Appendix B

Wastewater System Reports

Appendix B – Wastewater System Reports

New Castle County Reports

Kent County Reports

Sussex County Reports

Private System Reports

Delaware Wastewater Study System Report

New Castle County - Delaware City WWTP

ID: 63

New Castle County Dept. of Special Services
187-A Old Churchman's Road
New Castle, DE 19720

City ID: NCCDC

New Castle County - Delaware City WWTP

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Pat Creedon	General Manager, Special Services	pcreedon@nccde.org	(302)395-5795		
Jonathan Husband	Engineering and Environmental Services Manager	jhusband@nccde.org	(302)395-5746		(302)395-5802
Jason P. Zern, PE					

2) Interviewer Name: JH, CSG, HKM, JBM

3) Interview Date: 12/9/2010

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

This NPDES permit has been administratively extended. DNREC is currently working on the reissuance of the permit.

Treatment Plant

1) Wastewater Treatment Plant Name: Delaware City WWTP

2) Physical Address Governor Bacon Health Center
Delaware City, Delaware

3) General level of treatment

- [ ] Primary Treatment
- [ ] Nitrogen removal

New Castle County - Delaware City WWTP

- [x] Secondary Treatment
- [x] Tertiary Treatment
- [ ] Phosphorus removal
- [ ] Other (Describe):

4) What is source of treatment plant back-up power (check all that apply):

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [ ] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
DE0021555	NPDES	Stream Outfall	DELAWARE RIVER-ZONE 5	11. Delaware Bay (C&D Canal East)	39.577	75.5845	0.57	12/2/2008	12/31/2013

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.57	Average Daily Flow (MGD)	0.33
Peak Flow (MGD)	1.20	% of Average Daily Flow from Domestic Source	90.00
Anticipated Flow in 2020 (MGD)	0.38	Future Design Flow in 2030 (MGD	0.45

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) Yes

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	5-Day BOD	55	105	LBS/DY		12	22	MG/L	Weekly	Comp-8
001	pH				6		9	SU	Daily	Grab
001	TSS	69	105	LBS/DY		15	22	MG/L	Weekly	Comp-8
001	Enterococci					35	104	CFU/ 100ML	Weekly	Grab
001	Chlorine, Tot Res				1		4	MG/L	Daily	Grab

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ○ About Normal (150-250 mg/l BOD and TSS)
- ○ Above Normal (>250 mg/l BOD and TSS) Reason:
- ◉ Below Normal (<150 mg/l BOD and TSS) Reason: Unknown

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 16 to 20 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

New Castle County - Delaware City WWTP

PCS flow (0.55) doesn't match permit (0.57). Missing avg flow, anticipated flow. Subject to potential upcoming DRBC TMDLs regarding PCBs. Currently not subject to typical N-P TMDL reqs. Adopted BOD per DRBC.

Service Area

1) Service area, square miles: 5.00

2) Number of pump stations: 3

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [x] Other (Describe): Gov. Bacon State Facility Pump Station.
- [x] Portable Generator
- [ ] Battery
- [ ] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Delaware City	☐	71	637	$269.00	$171,353.00
Unincorporated - New Castle County	☐	29	265	$269.00	$71,285.00

7) Population served:

	Current	Future, 2030
Resident	2,621	2,781
Non-resident	0	0
Total	2,621	2,781

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Residential areas of the Delaware City and unincorporated North St. Georges (Cox Neck Road), Governor Bacon Health Center and Gunning Bedford School. No industrial wastes are discharged to this facility. 50/50 is an estimate, based on 2.5 ppl per hshld.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

I/I has been identified in the Delaware City collector system. The Delaware City Sewer Rehabilitation capital improvement project has been a multi-year and multi-project program to reduce existing I/I in the collector and trunk lines in Delaware City.

12) Service Area Comments:

N/A.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 20

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Two reserve accounts: Sewer Fund Budget Reserve Account and the Sewer Rate Stabilization Reserve Account.

7) How are residential customer rates/bills computed (check all that apply)?

- ☐ EDU
- ☑ Metered
- ☐ Front-footage assessment
- ☑ Other (Describe): Countywide Average.

8) How are commercial, industrial, and contract user rates/bills computed?

Based on Flow/BOD/SS with billing multipliers.

9) Median Household Income (MHI) ($/year) $62,293

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$600,186
2.0 percent of MHI	$881,128
2.5 percent of MHI	$1,162,069

11) Rates, Billing, and MHI Comments:

$56,660 Delaware City MHI only from 2010 CPI . MHI is 2009 ACS for all of NCC. New Castle County has one, unified rate system for WWT. WARNING: #10 is all of NCC and repeated for each unit.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

NCC does not have a set borrowing limit on wastewater enterprises, though it is one performance measure acknowledged by their bond rating agencies. Debt is 18% FY2010. NCC policy limit is 20%.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

New Castle County - Delaware City WWTP

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	◉	○	○	○
Commercial/Industrial Use	○	◉	○	○	○
Residential Use	○	◉	○	○	○
Municipal Wastewater Sludge Reuse	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○

2) Comments (options considered, opportunities, barriers):

Del City appears to be too small to have any worthwhile impact or cost-justifiable reason to change.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

NCC did not comment on N-P, etc. for Del City and it is not in current permit. Get N-P DMR data to see what effluent strength is.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Some study has been done, but not in depth. NCC's general view is that they are interested, but not actively pursuing, reuse. It does not appear that the installation costs justify a project. Permit limits are being met and population growth is slow.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A. Current permit is met and no anticipated issues.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A. Haven't looked into plant modification.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

None.

Delaware Wastewater Study System Report

New Castle County - Lea Eara Farms WWTP

ID: 65

New Catle County Dept. of Special Services
187-A Old Churchman's Road
New Castle, DE 19720

City ID: NCCLE

New Castle County - Lea Eara Farms WWTP

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Pat Creedon	General Manager, Special Services	pcreedon@nccde.org	(302)395-5795		
Jonathan Husband	Engineering and Environmental Services Manager	jhusband@nccde.org	(302)395-5746		(302)395-5802
Jason P. Zern, PE					

2) Interviewer Name: JH, CSG, HKM, JBM

3) Interview Date: 12/9/2010

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: Lea Eara Farms WWTP

2) Physical Address Sheats Lane
Middletown, DE 19709

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal

New Castle County - Lea Eara Farms WWTP

☑ Tertiary Treatment ☑ Other (Describe): Lagoon Storage for Spray

4) What is source of treatment plant back-up power (check all that apply):

☐ On-site Generator (diesel/gasoline) ☑ Portable Generator ☐ Other (Describe):
☐ On-site Generator (natural gas from main) ☐ Battery
☐ On-site Generator (propane / natural gas from tank) ☐ None

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
LTS 3035-92-08	State	Spray	001 - 2 adjacent spray fields	11. Delaware Bay (C&D Canal East)	39.534998	75.707398	0.131	6/24/2008	6/23/2010

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.10	Average Daily Flow (MGD)	0.05
Peak Flow (MGD)	0.07	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.05	Future Design Flow in 2030 (MGD	0.00

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	5-Day BOD					50		MG/L		
001	TSS					90		MG/L		
001	Fecal Coliform					200		#/ 100ML		
001	pH				5.5		9	SU		
001	Chlorine, Tot Res				1		4	MG/L		
001	Chloride (annual average)					350		MG/L		
001	Sodium (annual average)					210		MG/L		
001	Nitrogen, Total (annual per acre)		300	LB/YR						

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

◉ About Normal (150-250 mg/l BOD and TSS)
○ Above Normal (>250 mg/l BOD and TSS) Reason:

○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 21 to 30 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

☐ Wash out of biomass due to inflow and infiltration
☐ Equipment failure
☐ Design issues
☐ Operational issues
☐ Low dissolved oxygen
☐ Low alkalinity
☐ Low temperature
☐ Toxic shock
☐ Unknown
☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

◉ Yes, actual limits in place now.
○ No limits currently. ANTICIPATE limits within 5 years.
○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

◉ Yes, actual limits in place now.
○ No limits currently. ANTICIPATE limits within 5 years.
○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years? No

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☑ Other (explain): Monitoring Well Nitrates

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Low temperature
☐ Operational issues
☐ Design issues

☐ Unknown ☑ Other (explain) Lagoon leak.

25) General Treatment Plant Comments.

NCC is considering abandonment of this plant and integrating it into the WF#2 system.

Service Area

1) Service area, square miles: 0.50

2) Number of pump stations: 2

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline) ☐ Portable Generator
☐ On-site Generator (natural gas from main) ☐ Battery
☐ On-site Generator (propane/natural from tank) ☐ None
☐ Other (Describe):

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - New Castle County	☐	100	279	$269.00	$75,051.00

7) Population served:

	Current	Future, 2030
Resident	492	512
Non-resident	0	0
Total	492	512

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Small, isolated system serves Lea Eara Farms. Households based on 2.5 ppl/household.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

None. System is new.

12) Service Area Comments:

Planning to connect to WF#2 transmission line, which currently leads into Middletown.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 20

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Two reserve accounts: Sewer Fund Budget Reserve Account and the Sewer Rate Stabilization Reserve Account.

7) How are residential customer rates/bills computed (check all that apply)?

- ☐ EDU
- ☑ Metered
- ☐ Front-footage assessment
- ☑ Other (Describe): Countywide Average.

8) How are commercial, industrial, and contract user rates/bills computed?

Based on Flow/BOD/SS with billing multipliers.

9) Median Household Income (MHI) ($/year) $62,293

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$185,645
2.0 percent of MHI	$272,544
2.5 percent of MHI	$359,443

11) Rates, Billing, and MHI Comments:

2000 Census Block 100030166022: $82,384; 2010 CPI: $107,034. MHI is 2009 ACS for all of NCC. New Castle County has one, unified rate system for WWT. WARNING: #10 is all of NCC and repeated for each unit.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

NCC does not have a set borrowing limit on wastewater enterprises, though it is one performance measure acknowledged by their bond rating agencies. Debt is 18% FY2010. NCC policy limit is 20%.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	○	○	◉
Commercial/Industrial Use	○	◉	○	○	○
Residential Use	○	◉	○	○	○
Municipal Wastewater Sludge Reuse	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○

2) Comments (options considered, opportunities, barriers):

Spray application on crops used for livestock feed.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

High Nitrogen load.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Some study has been done, but not in depth. NCC's general view is that they are interested, but not actively pursuing, reuse. It does not appear that the installation costs justify a project. Permit limits are being met and population growth is slow.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

N/A.

Delaware Wastewater Study System Report

New Castle County - Port Penn STP

ID: 69

New Castle County Dept. of Special Services
187-A Old Churchman's Road
New Castle, DE 19720

City ID: NCCPP

New Castle County - Port Penn STP

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Pat Creedon	General Manager, Special Services	pcreedon@nccde.org	(302)395-5795		
Jonathan Husband	Engineering and Environmental Services Manager	jhusband@nccde.org	(302)395-5746		(302)395-5802
Jason P. Zern, PE					

2) Interviewer Name: JH, CSG, HKM, JBM

3) Interview Date: 12/9/2010

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: Port Penn STP

2) Physical Address Route 9
Port Penn, DE 19731

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal

☐ Tertiary Treatment ☐ Other (Describe):

4) What is source of treatment plant back-up power (check all that apply):

☑ On-site Generator (diesel/gasoline) ☐ Portable Generator ☐ Other (Describe):
☐ On-site Generator (natural gas from main) ☐ Battery
☐ On-site Generator (propane / natural gas from tank) ☐ None

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
DE0021539	NPDES	Stream Outfall	DELAWARE RIVER - ZONE 5	11. Delaware Bay (C&D Canal East)	39.512725	75.574180	0.57	12/2/2008	12/31/2013

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.05	Average Daily Flow (MGD)	0.04
Peak Flow (MGD)	0.19	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.04	Future Design Flow in 2030 (MGD	0.04

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) Yes

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	5-Day BOD	10	15	LBS/DY		24	36	MG/L	Monthly	Comp-8
001	pH				6		9	SU	Daily	Grab
001	TSS	13	19	LBS/DY		30	45	MG/L	Monthly	Comp-8
001	Enterococci					35	104	CFU/ 100ML	Monthly	Grab
001	Chlorine, Tot Res				1		4	MG/L	Daily	Grab

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

◉ About Normal (150-250 mg/l BOD and TSS)
○ Above Normal (>250 mg/l BOD and TSS) Reason:
○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 16 to 20 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Subject to potential upcoming TMDLs regarding DRBC PCBs. Currently not subject to typical N-P TMDL reqs. But adopted BOD per DRBC.

Service Area

1) Service area, square miles: 0.50

2) Number of pump stations: 1

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [x] Portable Generator
- [ ] Battery
- [ ] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - New Castle County	☐	100	164	$269.00	$44,116.00

7) Population served:

	Current	Future, 2030
Resident	676	988
Non-resident	0	0
Total	676	988

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Port Penn, Augustine Beach, and Bayview Beach. Households based on 2.5 ppl/hshld.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

I/I has been identified in the Port Penn collector system. Manhole frames and covers have been replaced under the Countywide Manhole rehabilitation capital improvement program. Evaluation of effectiveness to be reviewed.

12) Service Area Comments:

N/A.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 20

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Two reserve accounts: Sewer Fund Budget Reserve Account and the Sewer Rate Stabilization Reserve Account.

7) How are residential customer rates/bills computed (check all that apply)?

- ☐ EDU
- ☑ Metered
- ☐ Front-footage assessment
- ☑ Other (Describe): Countywide Average.

8) How are commercial, industrial, and contract user rates/bills computed?

Based on Flow/BOD/SS with billing multipliers.

9) Median Household Income (MHI) ($/year) $62,293

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$109,125
2.0 percent of MHI	$160,205
2.5 percent of MHI	$211,285

11) Rates, Billing, and MHI Comments:

Upper 2000/2010-CPI Block: 100030166032: $68,021/$88,374; Lower 2000/2010-CPI Block: 100030166031: $83,869/$108,963. New Castle County has one, unified rate system for WWT. #10 is all of NCC.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

NCC does not have a set borrowing limit on wastewater enterprises, though it is one performance measure acknowledged by their bond rating agencies. Debt is 18% FY2010. NCC policy limit is 20%.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	◉	○	○	○
Commercial/Industrial Use	○	◉	○	○	○
Residential Use	○	◉	○	○	○
Municipal Wastewater Sludge Reuse	○	◉	○	○	○

N/A-Additional reuse method not specified	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○

2) Comments (options considered, opportunities, barriers):

Port Penn appears to be too small to have any worthwhile impact or cost-justifiable reason to change.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

NCC did not comment on N-P, etc. for Port Penn and it is not in current permit. Get N-P DMR data to see what effluent strength is.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Some study has been done, but not in depth. NCC's general view is that they are interested, but not actively pursuing, reuse. It does not appear that the installation costs justify a project. Permit limits are being met and population growth is slow.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A. Current permit is met and no anticipated issues.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A. Haven't looked into plant modification.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

None.

Delaware Wastewater Study System Report

New Castle County - Water Farm #1 MOT WWTP

ID: 67

New Castle County Dept. of Special Services
187-A Old Churchman's Road
New Castle, DE 19720

City ID: NCCWF1

New Castle County - Water Farm #1 MOT WWTP

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Pat Creedon	General Manager, Special Services	pcreedon@nccde.org	(302)395-5795		
Jonathan Husband	Engineering and Environmental Services Manager	jhusband@nccde.org	(302)395-5746		(302)395-5802
Jason P. Zern, PE					

2) Interviewer Name: JH, CSG, HKM, JBM

3) Interview Date: 12/9/2010

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: Water Farm #1 aka MOT Regional WWTP

2) Physical Address County Road #424
Odessa, Delaware

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [x] Nitrogen removal
- [x] Phosphorus removal

New Castle County - Water Farm #1 MOT WWTP

☑ Tertiary Treatment ☑ Other (Describe): Solids - Aerobic Digestor

4) What is source of treatment plant back-up power (check all that apply):

☑ On-site Generator (diesel/gasoline) ☐ Portable Generator ☐ Other (Describe):
☐ On-site Generator (natural gas from main) ☐ Battery
☐ On-site Generator (propane / natural gas from tank) ☐ None

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
DE0050547	NPDES	Stream Outfall	001 - APPOQUINIMINK C	12. Delaware Bay (Appoquinimink River)	39.459513	75.644223	9999	7/1/2006	6/30/2011
LTS 3005-93-06	State	Field	002 - 5 pivots and 5 set sprayers	12. Delaware Bay (Appoquinimink River)	39.446101	75.635814	9999	7/28/2006	7/27/2011

6) Treatment Plant Capacity:

Current Design Flow (MGD)	2.50	Average Daily Flow (MGD)	0.57
Peak Flow (MGD)	1.50	% of Average Daily Flow from Domestic Source	90.00
Anticipated Flow in 2020 (MGD)	0.75	Future Design Flow in 2030 (MGD	1.35

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	pH				6		9	SU	Daily	Grab
001	TSS			LBS/DY		15	23	MG/L	Weekly	Comp-8
001	TKN, Total (may-nov)	10.4	15.6	LBS/DY				MG/L	Weekly	Comp-8
001	TKN, Total (annual average)	3796		LB/YR					Weekly	Comp-8
001	Phosphorus, Total	2.1	4.2	LBS/DY				MG/L	Weekly	Comp-8
001	Enterococci					33		#/ 100ML	5/ Month	Grab
001	5-Day CBOD	34.8	52.2	LBS/DY				MG/L	Weekly	Comp-8
002	5-Day BOD					50		MG/L		
002	TSS					50		MG/L		
002	Fecal Coliform					200		#/ 100ML		

002	pH			5.5	8.4	SU
002	Nitrogen, Total (annual per acre)	500	LB/YR			

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 21 to 30 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? Yes

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years? No

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- (•) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- ( ) No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- (•) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- ( ) No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years? No

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

Stated "not sure if ready to remove surface water discharge permit" due to winter conditions. Ammonia nitrogen is measured in TKN for NPDES.

Service Area

1) Service area, square miles: 22.00

2) Number of pump stations: 18

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☐ Other (Describe):
☑ Portable Generator
☐ Battery
☐ None

4) Number of holding tanks: 5

5) Total holding tank capacity (gallons): 61,000

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Odessa	☐	5	122	$269.00	$32,818.00
Townsend	☐	22	517	$269.00	$139,073.00
Unincorporated - New Castle County	☐	73	1749	$269.00	$470,481.00
Middletown	☑				

7) Population served:

	Current	Future, 2030
Resident	11,786	23,287
Non-resident	200	0
Total	11,986	23,287

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Includes properties located within the Town of Townsend, selected subdivisions located within the Town of Middletown (M-town is contract user), and specific sections of the Southern Sewer Service Area.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

No I/I issues.

12) Service Area Comments:

Pop served by NCC planning. EDU's by NCC Special Services. % breakdown is an estimate, Non-resident population is Middletown (approximated), flow-based limits.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 20

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Two reserve accounts: Sewer Fund Budget Reserve Account and the Sewer Rate Stabilization Reserve Account.

7) How are residential customer rates/bills computed (check all that apply)?

- ☐ EDU
- ☑ Metered
- ☐ Front-footage assessment
- ☑ Other (Describe): Countywide Average.

8) How are commercial, industrial, and contract user rates/bills computed?

Based on Flow/BOD/SS with billing multipliers.

9) Median Household Income (MHI) ($/year) $62,293

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$1,588,963
2.0 percent of MHI	$2,332,742
2.5 percent of MHI	$3,076,520

11) Rates, Billing, and MHI Comments:

2000 census w/ 2010 CPI - Odessa: $69,208, Townsend: $61,712, NCC Avg: $68,103; New Castle County has one, unified rate system for WWT. #10 is all of NCC.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

NCC does not have a set borrowing limit on wastewater enterprises, it is one performance measure acknowledged by their bond rating agencies. Debt is 18% FY2010. NCC policy limit is 20%.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	○	○	◉
Commercial/Industrial Use	○	◉	○	○	○
Residential Use	○	◉	○	○	○
Municipal Wastewater Sludge Reuse	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○

2) Comments (options considered, opportunities, barriers):

Spray application on crops used for livestock feed.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

High nitrogen load.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Some study has been done, but not in depth. NCC's general view is that they are interested, but not actively pursuing, reuse. It does not appear that the installation costs justify a project. Permit limits are being met and population growth is slow.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

Currently meeting permits.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

Existing NPDES permit for winter discharges during frozen conditions.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

N/A.

Delaware Wastewater Study System Report

Town of Middletown - Frog Hollow WWTF

ID: 64

19 West Green Street
Middletown, DE 19709

City ID: MIDLFH

Town of Middletown - Frog Hollow WWTF

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Morris Deputy	Town Manager	mdeputy@middletownde.org	(302)378-9120		(302)378-5672
Lou Vitola - NP	Finance Manager	lvitola@middletownde.org	(302)378-1181		
Wayne Kersey	Plant Manager				
Brian Carbaugh	Artesian - Director of Engineering	bcarbaugh@artesianwater.com	(302)453-6903		(302)453-6915
Mark Kondelis, Sr	Artesian - Manager of WW Services	mkondelis@artesianwater.com	(302)420-0372		

2) Interviewer Name: CSG, HKM

3) Interview Date: 11/11/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Municipal owned, Operated by Artesian Utility Development, Inc.

Treatment Plant

1) Wastewater Treatment Plant Name: Frog Hollow WWTF

2) Physical Address 30 Snead Circle
Middletown, DE 19709

3) General level of treatment

- ☐ Primary Treatment
- ☑ Secondary Treatment
- ☑ Tertiary Treatment
- ☐ Nitrogen removal
- ☐ Phosphorus removal
- ☑ Other (Describe): Lagoon Storage for Spray

4) What is source of treatment plant back-up power (check all that apply):

- ☐ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☐ Portable Generator
- ☐ Battery
- ☑ None
- ☐ Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
LTS 3015-99-10	State	Spray	001 - Parcels on both sides of CR427 (Golf Course)	12. Delaware Bay (Appoquinimink River)	39.47	75.714	0.25	8/5/2010	8/4/2015

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.25	Average Daily Flow (MGD)	0.12
Peak Flow (MGD)	0.16	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.25	Future Design Flow in 2030 (MGD	0.25

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	5-Day BOD					10		MG/L		Composite
001	TSS					10		MG/L		Composite
001	Fecal Coliform					20		#/ 100ML		Grab
001	Turbidity					5		TU		Record/ Totalize
001	pH				5.5		9	SU		Grab
001	Chlorine, Tot Res				1		4	MG/L		Record/ Totalize
001	Nitrogen, Total (annual per acre)		250	LB/YR						Composite

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- (•) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- ( ) No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ( ) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- (•) No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration ☐ Low temperature

- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Influent BOD/TSS looks below normal on readout b/c it's measured post side stream flow from filter building (30% recycle rate). Assume normal since all residential. Don't test NH3-N influent on either plant.

Service Area

1) Service area, square miles: 0.50

2) Number of pump stations: 3

3) What is source of back-up power at pump stations?

- ☑ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane/natural from tank)
- ☐ Other (Describe):
- ☐ Portable Generator
- ☐ Battery
- ☐ None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Middletown	☐	100	468	$184.83	$86,500.44

7) Population served:

	Current	Future, 2030
Resident	1,254	1,254
Non-resident	0	0
Total	1,254	1,254

8) Is service area digitized? Yes

9) Map obtained?

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Frog Hollow only serves "The Legends" (in Northeastern Middletown).

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

None.

12) Service Area Comments:

Residential only.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 193

6) Reserve account restrictions / comments (example: "emergency repairs only"):

See main MiddleTown plant.

7) How are residential customer rates/bills computed (check all that apply)?

- ☐ EDU
- ☑ Metered
- ☐ Front-footage assessment
- ☑ Other (Describe): Metered by water usage.

8) How are commercial, industrial, and contract user rates/bills computed?

See main Middletown plant.

