there does not appear to be any correlation between the effluent fecal concentration and the instream fluctuations. Recommend renewal of existing permit limits. Existing limits at 0.18 MGD should provide an incentive to relocate the outfall immediately. Regional office should comment on treatment plant class and monitoring frequencies - previous staff report indicates Class II, but Class III frequencies were given.

Prepared by: Janette Powell

Regional Office Evaluation and Recommendations:

The treatment facility is rated as a Class II facility as determined by the attached Rating scale. Therefore, monitoring frequencies should reflect that of a Class II facility.

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Carolina Meadows
NC0056413

S7Q10: 1.1 cfs

Background

The current permit has 3 limit pages; one for 0.09 MGD with discharge to an UT to Morgan Creek, one for an expansion to 0.18 MGD with relocated discharge to Morgan Creek, and one for an expansion to 0.35 MGD. The facility requested that existing limits be retained upon relocation of the discharge and expansion to 0.18 MGD and proposes to meet tertiary limits at the expanded 0.35 MGD flow. Existing limits were renewed for 0.09 MGD except fecal was updated to 200.0/100 ml from 1000.0/ 100 ml. Existing limits were given for 0.09 MGD - 0.18 MGD with the addition of a TRC limit of 28.0 µg/l. The existing limits were renewed as an incentive to expand and relocate discharge.

Instream Data

Based upon a review of effluent and downstream data, it appears there may be a significant fecal source between the discharge and the downstream location. This facility has difficulty maintaining compliance with the fecal effluent limit and instream fecal levels fluctuate wildly, often with measurements in the thousands. There does not appear to be any correlation between the effluent fecal concentration and the instream fluctuations.

Recommendations

Recommend renewal of existing permit limits. To give this facility lower limits for the 0.18 MGD when discharging to Morgan Creek would provide a disincentive to relocate the outfall immediately. Based on the field study done in May 1993, the wastewater should be removed from the UT ASAP. Limits above 0.18 MGD are BAT.

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REC'D - 11/13/96