9) Median Household Income (MHI) ($/year) $54,129

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$293,485
2.0 percent of MHI	$420,147
2.5 percent of MHI	$546,809

11) Rates, Billing, and MHI Comments:

See main Middletown plant.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

See main Middletown plant.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	○	○	○	○	◉
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○

2) Comments (options considered, opportunities, barriers):

Spraying on golf course.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

◉ Yes

○ No

4) Comments (to further explain your response to #3):

N/A.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

N/A, system is contained and effluent is already utilized for reuse.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Not at this time.

Delaware Wastewater Study System Report

Town of Middletown - Middletown

ID: 66

19 West Green Street
Middletown DE 19709

City ID: MIDLMT

Town of Middletown - Middletown

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Morris Deputy	Town Manager	mdeputy@middletownde.org	(302)378-9120		(302)378-5672
Lou Vitola - NP	Finance Manager	lvitola@middletownde.org	(302)378-1181		
Wayne Kersey	Plant Manager				
Brian Carbaugh	Artesian - Director of Engineering	bcarbaugh@artesianwater.com	(302)453-6903		(302)453-6915
Mark Kondelis, Sr	Artesian - Manager of WW Services	mkondelis@artesianwater.com	(302)420-0372		

2) Interviewer Name: CSG, HKM

3) Interview Date: 2/18/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Municipal owned, Operated by Artesian Utility Development, Inc. Some of Middletown's sewer does flow to NCC's WF #1. NCC bills the Town quarterly for treatment (flow, BOD, TSS). The Town customers only pay sewer service fees to the Town.

Treatment Plant

1) Wastewater Treatment Plant Name: Middletown WWTP

2) Physical Address 1400 Industrial Road
Middletown, DE 19709

Town of Middletown - Middletown

3) General level of treatment

- ☐ Primary Treatment
- ☑ Secondary Treatment
- ☑ Tertiary Treatment
- ☐ Nitrogen removal
- ☐ Phosphorus removal
- ☑ Other (Describe): Lagoon Storage for Spray

4) What is source of treatment plant back-up power (check all that apply):

- ☐ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☐ Portable Generator
- ☐ Battery
- ☑ None
- ☐ Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
LTS 3020-02-07	State	Spray	001 - Von Croy	12. Delaware Bay (Appoquinimink River)	39.427	75.745	1.8	8/2/2007	8/1/2012
LTS 3020-02-07	State	Spray	002 - Ford	12. Delaware Bay (Appoquinimink River)	39.412	75.737	9999	8/2/2007	8/1/2012
LTS 3020-02-07	State	Spray	003 - Jester	27. Chesapeake (Sassafras River)	39.399	75.746	9999	8/2/2007	8/1/2012
LTS 3020-02-07	State	Spray	004 - Clay	27. Chesapeake (Sassafras River)	39.421	75.756	9999	8/2/2007	8/1/2012
LTS 3020-02-07	State	Spray	005 - Park	12. Delaware Bay (Appoquinimink River)	39.428	75.731	9999	8/2/2007	8/1/2012

6) Treatment Plant Capacity:

Current Design Flow (MGD)	2.50	Average Daily Flow (MGD)	0.99
Peak Flow (MGD)	1.61	% of Average Daily Flow from Domestic Source	85.00
Anticipated Flow in 2020 (MGD)	3.00	Future Design Flow in 2030 (MGD	4.00

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001,002	5-Day BOD					50		MG/L		
001,002	TSS					90		MG/L		
001,002	Fecal Coliform					200		#/ 100ML		

001,002, 003,004	pH			5.5	9	SU
001,002, 003,004	Chlorine, Tot Res			1	4	MG/L
001,002, 003,004	Nitrogen, Total (annual per acre)	400	LB/YR			
003,004, 005	5-Day BOD				10	MG/L
003,004, 005	TSS				10	MG/L
003,004, 005	Fecal Coliform				20	#/ 100ML
003,004, 005	Turbidity				5	TU
003,004, 005	Chlorides				250	MG/L

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- (•) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- ( ) No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

- ☑ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
- ☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☑ Other (explain) Algae bloom in lagoons.

25) General Treatment Plant Comments.

Permit influent limit is 1.6 (1.8 adding Park). Main fields are Ford/VonCroy, secondary "as-needed" fields are Clay/Jester/Park. Plant/Spray upgrades finished last year. Peak Flow is Avg. Monthly. Industrial Flow is ~5%, Commercial ~10%. All flows meet most restrictive (unlimited access). Chem ad'n controls TP though not req'd. Note: Location of Park unknown, location is generalized in GIS.

Service Area

1) Service area, square miles: 11.80

2) Number of pump stations: 19

3) What is source of back-up power at pump stations?

- ☑ On-site Generator (diesel/gasoline)
- ☑ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane/natural from tank)
- ☐ Other (Describe):
- ☐ Portable Generator
- ☐ Battery
- ☐ None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Middletown	☐	98	5618	$184.83	$1,038,374.94

Town of Middletown - Middletown

Unincorporated - New Castle County	☑	2

7) Population served:

	Current	Future, 2030
Resident	15,056	25,000
Non-resident	100	7,500
Total	15,156	32,500

8) Is service area digitized? No

9) Map obtained?

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Middletown WWTP serves most of Middletown except Frog Hollow/Legends. NCC currently adds 0.02 MGD through WF#2 system, incl. schools, but has service limit of 1.5 MGD. Some Middletown served by NCC WF#1 (abt 0.15 MGD). M-town planning to serve Odessa.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

Minimal, N/A. November report provided to DNREC.

12) Service Area Comments:

567 businesses in Middletown (675 in 2030). All Middletown proper is served except minor carveouts still on septic. One large truck stop soon to convert from septic to sewer. 2 main industrials: Johnson Controls and Delstar McDermott.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? No

2) If the revenue is not sufficient, please explain why:

Contract cost for maintenance and operation of plant is lagging ahead of # of customers. Break even date is dependent on number of future customers (growth).

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 193

6) Reserve account restrictions / comments (example: "emergency repairs only"):

For sewer capital within 10 years via impact fees (not for O&M). $2.6M (reserve) vs. $1.37M (annual budget).

7) How are residential customer rates/bills computed (check all that apply)?

☐ EDU ☑ Metered ☐ Front-footage assessment

☑ Other (Describe): Metered by water usage.

8) How are commercial, industrial, and contract user rates/bills computed?

Water Consumption (no separate sewer meter for comm./ind.). NCC has sewer meter @ PS ($43.74/1000 gals incl. impact fee, user fee alone is $2.65/1000 gal).

9) Median Household Income (MHI) ($/year) $54,129

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$3,523,076
2.0 percent of MHI	$5,043,560
2.5 percent of MHI	$6,564,043

11) Rates, Billing, and MHI Comments:

MHI is 2010 CPI.

12) What is the debt borrowing limit ($)? $96,700,000

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $30,500,000

15) Borrowing Limit and Debt Comments:

GO Bonds. Referendum debt is 15%, of this 4% resolution.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	○	○	◉
Commercial/Industrial Use	○	○	○	◉	○
Residential Use	○	○	○	◉	○
Municipal Wastewater Sludge Reuse	◉	○	○	○	○
Golf	○	○	○	◉	○
Park	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

Golf Course planned. In final permitting for park area. Comm./Ind. is concrete pipe/mix plant possibility (nothing in place). Local residents have option to discuss reuse. Clear regulatory guidance not in place, would like more creative options.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

◉ Yes

○ No

4) Comments (to further explain your response to #3):

N/A.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Some interest from add'l farmers. May not be able to meet add'l farm demands (req'd detention time at plant).

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

Currently utilizing reuse but not being allowed to count toward disposal capacity.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
Continued Expansion (2 filters).	$2,000,000
Treatment/Infrastructure to Concrete Plant.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Considering solar and wind through grant funding.

Delaware Wastewater Study System Report

New Castle County - Water Farm #2

ID: 70

New Castle County Dept. of Special Services
187-A Old Churchman's Road
New Castle, DE 19720

City ID: NCCWF2

New Castle County - Water Farm #2

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Pat Creedon	General Manager, Special Services	pcreedon@nccde.org	(302)395-5795		
Jonathan Husband	Engineering and Environmental Services Manager	jhusband@nccde.org	(302)395-5746		(302)395-5802
Jason P. Zern, PE					

2) Interviewer Name: JH, CSG, HKM, JBM

3) Interview Date: 12/9/2010

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [ ] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

WWTP Project on Hold - Sending "core" SSSA to Middletown.

Treatment Plant

1) Wastewater Treatment Plant Name: N/A - Treated by Middletown WWTP

2) Physical Address Cedar Lane Rd and Marl Pit Rd
North of Middletown

3) General level of treatment

- [ ] Primary Treatment
- [ ] Nitrogen removal

- ☐ Secondary Treatment
- ☐ Tertiary Treatment
- ☐ Phosphorus removal
- ☑ Other (Describe): Collection only, no treatment.

4) What is source of treatment plant back-up power (check all that apply):

- ☐ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☐ Portable Generator
- ☐ Battery
- ☐ None
- ☑ Other (Describe): N/A. Collection only.

5) Permit Information: General

6) Treatment Plant Capacity:

Current Design Flow (MGD)		Average Daily Flow (MGD)	0.02
Peak Flow (MGD)		% of Average Daily Flow from Domestic Source	
Anticipated Flow in 2020 (MGD)		Future Design Flow in 2030 (MGD	

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ○ About Normal (150-250 mg/l BOD and TSS)
- ○ Above Normal (>250 mg/l BOD and TSS) Reason:
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)?

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

Plant on-hold. Proposed location is Northeast of Middletown. Line currently connects into Middletown near Frog Hollow.

Service Area

1) Service area, square miles: 17.00

2) Number of pump stations: 3

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☐ Other (Describe):
☑ Portable Generator
☐ Battery
☐ None

4) Number of holding tanks: 1

5) Total holding tank capacity (gallons): 1,000

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - New Castle County	☐	100	33	$269.00	$8,877.00

7) Population served:

	Current	Future, 2030
Resident	7,870	16,553
Non-resident	0	0
Total	7,870	16,553

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Southern Sewer Service Area (WF#2) – originally thinking of running a second pipe to WF#1. Negated due to cost. Water Farm #2 service area currently hooks up to Middletown WWTP through Parkside Subdivision (contract "satellite" user).

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

None, WF#2 collection system is relatively new.

12) Service Area Comments:

Pop served is all area residents per NCC planning not pop served. Multiply 33 EDU x 2.5 to estimate actual current pop served (includes 2 school campus facilities).

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 20

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Two reserve accounts: Sewer Fund Budget Reserve Account and the Sewer Rate Stabilization Reserve Account.

7) How are residential customer rates/bills computed (check all that apply)?

New Castle County - Water Farm #2

☐ EDU	☑ Metered	☐ Front-footage assessment
☑ Other (Describe):	Countywide Average.	

8) How are commercial, industrial, and contract user rates/bills computed?

Based on Flow/BOD/SS with billing multipliers.

9) Median Household Income (MHI) ($/year) $62,293

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$21,958
2.0 percent of MHI	$32,236
2.5 percent of MHI	$42,515

11) Rates, Billing, and MHI Comments:

Census 2000/2010-CPI Block 100030166022: $80,115/$104,086; CPI 2010 not calc'd.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

NCC does not have a set borrowing limit on wastewater enterprises, it is one performance measure acknowledged by their bond rating agencies. Debt is 18% FY2010. NCC policy limit is 20%.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	○	◉	○
Commercial/Industrial Use	○	◉	○	○	○
Residential Use	○	◉	○	○	○
Municipal Wastewater Sludge Reuse	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○

2) Comments (options considered, opportunities, barriers):

Working on 900 acre set-aside for Water Farm #2. Originally thought would need to implement in 15 years, now more like 30 (population growth).

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

- ○ Yes
- ◉ No

4) Comments (to further explain your response to #3):

No treatment plant managed by NCC for WF#2. Currently piped to Middletown.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Some study has been done, but not in depth. NCC's general view is that they are interested, but not actively pursuing, reuse. It does not appear that the installation costs justify a project. Permit limits are being met and population growth is slow.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

None.

Delaware Wastewater Study System Report

City of Wilmington

ID: 71

City ID: WILM

Department of Public Works
800 French Street
Wilmington, DE 19801

City of Wilmington

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Kash Srinivasan-NP	Public Works Director	ksrin@ci.wilmington.de.us	(302)576-3060		
Colleen Arnold	Assistant Water Division Director	carnold@wilmingtonde.gov	(302)576-3017		
Sean Duffy	Water Division Director	sduffy@ci.wilmington.de.us			
Alex Reznik	Veolia Water LA, North America				
Prabha Kumar	Black & Veatch				

2) Interviewer Name: CSH, HKM

3) Interview Date: 2/14/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Municipal Owned, Contract Operated. Veolia: P.O. Box 9856, Wilmington, Delaware 19809.

Treatment Plant

1) Wastewater Treatment Plant Name: Wilmington WWTP

2) Physical Address 12th Street and Hay Road
Wilmington, Delaware 19809

City of Wilmington

3) General level of treatment

- [x] Primary Treatment
- [x] Secondary Treatment
- [ ] Tertiary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal
- [x] Other (Describe): Solids Handling

4) What is source of treatment plant back-up power (check all that apply):

- [ ] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [x] Portable Generator
- [ ] Battery
- [ ] None
- [x] Other (Describe): Secondary Feed

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
DE0020320	NPDES	Stream Outfall	DELAWARE RIVER/TRIBUTARIES ZONE 5	02. Piedmont (Shellpot Creek)	39.726702	75.507576	105	7/1/2000	6/30/2005

6) Treatment Plant Capacity:

Current Design Flow (MGD)	105.00	Average Daily Flow (MGD)	75.00
Peak Flow (MGD)	340.00	% of Average Daily Flow from Domestic Source	85.00
Anticipated Flow in 2020 (MGD)	75.00	Future Design Flow in 2030 (MGD	75.00

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem)

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	pH				6		9	SU	Daily	Grab
001	TSS	22334	44668	LBS/DY		20	40	MG/L	Daily	Comp-8
001	Cd, Total	4.4	8.8	LBS/DY		4	8	UG/L	Weekly	Comp-8
001	Cr, Total	168	252	LBS/DY		0.15	0.22	MG/L	Weekly	Comp-8
001	Cu, Total	25.2	42.1	LBS/DY		23	38	UG/L	Weekly	Comp-8
001	Pb, Total	54.7	138	LBS/DY		49	123	UG/L	Weekly	Comp-8
001	Zn, Total	171	287	LBS/DY		153	257	UG/L	Weekly	Comp-8
001	Se, Total	24	65	LBS/DY		0.02	0.06	MG/L	Weekly	Comp-8
001	Flow	134		MGD					Continuous	Rcordr
001	Chlorine, Tot Res				0.1		4	MG/L	Daily	Grab
001	Hg, Total	0.48	0.64	LBS/DY		0.4	0.6	UG/L	Weekly	Comp-8

001	Fecal				200	400	#/ 100ML	Daily	Grab
001	5-Day CBOD	19080	38160	LBS/DY	17	34	MG/L	Daily	Comp-8
001	20-Day CBOD	31100		LBS/DY			MG/L	Weekly	Comp-8

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 16 to 20 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ( ) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- (•) No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ( ) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- (•) No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

Flows provided are dry weather and include contract user flows (NCC). Current design flow is secondary treatment capacity (8 basins with one down is 105). Polishing ponds are not true tertiary and can handle 340 mgd in wet weather (eq. of primary treatment). 168 is hydraulic flow through secondary (not treatment). 134 listed in permit is an arbitrary number (backed out from limits). Still meet cBOD/TSS in wet weather conditions. In process of revising permit to include dry and wet weather limits for long-term CSO strategy. Most non-domestic flows from County (City: 98.6% resd/comm, 64.3% resd only). City/County flow data reliability issues vs. metering. No TN/TP limits but monitoring for DRBC. Current NPDES permit has 1 WW outfall, 38 CSOs, (plus 5 storm outfalls on WWTP site).

Service Area

1) Service area, square miles: 8.50

2) Number of pump stations: 3

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☑ Other (Describe): Secondary Feeds.
☑ Portable Generator
☐ Battery
☐ None

4) Number of holding tanks: 1

5) Total holding tank capacity (gallons): 3,000,000

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Wilmington	☐		18898	$189.36	$3,578,525.28
Unincorporated - New Castle County	☑				

7) Population served:

	Current	Future, 2030
Resident	70,850	70,850
Non-resident	409,947	409,947
Total	480,797	480,797

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

The City of Wilmington has 5 main interceptors w/ 2 NCC tie-ins. Sanitary Sewers (26.9 miles @ 1"- 48"). Combined sanitary and storm (169.7 miles @1" – 240"). Major Holding tank is Canby Park. Population from WILMAPCO.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

City capturing 90% wet weather flows w/ CS thru real-time control. No plans to separate CS. Draft Long Term CSO Control Plan (LTCP) draft submitted in Sept 2010. CSO to tributaries of the Delaware River (Brandywine, Christina, Little Mill, and Shellpot).

12) Service Area Comments:

Service area listed is Wilmington only. Newark and some Del Cnty PA are contract users to NCC, which feed into Wilm's System through FMs into WWTP. 5 industrial users in Wilm. NCC has add'l industrial users and septic hauling station @ Airport Road.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? No

2) If the revenue is not sufficient, please explain why:

Water and sewer are combined fund. See attachment from Finance. Expect to be on track by FY 2012.

3) Do you have a reserve account? No

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? No

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

City considering adopting a new reserve policy.

7) How are residential customer rates/bills computed (check all that apply)?

- ☐ EDU
- ☑ Metered
- ☐ Front-footage assessment
- ☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

Most comm./ind. Bills computed same as residents. About 40 high-strength customers on sewer surcharge (flow, BOD, TSS equation). 5 industrial is Noramco, ICI, Amtrak, Cherry Island (DSWA), and IPC. NCC on contract.

9) Median Household Income (MHI) ($/year) $45,623

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$9,354,227
2.0 percent of MHI	$13,665,144

2.5 percent of MHI	$17,976,061

11) Rates, Billing, and MHI Comments:

MHI is CPI 2010 - COW. Avg Sewer based on 15,000 gal/quarter water usage ~189.36/yr. Residential storm charge avg ~$40.30/yr (tiered system based on lot size/type). About 26,000 parcels total, about 3,000 vacant (stormwater only).

12) What is the debt borrowing limit ($)?	$0
13) How much of this limit ($) is allocated to the wastewater enterprise?	$0
14) How much of this limit ($) available to the wastewater enterprise is used overall?	$53,635,000

15) Borrowing Limit and Debt Comments:

No borrowing limit. Sewer capital is primarily funded through SRF Loans, Grants, or long-term GO bonds. City does not have funding adequacy to cash finance capital projects.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	○	◉	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

Industry is DuPont Edgemoore, possibly Spray Cherry Island for Dust Control.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

Effluent is chlorinated.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

None.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
Tertiary Treatment.	

8) If reuse is not an option, what other methods are available to manage effluent?

Nothing appears viable at this time.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Working with DSWA landfill to start methane capture project from digester ($40M). Thermal Dryer for Solids "Thermal Dryer Renewable Energy Facility". Solar at Rock Manor WTP and Public Works new Admin Bldg.

Delaware Wastewater Study System Report

City of Newark Sewer Authority

ID: 68

220 Elkton Road, PO Box 390
Newark, DE 19715-0390

City ID: NWRK

City of Newark Sewer Authority

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Roy A. Simonson, PE	Director of Water and Wastewater	rsimonson@newark.de.us	(302)366-7055		(302)366-7160

2) Interviewer Name: CSG, TR

3) Interview Date: 12/21/2010

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [ ] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: N/A - through NCC to Wilmington WWTP

2) Physical Address N/A

3) General level of treatment

- [ ] Primary Treatment
- [ ] Secondary Treatment
- [ ] Tertiary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal
- [x] Other (Describe): Collection only, no treatment.

4) What is source of treatment plant back-up power (check all that apply):

- [ ] On-site Generator (diesel/gasoline)
- [ ] Portable Generator
- [x] Other (Describe):

☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane / natural gas from tank)
☐ Battery
☐ None

N/A. Collection only.

5) Permit Information: General

6) Treatment Plant Capacity:

Current Design Flow (MGD)		Average Daily Flow (MGD)	3.50
Peak Flow (MGD)		% of Average Daily Flow from Domestic Source	
Anticipated Flow in 2020 (MGD)		Future Design Flow in 2030 (MGD	

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years?

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem)

9) Permit Limits

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

◉ About Normal (150-250 mg/l BOD and TSS)
○ Above Normal (>250 mg/l BOD and TSS) Reason:
○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 21 to 30 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)?

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

☐ Wash out of biomass due to inflow and infiltration
☐ Equipment failure
☐ Design issues
☐ Operational issues
☐ Low dissolved oxygen
☐ Low alkalinity
☐ Low temperature
☐ Toxic shock
☐ Unknown
☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

○ Yes, actual limits in place now.
○ No limits currently. ANTICIPATE limits within 5 years.
○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

Average monthly flow for October 2007 – September 2010 is 106 MG/month, determined by looking at flow meters where water is turned over to NCCo. Metals are tested at Capital Trail station by City of Wilmington.

Service Area

1) Service area, square miles: 15.00

2) Number of pump stations: 3

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☐ Other (Describe):
☑ Portable Generator
☐ Battery
☐ None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City of Newark Sewer Authority

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Newark	☐	100	7899	$350.00	$2,764,650.00

7) Population served:

	Current	Future, 2030
Resident	30,230	30,947
Non-resident	0	0
Total	30,230	30,947

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Est. 114 miles mixed gravity/FM; flow variation August to May from UD; majority flow is domestic. About 36% of service area is UD (metered same as rest of Newark). Don't serve outside city limits. UD students are not incl. in census/pop count ~20,000.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

Currently quantifying Inflow and Infiltration problem; no combined sewer.

12) Service Area Comments:

Broken up into two metered sub-areas, north and south (Brookside and Capital Trail metering stations). Only pay NCC as contract user, not Wilmington. Growth into 2030 is per Delaware Population Consortium.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 180

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Account is restricted to WW but no internal restrictions. Operating revenue $4.1M. Reserve is $7.4M.

7) How are residential customer rates/bills computed (check all that apply)?

☐ EDU ☑ Metered ☐ Front-footage assessment

☑ Other (Describe): Metered by water usage.

8) How are commercial, industrial, and contract user rates/bills computed?

Based on characteristics and strength (Flow/BOD/TSS) with billing multipliers. No municipal contract users.

9) Median Household Income (MHI) ($/year) $53,357

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$3,557,354
2.0 percent of MHI	$5,664,689
2.5 percent of MHI	$7,772,024

11) Rates, Billing, and MHI Comments:

Using 2009 NCC ACS for MHI. 2000 census w/ 2010 CPI is $63,347. Current sewer rate is $6.753/1000 gallons.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

Newark doesn't have the authority to borrow for wastewater services at this point, but do for other public works services.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	◉	○	○	○
Commercial/Industrial Use	○	◉	○	○	○
Residential Use	○	◉	○	○	○
Municipal Wastewater Sludge Reuse	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○

2) Comments (options considered, opportunities, barriers):

Would consider a package plant if someone was interested.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

Not treating wastewater.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

UD Ag possibly.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

None at this time.

Delaware Wastewater Study System Report

New Castle County - North of the C&D

ID: 88

New Catle County Dept. of Special Services
187-A Old Churchman's Road
New Castle, DE 19720

City ID: NCCWLM

New Castle County - North of the C&D

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Pat Creedon	General Manager, Special Services	pcreedon@nccde.org	(302)395-5795		
Jonathan Husband	Engineering and Environmental Services Manager	jhusband@nccde.org	(302)395-5746		(302)395-5802
Jason P. Zern, PE					

2) Interviewer Name: JH, CSG, HKM, JBM

3) Interview Date: 12/9/2010

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [ ] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

NCC's collection and transmission district. Contract user to the City of Wilmington's WWTP. Also provide a local service function for C.O.W.

Treatment Plant

1) Wastewater Treatment Plant Name: N/A - Treated by Wilmington WWTP

2) Physical Address N/A

3) General level of treatment

- [ ] Primary Treatment
- [ ] Nitrogen removal

- ☐ Secondary Treatment
- ☐ Tertiary Treatment
- ☐ Phosphorus removal
- ☑ Other (Describe): Collection only, no treatment.

4) What is source of treatment plant back-up power (check all that apply):

- ☐ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☐ Portable Generator
- ☐ Battery
- ☐ None
- ☑ Other (Describe): N/A. Collection only.

5) Permit Information: General

6) Treatment Plant Capacity:

Current Design Flow (MGD)		Average Daily Flow (MGD)	50.00
Peak Flow (MGD)	150.00	% of Average Daily Flow from Domestic Source	
Anticipated Flow in 2020 (MGD)		Future Design Flow in 2030 (MGD	

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) Yes

9) Permit Limits

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ○ About Normal (150-250 mg/l BOD and TSS)
- ○ Above Normal (>250 mg/l BOD and TSS) Reason:
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)?

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

N/A.

Service Area

1) Service area, square miles: 250.00

2) Number of pump stations: 127

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☑ On-site Generator (propane/natural from tank)
☑ Other (Describe): Dual Power.
☑ Portable Generator
☐ Battery
☐ None

New Castle County - North of the C&D

4) Number of holding tanks: 12

5) Total holding tank capacity (gallons): 75,000

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - New Castle County	☐	69	91483	$269.00	$24,608,927.00
Delaware County, PA	☑	1			
Arden	☐	2	2652	$269.00	$713,388.00
Ardencroft	☐	2	2652	$269.00	$713,388.00
Bellefonte	☐	5	6629	$269.00	$1,783,201.00
Elsmere	☐	5	6629	$269.00	$1,783,201.00
New Castle	☐	3	3978	$269.00	$1,070,082.00
Newport	☐	3	3978	$269.00	$1,070,082.00
Newark	☑	10			

7) Population served:

	Current	**Future, 2030**
Resident	379,717	393,631
Non-resident	30,230	30,947
Total	409,947	424,578

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

1,635 miles of gravity sewer and 42,000 manholes. Pipe size from 8" to 72". PVC, VCP, DI, CI, and other materials. Separate system, dates back to 1929. 155 pump stations and 100 miles of force main. Does not include Newark, Bethel Twnshp, or C.O.W.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

I/I in the service area is acceptable, with localized cases of excessive I/I. Several projects within the NCC Capital Improvements Programs are actively investigating, identifying and correcting excessive I/I.

12) Service Area Comments:

EDU doesn't incl the satellite (contract) users City of Newark or Bethel Township, PA. Also doesn't incl City of Wilmington proper. % service areas are estimates. # EDU is 118,000 per NCC Special Services, pop per NCC Planning. 30,230 non-res is Newark.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

New Castle County - North of the C&D

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 20

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Two reserve accounts: Sewer Fund Budget Reserve Account and the Sewer Rate Stabilization Reserve Account.

7) How are residential customer rates/bills computed (check all that apply)?

- ☐ EDU
- ☑ Metered
- ☐ Front-footage assessment
- ☑ Other (Describe): Countywide Average.

8) How are commercial, industrial, and contract user rates/bills computed?

Based on Flow/BOD/SS with billing multipliers.

9) Median Household Income (MHI) ($/year) $62,293

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$78,517,275
2.0 percent of MHI	$115,270,457
2.5 percent of MHI	$152,023,638

11) Rates, Billing, and MHI Comments:

Census 2000/2010-CPI Block 100030166022: $80,115/$104,086; CPI 2010 not calc'd.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

NCC does not have a set borrowing limit on wastewater enterprises, it is one performance measure acknowledged by their bond rating agencies. Debt is 18% FY2010. NCC policy limit is 20%.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	◉	○	○	○
Commercial/Industrial Use	○	◉	○	○	○
Residential Use	○	◉	○	○	○
Municipal Wastewater Sludge Reuse	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○

New Castle County - North of the C&D

N/A-Additional reuse method not specified	○	◉	○	○	○
N/A-Additional reuse method not specified	○	◉	○	○	○

2) Comments (options considered, opportunities, barriers):

NCC is densely populated.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

No treatment plant managed by NCC for Wilmington Collection System. Currently piped to Wilmington.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Some study has been done, but not in depth. NCC's general view is that they are interested, but not actively pursuing, reuse. It does not appear that the installation costs justify a project. Permit limits are being met and population growth is slow.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

None.

Delaware Wastewater Study System Report

City of Harrington

ID: 60

106 Dorman Street
PO Box 236
Harrington, DE 19952

City ID: HARR

City of Harrington

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
John Schatzschneider	City Manager	jschatz@cityofharrington.com	(302)398-3530		
Scott Cahall - NP	Public Works Supervisor	scahall@cityofharrington.com	(302)398-8116		(302)398-8116
John Rathje	Plant Operator-Supervisor	jrathje@cityofharrington.com	(302)398-8933		(302)398-4490
Chris Curran - NP	URS	chris_curran@urscorp.com	(302)781-5888		(302)781-5901
Debbie Pfeil - NP	URS	debbie_pfeil@urscorp.com	(302)547-6068		(302)933-0320

2) Interviewer Name: CSG, TR

3) Interview Date: 2/2/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Harrington has tied into a force main to the Kent County WWTP and converted the Harrington WWTP to a pump station. The NPDES permit DE0020036 will not be reissued.

Treatment Plant

1) Wastewater Treatment Plant Name: City of Harrington WWTP

2) Physical Address 500 Porter Street
Harrington, Delaware

3) General level of treatment

- [x] Primary Treatment
- [x] Secondary Treatment
- [ ] Tertiary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal
- [ ] Other (Describe):

4) What is source of treatment plant back-up power (check all that apply):

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [ ] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
DE0020036	NPDES	Stream Outfall	BROWN'S BRANCH	19. Delaware Bay (Murderkill River)	38.928	75.560	0.75	1/1/2007	12/31/2011

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.75	Average Daily Flow (MGD)	0.50
Peak Flow (MGD)	0.80	% of Average Daily Flow from Domestic Source	90.00
Anticipated Flow in 2020 (MGD)	0.64	Future Design Flow in 2030 (MGD	0.75

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? Yes

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) Yes

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	DO				3			MG/L	Daily	Grab
001	pH				6		9	SU	Daily	Grab
001	TSS	81	125	LBS/DY		13	20	MG/L	Weekly	Comp-8
001	Nitrogen, Total	140		LBS/DY				MG/L	2/ Month	Comp-8
001	Nitrogen, Total (annual average)	9125		LB/YR					2/ Month	Comp-8
001	Phosphorus, Total	0.75		LBS/DY				MG/L	2/ Month	Comp-8
001	Phosphorus, Total (annual average)	55		LB/YR					2/ Month	Comp-8

001	Enterococci			33	#/ 100ML	Weekly	Grab
001	Flow	0.75	MGD			Continuous	Rcordr
001	Chlorine, Tot Res			0	MG/L	Weekly	Grab
001	5-Day CBOD	37.5	LBS/DY		MG/L	2/ Month	Comp-8
001	5-Day CBOD (annual average)	3000	LBS/DY			2/ Month	Comp-8

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 21 to 30 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- (•) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- ( ) No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? Yes

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- (•) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- ( ) No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years? Yes

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☑ Other (explain): Instantaneous (BOD/TSS/Fecal), but otherwise answer is "No".

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☑ Other (explain) System overload during major storm (didn't breach though).

25) General Treatment Plant Comments.

Murderkill River Watershed TMDL in 12/2001, amended 08/2004,TMDL is N, P, and cBOD-5. See permit fact sheet for daily/annual limits, etc. Solids now trucked to KCWWTP. 2x generators. BOD/TSS below normal during I/I. Facility is inadequate to manage N/P. Lagoons to remain for emergency storage due to interconnect w/ Milford before reaching KCWWTP. Outfall Lat/Longs from PCS don't match permit.

Service Area

1) Service area, square miles: 3.62

2) Number of pump stations: 8

3) What is source of back-up power at pump stations?

☐ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☑ Other (Describe): 1 small generator at friendship village. Usually borrow portable from KCWWTP.
☐ Portable Generator
☐ Battery
☑ None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Harrington	☐	90	1200	$560.00	$672,000.00
Farmington	☐	10	150	$660.00	$99,000.00

7) Population served:

	Current	Future, 2030
Resident	3,161	3,600
Non-resident	300	300

Total	3,461	3,900

8) Is service area digitized? Yes

9) Map obtained? No

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

No combined sewer. All Harrington and Farmington w/in muni limits. A few single hookups b/w Harr and Farm. Service Area size/shape is from CPCN map. The 300 non-res is Farmington, estimated.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

Major I/I wet-weather issue which can double the flow. Studies have been performed to find suspect areas (about 1/4 of town studied). Applied for grants to continue. Mostly inflow. Recent rehab includes inserts, sliplining, full replacements.

12) Service Area Comments:

Gravity mains: 13 miles @ 8 - 15", Farmington: 10'500 LF Gravity; Harrington FM: 3,831 LF @ 2–4"; 1 PS in Farmington, Farmington FM: 19,400 LF @ 6"; Harrington Racetrack/Delaware State Fair (Private, On-site PS). Industry is Colorbox (GP packaging).

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 22.5

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Escrow account for future debt service. Impact reserve account for future installations or major repairs.

7) How are residential customer rates/bills computed (check all that apply)?

☐ EDU ☐ Metered ☐ Front-footage assessment

☑ Other (Describe): Flat Fee - Inside and Outside Rates.

8) How are commercial, industrial, and contract user rates/bills computed?

Flow only. Limits are set on BOD, TSS, and Oil/Grease and are tested.

9) Median Household Income (MHI) ($/year) $40,204

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$43,131
2.0 percent of MHI	$314,508

2.5 percent of MHI	$585,885

11) Rates, Billing, and MHI Comments:

2010 CPI: Farmington: $53,863 @ 10% Flow, Harrington:$40,204 @ 90% Flow.

12) What is the debt borrowing limit ($)?	$5,185,350
13) How much of this limit ($) is allocated to the wastewater enterprise?	$0
14) How much of this limit ($) available to the wastewater enterprise is used overall?	$5,000,000

15) Borrowing Limit and Debt Comments:

The $5M is for the FM upgrade to KCWWTP.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○

2) Comments (options considered, opportunities, barriers):

Cost analysis on connecting to KCWWTP vs. spray system showed obvious choice. Storage lagoon is what killed price. 8 miles to Frederica (not including Farmington).

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

N/A taking system off-line.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

N/A taking system off-line.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A, taking system off-line.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
Storage Lagoon.	

8) If reuse is not an option, what other methods are available to manage effluent?

Sending waste to KCWWTP.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Looked into solar but now N/A.

Delaware Wastewater Study System Report

Kent County Department of Public Works

ID: 61

Kent County Levy Court
555 Bay Road
Dover, DE 19901

City ID: KENT

Kent County Department of Public Works

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Hans Medlarz	Director of Public Works	hans.medlarz@co.kent.de.us	(302)744-2430		

2) Interviewer Name: CSG, HKM, JH

3) Interview Date: 12/10/2010

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: Kent County Regional WWTP

2) Physical Address 139 Milford Neck Road
Milford, Delaware 19963

3) General level of treatment

- [x] Primary Treatment
- [x] Secondary Treatment
- [x] Tertiary Treatment
- [x] Nitrogen removal
- [x] Phosphorus removal
- [x] Other (Describe): Downflow filtration, Ferric Injection before filtration and adding carbon sources to remove phosphate, sludge

handling

4) What is source of treatment plant back-up power (check all that apply):

- ☑ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☐ Portable Generator
- ☐ Battery
- ☐ None
- ☑ Other (Describe): 1.2 MW Solar

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
DE0020338	NPDES	Stream Outfall	MURDERKILL RIVER	19. Delaware Bay (Murderkill River)	38.99703083	75.43876583	16.3	11/1/2006	10/31/2011

6) Treatment Plant Capacity:

Current Design Flow (MGD)	16.30	Average Daily Flow (MGD)	12.19
Peak Flow (MGD)	18.60	% of Average Daily Flow from Domestic Source	74.00
Anticipated Flow in 2020 (MGD)	15.00	Future Design Flow in 2030 (MGD	18.00

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? Yes

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) Yes

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	DO				5			MG/L	Daily	Grab
001	Flow	16.3		MGD					Continuous	Rcordr
001	pH				6		9	SU	Daily	Grab
001	Chlorine, Tot Res (MDL)						0	MG/L	Daily	Grab
001	Enterococci					33		#/ 100ML	Daily	Grab
001	TSS	2720	4080	LBS/DY		20	30	MG/L	Weekly	Comp-8
001	5-Day CBOD	1001		LBS/DY				MG/L	Daily	Comp-8
001	Nitrogen, Total (annual average)		274115	LB/YR					Weekly	Comp-8
001	Nitrogen, Total (may-sept)	751	1126	LBS/DY				MG/L	Weekly	Comp-8
001	Phosphorus, Total (annual average)		22812	LB/YR					Weekly	Comp-8
001	Phosphorus, Total (may-sept)	62.5	93.7	LBS/DY				MG/L	Weekly	Comp-8

Kent County Department of Public Works

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ○ About Normal (150-250 mg/l BOD and TSS)
- ◉ Above Normal (>250 mg/l BOD and TSS) Reason: Food processing
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 21 to 30 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years? No

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

- ☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
- ☐ Metals (any) ☐ PCBs ☑ Other (explain): Nothing for 2 consecutive months (see

below for individual instances).

24) What was the cause of the above non-compliance?

- [x] Wash out of biomass due to inflow and infiltration
- [x] Toxic shock
- [ ] Equipment failure
- [ ] Unknown
- [ ] Low temperature
- [ ] Operational issues
- [ ] Design issues
- [ ] Other (explain)

25) General Treatment Plant Comments.

BOD/TSS strength top end of normal (250 to 300 influent strength in November 2010). Ammonia/N/P limits start in May 2011. Temp above TN limits due to plant modifications/construction. Exceeded flow capacity in March 2010 b/c I/I. Also exceeded TSS capacity due to I/I biomass washout. Lat/Lon doesn't match PCS.

Service Area

1) Service area, square miles: 47.50

2) Number of pump stations: 85

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [x] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [ ] Portable Generator
- [ ] Battery
- [ ] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Bowers Beach	☐		347	$410.48	$142,436.56
Camden	☑				
KCSSD - Capital Park	☐		243	$304.80	$74,066.40
Cheswold	☐		1259	$313.56	$394,772.04
Clayton	☑				
KCSSD - Colony West	☐		195	$282.20	$55,029.00
Dover	☑				
KCSSD - Dykes Branch	☐		1155	$323.76	$373,942.80
Felton	☐		1047	$333.56	$349,237.32
Frederica	☐		404	$333.56	$134,758.24
KCSSD - Garrison Lake I	☐		316	$304.80	$96,316.80
KCSSD - Garrison Lake II	☐		95	$304.80	$28,956.00
KCSSD - Garrison Lake V	☐		972	$304.80	$296,265.60
KCSSD - Garrison Lake IV	☐		121	$304.80	$36,880.80
KCSSD - Generals Green	☐		327	$304.80	$99,669.60
KCSSD - Isaacs Branch	☐		2263	$304.80	$689,762.40
Kenton	☐		133	$476.60	$63,387.80

Little Creek	☐	132	$358.32	$47,298.24
KCSSD - Little Heaven	☐	27	$282.20	$7,619.40
Magnolia	☐	757	$282.20	$213,625.40
Milford	☑			
KCSSD - Northeast	☐	220	$517.20	$113,784.00
KCSSD - Pickering Beach	☐			
KCSSD - Royal Grant	☐	207	$304.80	$63,093.60
Smyrna	☑			
KCSSD - Tidbury Branch	☐	1755	$304.80	$534,924.00
Wyoming	☑			
KCSSD - Bakers Choice	☐	86	$499.08	$42,920.88
KCSSD - Burtonwood Village	☐	122	$304.80	$37,185.60
KCSSD - Carlisle Village	☐	240	$304.80	$73,152.00
KCSSD - DAFB	☐	2829	$282.20	$798,343.80
KCSSD - North Magnolia	☐	69	$282.20	$19,471.80
KCSSD - South Central	☐	870	$439.20	$382,104.00

7) Population served:

	Current	Future, 2030
Resident	37,130	39,130
Non-resident	62,870	65,870
Total	100,000	105,000

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

220 miles Gravity sewers (<=18"), 139 Low pressure sewers / Force main (49 miles of 24”-48” pipes); Nascar 2 weekends a year. Original quote of 100,000 pop. served. Subtracted out contract user populations to separate res/non-res.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

No Combined Sewer. Experience I/I problems from towns contributing to system. Much of the I/I is from the City of Dover (Pump Station #3): 1.5 MGD (Sept. 2010, dry) vs. 3.25 MGD (March 2010, wet).

12) Service Area Comments:

DAFB is now a district. "Other" examples include MHPs (High Point - 500 units) or industry (PPG). Adding 1600 EDUs/yr, x200, should be 400,000 GPY but not seeing it…

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 7

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Funds are shared/overlapped. "Working capital reserve fund", "capital emergency reserve fund", (not "accounts"), are restricted. Operating revenue and % reserve do not include debt service.

7) How are residential customer rates/bills computed (check all that apply)?

- ☑ EDU
- ☐ Metered
- ☐ Front-footage assessment
- ☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

All comm./ind./MHP/contracts pay $2.34 per 1000 gal.

9) Median Household Income (MHI) ($/year) $48,073

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$6,506,245
2.0 percent of MHI	$10,397,995
2.5 percent of MHI	$14,289,744

11) Rates, Billing, and MHI Comments:

Flow-weighted MHI spreadsheet provided by Hans ($37,002, Census 2000). Converted to CPI 2010. Note: KC Avg. Adj to 2010 is $53,203. Also compare to ACS. Operations fee is uniform ($282/yr – Colony West). Rest is debt-based.

12) What is the debt borrowing limit ($)? $382,000,000

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $52,000,000

15) Borrowing Limit and Debt Comments:

Debt borrowing limit is about 12% of assessed value.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	◉	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
Water Reclaimed at plant 100,000 gpd	○	○	○	○	◉

N/A-Additional reuse method not specified	◉	◉	◉	◉	◉	
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉	

2) Comments (options considered, opportunities, barriers):

100% sludge reuse. Been purchasing land around plant for spray, about 700 acres to date. 10 years down road per estimated EDU's.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

- ◉ Yes
- ○ No

4) Comments (to further explain your response to #3):

Meets unlimited upon completion of tertiary project (funding in place, next 24 months).

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Interest is great if farmers have control of valve. Questions about cost and ability to keep pressure.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

Don't need it now, possibly in future.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A, funding is in place.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

1.2 MW solar panels for 100% elec on sunny days, HVAC with effluent (heat exchangers / heat pumps), 3 passive solar greenhouses for drying (1/4 acre each w/ heated floors), not interested in methane capture (expertise issue, and only 20%).

Delaware Wastewater Study System Report

Camden-Wyoming Sewer and Water Authority

ID: 57

16 S. West St.
Camden, DE 19934

City ID: CAMD

Camden-Wyoming Sewer and Water Authority

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Harold L. Scott Sr	Superintendent	info@cwswa.com	(302)697-6372		
Soheil Gharebaghi, PE	Authority Engineer	gharebaghi@comcast.net	(302)697-6372	m:373 -3936	

2) Interviewer Name: CSG

3) Interview Date: 3/11/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [ ] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- ( ) Municipal
- (•) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

CWSWA is a municipal authority and is not directly affiliated with the Towns of Camden and Wyoming. Not under PSC/CPCN for sewer (water only). Not funded by tax money. Lisa.boltz@townofcamden.com; townofwyoming@comcast.net.

Treatment Plant

1) Wastewater Treatment Plant Name: N/A - Treated by Kent County WWTP

2) Physical Address N/A

3) General level of treatment

- [ ] Primary Treatment
- [ ] Secondary Treatment
- [ ] Tertiary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal
- [x] Other (Describe): Collection only, no treatment.

4) What is source of treatment plant back-up power (check all that apply):

- ☐ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☐ Portable Generator
- ☐ Battery
- ☐ None
- ☑ Other (Describe): N/A. Collection only.

5) Permit Information: General

6) Treatment Plant Capacity:

Current Design Flow (MGD)		Average Daily Flow (MGD)	0.70
Peak Flow (MGD)	0.98	% of Average Daily Flow from Domestic Source	78.00
Anticipated Flow in 2020 (MGD)	1.00	Future Design Flow in 2030 (MGD	

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ○ About Normal (150-250 mg/l BOD and TSS)
- ○ Above Normal (>250 mg/l BOD and TSS) Reason:
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.

- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

Kent County has not complained about effluent from CWSWA.

Service Area

1) Service area, square miles: 3.75

2) Number of pump stations: 7

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☑ Other (Describe): Bypass Pump.
☐ Portable Generator
☐ Battery
☐ None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

Camden-Wyoming Sewer and Water Authority

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Camden	☐	63	1469	$313.35	$460,311.15
Wyoming	☐	34	793	$313.35	$248,486.55
Unincorporated - Kent County	☐	3	70	$313.35	$21,934.50

7) Population served:

	Current	Future, 2030
Resident	3,241	6,500
Non-resident	100	200
Total	3,341	6,700

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Gravity sewer (8”-15” @ 26 mi); FM (4"-10"@ 4 mi). Camden Wyoming municipal limits are not the same as CWSWA's service area. Metered @ KC#14 & Southern Sewer District PS (Nelly Stokes, about 19.6% flow). 2332 resid. EDUs (inc. apt's). 251 commercial.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

I/I approximately 40% increase in average flow for existing (mostly pre-1995 system: vitrified clay, 10% from post-1995 installations). Exfiltration also an issue. Complete fix not financially realistic. Fix upon finding or known target areas.

12) Service Area Comments:

About 8 out parcels (enclaves) are not served, otherwise most parcels within muni limits are served. Some unincorp Kent Co served. Issues with Camden/Wyoming not enforcing sewer connections during new annexations. Camdel Metals (no pre-treatment).

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

Revenue to expenditure must be 120%.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 10

6) Reserve account restrictions / comments (example: "emergency repairs only"):

N/A.

Camden-Wyoming Sewer and Water Authority

7) How are residential customer rates/bills computed (check all that apply)?

☑ EDU ☐ Metered ☐ Front-footage assessment

☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

$0.24 on top of KCWW fees. Rates same (resid.: monthly, comm.: quarterly).

9) Median Household Income (MHI) ($/year) $62,069

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$1,440,441
2.0 percent of MHI	$2,164,166
2.5 percent of MHI	$2,887,891

11) Rates, Billing, and MHI Comments:

2010 CPI - Camden: $61,189, Wyoming: $62,949 (weighted average).

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $300,000

15) Borrowing Limit and Debt Comments:

No limit, it's whatever the authority can handle based on user fees.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○

2) Comments (options considered, opportunities, barriers):

10 miles to Frederica. Former plant abandoned in 1970's near Isaac's Branch.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

- ○ Yes
- ◉ No

4) Comments (to further explain your response to #3):

N/A.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

N/A.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

None.

Delaware Wastewater Study System Report

Dover Sewer Authority

ID: 59

City Hall
15 East Loockerman Street
Dover, DE 19901

City ID: DOVE

Dover Sewer Authority

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Scott Koenig - NP	Director of Public Works	skoenig@dover.de.us	(302)736-7026		(302)736-7177
Sharon Duca	Water-Wastewater Manager	sduca@dover.de.us	(302)736-7070		
Donna S. Mitchell, CPA	Controller/Treasurer	dmitchell@dover.de.us	(302)736-7018		

2) Interviewer Name: CSG, HKM

3) Interview Date: 11/11/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [ ] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Mailing Address: City Hall - The Plaza, P.O. Box 475, Dover, DE 19903-0475.

Treatment Plant

1) Wastewater Treatment Plant Name: N/A - Treated by Kent County WWTP

2) Physical Address N/A

3) General level of treatment

- [ ] Primary Treatment
- [ ] Secondary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal

Dover Sewer Authority

☐ Tertiary Treatment ☑ Other (Describe): Collection only, no treatment.

4) What is source of treatment plant back-up power (check all that apply):

☐ On-site Generator (diesel/gasoline) ☐ Portable Generator ☑ Other (Describe):
☐ On-site Generator (natural gas from main) ☐ Battery N/A. Collection only.
☐ On-site Generator (propane / natural gas from tank) ☐ None

5) Permit Information: General

6) Treatment Plant Capacity:

Current Design Flow (MGD)		Average Daily Flow (MGD)	5.40
Peak Flow (MGD)	8.30	% of Average Daily Flow from Domestic Source	75.00
Anticipated Flow in 2020 (MGD)		Future Design Flow in 2030 (MGD	

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) Yes

9) Permit Limits

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

○ About Normal (150-250 mg/l BOD and TSS)
○ Above Normal (>250 mg/l BOD and TSS) Reason:
○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)?

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

☐ Wash out of biomass due to inflow and infiltration ☐ Low dissolved oxygen ☐ Unknown
☐ Equipment failure ☐ Low alkalinity ☐ Other (explain):
☐ Design issues ☐ Low temperature
☐ Operational issues ☐ Toxic shock

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☑ Other (explain): BOD

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☑ Other (explain): From Fordham Brewery on Horsepond Road. Now has pre-treatment.

25) General Treatment Plant Comments.

Kent County mandates/manages industrial pre-treatment systems. 10 yr. contract user agreement w/ KCWWTP (2006). Mo max flows, but performed a TFS for estimated flows. 7 different points into KC sewer, all metered. Largest basin is #3: 50 miles of pipe. 2 stations managed by KC, 5 by Dover. Testing by County as they see fit, Dover does test some industrial users.

Service Area

1) Service area, square miles: 23.40

2) Number of pump stations: 41

3) What is source of back-up power at pump stations?

- ☑ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☑ Portable Generator
- ☐ Battery

Dover Sewer Authority

☐ On-site Generator (propane/natural from tank) ☐ None

☐ Other (Describe):

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Dover	☐	100	10125	$491.31	$4,974,513.75

7) Population served:

	Current	Future, 2030
Resident	37,479	39,226
Non-resident	300	300
Total	37,779	39,526

8) Is service area digitized? Yes

9) Map obtained? No

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

13,500 EDU if incl. comm/ind. Rodney Village & Hunters Point served outside muni. About 20-25 KC parcels on septic w/in Dover limits, otherwise all Dover muni residents served. City of Dover for ppl data. Spike from race wknd (Dover Downs).

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

5 yr. CIP includes smoke testing/video. Also using GIS. Formal study of 2% city in 2006 and just finishing. Purchased truck and doing "as-you-go". More cost effective.

12) Service Area Comments:

150 miles gravity, 40 mi FM. Garrison Oaks Tract - Solar and Combustion Power Plant (Future Need) w/in 5 years. Didn't request map since at heart of Kent Cty's regional system.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

W/WW is the same fund. Previously W was supporting WW, recent I/I adjustment fixes (see rate comment). W/WW is meeting all debt covenants and financial obligations regardless.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 8

Dover Sewer Authority

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Must keep min 8% + 2% for cap imp + $0.5M for emergency. Restrictions: one set by Council, one by ordinance.

7) How are residential customer rates/bills computed (check all that apply)?

☐ EDU ☑ Metered ☐ Front-footage assessment

☑ Other (Describe): Metered by water usage for residents.

8) How are commercial, industrial, and contract user rates/bills computed?

No muni contract users. Flow-based only same as residential, no BOD/TSS. Some may have separate sewer meter. Hunters Point has single sewer meter.

9) Median Household Income (MHI) ($/year) $50,239

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$2,655,534
2.0 percent of MHI	$5,198,884
2.5 percent of MHI	$7,742,233

11) Rates, Billing, and MHI Comments:

Formerly no markup on KC charge, now $1.05 surcharge to fix I/I. Dover Comprehensive plan states $58,700 (by HUD 2007).

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $6,800,000

15) Borrowing Limit and Debt Comments:

No GO bonds (general obligation), revenue bonds only on utils, so no max borrowing limit (just need to meet debt covenant). See sheets. Bonded in 2005 as well. Now include Stimulus Funds, leveraging SRF if rate stays lower than bond market.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	○	◉	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

Dover Sewer Authority

2) Comments (options considered, opportunities, barriers):

No treatment. Interested in hearing more about "helper" solutions such as pretreatment, waste-stream separation/reuse options for industries, holding tanks, etc, but otherwise not many options seen. 12 miles to Frederica.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

- ○ Yes
- ◉ No

4) Comments (to further explain your response to #3):

N/A. No treatment.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

None. Asked about possibility of Del State having small educational facility and said prob not due to many factors. Pumping to Frederica and back makes little sense.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

Continue to discharge to KC system.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Solar panels on admin buildings.

Delaware Wastewater Study System Report

Milford Sewer Authority

ID: 62

180 Vickers Drive
Milford, DE 19963

City ID: MLFD

Milford Sewer Authority

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
David Baird	City Manager	dbaird@milford-de.gov	(302)422-6616		
Eugene Helmick	Superintendent of Wastewater		(302)422-6616		
Steve Ellingsworth	W-WW Operator				
Brad Dennehy	Director, Public Works				

2) Interviewer Name: CSG, JBM

3) Interview Date: 2/22/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [ ] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Milford would like help getting I/I issue resolved.

Treatment Plant

1) Wastewater Treatment Plant Name: N/A - Treated by Kent County WWTP

2) Physical Address N/A

3) General level of treatment

- [ ] Primary Treatment
- [ ] Secondary Treatment
- [ ] Tertiary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal
- [x] Other (Describe): Collection only, no treatment.

4) What is source of treatment plant back-up power (check all that apply):

- ☐ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☐ Portable Generator
- ☐ Battery
- ☐ None
- ☑ Other (Describe): N/A. Collection only.

5) Permit Information: General

6) Treatment Plant Capacity:

Current Design Flow (MGD)		Average Daily Flow (MGD)	2.50
Peak Flow (MGD)	4.00	% of Average Daily Flow from Domestic Source	70.00
Anticipated Flow in 2020 (MGD)		Future Design Flow in 2030 (MGD	

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) Yes

9) Permit Limits

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ○ About Normal (150-250 mg/l BOD and TSS)
- ○ Above Normal (>250 mg/l BOD and TSS) Reason:
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.

- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

KC does periodic tests and monitors industrial pre-treatment systems. No limit on flow but update flow agreement / flow estimate every 2 years with KCWWTF. Not sure about future flows, but do anticipate growth by 2020/2030.

Service Area

1) Service area, square miles: 10.30

2) Number of pump stations: 17

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☑ Other (Describe): 9 diesel, 8 have hookups for portable.
☑ Portable Generator
☐ Battery
☐ None

4) Number of holding tanks: 0

Milford Sewer Authority

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Milford	☐	99	3895	$406.20	$1,582,149.00
Unincorporated - Kent County	☐	1	91	$479.10	$43,598.10
Unincorporated - Sussex County	☐	1			

7) Population served:

	Current	Future, 2030
Resident	9,302	19,273
Non-resident	227	470
Total	9,529	19,743

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Milford straddles Ssx Co and Kent Co boundary. All flows to KCWWTF. Some areas in municipal limits unserved but are serviceable; About 91 outside users in unincorporated Kent/Sussex Co's incl. Baltimore Air Coil.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

2009: 32%, 2010: 43%, 2011: 26%. Formal I/I report avail April 2011. Est $15-20M to repair. Old system (brick, terra cotta, some flooding issues), mostly center of Milford (old town). Lots of unnecessary pumping (electrical waste and wear on equipment).

12) Service Area Comments:

FM/PS and gravity sewer main (about 60 miles @ 8-24”); Most flows conveyed to Kent County pump station No. 7. KC maintains FM past PS#7. Major industrial and food processing users are Perdue, Seawatch (clams), and Baltimore Air Coil.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 39

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Must be approved by council.

Milford Sewer Authority

7) How are residential customer rates/bills computed (check all that apply)?

☐ EDU ☑ Metered ☐ Front-footage assessment

☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

Most off water meter, some have separate sewer meter. Same rate as residents, flow-based only.

9) Median Household Income (MHI) ($/year) $42,257

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$900,799
2.0 percent of MHI	$1,742,981
2.5 percent of MHI	$2,585,163

11) Rates, Billing, and MHI Comments:

MHI is 2010 CPI. Milford is W/WW/Elec. Meter is read off water. $10 base + $2.43/1000 gal (Outside rates are 1.5x city rate) + $2.34/1000 gal (Kent County fee).Kent fee, avg. 5,000 gal month.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $3,027,833

15) Borrowing Limit and Debt Comments:

No limit but subject to referendum. Upcoming $4.5M debt for wastewater (some I&I).

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○

2) Comments (options considered, opportunities, barriers):

7 miles to Frederica. Could do package systems on growth areas for reuse but no point, KC is set up to handle it.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

- ○ Yes
- ◉ No

4) Comments (to further explain your response to #3):

N/A.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

N/A.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Part of discussion for any new facilities but nothing in works. Mostly efficiency upgrades through electrical utility.

Delaware Wastewater Study System Report

Town of Clayton

ID: 58

414 Main Street
Clayton, DE 1993811

City ID: CLAY

Town of Clayton

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Jeff Hurlock	Town Foreman	jahurlock@clayton-delaware.com	(302)653-5637		
Thomas E. Horn, Jr - NP	Mayor		(302)270-1002		

2) Interviewer Name: CSG, TR

3) Interview Date: 1/10/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [ ] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: N/A - Treated by Kent County WWTP

2) Physical Address N/A

3) General level of treatment

- [ ] Primary Treatment
- [ ] Secondary Treatment
- [ ] Tertiary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal
- [x] Other (Describe): Collection only, no treatment.

4) What is source of treatment plant back-up power (check all that apply):

- [ ] On-site Generator (diesel/gasoline)
- [ ] Portable Generator
- [x] Other (Describe):

☐ On-site Generator (natural gas from main)	☐ Battery	N/A. Collection only.
☐ On-site Generator (propane / natural gas from tank)	☐ None	

5) Permit Information: General

6) Treatment Plant Capacity:

Current Design Flow (MGD)		Average Daily Flow (MGD)	0.23
Peak Flow (MGD)	0.35	% of Average Daily Flow from Domestic Source	75.00
Anticipated Flow in 2020 (MGD)		Future Design Flow in 2030 (MGD	

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) Yes

9) Permit Limits

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ◉ About Normal (150-250 mg/l BOD and TSS)
- ○ Above Normal (>250 mg/l BOD and TSS) Reason:
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)?

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

☐ Wash out of biomass due to inflow and infiltration	☐ Low dissolved oxygen	☐ Unknown
☐ Equipment failure	☐ Low alkalinity	☐ Other (explain):
☐ Design issues	☐ Low temperature	
☐ Operational issues	☐ Toxic shock	

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

Half system direct to Kent County (new, 0.058 MGD), half thru Smyrna to Kent (old, 0.173 MGD). Peak flow was through Smyrna's system only due to "Old Town". No limit for Kent, Limit thru Smyrna is 0.4 MGD.

Service Area

1) Service area, square miles: 2.00

2) Number of pump stations: 6

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☐ Other (Describe):
☐ Portable Generator
☐ Battery
☐ None

4) Number of holding tanks: 2

5) Total holding tank capacity (gallons): 300,000

6) Sewer Districts included in service area (in whole or in part):

Town of Clayton

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Clayton	☐	100	1131	$373.20	$422,089.20

7) Population served:

	Current	Future, 2030
Resident	2,200	3,450
Non-resident	20	25
Total	2,220	3,475

8) Is service area digitized? No

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

About 8 miles of gravity sewer plus FM/PS. Serve incorporated Clayton and some unincorp Kent County during annex. All new developments straight to Kent System by lift station/gravity. "Old Town" system 80-100 yrs old, probably needs to be redone.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

"Old Town" received planning grant for I/I study (~$30K) matching. Will include 5 year CIP. Otherwise do repairs when an issue is seen. No combined sewer. Believe it's an inflow problem and infiltration has been resolved.

12) Service Area Comments:

Major industries are CGD biodiesel (pre-treatment oil/water separator monitored by Kent Cnty), through Old Town. No major food processing or commercial.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

Recently increased rates (passed by council).

3) Do you have a reserve account? No

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? No

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Part of rate increase is to create a dedicated reserve account.

7) How are residential customer rates/bills computed (check all that apply)?

☐ EDU ☑ Metered ☐ Front-footage assessment

☑ Other (Describe): Metered by water usage; Some Unincorp Kent County estimated.

8) How are commercial, industrial, and contract user rates/bills computed?

Same as residential (flow based, no BOD or TSS fee).

9) Median Household Income (MHI) ($/year) $56,466

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$535,856
2.0 percent of MHI	$855,172
2.5 percent of MHI	$1,174,487

11) Rates, Billing, and MHI Comments:

New sewer is billed quarterly. Old sewer is billed monthly. Annual: $295.20 is flow based, $373.20 is bill based. $5/1,000 gal. Avg 4,920 gal/month. Minimum is $16.50/month. MHI is 2010 CPI.

12) What is the debt borrowing limit ($)? $1,000,000

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

$800K already used for new water treatment plant.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○

2) Comments (options considered, opportunities, barriers):

25 miles to Frederica.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

No treatment or pretreatment.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

N/A.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Solar on Water Treatment Plant.

Delaware Wastewater Study System Report

Town of Smyrna

ID: 87

220 Artisan Drive
Smyrna, DE 19977

City ID: SMYR

Town of Smyrna

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Dave Hugg	City Manager	Dhugg@smyrna.delaware.gov	(302)653-3492		
Daryl Jester	Director of Public Works	djester@smyrna.delaware.gov	(302)653-3482		
Marke Gede - NP	Finance Director	mgede@smyrna.delaware.gov	(302)653-3483		

2) Interviewer Name: CSG, TR

3) Interview Date: 2/10/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [ ] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: N/A - Treated by Kent County WWTP

2) Physical Address N/A

3) General level of treatment

- [ ] Primary Treatment
- [ ] Secondary Treatment
- [ ] Tertiary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal
- [x] Other (Describe): Collection only, no treatment.

4) What is source of treatment plant back-up power (check all that apply):

- ☐ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☐ Portable Generator
- ☐ Battery
- ☐ None
- ☑ Other (Describe): N/A. Collection only.

5) Permit Information: General

6) Treatment Plant Capacity:

Current Design Flow (MGD)		Average Daily Flow (MGD)	0.64
Peak Flow (MGD)		% of Average Daily Flow from Domestic Source	96.00
Anticipated Flow in 2020 (MGD)	0.96	Future Design Flow in 2030 (MGD	1.28

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ◉ About Normal (150-250 mg/l BOD and TSS)
- ○ Above Normal (>250 mg/l BOD and TSS) Reason:
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.

- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

0.64 flow incl about half of Clayton, measured at PS#1. Do not think Kent County is regularly testing Smyrna for strength, nutrients, etc.

Service Area

1) Service area, square miles: 4.50

2) Number of pump stations: 11

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☐ Other (Describe):
☑ Portable Generator
☐ Battery
☐ None

4) Number of holding tanks: 0

Town of Smyrna

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Smyrna	☐		3724	$303.00	$1,128,372.00
Clayton	☑				

7) Population served:

	Current	Future, 2030
Resident	10,000	20,000
Non-resident	2,000	2,000
Total	12,000	22,000

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Serve town limits south of Duck Creek. Also serves portions of Clayton. Kent meters and subtracts out the Rest Area, DEMA, DCC from Smyrna's flows (all north of Duck Creek, maintained by Kent). 2000 non-res is Clayton.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

No I/I issue. Continue maintenance to continue non-issue.

12) Service Area Comments:

FM/PS's. Gravity sewer (30 miles @ 8”-24”). Delaware Home and Hospital for the Chronically Ill is a large user (1 MG/year).

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? No

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Not reserved for WW. The Town of Smyrna has 3 million rainy day fund which can be used for capital construction but has to be authorized by Town Council. This reserve is combined with water and other public works.

7) How are residential customer rates/bills computed (check all that apply)?

☐ EDU ☑ Metered ☐ Front-footage assessment

☑ Other (Describe): Metered by water usage.

8) How are commercial, industrial, and contract user rates/bills computed?

Smyrna bills Clayton @ Clayton metering station (maintained by Clayton). Kent bills Smyrna full flow @ PS1 maintained by County (meter and PS). Large users are still billed by water meter.

9) Median Household Income (MHI) ($/year) $66,853

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$2,606,037
2.0 percent of MHI	$3,850,839
2.5 percent of MHI	$5,095,642

11) Rates, Billing, and MHI Comments:

2010 CPI is $47,047. MHI provided from Kent County Economic Study. The town's sewer rates are not based on MHI.

12) What is the debt borrowing limit ($)? $108,000,000

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $4,500,000

15) Borrowing Limit and Debt Comments:

Borrowing limit is 12% total assessed value of $900M. Potential outstanding debt in projects sheet via stimulus.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○

2) Comments (options considered, opportunities, barriers):

25 miles to Frederica, so no point in re-running line.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

- ◉ Yes
- ◉ No

4) Comments (to further explain your response to #3):

N/A.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

N/A.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

N/A.

Delaware Wastewater Study System Report

City of Lewes

ID: 78

Board of Public Works
107 Franklin Avenue, PO Box 518
Lewes, DE 19958

City ID: LEWS

City of Lewes

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Ken Meachem	BPW Manager	kmecham@ci.lewes.de.us	(302)645-6228		
Darrin Gordon - NP	Assistant General Manager of Public Works	bpwdgordon@ci.lewes.de.us	(302)645-6228		(302)645-6358
Walt Balmer	Severn Trent Services - PM				

2) Interviewer Name: CSG, JBM

3) Interview Date: 2/15/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- ( ) Municipal
- (•) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: City of Lewes STP

2) Physical Address 116 American Legion Road
Lewes, Delaware 19958

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [x] Nitrogen removal
- [x] Phosphorus removal

City of Lewes

☑ Tertiary Treatment ☐ Other (Describe):

4) What is source of treatment plant back-up power (check all that apply):

☑ On-site Generator (diesel/gasoline) ☐ Portable Generator ☐ Other (Describe):
☐ On-site Generator (natural gas from main) ☐ Battery
☐ On-site Generator (propane / natural gas from tank) ☐ None

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
DE0021512	NPDES	Stream Outfall	LEWES-REHOBOTH CANAL	22. Delaware Bay (Broadkill River)	38.774401	75.134593	1.5	9/1/2004	8/31/2009

6) Treatment Plant Capacity:

Current Design Flow (MGD)	1.50	Average Daily Flow (MGD)	0.68
Peak Flow (MGD)	1.15	% of Average Daily Flow from Domestic Source	90.00
Anticipated Flow in 2020 (MGD)	1.10	Future Design Flow in 2030 (MGD	1.30

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	5-Day BOD	200	300	LBS/DY		16	24	MG/L	Weekly	Comp-8
001	pH				6		9	SU	Daily	Grab
001	TSS	188	288	LBS/DY		15	23	MG/L	Weekly	Comp-8
001	Nitrogen, Total	100		LBS/DY		8		MG/L	Monthly	Comp-8
001	Phosphorus, Total	25		LBS/DY		2		MG/L	Monthly	Comp-8
001	Enterococci					10		#/ 100ML	Weekly	Grab
001	Flow	1.5		MGD					Continuous	Rcordr
001	Chlorine, Tot Res						0	MG/L	Daily	Grab

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

◉ About Normal (150-250 mg/l BOD and TSS)
○ Above Normal (>250 mg/l BOD and TSS) Reason:
○ Below Normal (<150 mg/l BOD and TSS) Reason:

City of Lewes

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 21 to 30 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years? No

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Recent studies conclude average effluent 2.5% to the Rehoboth Bay and 97.5% to the Delaware Bay, so nutrient offset is feasible. Current NPDES is under administrative extension. Previous clarifier now acting as 0.5MG emergency storage.

Service Area

1) Service area, square miles: 4.63

2) Number of pump stations: 32

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [x] Portable Generator
- [ ] Battery
- [x] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Lewes	☐	100	2400	$790.08	$1,896,192.00
Unincorporated - Sussex County	☐		30	$1,193.19	$35,795.70

7) Population served:

	Current	Future, 2030
Resident	7,500	11,250
Non-resident	80	900
Total	7,580	12,150

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Ppl does not include transient tourism. Growth/outside service due to large ongoing annexation per cmphsv plan. Working w/ SsxCo Regional for planning efficiency. About 174 commercial EDUs incl. 4 large condo/hotels.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

No I/I issue or combined sewer; Resolved since last survey. 5% manhole renewal annually. Plant able to handle coastal flooding.

12) Service Area Comments:

Gravity sewer, FM, four grinder pump stations, 56 pumps for 28 PSs (3 are lift stations). All Lewes proper is served. Some pockets within boundary not incorp (may or may not be served).

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

Recent rate increase.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 59

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Per cash reserve policy: 25% for OM, 2% for net asset cost/risk management, 15% of current capital budget (for future project funding), 15% set aside for 5 year CIP.

7) How are residential customer rates/bills computed (check all that apply)?

- ☐ EDU
- ☑ Metered
- ☐ Front-footage assessment
- ☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

No industry or contract users; no pretreatment systems. Commercial same as resident but larger fee comm. users and larger meters.

9) Median Household Income (MHI) ($/year) $63,281

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$374,605
2.0 percent of MHI	$1,143,469
2.5 percent of MHI	$1,912,333

11) Rates, Billing, and MHI Comments:

Lewes is W/WW/Elec. MHI is 2010 CPI.

12) What is the debt borrowing limit ($)? $20,000,000

13) How much of this limit ($) is allocated to the wastewater enterprise? $14,000,000

14) How much of this limit ($) available to the wastewater enterprise is used overall? $12,000,000

15) Borrowing Limit and Debt Comments:

Some Bonds, Most debt is recent plant upgrades through State Revolving Funds (projects are "finished").

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

City of Lewes

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	○	○	○	◉	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
Plant Internal Recirculation	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

Impact Area 7 for residential reuse (New Development). No major land or industry available to accept effluent. Also interested in shallow injection of effluent to act as a saltwater barrier.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

◉ Yes

○ No

4) Comments (to further explain your response to #3):

Recently upgraded secondary treatment train at plant.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

None.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

NPDES permit: Looking for alternatives/options for nutrient offset (trading) program for Inland Bays (N/P needs to be "0") through reforestation, wetland buffers/BMPs, relocate livestock manure, storage to match tidal influence.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Solar panel hot water heater, plant is new so no major retrofits, doing process control efficiency now. #1 effluent quality in State, best biosolids in the State.

Delaware Wastewater Study System Report

City of Rehoboth Beach

ID: 82

City ID: REHO

229 Rehoboth Avenue
PO Box C
Rehoboth Beach, DE 19971

City of Rehoboth Beach

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Greg Ferrese - NP	City Manager	gferrese@cityofrehoboth.com	(302)227-4641		
Sam Cooper	Mayor				
Rip Copithorn	GHD	Rip.Copithorn@ghd.com	(240)206-6815		
Bob Stenger	Wastewater Plant Supervisor		(302)227-7979		

2) Interviewer Name: CSG ,HKM

3) Interview Date: 11/11/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Currently applying for ocean outfall permit. TMDL compliance order in 2005 permit. New NPDES permit filed just before Sept. 2010. Alt Contact: information@cityofrehoboth.com.

Treatment Plant

1) Wastewater Treatment Plant Name: City of Rehoboth Beach STP

2) Physical Address State Road Extended
Sussex County, Delaware

3) General level of treatment

- [x] Primary Treatment
- [x] Nitrogen removal

City of Rehoboth Beach

- [x] Secondary Treatment
- [x] Tertiary Treatment
- [x] Phosphorus removal
- [x] Other (Describe): Solids Handling

4) What is source of treatment plant back-up power (check all that apply):

- [ ] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [ ] Portable Generator
- [ ] Battery
- [x] None
- [x] Other (Describe): 2nd feed of normal power (same substation, different transformer)

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
DE0020028	NPDES	Stream Outfall	LEWES-REHOBOTH CANAL	39. Inland Bays/Atlantic Ocean (Rehoboth Bay)	38.699249	75.093303	3.4	10/1/2005	9/30/2010

6) Treatment Plant Capacity:

Current Design Flow (MGD)	3.40	Average Daily Flow (MGD)	1.08
Peak Flow (MGD)	3.06	% of Average Daily Flow from Domestic Source	62.00
Anticipated Flow in 2020 (MGD)	1.24	Future Design Flow in 2030 (MGD	2.00

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	DO				5			MG/L	Daily	Grab
001	5-Day BOD	539	822	LBS/DY		15	29	MG/L	3/ Week	Comp-8
001	pH				6		9	SU	Daily	Grab
001	TSS	425	652	LBS/DY		15	23	MG/L	Daily	Comp-8
001	Nitrogen, Total (annual average)		24300	LB/YR					3/ Week	Comp-8
001	Phosphorus, Total (annual average)		5308	LB/YR					Daily	Comp-8
001	Enterococci					10		#/ 100ML	3/ Week	Grab
001	Flow	3.4		MGD					Continuous	Rcordr
001	Chlorine, Tot Res						0	MG/L	Daily	Grab

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (●) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 21 to 30 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- (●) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- ( ) No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- (●) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- ( ) No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years? No

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

TN/TP may not be required for ocean outfall. No NH3-N limit but there is a TN limit based on waste load allocation (WLA). TKN 40 mg/l.

Service Area

1) Service area, square miles: 1.00

2) Number of pump stations: 7

3) What is source of back-up power at pump stations?

- ☑ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane/natural from tank)
- ☑ Other (Describe): Dual Feed at main power.
- ☑ Portable Generator
- ☐ Battery
- ☐ None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Rehoboth Beach	☐		2200	$325.00	$715,000.00
Dewey Beach	☑				
Henlopen Acres	☑				
Unincorporated - Sussex County	☐		289	$633.22	$183,000.58

7) Population served:

	Current	Future, 2030
Resident	1,495	1,595
Non-resident	100	100
Total	1,595	1,695

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Rehoboth is gravity (23 miles @ 8-18") to FM into plant; Dewey is FM direct, Henlopen is FM to gravity. Unincorp SusxCo is North Shores. No significant industrial. Dewey/Henlopen by Sussex Co.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

No CSO. No major I/I issue, but coastal flooding inflow issues. Can temp divert to storage tank (1 MG, steel) or oxidation ditches during flooding (both post-prelim treatment).

12) Service Area Comments:

Major seasonal variations (peak is summer). Rehoboth population during winter is 1495. Summer is 4495 (not including tourists). Growth is 5 houses/year. 2200 is single-family homes (3500 includes condos, apts, etc.). 4th July hosts 18,000 ppl.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

Rates will increase in future to finance cost of alternative effluent discharge ocean outfall.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 2

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Reserve is for treatment plant.

7) How are residential customer rates/bills computed (check all that apply)?

- ☐ EDU
- ☑ Metered
- ☐ Front-footage assessment
- ☑ Other (Describe): Metered by water usage.

8) How are commercial, industrial, and contract user rates/bills computed?

Same as residential (off water meter).

9) Median Household Income (MHI) ($/year) $66,817

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$1,596,612
2.0 percent of MHI	$2,428,150
2.5 percent of MHI	$3,259,687

11) Rates, Billing, and MHI Comments:

3,500 EDU x $325 ~ $1,146,000. Dewey ~ $665,000. Henlopen ~ $65,000. North Shores ~ $183,000. Total ~ $2,060,000/yr. MHI is 2010 CPI. Current is 0.5%.

12) What is the debt borrowing limit ($)? $18,190,000

13) How much of this limit ($) is allocated to the wastewater enterprise? $16,000,000

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

City of Rehoboth Beach

Grant application $32 million for improvements (total estimated cost for transmission/plant/outfall). Current treatment plant is paid off.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	◉	○	○
Commercial/Industrial Use	○	○	◉	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

N/A.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

◉ Yes

◉ No

4) Comments (to further explain your response to #3):

N/A.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

N/A.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

Nutrient Loadings to Inland Bays - changing to ocean outfall so N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
Minor plant upgrades would be required for ag reuse.	

8) If reuse is not an option, what other methods are available to manage effluent?

Nutrient trading and various discharge options were studied, and ocean outfall is only viable option. Ocean outfall eliminates current discharge to Inland Bays thereby achieving compliance with the consent order.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Looking to upgrades solids from Class B to Class A.

Delaware Wastewater Study System Report

City of Seaford

ID: 83

PO Box 1100
414 High Street
Seaford, DE 19973

City ID: SEAF

City of Seaford

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Dolores Slatcher - NP	City Manager	dslatcher@seafordde.com	(302)629-9173		
Bryant Tifft	Operations Coordinator		(302)629-8340		(302)629-0206
Berley Mears	Director of Public Works	publicworks@seafordde.com	(302)629-8307		(302)628-6022
Charles Anderson	Asst. City Manager				

2) Interviewer Name: CSG, HKM

3) Interview Date: 2/3/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Seaford manages W/WW/Elec.

Treatment Plant

1) Wastewater Treatment Plant Name: City of Seaford WWTP

2) Physical Address 403 Nanticoke Avenue
Seaford, Delaware 19973

3) General level of treatment

City of Seaford

- [x] Primary Treatment
- [x] Secondary Treatment
- [x] Tertiary Treatment
- [x] Nitrogen removal
- [x] Phosphorus removal
- [x] Other (Describe): Solids Handling

4) What is source of treatment plant back-up power (check all that apply):

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [ ] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
DE0020265	NPDES		NANTICOKE RIVER	31. Chesapeake (Nanticoke River)	38.632835	75.618018	2	6/1/2008	5/31/2013

6) Treatment Plant Capacity:

Current Design Flow (MGD)	2.00	Average Daily Flow (MGD)	1.00
Peak Flow (MGD)	3.00	% of Average Daily Flow from Domestic Source	90.00
Anticipated Flow in 2020 (MGD)	2.00	Future Design Flow in 2030 (MGD	3.00

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) Yes

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	5-Day BOD	198	297	LBS/DY		12	18	MG/L	Week-Days	Comp-8
001	pH				6		9	SU	Daily	Grab
001	TSS	135	207	LBS/DY		8	13	MG/L	Week-Days	Comp-8
001	Nitrogen, Total (may-nov)	135		LBS/DY				MG/L	2/ Month	Comp-8
001	Nitrogen, Total (annual average)		49086	LB/YR					2/ Month	Comp-8
001	Phosphorus, Total	34	50	LBS/DY		2	3	MG/L	2/ Month	Comp-8
001	Enterococci					100		#/ 100ML	Week-Days	Grab

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ○ About Normal (150-250 mg/l BOD and TSS)
- ◉ Above Normal (>250 mg/l BOD and TSS) Reason: Unknown

○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 30 to 50 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

☐ Wash out of biomass due to inflow and infiltration
☐ Equipment failure
☐ Design issues
☐ Operational issues
☐ Low dissolved oxygen
☐ Low alkalinity
☐ Low temperature
☐ Toxic shock
☐ Unknown
☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

◉ Yes, actual limits in place now.
○ No limits currently. ANTICIPATE limits within 5 years.
○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

◉ Yes, actual limits in place now.
○ No limits currently. ANTICIPATE limits within 5 years.
○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years? No

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Low temperature
☐ Operational issues
☐ Design issues

☐ Unknown ☐ Other (explain)

25) General Treatment Plant Comments.

PCS dbase flow states 0.9, flow no longer in permit. Future flow of 3.0 is an early feasibility study for expansion only; no design or guarantee of need or buildout. Not anticipating DNREC to eliminate stream discharge, but proactively looking into spray application for dual permitting. Blades allotted capacity to ~10% (144,000 gpd). Allowed add'l 100,000 gpd increment purchase per schedule, but each increment goes away if can't show growth. #17 should be "YES", and #18 should be "Based on growth and increase of flow. Looking to spray irrigate some of our effluent to offset our loading limits." Also concerned about more strict N limit on TMDL.

Service Area

1) Service area, square miles: 5.00

2) Number of pump stations: 15

3) What is source of back-up power at pump stations?

☐ On-site Generator (diesel/gasoline) ☑ Portable Generator
☐ On-site Generator (natural gas from main) ☐ Battery
☐ On-site Generator (propane/natural from tank) ☑ None
☑ Other (Describe): Only 1 is none.

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Seaford	☐	92	1819	$446.88	$812,874.72
Blades	☑	8			

7) Population served:

	Current	Future, 2030
Resident	7,200	15,000
Non-resident	800	1,600
Total	8,000	16,600

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Newly annexed areas do not have extensions but are serviceable. Some enclave parcels may or may not be served (ex. Front St Extension served). Maj. is gravity sewer (8”-18”); some FM/PS. Major parts of system mapped.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

I/I issues during rain events: increase up to 2 MGD. Funding on-going; Mixed bag of I/I issues and sewer types. Worst area is "Old Town" (central) CSO was eliminated in early 2000's.

12) Service Area Comments:

Blades is operated by Sussex County incl. FM to interceptor MH near WWTP incl. under Nanticoke River. PS is physically in Blades. Invista not part of muni or WW system. Pre-treatment program managed by Seaford.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

Breakeven enterprise funds (O&M), but no major set-aside to start major capital improvements.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 5

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Emergencies or minor capital improvements.

7) How are residential customer rates/bills computed (check all that apply)?

- ☑ EDU
- ☐ Metered
- ☐ Front-footage assessment
- ☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

BASF, Orient Chem., Proceno Plating (Blades), Nanticoke Memorial, Allan's Hatchery, Seaford HS, 3 elem. schl., 1 middle schl. Most metered of water, some sewer meter (incl. Blades). Surcharge rates (TSS, BOD, nutrients, etc.) per individual agreements.

9) Median Household Income (MHI) ($/year) $49,275

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$531,594
2.0 percent of MHI	$979,750
2.5 percent of MHI	$1,427,906

11) Rates, Billing, and MHI Comments:

MHI is 2010 (Ssx Co?). 1 EDU is flat fee $37.24/month (based on 9,000 gal/month).

12) What is the debt borrowing limit ($)? $248,918,175

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $5,474,425

15) Borrowing Limit and Debt Comments:

Charter can't do over $2M w/o going to referendum. Borrowing limit is set in Charter at 25%.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	◉	○	○	○
Commercial/Industrial Use	○	◉	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
Golf Course	○	○	○	◉	○
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

See below for Ag and state lands. Hoopers Landing Golf Course, 1/4 mile from plant, 90 acres purchased (200 total, but concerned about leased land). Studying soil for past year incl. est. nutrient loadings per superintendent records.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

- ◉ Yes
- ○ No

4) Comments (to further explain your response to #3):

Tertiary.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

WWTP is close to State-owned Forestry. Some ag, available and interest but haven't looked into detailed agreements w/ farmers.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A - Not exceeding limits.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
Infrastructure (lines, pumping, etc.).	

8) If reuse is not an option, what other methods are available to manage effluent?

Current NPDES, RIBs if can find land, County has lots of land (reciprocal agreement).

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Looking into solar, and looking into access to green credits for green projects.

Delaware Wastewater Study System Report

Delmar Sewer Authority

ID: 73

101 S. Pennsylvania Ave
Delmar, DE 19940

City ID: DELM

Delmar Sewer Authority

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Jerome Reid	Public Works	wtp.delmar@verizon.net	(302)846-3696		
Kimberly Layton	Financial Officer	klayton.delmar@verizon.net	(302)846-2664	106	
Alonzo Hardy	Wastewater Treatment Plant Superintendent				
Georgia Tate - NP	Jerome Reid's Assistant				

2) Interviewer Name: CSG, JBM

3) Interview Date: 1/26/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Split at MD-DE State Line. WWTP is in MD, under MD NPDES. MD address is: 100 S. Pennsylvania Ave Delmar, MD 21875.

Treatment Plant

1) Wastewater Treatment Plant Name: Delmar WWTP

2) Physical Address 30055 Connelly Mill Road
Delmar, Wicomico County, MD 21875

3) General level of treatment

Delmar Sewer Authority

- ☐ Primary Treatment
- ☑ Secondary Treatment
- ☑ Tertiary Treatment
- ☐ Nitrogen removal
- ☐ Phosphorus removal
- ☑ Other (Describe): Solids Handling

4) What is source of treatment plant back-up power (check all that apply):

- ☑ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☐ Portable Generator
- ☐ Battery
- ☐ None
- ☐ Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
MD0020532	NPDES	Stream Outfall	Wood Creek	36. Chesapeake (Wicomico)	38.422509	75.568496	0.65	7/1/2007	6/30/2012

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.65	Average Daily Flow (MGD)	0.35
Peak Flow (MGD)	2.20	% of Average Daily Flow from Domestic Source	95.00
Anticipated Flow in 2020 (MGD)	1.50	Future Design Flow in 2030 (MGD	2.50

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? Yes

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) Yes

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	5-Day BOD (Apr-Sept, monthly avg)					20		MG/L		
001	5-Day BOD (Oct-Mar, monthly avg)					30		MG/L		
001	TSS					30		MG/L		
001	Phosphorus, Total (monthly avg)					0.5		MG/L		
001	Nitrogen, NH3 (Apr-Sept, monthly avg)					2.6		MG/L		
001	Nitrogen, NH3 (Oct-Mar, monthly avg)					14		MG/L		
001	Fecal Coliform						200	#/ 100ML		
001	E. Coli						126	#/ 100ML		
001	Chlorine, Tot Res						0.0123	MG/L		

001	DO	5		MG/L
001	pH	6.5	8.5	SU

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ○ About Normal (150-250 mg/l BOD and TSS)
- ◉ Above Normal (>250 mg/l BOD and TSS) Reason: Food processing
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? < 15 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? Yes

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years? Yes

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☑ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☑ Other (explain): Design has been going back and forth since 1996.

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? Yes

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years? Yes

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☑ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☑ Equipment failure
☐ Unknown
☐ Low temperature
☑ Operational issues
☑ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

Plant being upgraded w/ ENR/BNR and increased capacity of 0.85 MGD. Limitations listed are interim. Interim Total N goal is stated in permit text. See permit for final limits. Plan to be in compliance with final limits within next two years (construction, startup and testing). Funding and design in place.

Service Area

1) Service area, square miles: 7.00

2) Number of pump stations: 11

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☑ Other (Describe): Bypass gravity feeds.
☐ Portable Generator
☐ Battery
☐ None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Delmar	☐	99	1809	$275.53	$498,433.77
Unincorp - Wicomico Cnty (MD)	☐	1	12	$476.44	$5,717.28

7) Population served:

	Current	Future, 2030
Resident	4,523	7,037
Non-resident	30	30
Total	4,553	7,067

8) Is service area digitized? No

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Delmar Sewer Authority

Service Delmar municipal limits (MD/DE), plus 2 other small residential areas and MHP's in unincorporated Wicomico County, MD. No service to unincorporated Susx Co. No combined sewer.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

Experience I/I due to old lines and manholes. Identified critical areas and small upgrades such as inserts. Conducting some studies and smoke testing. No comprehensive study at this time.

12) Service Area Comments:

No major industrial flows, some commercial flows. Evo Brewery is considered a commercial user.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

Just revised rates to meet new upgrades.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? No

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 9

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Emergency repairs or can take out a portion for a major project. Water and Sewer reserve fund is combined.

7) How are residential customer rates/bills computed (check all that apply)?

- [x] EDU
- [x] Metered
- [x] Front-footage assessment
- [ ] Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

Breckenridge (non-metered MHP) is flat fee per EDU. Commercial is metered and converted to EDU, flow only.

9) Median Household Income (MHI) ($/year) $34,842

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$447,558
2.0 percent of MHI	$764,795
2.5 percent of MHI	$1,082,031

11) Rates, Billing, and MHI Comments:

Billed quarterly, Avg Annual Rate is based on 12,557 gal/qtr per EDU, plus add'l rates. MHI is 2010 CPI.

12) What is the debt borrowing limit ($)? $33,000,000

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $233,600

15) Borrowing Limit and Debt Comments:

Cannot exceed 25% of assessment.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	◉	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	○	◉	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○

2) Comments (options considered, opportunities, barriers):

No local industry for industrial reuse, not feasible for residential. Solids go to belt press, aerobic digester, drying bed, and landfill.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

◉ Yes

○ No

4) Comments (to further explain your response to #3):

Will meet standards once ENR/BNR system is installed.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Land is available in Maryland. Farmers do not want to assume responsibility for nutrient management, water management, or solids.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A - upgrades should meet the requirements.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
Pipeline.	

Spray equipment.	

8) If reuse is not an option, what other methods are available to manage effluent?

Don't know.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

None.

Delaware Wastewater Study System Report

Sussex County - Inland Bays Regional WWTF

ID: 76

PO Box 589
22215 Dupont Blvd.
Georgetown, DE 19947

City ID: SUSXIB

Sussex County - Inland Bays Regional WWTF

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Mike Izzo	County Engineer	mizzo@sussexcountyde.gov	(302)855-7718		(302)855-7799
Michael Winters	District Manager	mwinters@sussexcountyde.gov	(302)947-0864		
Heather Sheridan	Director of Environmental Services	hsheridan@sussexcountyde.gov	(302)855-7730		

2) Interviewer Name: CSG, JC

3) Interview Date: 1/20/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: Inland Bays Regional WWTF

2) Physical Address

29445 Inland Bay Rd
(Country Road 306)
Millsboro, DE 19966

3) General level of treatment

- [ ] Primary Treatment
- [x] Nitrogen removal

Sussex County - Inland Bays Regional WWTF

- [x] Secondary Treatment
- [x] Tertiary Treatment
- [ ] Phosphorus removal
- [x] Other (Describe): Storage Lagoons for Spray

4) What is source of treatment plant back-up power (check all that apply):

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [ ] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
LTS 5004-90-06A	State	Field	North Field, South Field and Burton Field	39. Inland Bays/Atlantic Ocean (Rehoboth Bay)	38.642486	75.226909		9/5/2006	9/4/2011

6) Treatment Plant Capacity:

Current Design Flow (MGD)	2.13	Average Daily Flow (MGD)	0.55
Peak Flow (MGD)	0.80	% of Average Daily Flow from Domestic Source	89.00
Anticipated Flow in 2020 (MGD)	2.80	Future Design Flow in 2030 (MGD	3.70

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	5-Day BOD					50		MG/L		
001	TSS					90		MG/L		
001	Fecal Coliform					200		#/ 100ML		
001	pH				5.5		9	SU		
001	Chlorine, Tot Res				1		4	MG/L		
001	Chloride (annual average)					350		MG/L		
001	Sodium (annual average)					210		MG/L		
001	Nitrogen, Total (annual per acre)		250	LB/YR						
001,002	Chloride (annual average)					350		MG/L		
001,002	Sodium (annual average)					210		MG/L		

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 30 to 50 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- (•) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- ( ) No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? Yes

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ( ) Yes, actual limits in place now.
- (•) No limits currently. ANTICIPATE limits within 5 years.
- ( ) No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits? No

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform

☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Plant dated 1992. Amended permit in 2009 (added another spray field). Before Ph I expansion design flow was 1.46 MGD. Phases II and III are ready for 2020 and 2030 flows. Total N for year exceeded by Nov. New Biolac system should resolve Total N and anticipated Total P. Studying soil mobility of Phos now.

Service Area

1) Service area, square miles: 15.87

2) Number of pump stations: 87

3) What is source of back-up power at pump stations?

- ☑ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane/natural from tank)
- ☐ Other (Describe):
- ☑ Portable Generator
- ☐ Battery
- ☑ None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
SCSSD - IB - Long Neck	☐		6833	$617.94	$4,222,384.02
SCSSD - IB - Oak Orchard	☐		799	$700.00	$559,300.00
SCSSD - IB - Angola	☐		135	$912.00	$123,120.00

7) Population served:

	Current	Future, 2030
Resident	20,111	145,526
Non-resident	0	0
Total	20,111	145,526

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Gravity and force mains, Sixty-three "E1" grinder pump stations incl. Ellendale; Seasonal flow variations (more in summer).

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

Study performed by consultants and County showed system did not meet EPA's definition of excessive I/I.

12) Service Area Comments:

Stopped accepting private septage in 04/2008 -> now goes to South Coastal.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

None.

7) How are residential customer rates/bills computed (check all that apply)?

- [x] EDU
- [ ] Metered
- [x] Front-footage assessment
- [ ] Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

Same as residents.

9) Median Household Income (MHI) ($/year) $48,422

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$736,601
2.0 percent of MHI	$2,617,069
2.5 percent of MHI	$4,497,538

11) Rates, Billing, and MHI Comments:

Long Neck 2010 CPI: $45,067; Oak Orchard used SusxCo in 2008 Rate Study: $50,939. Took average of 2.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

Sussex County declined to disclose debt information or reserve amount.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	○	○	◉
Commercial/Industrial Use	○	○	○	○	○
Residential Use	○	○	○	○	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
N/A-Additional reuse method not specified	○	○	○	○	○
N/A-Additional reuse method not specified	○	○	○	○	○
N/A-Additional reuse method not specified	○	○	○	○	○

2) Comments (options considered, opportunities, barriers):

175 acres on-site for sludge spreading; spray on Ag land - more spray sites

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

Biolac proposed effluent: BOD, TSS - 15, TN - 10.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Sussex County owns 2,188 acres.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

Current upgrades meet future limits.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

See South Coastal response.

Delaware Wastewater Study System Report

Sussex County - Piney Neck Regional WWTF

ID: 81

PO Box 589
22215 Dupont Blvd.
Georgetown, DE 19947

City ID: SUSXPN

Sussex County - Piney Neck Regional WWTF

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Mike Izzo	County Engineer	mizzo@sussexcountyde.gov	(302)855-7718		(302)855-7799
Holly Brittingham	District Manager	hbrittingham@sussexcountyde.gov	(302)732-9540		
Heather Sheridan	Director of Environmental Services	hsheridan@sussexcountyde.gov	(302)855-7730		

2) Interviewer Name: CSG, JC

3) Interview Date: 1/20/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: Piney Neck Regional WWTF

2) Physical Address 29535 Piney Neck Road
(County Road 336)
Dagsboro, DE

3) General level of treatment

- [ ] Primary Treatment
- [ ] Nitrogen removal

Sussex County - Piney Neck Regional WWTF

- [x] Secondary Treatment
- [ ] Tertiary Treatment
- [ ] Phosphorus removal
- [x] Other (Describe): Storage Lagoons for Spray

4) What is source of treatment plant back-up power (check all that apply):

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [ ] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
LTS-5003096-08	State	Field	001 - On-Site Spray Fields	42. Inland Bays/Atlantic Ocean (Indian River Bay)	38.562538	75.235557		7/22/2008	7/21/2013
LTS-5003096-08	State	Spray	002 - Loblolly Pine Plantation	42. Inland Bays/Atlantic Ocean (Indian River Bay)	38.563934	75.238940		7/22/2008	7/21/2013

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.20	Average Daily Flow (MGD)	0.09
Peak Flow (MGD)	0.10	% of Average Daily Flow from Domestic Source	81.00
Anticipated Flow in 2020 (MGD)	0.95	Future Design Flow in 2030 (MGD	1.60

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001,002	5-Day BOD					50		MG/L		
001,002	TSS					90		MG/L		
001,002	Fecal Coliform					200		#/ 100ML		
001,002	pH				5.5		9	SU		
001,002	Chlorine, Tot Res				1		4	MG/L		
001	Nitrogen, Total (annual per acre)		350	LB/YR						
002	Nitrogen, Total (annual per acre)		300	LB/YR						

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 30 to 50 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- (•) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- ( ) No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- (•) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- ( ) No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years? No

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Seasonal flow variation. Seasonal flow limits: 0.166 (s); 0.141 (w). Trying to figure out how to meet PSN2 and PSP1 IBPCS regs for new of permitting (data not yet available for phosphate mobility in soil).

Service Area

1) Service area, square miles: 3.66

2) Number of pump stations: 7

3) What is source of back-up power at pump stations?

- ☑ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane/natural from tank)
- ☐ Other (Describe):
- ☐ Portable Generator
- ☐ Battery
- ☐ None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Dagsboro-Frankford	☐		556	$412.48	$229,338.88

7) Population served:

	Current	Future, 2030
Resident	2,903	3,653
Non-resident	0	0
Total	2,903	3,653

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

N/A.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

Do not see excess I/I in this system.

12) Service Area Comments:

District is "Dagsboro-Frankford" including some unincorporated Sussex County. Dagsboro and Frankford are each an incorporated town.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

None.

7) How are residential customer rates/bills computed (check all that apply)?

- [x] EDU
- [ ] Metered
- [x] Front-footage assessment
- [ ] Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

Same as residents.

9) Median Household Income (MHI) ($/year) $47,375

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$165,769
2.0 percent of MHI	$297,471
2.5 percent of MHI	$429,174

11) Rates, Billing, and MHI Comments:

2010 CPI - Frankford: $45,905, Dagsboro: $48,845, took average.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

Sussex County declined to disclose debt information or reserve amount.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	○	○	◉
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○

2) Comments (options considered, opportunities, barriers):

N/A.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

BOD=26, TSS=25, fecal <1 (OK).

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Adjacent land owner and contract farmer is interested in expanding the effluent spray application to 23 acres. County owns an additional 158 for spray expansion.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

N/A.

Delaware Wastewater Study System Report

Sussex County - South Coastal Regional WWTF

ID: 85

PO Box 589
22215 Dupont Blvd.
Georgetown, DE 19947

City ID: SUSXSC

Sussex County - South Coastal Regional WWTF

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Mike Izzo	County Engineer	mizzo@sussexcountyde.gov	(302)855-7718		(302)855-7799
Loran George	District Manager	lgeorge@sussexcountyde.gov	(302)855-7730		
Heather Sheridan	Director of Environmental Services	hsheridan@sussexcountyde.gov	(302)855-7730		

2) Interviewer Name: CSG, JC

3) Interview Date: 1/20/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Effluent joins treated effluent from Selbyville's WWTF and discharges through diffusers at the end of ocean outfall, located about 5,000 ft. from the shore.

Treatment Plant

1) Wastewater Treatment Plant Name: South Coastal Regional WWTF

2) Physical Address 33711 S. Coastal Lane
(County Road 368)
South of Ocean View, Sussex County, Delaware

3) General level of treatment

Sussex County - South Coastal Regional WWTF

- ☐ Primary Treatment
- ☑ Secondary Treatment
- ☑ Tertiary Treatment
- ☐ Nitrogen removal
- ☐ Phosphorus removal
- ☐ Other (Describe):

4) What is source of treatment plant back-up power (check all that apply):

- ☑ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☐ Portable Generator
- ☐ Battery
- ☐ None
- ☐ Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
DE0050008	NPDES	Ocean Outfall	ATLANTIC OCEAN	45. Inland Bays/Atlantic Ocean (Little Assawoman)	38.524007	74.956693	9	1/1/2005	12/31/2009

6) Treatment Plant Capacity:

Current Design Flow (MGD)	9.00	Average Daily Flow (MGD)	2.30
Peak Flow (MGD)	6.80	% of Average Daily Flow from Domestic Source	80.60
Anticipated Flow in 2020 (MGD)	8.10	Future Design Flow in 2030 (MGD	16.60

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	Flow	9		MGD					Continuous	Rcordr
001	Chlorine, Tot Res				1		4	MG/L	Daily	Grab
001	5-Day BOD (may-nov)	1126	1151	LBS/DY		15	23	MG/L	3/ Week	Comp-8
001	5-Day BOD (dec-apr)	1126	1151	LBS/DY		15	23	MG/L	Weekly	Comp-8
001	pH				6		9	SU	Daily	Grab
001	TSS (may-nov)	1126	1151	LBS/DY		15	23	MG/L	3/ Week	Comp-8
001	TSS (dec-apr)	1126	1151	LBS/DY		15	23	MG/L	Weekly	Comp-8
001	Enterococci (may-nov)					10		#/ 100ML	Daily	Grab
001	Enterococci (dec-apr)					10		#/ 100ML	Weekly	Grab

Sussex County - South Coastal Regional WWTF

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 21 to 30 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ( ) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- (•) No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ( ) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- (•) No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Can handle up to 14 MGD. 22 MGD is max at outfall. Selbyville using 1.5 MGD outfall (Selb. Says authorized up to 2 MGD). 2007: upgrades: addl treatment capacity, new aeration, clarifiers, grit treatment, surge control, odor control, new solids handling [Class A]).

Service Area

1) Service area, square miles: 33.17

2) Number of pump stations: 106

3) What is source of back-up power at pump stations?

- ☑ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane/natural from tank)
- ☐ Other (Describe):
- ☑ Portable Generator
- ☐ Battery
- ☐ None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Bethany Beach	☐		3721	$323.00	$1,201,883.00
South Bethany	☐		5221	$329.00	$1,717,709.00
Fenwick Island	☐		5983	$391.00	$2,339,353.00
Ocean View	☐		1150	$622.00	$715,300.00
SCSSD - SC - Holts Landing	☐		500	$712.00	$356,000.00
SCSSD - SC - Miller Creek	☐		413	$948.00	$391,524.00
Millville	☐		2395	$772.00	$1,848,940.00
Selbyville	☑				
SCSSD - SC - Jhnsns Crnr	☐		62	$880.00	$54,560.00
SCSSD - SC - Bay View Ests	☐		162	$1,012.00	$163,944.00
SCSSD - SC - Cedar Neck	☐		1690	$668.00	$1,128,920.00
SCSSD - SC - N. Bethany	☐		979	$1,453.00	$1,422,487.00
SCSSD - SC - Sea Country Ests	☐		40	$757.00	$30,280.00
SCSSD - SC - S Ocean View	☐		262	$801.00	$209,862.00

7) Population served:

	Current	Future, 2030
Resident	67,791	95,420
Non-resident	560	616

Total	68,351	96,036

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Domestic flow: 26,817 EDUs, Commercial: 453 EDUs; 212+ pumps total for PS; Seasonal variation: Winter average daily – 2.0 mgd; Summer – 4.5 mgd; Survey previously conducted; Funds allocated annually to slip line problem areas. Non-res is Selbyville.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

I/I issues resolved, sliplined all conc. pipes and inserts.

12) Service Area Comments:

Private septic haulers outside boundaries may haul to South Coastal septic receiving station. The facility treated 5,345,972 gallons of septage or holding tank waste (year 2010). EDUs from 2010 growth calendar. Rates use 2008 rate study or est. 60' frntg.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

None.

7) How are residential customer rates/bills computed (check all that apply)?

- ☑ EDU
- ☐ Metered
- ☑ Front-footage assessment
- ☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

Same as residents.

9) Median Household Income (MHI) ($/year) $50,537

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$5,534,604
2.0 percent of MHI	$11,239,726
2.5 percent of MHI	$16,944,848

11) Rates, Billing, and MHI Comments:

Sussex County MHI 2009 ACS. (SusxCo MHI 2000 w/ CPI is $50,939).

12) What is the debt borrowing limit ($)?	$0
13) How much of this limit ($) is allocated to the wastewater enterprise?	$0
14) How much of this limit ($) available to the wastewater enterprise is used overall?	$0

15) Borrowing Limit and Debt Comments:

Sussex County declined to disclose debt information or reserve amount.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	○	◉	○	○	○
Residential Use	○	◉	○	○	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
Recycle effluent for plant processes	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

No local farmer interest or land availability for crop irrigation.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

- ○ Yes
- ◉ No

4) Comments (to further explain your response to #3):

Does not meet TSS/BOD req'ts.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

None.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

All permits and anticipated permits being met.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

Expansion of plant (Hydraulic capacity of ocean outfall is 22 MGD).

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Class "A" Biosolids w/ liming agent for pH adjustment by local farmers.

Delaware Wastewater Study System Report

Sussex County - Wolfe Neck WWTF

ID: 86

PO Box 589
22215 Dupont Blvd.
Georgetown, DE 19947

City ID: SUSXWN

Sussex County - Wolfe Neck WWTF

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Mike Izzo	County Engineer	mizzo@sussexcountyde.gov	(302)855-7718		(302)855-7799
Heather Sheridan	Director of Environmental Services	hsheridan@sussexcountyde.gov	(302)855-7730		
Gordy Serman	District Manager	gserman@sussexcountyde.gov	(302)644-2761		

2) Interviewer Name: CSG, JC

3) Interview Date: 1/20/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: Wolfe Neck WWTF

2) Physical Address 36160 Wolfe Neck Rd (Road 270)
Rehoboth Beach, DE 19971

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal

Sussex County - Wolfe Neck WWTF

☐ Tertiary Treatment ☑ Other (Describe): Storage Lagoons for Spray

4) What is source of treatment plant back-up power (check all that apply):

☐ On-site Generator (diesel/gasoline) ☐ Portable Generator ☐ Other (Describe):
☐ On-site Generator (natural gas from main) ☐ Battery
☑ On-site Generator (propane / natural gas from tank) ☐ None

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
LTS 5005-95-05	State	Field	On site spray fields	38. Inland Bays/Atlantic Ocean (Lewes-Rehoboth Canal)	38.748109	75.108352	4	10/14/2005	10/18/2010

6) Treatment Plant Capacity:

Current Design Flow (MGD)	4.00	Average Daily Flow (MGD)	1.52
Peak Flow (MGD)	2.10	% of Average Daily Flow from Domestic Source	75.00
Anticipated Flow in 2020 (MGD)	7.00	Future Design Flow in 2030 (MGD	10.00

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	5-Day BOD					50		MG/L		
001	TSS					90		MG/L		
001	Fecal Coliform					200		#/ 100ML		
001	pH				5		9	SU		
001	Chlorine, Tot Res				1		4	MG/L		
001	Nitrogen, Total (annual per acre)		396	LB/YR						

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

◉ About Normal (150-250 mg/l BOD and TSS)
○ Above Normal (>250 mg/l BOD and TSS) Reason:
○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

Sussex County - Wolfe Neck WWTF

11) What is the typical average strength of the influent wastewater NH3-N? 30 to 50 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years? No

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Sussex County - Wolfe Neck WWTF

Permitted for 4.0 MGD (May-Sept) and 2.23 MGD (Oct-April). Seasonal avg flows: 2.3 (summer) 1.9 (winter). Trying to figure out how to meet PSN2 and PSP1 IBPCS regs for new of permitting (data not yet available for phosphate mobility in soil). Running out of room to spray (using 306 of 320 acres rented from Parks and Rec. Looking into RIBs or Biolac.

Service Area

1) Service area, square miles: 19.94

2) Number of pump stations: 89

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [x] Portable Generator
- [ ] Battery
- [x] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
SCSSD - WN - W. Rehoboth Expsn. Area	☐	100	13485	$705.80	$9,517,713.00

7) Population served:

	Current	Future, 2030
Resident	41,454	442,638
Non-resident	0	0
Total	41,454	442,638

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

PS: 190+ pumps total; Plus smaller grinder pumps throughout system.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

Study performed in Fall 2010. Data showed facility did not have excessive I/I according to EPA standard of 275 gpcd. Facility had max daily flow per capita of 75.5 for 5 year period of study.

12) Service Area Comments:

N/A.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

None.

7) How are residential customer rates/bills computed (check all that apply)?

- [x] EDU
- [ ] Metered
- [x] Front-footage assessment
- [ ] Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

Same as residents.

9) Median Household Income (MHI) ($/year) $50,537

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$704,659
2.0 percent of MHI	$4,112,116
2.5 percent of MHI	$7,519,573

11) Rates, Billing, and MHI Comments:

W. Rehoboth Exp. Area used Sussex County MHI in 2008 rate study. 2009 ACS is $50,537. SusxCo MHI 2000 w/ CPI is $50,939.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

Sussex County declined to disclose debt information or reserve amount.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

Sussex County - Wolfe Neck WWTF

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	○	○	◉
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○

2) Comments (options considered, opportunities, barriers):

Spray for Ag use. Have permit for Class B sludge (any facility) but no need at this time for this facility.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

TSS = 19.7 (>10), BOD = 18.2 (>10), Fecal Coliform <1 (OK).

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Land is limited Expansion of land application not considered viable. County conducting analysis of WW handling options. One solution presented in the report included sending excess flow from Rehoboth to the IBRWF for treatment and disposal. Maybe RIBs.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

Meeting current administrative permit requirements, but unsure how to meet upcoming performance standards.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
Filters.	$1,000,000

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Getting solar at one plant soon. Recent study for wind energy, not sure of result.

Delaware Wastewater Study System Report

Town of Georgetown

ID: 74

39 The Circle
Georgetown DE 19947

City ID: GEOR

Town of Georgetown

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Gene Dvnornick	Town Manager	gdvornick@georgetowndel.com	(302)856-7391		
Keith Hudson	Superintendent Wastewater Treatment Facilities	kdhudson@hughes.net	(302)836-7377		(302)856-7934
Laura Givens	Finance Manager	lgsmith@georgetowndel.com	(302)856-7391		

2) Interviewer Name: CSG, JBM

3) Interview Date: 2/15/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Population and flow rates based on 38% growth rate per 2000 vs. 2010 census.

Treatment Plant

1) Wastewater Treatment Plant Name: Town of Georgetown WRF

2) Physical Address 24027 Cedar Lane
Georgetown, DE 19947

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [x] Nitrogen removal
- [x] Phosphorus removal

☐ Tertiary Treatment ☑ Other (Describe): Some Solids, Storage lagoons for spray

4) What is source of treatment plant back-up power (check all that apply):

☑ On-site Generator (diesel/gasoline) ☐ Portable Generator ☐ Other (Describe):
☐ On-site Generator (natural gas from main) ☐ Battery
☐ On-site Generator (propane / natural gas from tank) ☐ None

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
LTS-50 14-91-09	State	Field	County Road 318	40. Inland Bays/Atlantic Ocean (Indian River)	38.655728	75.332046	1.3	2/5/2009	2/4/2014

6) Treatment Plant Capacity:

Current Design Flow (MGD)	1.30	Average Daily Flow (MGD)	0.85
Peak Flow (MGD)	1.60	% of Average Daily Flow from Domestic Source	92.00
Anticipated Flow in 2020 (MGD)	1.18	Future Design Flow in 2030 (MGD	2.50

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	5-Day BOD					50		MG/L		
001	TSS					50		MG/L		
001	Fecal Coliform					200		#/ 100ML		
001	pH				5.5		9	SU		
001	Chlorine, Tot Res				1		4	MG/L		
001	Nitrogen, Total (annual per acre)		400	LB/YR						

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

◉ About Normal (150-250 mg/l BOD and TSS)
○ Above Normal (>250 mg/l BOD and TSS) Reason:
○ Below Normal (<150 mg/l BOD and TSS) Reason:

Town of Georgetown

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 21 to 30 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Spray Irrigation due to Inland Bays restrictions. NPDES went away in 2003. Phosphorus lowered through sodium alum chem addition for crop control (summer) but not regulated. Winter is caustic soda so no Phos control. Looking for funding for heated building to do sodium alum year round. Otherwise adhere to Baxter Farm Nutrient Management Plan. Avg. daily flow est. 1.175 MGD in 2020 and 1.63 MGD in 2030. Design flow is estimated at 1.8 MGD in 2020 and 2.5 MGD in 2030.

Service Area

1) Service area, square miles: 4.50

2) Number of pump stations: 21

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [x] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [x] Portable Generator
- [ ] Battery
- [ ] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Georgetown	☐		1881	$648.92	$1,220,618.52
Ellendale	☑				
Unincorporated - Sussex County	☐		57	$919.80	$52,428.60

7) Population served:

	Current	Future, 2030
Resident	6,422	12,286
Non-resident	500	1,000
Total	6,922	13,286

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

All G-town proper served plus E-dale. SsxCo Correctional (F), County Airport (F), Delmarva Christian HS (W), Sussex Central HS (F), Sports at the Beach, Woods at Walls Creek (F) Golf Village, SsxTechHS; Del Tech; F=at PS, W=water meter. Mostly gravity?

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

G-town I/I issues mostly in "Old Town": Eastern Side/Kimmytown. Brick MH/ TC pipes from 1930/40's see infiltration during storms, creates pipeline back-ups. See 50% instantaneous peak increases. Most inflow problems fixed. Some funding for studies rec'd.

12) Service Area Comments:

Ellendale system is operated/maintained by Sussex County incl. FM to G-town. No resid cnnctns b/w E-dale and G-town. Expanding service area? Ind. user SusxCo Ind./Air Park (DeCrane, Justin Fiberglass, small poultry process). Perdue is bathrooms only.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

Council recently approved rate increase.

3) Do you have a reserve account? No

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? No

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Holding 2 years of impact fees for future projects. Establishing reserve account part of new plan.

7) How are residential customer rates/bills computed (check all that apply)?

- [x] EDU
- [x] Metered
- [ ] Front-footage assessment
- [ ] Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

See service area for comm. (some sewer meter, some water meter). Agreement with Sussex County for E-dale is an operational expense ratio (audited).

9) Median Household Income (MHI) ($/year) $41,412

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	
2.0 percent of MHI	$332,082
2.5 percent of MHI	$733,364

11) Rates, Billing, and MHI Comments:

Bill quarterly. Three apt complexes as residential. Most properties are metered.

12) What is the debt borrowing limit ($)? $33,853,658

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $14,751,652

15) Borrowing Limit and Debt Comments:

Per charter, cannot exceed 75% of assessed value. Using past Grants and SRF.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	○	○	◉
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

See permit for spray sites. DDR in to DNREC for woods spray site. Sludge to land application every 5-10 years.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

Think could probably meet but standards but don't have official tertiary treatment (filtration) system.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

See #2. No other ag landowners have shown interest.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A, Currently using reuse to meet permit req's.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
Tertiary Treatment.	
Additional land and transmission infrastructure.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Not at this time.

Delaware Wastewater Study System Report

Town of Bridgeville

ID: 72

Waste Water Treatment Facilities
101 North Main Street
Bridgeville, DE 19933

City ID: BRDG

Town of Bridgeville

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Jeff Collins	Wastewater Treatment Plant Superintendent	jcollinstob@gmail.com	(302)337-7843		
Merit Burke - NP	Town Manager	mburke@ddmg.net	(302)337-7135		
Jesse Savage	Financial Director	jsavage@ddmg.net	(302)337-7135		

2) Interviewer Name: CSG, HKM

3) Interview Date: 1/31/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: Town of Bridgeville WWTF

2) Physical Address Main Street and SR13A
Bridgeville, Delaware

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [x] Tertiary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal
- [x] Other (Describe): Solids Handling

4) What is source of treatment plant back-up power (check all that apply):

- ☑ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☑ Portable Generator
- ☐ Battery
- ☐ None
- ☐ Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
DE0020249	NPDES	Stream Outfall	001 - BRIDGEVILLE BRANCH (INTERIM)	31. Chesapeake (Nanticoke River)	38.745735	75.579676	0.8	2/1/2009	1/31/2012
LTS 5006-07-09	State	Spray	002 - Tatman Farm Spray Irrigation Facility	32. Chesapeake (Gum Branch)	38.733923	75.554111		2/13/2009	2/12/2014

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.80	Average Daily Flow (MGD)	0.23
Peak Flow (MGD)	1.00	% of Average Daily Flow from Domestic Source	85.00
Anticipated Flow in 2020 (MGD)	0.25	Future Design Flow in 2030 (MGD	0.28

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) Yes

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
002	5-Day BOD					50		MG/L		
002	TSS					50		MG/L		
002	Fecal Coliform					200		#/ 100ML		
002	Chlorine, Tot Res				1		4	MG/L		
002	Chloride (annual average)					350		MG/L		
002	Sodium (annual average)					210		MG/L		
002	Nitrogen, Total (annual per acre)		300	LB/YR						
001	DO (jan-may)				1			MG/L	Daily	Grab
001	DO (jun-dec)				4			MG/L	Daily	Grab
001	5-Day BOD	79.4		LBS/DY		20	30	MG/L	Weekly	Comp-8

Town of Bridgeville

001	pH				6		9	SU	Daily	Grab
001	TSS	100	150	LBS/DY		15	23	MG/L	Weekly	Comp-8
001	Nitrogen, Total (may-nov)	52.9		LBS/DY				MG/L	Monthly	Comp-8
001	Nitrogen, Total (annual average)		19312	LB/YR					Monthly	Comp-8
001	Phosphorus, Total (may-nov)	13.4		LBS/DY				MG/L	Monthly	Comp-8
001	Phosphorus, Total (annual average)		4909	LB/YR					Monthly	Comp-8
001	Enterococci					100		#/ 100ML	Weekly	Grab

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 30 to 50 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- (•) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- ( ) No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? Yes

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- (●) Yes, actual limits in place now.
- ( ) No limits currently. ANTICIPATE limits within 5 years.
- ( ) No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years? Yes

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

Current projections show ultimate build-out at 5,646 EDUs which equates to 1.167 MGD. TMDLs: BOD5, Total N, Total P, and bacteria (enterococcus). Advised biological nitrogen removal (BNR) and biological or chemical phosphorus removal will be necessary for discharge to Nanticoke, so added spray system. 6) Actual capacity at 0.367 based on future permit and nutrient loadings. 15) NPDES yes, Spray no. Plant is old, needs major upgrades. RBCs past life expectancy (8 total, 1 down). 2006-2007 was for Parkson GeoReactors, but they kept failing. Wet well 2 stories below grade for gravity mains. 6600' to stream, then addl 4 miles to spray site. Camera crews cut about 25 holes in top of 18" effluent pipe when former gravity line so discharge is an issue. Existing treatment process is not capable of removing nitrogen and therefore replacement of current treatment plant will be necessary to meet future nitrogen limits. Future phosphorus limits will be difficult to meet with the current treatment plant and replacement will be necessary. See reuse for spray site info.

Service Area

1) Service area, square miles: 2.38

2) Number of pump stations: 2

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☐ Other (Describe):
☐ Portable Generator
☐ Battery
☐ None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

Town of Bridgeville

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Bridgeville	☐	63	916	$336.00	$307,776.00
Greenwood	☑	37			

7) Population served:

	Current	Future, 2030
Resident	2,013	4,500
Non-resident	1,125	1,489
Total	3,138	5,989

8) Is service area digitized? Yes

9) Map obtained? No

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Serve all of Bridgeville and Greenwood muni limits except as stated below. Greenwood not part of #7. Most of town is gravity sewer (8-30" @ 36,950 ft). 2 pumps per PS. Heritage Shores and McD's/Sonic direct to WWTP.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

Have I/I problem, but need to fully quantify. Nothing specific is being done to fix it.

12) Service Area Comments:

Unserved areas in Bridgeville muni limits: Two (2) lots along Market St; Two (2) acres along Sussex Ave. extended; One (1) home at Railroad Ave. High strength from Rapa Scrapple (4.5 MG/yr) and Cannon Cold Storage (1.6 MG/yr); both have pretreatment.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

Recently increased rates, July 2010.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 15

6) Reserve account restrictions / comments (example: "emergency repairs only"):

No formal restrictions (repairs only). Also, Greenwood pays into a sinking fund (1% per year) for repairs in Bridgeville (repairs must be approved by council).

7) How are residential customer rates/bills computed (check all that apply)?

☐ EDU ☑ Metered ☐ Front-footage assessment

☐ Other (Describe):

Town of Bridgeville

8) How are commercial, industrial, and contract user rates/bills computed?

Metered (comm. and contract), or self-reporting via a pre-treatment ordinance (industrial). Flow based rates considering BOD/nutrients/TSS/etc.

9) Median Household Income (MHI) ($/year) $34,532

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$166,694
2.0 percent of MHI	$324,850
2.5 percent of MHI	$483,007

11) Rates, Billing, and MHI Comments:

2000 Census w/ 2010 CPI. Avg annual rate is based on 3,100 gal/household/month. Avg annual revenue is ~$560,000.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $4,640,000

15) Borrowing Limit and Debt Comments:

No debt borrowing limit. Debt service is $350,000/year. Total current debt is $5.8M (80% sewer). GO bonds.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	○	○	◉
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○

2) Comments (options considered, opportunities, barriers):

Need to complete plant upgrades. Said no to residential, though there is residential near spray field. There appears to be a large opportunity for ag and residential irrigation or drip systems if plant upgrades could be completed.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

- ○ Yes
- ◉ No

4) Comments (to further explain your response to #3):

N/P too high. Treatment system is outdated. Also, effluent line to both stream and spray is damaged.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Utilizing 80 acres at Tatman Farm site (abt 66 under pivot). 900 acre lease on Wheatley property (next to existing). Says recent passing of a senate bill (#129, 2009) saying allowed to spray add'l nutrients during growing season.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

Nutrient Loadings. If the plant gets fixed/upgraded, could meet NPDES annual TMDL loads (winter discharge only), not sure about daily loads.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
None, but plant needs to be majorly upgraded/repaired.	

8) If reuse is not an option, what other methods are available to manage effluent?

Currently still have NPDES point discharge permit.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Got $120K for energy audit upgrades (light bulbs, doors, windows, pump motors, etc.).

Delaware Wastewater Study System Report

Town of Greenwood

ID: 75

PO Box 216
Greenwood, DE 19950

City ID: GREN

Town of Greenwood

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Willard T. Russell - NP	Mayor		(302)349-4534		
John McDonnell	Town Manager	jmcdonnell@townofgreenwood.us	(302)349-4534		
Terri Hignutt	Admin. Asst.	thignutt@townofgreenwood.us	(302)349-4534		
Roger Breeding - NP (on job site)	Public Works Manager				

2) Interviewer Name: CSG, HKM

3) Interview Date: 1/31/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [ ] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

1.5 ppl in public works, 4 ppl total incl. town manager. (1 police chief, 3 part time police).

Treatment Plant

1) Wastewater Treatment Plant Name: N/A - Treated by Bridgeville WWTF

2) Physical Address Metered at Mill St. pump station

3) General level of treatment

- [ ] Primary Treatment
- [ ] Nitrogen removal

- ☐ Secondary Treatment
- ☐ Tertiary Treatment
- ☐ Phosphorus removal
- ☑ Other (Describe): Collection only, no treatment.

4) What is source of treatment plant back-up power (check all that apply):

- ☐ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☐ Portable Generator
- ☐ Battery
- ☐ None
- ☑ Other (Describe): N/A. Collection only.

5) Permit Information: General

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.09	Average Daily Flow (MGD)	0.09
Peak Flow (MGD)	0.12	% of Average Daily Flow from Domestic Source	85.00
Anticipated Flow in 2020 (MGD)	0.10	Future Design Flow in 2030 (MGD	0.11

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) Yes

9) Permit Limits

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ◉ About Normal (150-250 mg/l BOD and TSS)
- ○ Above Normal (>250 mg/l BOD and TSS) Reason:
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 21 to 30 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

0.086 MGD pre Bridgeville agreement (1989), avg. 0.085 MGD. Looking for additional capacity from Bridgeville (15%). Agreement is flow only, no BOD or TSS.

Service Area

1) Service area, square miles: 0.69

2) Number of pump stations: 2

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☐ Portable Generator
☐ Battery
☐ None

Town of Greenwood

☐ Other (Describe):

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Greenwood	☐	100	450	$696.00	$313,200.00

7) Population served:

	Current	Future, 2030
Resident	1,125	1,489
Non-resident	0	0
Total	1,125	1,489

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Two industries: Penn Fibre (plastics) and James Thompson (fabrics?) but no industrial waste, only sanitary. About 7 metered commercial businesses convert to 70 EDU's (Royan Farms, etc.). Pump station at Mile Stretch Road and Adams Road. No combined sewer

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

I/I is an issue. 33% increase in wet weather (instantaneous only). Camera studies being performed, Haven't identified all sources, fixed some areas.

12) Service Area Comments:

Installed around 1989. Greenwood manages the FM to Bridgeville up to Bridgeville's muni limits. 0.69 sq. mi. is Greenwood proper. CPCN map shows service rights down to Bridgeville.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 15

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Emergency repairs only. Percent is approximated.

7) How are residential customer rates/bills computed (check all that apply)?

☑ EDU ☐ Metered ☐ Front-footage assessment

☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

No industrial or contracts. Commercial is flow based (1 meter unit / 200 gal/day). 6,000 gal/month is one EDU.

9) Median Household Income (MHI) ($/year) $46,236

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	
2.0 percent of MHI	$102,924
2.5 percent of MHI	$206,955

11) Rates, Billing, and MHI Comments:

Seeing non-payments due to economy. MHI is 2010 CPI.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

Currently no debt for sewer, but $1.4M just for water. No debt borrowing limit (it's what residents approve).

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○

2) Comments (options considered, opportunities, barriers):

No treatment facility.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

- ○ Yes
- ◉ No

4) Comments (to further explain your response to #3):

N/A.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Available around Greenwood, but no pipeline infrastructure.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A. Connected to Bridgeville.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

None.

Delaware Wastewater Study System Report

Town of Laurel

ID: 77

201 Mechanic Street
Laurel, DE 19956

City ID: LAUR

Town of Laurel

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Jamie Smith - NP	Ops Manager, Acting Town Manager	laurelop@comcast.net	(302)875-2277		
Wood Vickers	Director of Public Works	laurelpwd@comcast.net	(302)875-2277		
Mark Frye - NP	Wastewater Superintendent		(302)875-2277		
Linda Lewis - NP	Wastewater Lab Technician		(302)875-2277		
Mary Introcaso	Finance Manager		(302)875-2277		

2) Interviewer Name: CSG, HKM

3) Interview Date: 2/3/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: Town of Laurel STP

2) Physical Address 10012 Clearwater Lane
Laurel, Delaware 19956

3) General level of treatment

Town of Laurel

- [ ] Primary Treatment
- [x] Secondary Treatment
- [x] Tertiary Treatment
- [x] Nitrogen removal
- [x] Phosphorus removal
- [ ] Other (Describe):

4) What is source of treatment plant back-up power (check all that apply):

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [ ] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
DE0020125	NPDES		BROAD CREEK	35. Chesapeake (Broad Creek)	38.558121	75.581307	0.7	6/1/2009	5/31/2014

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.70	Average Daily Flow (MGD)	0.35
Peak Flow (MGD)	0.80	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	1.00	Future Design Flow in 2030 (MGD	1.40

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) Yes

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	5-Day BOD	51		LBS/DY				MG/L	Weekly	Comp-8
001	pH				6		9	SU	Daily	Grab
001	TSS	88	134	LBS/DY		15	23	MG/L	Weekly	Comp-8
001	Nitrogen, Total (may-nov)	33		LBS/DY				MG/L	Monthly	Comp-8
001	Nitrogen, Total (annual average)	12045		LB/YR					Monthly	Comp-8
001	Phosphorus, Total	8.4		LBS/DY				MG/L		Comp-8
001	Enterococci					100		#/ 100ML	Weekly	Grab

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:

○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 30 to 50 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

☐ Wash out of biomass due to inflow and infiltration
☐ Equipment failure
☐ Design issues
☐ Operational issues
☐ Low dissolved oxygen
☐ Low alkalinity
☐ Low temperature
☐ Toxic shock
☐ Unknown
☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

◉ Yes, actual limits in place now.
○ No limits currently. ANTICIPATE limits within 5 years.
○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

◉ Yes, actual limits in place now.
○ No limits currently. ANTICIPATE limits within 5 years.
○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years? No

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Low temperature
☐ Operational issues
☐ Design issues

☐ Unknown ☐ Other (explain)

25) General Treatment Plant Comments.

TMDL is BOD5, TN, TP, and enterococcus. Flows no longer in permit. New WWTP went online in 2008 ($11m facility). Waste into old holding lagoons (2 lagoons, 10 acres, 1 decommissioned). No actual solids handling/management though (looking into it). 15% commercial, no industrial. Working w/ USDA for expansion to 1.4 MGD. Was having some chemical additive issues, but no non-compliance issues and since resolved. Injecting methanol to substitute low BOD for de-nit. Concerned over potential new EPA TMDL, considering plant is only 3 years old.

Service Area

1) Service area, square miles: 2.73

2) Number of pump stations: 3

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☐ Other (Describe):
☐ Portable Generator
☐ Battery
☐ None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Laurel	☐	100	1327	$678.00	$899,706.00

7) Population served:

	Current	Future, 2030
Resident	3,668	5,300
Non-resident	8	8
Total	3,676	5,308

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Combined system on 6th St (West St to town boundary, no CSO in CS area). Most of Laurel proper is served (NE annex area converting now: Bargain Bills, Royal Farms, some residents).

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

I/I Problems ID'd. 200% instantaneous increase (not prolonged), assume due to combined system. Code enforcement on roof leaders, etc. Infiltration and other small issues repaired as-seen.

12) Service Area Comments:

Annexation problems are compromising the W/WW utility: local neighborhoods on well/septic do not want to convert. WWTP also receives septage. No large growth expected in next 5 years.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? No

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 1

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Reserve is W/WW capital reserve for projects (leftover impact fees, etc.). No active O&M/enterprise reserve.

7) How are residential customer rates/bills computed (check all that apply)?

- [x] EDU
- [x] Metered
- [ ] Front-footage assessment
- [ ] Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

Metered like residential but different rate (no sewer meters).

9) Median Household Income (MHI) ($/year) $36,795

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	
2.0 percent of MHI	$76,833
2.5 percent of MHI	$320,968

11) Rates, Billing, and MHI Comments:

MHI is CPI 2010. Laurel says seems really high (probably still like $28,000). Rest of town will be metered w/in 1 year (400 meters), 842 are metered. About 50% are renters, delinquency rate is high (70% @30 days, 30% @45).

12) What is the debt borrowing limit ($)? $19,034,681

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $4,120,337

15) Borrowing Limit and Debt Comments:

Anything past $15M goes to referendum. $4M is remaining principal of WWTP. Will increase w/ USDA Phase I (add'l $2M).

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	○	◉	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	○	◉	○	○	○
RIBs	○	○	○	◉	○
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

Not anticipating DNREC to elim. NPDES permit, but don't see availability to increase capacity due to loadings. Found 2-3 farms for spray (800 acres, 140 acres) or RIBs (50-60 acres), only 400 yds away. Need guidance on land purchasing vs. control rights.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

◉ Yes

○ No

4) Comments (to further explain your response to #3):

Already low due to TMDL.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

See #2 comment.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A, but may get more flow capacity w/ spray site (dual permit).

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
Infrastructure (Pipes, Pumps, etc.).	

8) If reuse is not an option, what other methods are available to manage effluent?

NPDES.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Not at this time but considering it. Did energy audit: got "low hanging fruit" (lights, HVAC, variable speed motors, etc.).

Delaware Wastewater Study System Report

Town of Millsboro

322 Wilson Highway
Millsboro, DE 19966

ID: 79
City ID: MILLS

Town of Millsboro

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Faye Lingo - NP	Town Manager	fayelmillsboro@mchsi.com	(302)934-8171		
Kenny Niblett, Jr.	Director of Public Works	lindaj@milsboro.org	(302)934-8171		
Bill Sauer	Finance Officer	bills@millsboro.org			
Mark Downes - NP	Cabe Associates		(800)542-7979		
Steve Lewandowski	Cabe Associates	shl@cabe.com	(800)542-7979		
Matt Schifano	Assistant Town Manager				

2) Interviewer Name: CSG, JBM

3) Interview Date: 2/9/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: Town of Millsboro WWTF

2) Physical Address 361 East State Street
Millsboro, Delaware 19966

3) General level of treatment

Town of Millsboro

- ☐ Primary Treatment
- ☑ Secondary Treatment
- ☑ Tertiary Treatment
- ☑ Nitrogen removal
- ☐ Phosphorus removal
- ☑ Other (Describe): Ultra Filtration, Solids Handling

4) What is source of treatment plant back-up power (check all that apply):

- ☑ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☐ Portable Generator
- ☐ Battery
- ☐ None
- ☐ Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
DE0050164	NPDES	Stream Outfall	TIGER BRANCH/INDIAN RIVER	40. Inland Bays/Atlantic Ocean (Indian River)	38.590556	75.281372	0.55	6/1/2000	5/31/2005

6) Treatment Plant Capacity:

Current Design Flow (MGD)	1.15	Average Daily Flow (MGD)	0.45
Peak Flow (MGD)	0.58	% of Average Daily Flow from Domestic Source	85.00
Anticipated Flow in 2020 (MGD)	3.00	Future Design Flow in 2030 (MGD	3.00

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? Yes

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) Yes

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	5-Day BOD	56	86	LBS/DY			23	MG/L	Weekly	Comp-8
001	pH				6		9	SU	Daily	Grab
001	TSS	56	86	LBS/DY			23	MG/L	Weekly	Comp-8
001	Phosphorus, Total	4.56	9.22	LBS/DY			2	MG/L	Weekly	Comp-8
001	Flow	0.55		MGD					Continuous	Rcordr
001	Fecal					200	400	#/ 100ML	Weekly	Grab

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ◉ About Normal (150-250 mg/l BOD and TSS)
- ○ Above Normal (>250 mg/l BOD and TSS) Reason:

○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 30 to 50 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ◉ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits? No

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years? Yes

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

- ☑ pH ☐ cBOD ☑ TSS ☐ DO ☐ Total Residual Chlorine ☑ Enterococcus / Fecal Coliform
- ☐ Metals (any) ☐ PCBs ☑ Other (explain): BOD

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues

☐ Unknown ☑ Other (explain) Temp issue due to construction/startup. Back in compliance.

25) General Treatment Plant Comments.

Recent plant and discharge modifications to 1.15 for anticipated growth, not yet in permit. Currently monitoring NH3-N and TN but no limits. TP issue was related to new equip startup: Chemical associated with MBR, switched to poly aluminum chloride now <0.1. Eff. Prob was upgrades Sept 09, Wet Winter Weather 09/10. Expect spray on-line 2012. NPDES will likely go away.

Service Area

1) Service area, square miles: 2.00

2) Number of pump stations: 9

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline) ☐ Portable Generator
☐ On-site Generator (natural gas from main) ☐ Battery
☐ On-site Generator (propane/natural from tank) ☑ None
☐ Other (Describe):

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Millsboro	☐	100	2810	$475.20	$1,335,312.00

7) Population served:

	Current	Future, 2030
Resident	2,600	14,000
Non-resident	100	100
Total	2,700	14,100

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Stockley Hospital, East Millsboro Elementary School outside muni limits; Woodlands of Millsboro ~56 EDUs (Bill SusxCo but maintain). Merck/Schering-Plough, Intervet, Expansion into growth area per cmphsv plan. All served w/in Millsboro proper.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

Millsboro proper has no I/I issue. Stockley Hospital facilities has I/I issue (permitted 0.3 MGD?, flows doubled late winter 2009/10), which is a private system working on upgrades (immediate upgrades done).

12) Service Area Comments:

Districts by pump station; Gravity sewers (54,446 @ 8-14").

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? No

2) If the revenue is not sufficient, please explain why:

Current O&M is covered. New plant depreciation and interest on loans exceeds income from WW. Plant was constructed for Plantation lakes (80% impact fees, 20% townspeople), but development is stalled.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 20

6) Reserve account restrictions / comments (example: "emergency repairs only"):

%WW is from June 30, 2010. Reserve may be used for debt service, emergency repairs, or major renovations.

7) How are residential customer rates/bills computed (check all that apply)?

- ☑ EDU
- ☑ Metered
- ☐ Front-footage assessment
- ☑ Other (Describe): Metered by water usage. Some residents have separate water meter for irrigation.

8) How are commercial, industrial, and contract user rates/bills computed?

Flow only same as residential. Pretreatment and standards in ordinance. Testing done at lab effluent (Intervet/Merck) but no required pretreatment at this time. Stockley, school, and Woodlands have sewer meters.

9) Median Household Income (MHI) ($/year) $35,571

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$164,006
2.0 percent of MHI	$663,778
2.5 percent of MHI	$1,163,551

11) Rates, Billing, and MHI Comments:

2810 @ $476.89/yr incl. commercial EDU. Res only is 1878 @ $280/yr. Billing is quarterly @ $0.70/100 gal, min 7,500 gal per quarter.

12) What is the debt borrowing limit ($)? $36,000,000

13) How much of this limit ($) is allocated to the wastewater enterprise? $33,000,000

14) How much of this limit ($) available to the wastewater enterprise is used overall? $25,900,000

15) Borrowing Limit and Debt Comments:

4.2 million SRF Loan for treatment plant upgrades; 1.9 million STAG for transmission and disposal; Development Fees.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	○	◉	○
Commercial/Industrial Use	○	○	○	◉	○
Residential Use	○	○	○	◉	○
Municipal Wastewater Sludge Reuse	○	◉	○	○	○
RIBs	○	○	○	◉	○
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

Line to spray/RIBs site will run down residential streets. Infrastructure is in for pumping to middle school fields and little league fields (Fall 2011). Not seeing much sludge but interested in mulching. NRG expressed interest but nothing official.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

◉ Yes

○ No

4) Comments (to further explain your response to #3):

Recent plant upgrades.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Spray/RIBs sites in final design. Plantation Lakes golf course expressed interest but nothing official.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

Already stated. Switching to spray. It is Millsboro's understanding that their NPDES permit will be eliminated.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
None in plant.	
Currently permitting transmission and infrastructure for spray.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A. Deep well injection studied and not feasible (couldn't find a lens to discharge to, and cost in general was not viable).

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Interested in anything paid for by grants.

Delaware Wastewater Study System Report

Town of Selbyville

ID: 84

68 W. Church Street
PO Box 106
Selbyville, DE 19975-0106

City ID: SELB

Town of Selbyville

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Robert Dickerson	Town Administrator	tmselbyville@mchsi.com	(302)436-8314		(302)436-8018
F. James Burk, Jr.	Wastewater, Manager of Operations	selbyvil@live.com	(302)436-5271		

2) Interviewer Name: CSG, JBM

3) Interview Date: 1/26/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) No

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: Town of Selbyville WWTF

2) Physical Address 37619 Wastewater Lane
near County Road 386A (Polly Branch Road)
Selbyville, DE 19975

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [x] Tertiary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal
- [ ] Other (Describe):

Town of Selbyville

4) What is source of treatment plant back-up power (check all that apply):

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [ ] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
DE0020010	NPDES	Ocean Outfall	Atlantic Ocean	45. Inland Bays/Atlantic Ocean (Little Assawoman)	38.524007	74.956693	1.25	1/1/2010	12/31/2015

6) Treatment Plant Capacity:

Current Design Flow (MGD)	1.25	Average Daily Flow (MGD)	1.11
Peak Flow (MGD)	1.30	% of Average Daily Flow from Domestic Source	23.00
Anticipated Flow in 2020 (MGD)	1.20	Future Design Flow in 2030 (MGD	1.25

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	5-Day BOD	156	240	LBS/DY		15	23	MG/L	Week-Days	Comp-8
001	pH				6		9	SU	Daily	Grab
001	TSS	156	240	LBS/DY		15	23	MG/L	Week-Days	Comp-8
001	Enterococci					10		#/ 100ML	Week-Days	Grab
001	Chlorine, Tot Res				1		4	MG/L	Daily	Grab

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ○ About Normal (150-250 mg/l BOD and TSS)
- ◉ Above Normal (>250 mg/l BOD and TSS) Reason: Food processing
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 30 to 50 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

- ☐ pH
- ☐ cBOD
- ☑ TSS
- ☐ DO
- ☑ Total Residual Chlorine
- ☐ Enterococcus / Fecal Coliform
- ☐ Metals (any)
- ☐ PCBs
- ☑ Other (explain): BOD

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☑ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Town of Selbyville

Flow removed from new permit. Equipment Failure Resolved. Outfall is Atlantic Ocean via a connection to SusxCo's South Coastal discharge pipe approximately 17 miles from the facility (post-treatment). Just finished upgrades to 1.5 MGD. Allowed 2.0 MGD to SusxCo's ocean outfall.

Service Area

1) Service area, square miles: 5.00

2) Number of pump stations: 12

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [x] Portable Generator
- [ ] Battery
- [ ] None

4) Number of holding tanks: 2

5) Total holding tank capacity (gallons): 20,000,000

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Selbyville	☐	83	1113	$618.44	$688,323.72
Unincorporated - Sussex County	☐	17	224	$818.93	$183,440.32

7) Population served:

	Current	Future, 2030
Resident	2,230	2,453
Non-resident	560	616
Total	2,790	3,069

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Entire town served plus some Maryland and unincorporated Sussex; 25 pumps for PSs; Mountaire poultry processing plant and other commercial businesses account for about 77% of flow.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

<10%, not studied; no CSO.

12) Service Area Comments:

Line to SusxCo's system is maintained by Selbyville. Non-res population is Unincorp Ssx Co. 2030 growth is estimated at 10%.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? No

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? 84

6) Reserve account restrictions / comments (example: "emergency repairs only"):

Marked as restricted, but not required.

7) How are residential customer rates/bills computed (check all that apply)?

- ☐ EDU
- ☑ Metered
- ☐ Front-footage assessment
- ☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

Commercial same as residential (based off water meter). Separate, special agreement with a single large industrial user (Mountaire).

9) Median Household Income (MHI) ($/year) $47,096

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$72,746
2.0 percent of MHI	$387,583
2.5 percent of MHI	$702,420

11) Rates, Billing, and MHI Comments:

MHI from 2010 CPI. Avg annual rates are flat fee plus based on average usage of 9,000 gal/month. Rates sheets attached.

12) What is the debt borrowing limit ($)? $12,257,933

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $7,081,097

15) Borrowing Limit and Debt Comments:

May borrow up to 50% of property assessment value ($24,515,866: Feb 2011).

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

Town of Selbyville

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	◉	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	○	○	○	○

2) Comments (options considered, opportunities, barriers):

Land has high water table (1986 study). Mountaire currently has own W/WWTP's and recycles water. May be interested in water recycling for future projects (such as commercial/residential irrigation), but existing infrastructure is not equipped for it.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

High N/P.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Ag lands are available, but water table is too high.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
Piping and equipment.	
Land Acquisition.	

8) If reuse is not an option, what other methods are available to manage effluent?

Ocean outfall.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

No anaerobic digestor so no methane capture, basic items like switching to T8 bulbs, maybe solar but would need referendum and matching funds for competitive grants.

Delaware Wastewater Study System Report

Sussex County - Sussex Co. Collection Systems

ID: 89

PO Box 589
22215 Dupont Blvd.
Georgetown, DE 19947

City ID: SUSXOT

Sussex County - Sussex Co. Collection Systems

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Mike Izzo	County Engineer	mizzo@sussexcountyde.gov	(302)855-7718		(302)855-7799
Heather Sheridan	Director of Environmental Services	hsheridan@sussexcountyde.gov	(302)855-7730		

2) Interviewer Name: CSG, JC

3) Interview Date: 1/20/2010

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [ ] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- (•) Municipal
- ( ) Municipal Authority
- ( ) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

This is a placeholder for Sussex County Districts (treated by another muni's WWTP): Blades (Seaford), Ellendale (Georgetown), Dewey Beach (Rehoboth), Henlopen Acres (Rehoboth), Soon: Woodlands of Millsboro.

Treatment Plant

1) Wastewater Treatment Plant Name: N/A - (Blades/Ellendale/Dewey Beach/Henlopen Acres)

2) Physical Address N/A

3) General level of treatment

- [ ] Primary Treatment
- [ ] Secondary Treatment
- [ ] Tertiary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal
- [x] Other (Describe): Collection only, no treatment.

4) What is source of treatment plant back-up power (check all that apply):

- ☐ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☐ Portable Generator
- ☐ Battery
- ☐ None
- ☑ Other (Describe): N/A. Collection only.

5) Permit Information: General

6) Treatment Plant Capacity:

Current Design Flow (MGD)		Average Daily Flow (MGD)	
Peak Flow (MGD)		% of Average Daily Flow from Domestic Source	
Anticipated Flow in 2020 (MGD)		Future Design Flow in 2030 (MGD	

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ○ About Normal (150-250 mg/l BOD and TSS)
- ○ Above Normal (>250 mg/l BOD and TSS) Reason:
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)?

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.

- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

N/A.

Service Area

1) Service area, square miles: 5.60

2) Number of pump stations: 20

3) What is source of back-up power at pump stations?

☑ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☐ Other (Describe):
☑ Portable Generator
☐ Battery
☑ None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

Sussex County - Sussex Co. Collection Systems

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Blades	☐		449	$376.82	$169,192.18
Ellendale	☐		474	$451.00	$213,774.00
Dewey Beach	☐		2978	$375.14	$1,117,166.92
Henlopen Acres	☐		169	$588.15	$99,397.35
Golf Village	☐		37	$179.00	$6,623.00
Woodlands of MLBO	☐		46	$856.00	$39,376.00

7) Population served:

	Current	Future, 2030
Resident	12,500	12,500
Non-resident	0	0
Total	12,500	12,500

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

PS: Blades, 3; Ellendale, 4 (58 E-loms); Dewey, 8; Henlopen, 5. 12,500 is estimate based on 2.5 ppl/EDU (all 4 districts).

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

No I/I issues in any of these 4 districts (Blades, Dewey Beach, Ellendale, or Henlopen Acres).

12) Service Area Comments:

Blades goes to Seaford. Ellendale goes to Georgetown. Dewey Beach and Henlopen Acres go to Rehoboth. 5.6 square miles is all 4 districts combined. Woodlands of Millsboro (goes to Millsboro) and Town of Bethel (Seaford) did not make the report.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? Yes

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? Yes

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

None.

7) How are residential customer rates/bills computed (check all that apply)?

☑ EDU ☐ Metered ☑ Front-footage assessment

☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

Same as residents.

9) Median Household Income (MHI) ($/year) $50,537

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$1,502,673
2.0 percent of MHI	$2,552,074
2.5 percent of MHI	$3,601,475

11) Rates, Billing, and MHI Comments:

Sussex County MHI 2009 ACS. (SusxCo MHI 2000 w/ CPI is $50,939).

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

Sussex County declined to disclose debt information or reserve amount.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	◉	◉	◉	◉
Commercial/Industrial Use	◉	◉	◉	◉	◉
Residential Use	◉	◉	◉	◉	◉
Municipal Wastewater Sludge Reuse	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

N/A.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

- ◉ Yes
- ◉ No

4) Comments (to further explain your response to #3):

N/A.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

N/A.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

N/A.

Delaware Wastewater Study System Report

Artesian - Beaver Creek

ID: 90

664 Churchmans Rd.
Newark, DE 19702

City ID: ARTBEA

Artesian - Beaver Creek

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Brian Carbaugh	Director of Engineering	bcarbaugh@artesianwater.com	(302)453-6903		(302)453-6915
Mark Kondelis, Sr	Artesian - Manager of WW Services	mkondelis@artesianwater.com	(302)420-0372		

2) Interviewer Name: CSG, HKM

3) Interview Date: 3/23/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- ( ) Municipal
- ( ) Municipal Authority
- (•) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Regulated Utility, Artesian Wastewater Management, Inc. (AWMI). Only serving BC, just permitted Shoreview Woods (w/in 1 yr.) looking to expand, putting another unit.

Treatment Plant

1) Wastewater Treatment Plant Name: Beaver Creek

2) Physical Address North East corner of Routes 5 & 9, Harbeson, Sussex County, DE tax map # 2-35-30.00-24.00 & 32.00

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [ ] Tertiary Treatment
- [x] Nitrogen removal
- [ ] Phosphorus removal
- [ ] Other (Describe):

Artesian - Beaver Creek

4) What is source of treatment plant back-up power (check all that apply):

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [ ] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
202902-OP	State	RIBS	On-Site	22. Delaware Bay (Broadkill River)			0.15	1/18/2007	1/18/2017

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.05	Average Daily Flow (MGD)	0.02
Peak Flow (MGD)	0.04	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.15	Future Design Flow in 2030 (MGD	0.30

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	Flow	0.15		MGD					Continuous	Rcordr
001	Nitrogen, Total					10		MG/L		
001	Nitrogen, Total (annual average)		0.01843	LBS/DY						
001	5-Day BOD					30	45	MG/L		
001	TSS					30	45	MG/L		

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ○ About Normal (150-250 mg/l BOD and TSS)
- ◉ Above Normal (>250 mg/l BOD and TSS) Reason: Unknown
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 30 to 50 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

Artesian - Beaver Creek

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

- ☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
- ☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

1 SBR w/ RIBs (Fluidyne ISAM batch). Sometimes issues during low-flow months. Current permit allows 0.150 MGD (Phase III), Current design flow is Phase I of III. Based on 300 gpd/EDU. Potential in doubling plant by 2030 to 0.300 MGD. Artesian says "influent strength slightly above normal is the new normal" due to various reasons (lifestyle changes, etc). No effluent problems.

Service Area

1) Service area, square miles: 0.64

2) Number of pump stations: 2

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [ ] Portable Generator
- [ ] Battery
- [x] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - Sussex County	☐	100	163	$900.00	$146,700.00

7) Population served:

	Current	Future, 2030
Resident	400	2,500
Non-resident	0	0
Total	400	2,500

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Beaver Creek buildout will be 325 EDU. Population is 2.5 x EDU.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

No I/I or CS.

12) Service Area Comments:

See ANSWRF for composite (all in eastern Ssx Co.). Beaver Creek, Heron Bay, Stonewater, Island (p), and ANSWEF (p) are authorized by Ssx Co. to act as a regional facility (Reserves & Villages are stand-alone).

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? No

2) If the revenue is not sufficient, please explain why:

Due to reduced rate of build-out.

3) Do you have a reserve account? N/A.

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? N/A.

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

N/A.

7) How are residential customer rates/bills computed (check all that apply)?

- ☑ EDU
- ☐ Metered
- ☐ Front-footage assessment
- ☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

Clubhouse and WTP is multiple EDU.

9) Median Household Income (MHI) ($/year) $65,773

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$14,115
2.0 percent of MHI	$67,720
2.5 percent of MHI	$121,325

11) Rates, Billing, and MHI Comments:

Monthly $75 flat, connection/impact fees.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

N/A.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	◉	○	○
Commercial/Industrial Use	○	○	◉	○	○
Residential Use	○	○	◉	○	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
RIBs	○	○	○	○	◉

N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

Not enough flows for ag spray - recharge through RIBs.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

- ○ Yes
- ◉ No

4) Comments (to further explain your response to #3):

No filtration.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

N/A.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Currently looking at efficiency options but none at moment.

Delaware Wastewater Study System Report

Artesian - Heron Bay

ID: 91

664 Churchmans Rd.
Newark, DE 19702

City ID: ARTHER

Artesian - Heron Bay

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Brian Carbaugh	Director of Engineering	bcarbaugh@artesianwater.com	(302)453-6903		(302)453-6915
Mark Kondelis, Sr	Artesian - Manager of WW Services	mkondelis@artesianwater.com	(302)420-0372		

2) Interviewer Name: CSG, HKM

3) Interview Date: 3/23/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- ( ) Municipal
- ( ) Municipal Authority
- (•) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Regulated utility, Artesian Wastewater Management, Inc. (AWMI).

Treatment Plant

1) Wastewater Treatment Plant Name: Heron Bay

2) Physical Address North West of the intersection of Route 23 and Road 286 Sussex County, DE
tax map # 2-34-5-45.00

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [ ] Tertiary Treatment
- [x] Nitrogen removal
- [ ] Phosphorus removal
- [ ] Other (Describe):

Artesian - Heron Bay

4) What is source of treatment plant back-up power (check all that apply):

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [ ] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
199889-OPB	State	RIBS	On-Site	39. Inland Bays/Atlantic Ocean (Rehoboth Bay)			0.05	4/30/2007	4/30/2017

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.05	Average Daily Flow (MGD)	0.01
Peak Flow (MGD)	0.02	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.10	Future Design Flow in 2030 (MGD	0.10

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	Flow	0.05		MGD					Continuous	Rcordr
001	Nitrogen, Total					10		MG/L		
001	Nitrogen, Total (annual average)		0.01843	LBS/DY						
001	5-Day BOD					30		MG/L		
001	TSS					30		MG/L		

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 30 to 50 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

Artesian - Heron Bay

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Fluidyne ISAM 50 SBR to RIBs. 0.10 in permit (expect second unit online by Summer 2011). Max's out due to disposal capacity (RIBs). Unsure of peak flow. No effluent problems.

Service Area

1) Service area, square miles: 0.58

2) Number of pump stations: 2

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [ ] Portable Generator
- [ ] Battery
- [ ] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - Sussex County	☐	100	176	$900.00	$158,400.00

7) Population served:

	Current	Future, 2030
Resident	440	1,113
Non-resident	0	0
Total	440	1,113

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Heron Bay is 325 EDU at buildout plus temp serving parts of Oakwood Village for Ssx Co (118 EDUs, may get more). Pop is 2.5 x EDU.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

No I/I or CS. System is new.

12) Service Area Comments:

See ANSWRF for composite (all in eastern Ssx Co.). Beaver Creek, Heron Bay, Stonewater, Island (p), and ANSWEF (p) are authorized by Ssx Co. to act as a regional facility (Reserves & Villages are stand-alone).

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? No

2) If the revenue is not sufficient, please explain why:

Due to reduced rate of build-out.

3) Do you have a reserve account? N/A.

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? N/A.

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

N/A.

7) How are residential customer rates/bills computed (check all that apply)?

- [x] EDU
- [ ] Metered
- [ ] Front-footage assessment
- [ ] Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

N/A.

9) Median Household Income (MHI) ($/year) $49,484

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	
2.0 percent of MHI	$15,784
2.5 percent of MHI	$59,330

11) Rates, Billing, and MHI Comments:

Monthly $75 flat, connection/impact fees.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

N/A.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	◉	○	○
Commercial/Industrial Use	○	○	◉	○	○
Residential Use	○	○	◉	○	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
RIBs	○	○	○	○	◉

Artesian - Heron Bay

N/A-Additional reuse method not specified	◉	◉	◉	◉	◉	
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉	

2) Comments (options considered, opportunities, barriers):

Not enough flows for ag spray - recharge through RIBs.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

- ○ Yes
- ◉ No

4) Comments (to further explain your response to #3):

No filtration.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

N/A.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Currently looking at efficiency options but none at moment.

Delaware Wastewater Study System Report

Artesian - Reserves at Lewes Landing

ID: 93

664 Churchmans Rd.
Newark, DE 19702

City ID: ARTRES

Artesian - Reserves at Lewes Landing

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Brian Carbaugh	Director of Engineering	bcarbaugh@artesianwater.com	(302)453-6903		(302)453-6915
Mark Kondelis, Sr	Artesian - Manager of WW Services	mkondelis@artesianwater.com	(302)420-0372		

2) Interviewer Name: CSG, HKM

3) Interview Date: 3/23/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- ○ Municipal
- ○ Municipal Authority
- ◉ Private Investor Owned
- ○ Private Non-Investor Owned
- ○ Other (Describe):

7) General Comments

Treatment Plant

1) Wastewater Treatment Plant Name: Reserves at Lewes Landing

2) Physical Address South side of Route 9, outside of Lewes, Sussex County, Delaware

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [ ] Tertiary Treatment
- [x] Nitrogen removal
- [ ] Phosphorus removal
- [ ] Other (Describe):

4) What is source of treatment plant back-up power (check all that apply):

- [x] On-site Generator (diesel/gasoline)
- [ ] Portable Generator
- [ ] Other (Describe):

Artesian - Reserves at Lewes Landing

☐ On-site Generator (natural gas from main) ☐ Battery
☐ On-site Generator (propane / natural gas from tank) ☐ None

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
207815-OPB	State	Drip Irrigation	On-Site	22. Delaware Bay (Broadkill River)			0.03	2/21/2006	2/21/2016

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.03	Average Daily Flow (MGD)	0.01
Peak Flow (MGD)	0.01	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.03	Future Design Flow in 2030 (MGD	0.03

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	Flow	0.03		MGD					Continuous	Rcordr
001	Nitrogen, Total					10		MG/L		
001	Nitrogen, Total (annual average)		0.01843	LBS/DY						
001	5-Day BOD					30		MG/L		
001	TSS					30		MG/L		

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

○ About Normal (150-250 mg/l BOD and TSS)
◉ Above Normal (>250 mg/l BOD and TSS) Reason: Unknown
○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 30 to 50 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

☐ Wash out of biomass due to inflow and infiltration ☐ Low dissolved oxygen ☐ Unknown

- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Biowheel, single sludge De-Nit process, to drip irrigation. Artesian says "influent strength slightly above normal is the new normal" due to various reasons (lifestyle changes, etc). No effluent problems.

Artesian - Reserves at Lewes Landing

Service Area

1) Service area, square miles: 0.14

2) Number of pump stations: 1

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [ ] Portable Generator
- [ ] Battery
- [ ] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - Sussex County	☐	100	51	$900.00	$45,900.00

7) Population served:

	Current	Future, 2030
Resident	81	243
Non-resident	0	0
Total	81	243

8) Is service area digitized?

9) Map obtained?

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Stand alone community system ~1/3 built-out. Buildout is 97 EDU plus clubhouse. Pop is EDU x 2.5.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

None.

12) Service Area Comments:

See ANSWRF for composite (all in eastern Ssx Co.). Beaver Creek, Heron Bay, Stonewater, Island (p), and ANSWEF (p) are authorized by Ssx Co. to act as a regional facility (Reserves & Villages are stand-alone).

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? No

2) If the revenue is not sufficient, please explain why:

Due to reduced rate of build-out.

3) Do you have a reserve account? N/A.

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? N/A.

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

N/A.

7) How are residential customer rates/bills computed (check all that apply)?

- ☑ EDU
- ☐ Metered
- ☐ Front-footage assessment
- ☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

Clubhouse, no WTP on-site.

9) Median Household Income (MHI) ($/year) $50,074

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	
2.0 percent of MHI	$5,175
2.5 percent of MHI	$17,944

11) Rates, Billing, and MHI Comments:

Monthly $75 flat, connection/impact fees.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

N/A.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
Drip Irrigation	○	○	○	○	◉

Artesian - Reserves at Lewes Landing

N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

Not enough flows for ag spray - recharge through drip system.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

- ○ Yes
- ◉ No

4) Comments (to further explain your response to #3):

N/A.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

N/A.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Currently looking at efficiency options but none at moment.

Delaware Wastewater Study System Report

Artesian - Stonewater Creek

ID: 92

664 Churchmans Rd.
Newark, DE 19702

City ID: ARTSTO

Artesian - Stonewater Creek

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Brian Carbaugh	Director of Engineering	bcarbaugh@artesianwater.com	(302)453-6903		(302)453-6915
Mark Kondelis, Sr	Artesian - Manager of WW Services	mkondelis@artesianwater.com	(302)420-0372		

2) Interviewer Name: CSG, HKM

3) Interview Date: 3/23/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- ○ Municipal
- ○ Municipal Authority
- ◉ Private Investor Owned
- ○ Private Non-Investor Owned
- ○ Other (Describe):

7) General Comments

Regulated utility, Artesian Wastewater Management, Inc. (AWMI).

Treatment Plant

1) Wastewater Treatment Plant Name: Stonewater Creek

2) Physical Address East side Route 5 approximately 1,500 feet north of County Road 307, Sussex County, DE

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [ ] Tertiary Treatment
- [x] Nitrogen removal
- [ ] Phosphorus removal
- [ ] Other (Describe):

Artesian - Stonewater Creek

4) What is source of treatment plant back-up power (check all that apply):

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [ ] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
202221-OP-C	State	RIBS	On-Site	39. Inland Bays/Atlantic Ocean (Rehoboth Bay)			0.225	10/3/2005	10/3/2015

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.23	Average Daily Flow (MGD)	0.03
Peak Flow (MGD)	0.05	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.23	Future Design Flow in 2030 (MGD	0.41

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	Flow	0.225		MGD					Continuous	Rcordr
001	Nitrogen, Total					10		MG/L		
001	5-Day BOD					30		MG/L		
001	TSS					30		MG/L		
001	Chlorine, Tot Res						250	MG/L	Daily	Grab

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ○ About Normal (150-250 mg/l BOD and TSS)
- ◉ Above Normal (>250 mg/l BOD and TSS) Reason: Unknown
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 30 to 50 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)?

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Artesian - Stonewater Creek

Dual Aqua-aerobic, SBR w/RIBs (permitted for second dual). Currently built to 750 EDU (0.225 MGD), but permitted at 1500 EDU (0.450 MGD), but limited by disposal area (1350 EDU, 0.405 MGD). Looking into future disposal areas to handle ~1.0 MGD add'l flow. Artesian says "influent strength slightly above normal is the new normal" due to various reasons (lifestyle changes, etc). No effluent problems.

Service Area

1) Service area, square miles: 1.00

2) Number of pump stations: 2

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [ ] Portable Generator
- [ ] Battery
- [ ] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - Sussex County	☐	100	325	$900.00	$292,500.00

7) Population served:

	Current	Future, 2030
Resident	812	3,375
Non-resident	0	0
Total	812	3,375

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Currently serving Stonewater and Independence (252+73 EDU), but planning to serve add'l expansion areas. 2030 pop is 1350 x 2.5.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

Infiltration due to construction being corrected.

12) Service Area Comments:

See ANSWRF for composite (all in eastern Ssx Co.). Beaver Creek, Heron Bay, Stonewater, Island (p), and ANSWEF (p) are authorized by Ssx Co. to act as a regional facility (Reserves & Villages are stand-alone).

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? No

2) If the revenue is not sufficient, please explain why:

Due to reduced rate of build-out.

3) Do you have a reserve account? N/A.

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? N/A.

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

N/A.

7) How are residential customer rates/bills computed (check all that apply)?

- ☑ EDU
- ☐ Metered
- ☐ Front-footage assessment
- ☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

Clubhouse (public at Independence) at each plus WTPs treated as multi-EDU.

9) Median Household Income (MHI) ($/year) $49,484

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	
2.0 percent of MHI	$29,146
2.5 percent of MHI	$109,558

11) Rates, Billing, and MHI Comments:

Monthly $75 flat, connection/impact fees.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

N/A.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

Artesian - Stonewater Creek

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
RIBs	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

Not enough flows for ag spray - recharge through RIBs.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

N/A.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

N/A.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Currently looking at efficiency options but none at moment.

Delaware Wastewater Study System Report

Artesian - Villages at Herring Creek

ID: 94

664 Churchmans Rd.
Newark, DE 19702

City ID: ARTVIL

Artesian - Villages at Herring Creek

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Brian Carbaugh	Director of Enginering	bcarbaugh@artesianwater.com	(302)453-6903		(302)453-6915
Mark Kondelis, Sr	Artesian - Manager of WW Services	mkondelis@artesianwater.com	(302)420-0372		

2) Interviewer Name: CSG, HKM

3) Interview Date: 3/23/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- ( ) Municipal
- ( ) Municipal Authority
- (•) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

Either being turned over to or tied into Ssx Co. Wolfe Neck system (incl. pump station, coll sys, etc.).

Treatment Plant

1) Wastewater Treatment Plant Name: Villages at Herring Creek

2) Physical Address Off Route 24, Angola Neck Expansion

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [ ] Tertiary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal
- [x] Other (Describe): Storage Lagoon for Spray

4) What is source of treatment plant back-up power (check all that apply):

Artesian - Villages at Herring Creek

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [ ] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
LTS 5009-04-09	State	Spray	Spray - Adjacent Fields	39. Inland Bays/Atlantic Ocean (Rehoboth Bay)			0.03	10/2/2009	3/1/2012

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.03	Average Daily Flow (MGD)	0.01
Peak Flow (MGD)	0.02	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.00	Future Design Flow in 2030 (MGD	0.00

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	Flow (Influent)	0.03		MGD					Continuous	Composite
001	Flow (Effluent, weekly)	2.5		CH/ ACF					Continuous	Rcordr
001	Flow (Effluent, hourly)	0.25		H/ACRE					Continuous	Rcordr
001	pH				5.5		9	SU	Monthly	
001	Clorine, Tot Res				1		4	MG/L	Quarterly	
001	Clorine (annual average)						250	MG/L	Quarterly	
001	Sodium (annual average)						210	MG/L	Quarterly	
001	Nitrogen, Total (annual per acre)		380	LBS/ YR						
001	5-Day BOD						50	MG/L	Monthly	Composite
001	TSS						90	MG/L	Monthly	Composite
001	Fecal Coliform						200	#/ 100ML	2/ Month	Grab

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ○ About Normal (150-250 mg/l BOD and TSS)
- ◉ Above Normal (>250 mg/l BOD and TSS) Reason: Unknown
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N? 30 to 50 mg/l

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years? No

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Aerated lagoon, storage, spray irrigation. Artesian says "influent strength slightly above normal is the new normal" due to various reasons (lifestyle changes, etc). No effluent problems.

Service Area

1) Service area, square miles: 0.20

2) Number of pump stations: 1

3) What is source of back-up power at pump stations?

- ☑ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane/natural from tank)
- ☐ Other (Describe):
- ☐ Portable Generator
- ☐ Battery
- ☐ None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - Sussex County	☐	100	43	$900.00	$38,700.00

7) Population served:

	Current	Future, 2030
Resident	300	0
Non-resident	0	0
Total	300	0

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

43 EDU is current. Built out is 120 units x 2.5 =300 ppl which is in-progress. Future flows set to 0 due to proposed connection to Wolfe Neck.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

None.

12) Service Area Comments:

Artesian - Villages at Herring Creek

See ANSWRF for composite (all in eastern Ssx Co.). Beaver Creek, Heron Bay, Stonewater, Island (p), and ANSWEF (p) are authorized by Ssx Co. to act as a regional facility (Reserves & Villages are stand-alone).

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? No

2) If the revenue is not sufficient, please explain why:

Due to reduced rate of build-out.

3) Do you have a reserve account? N/A.

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? N/A.

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

N/A.

7) How are residential customer rates/bills computed (check all that apply)?

- ☑ EDU
- ☐ Metered
- ☐ Front-footage assessment
- ☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

No clubhouse or WWTP.

9) Median Household Income (MHI) ($/year) $52,878

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	
2.0 percent of MHI	$6,775
2.5 percent of MHI	$18,144

11) Rates, Billing, and MHI Comments:

Monthly $75 flat, connection/impact fees.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

N/A.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	○	○	◉
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	◉	○	○	○	○
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

N/A.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

Restricted spray site.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

N/A.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

None.

Delaware Wastewater Study System Report

Artesian - ANSWRF *Proposed Planning Area* ID: 105

664 Churchmans Rd.
Newark, DE 19702

City ID: ANSWRF

Artesian - ANSWRF *Proposed Planning Area*

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Brian Carbaugh	Director of Engineering	bcarbaugh@artesianwater.com	(302)453-6903		

2) Interviewer Name:

3) Interview Date:

4) Entity responsibilities (check all that apply):

- ☐ Collection
- ☐ Transmission
- ☐ Treatment (including solids)
- ☐ Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area)

6) Ownership

- ○ Municipal
- ○ Municipal Authority
- ○ Private Investor Owned
- ○ Private Non-Investor Owned
- ○ Other (Describe):

7) General Comments

This is a placeholder for Artesian's regional planning area surrounding Milton.

Treatment Plant

1) Wastewater Treatment Plant Name: N/A - ANSWRF *Proposed Planning Area*

2) Physical Address N/A

3) General level of treatment

- ☐ Primary Treatment
- ☐ Secondary Treatment
- ☐ Tertiary Treatment
- ☐ Nitrogen removal
- ☐ Phosphorus removal
- ☐ Other (Describe):

4) What is source of treatment plant back-up power (check all that apply):

- ☐ On-site Generator (diesel/gasoline)
- ☐ Portable Generator
- ☐ Other (Describe):

☐ On-site Generator (natural gas from main) ☐ Battery
☐ On-site Generator (propane / natural gas from tank) ☐ None

5) Permit Information: General

6) Treatment Plant Capacity:

Current Design Flow (MGD)		Average Daily Flow (MGD)	
Peak Flow (MGD)		% of Average Daily Flow from Domestic Source	
Anticipated Flow in 2020 (MGD)		Future Design Flow in 2030 (MGD	

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years?

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem)

9) Permit Limits

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

○ About Normal (150-250 mg/l BOD and TSS)
○ Above Normal (>250 mg/l BOD and TSS) Reason:
○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)?

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

☐ Wash out of biomass due to inflow and infiltration
☐ Equipment failure
☐ Design issues
☐ Operational issues
☐ Low dissolved oxygen
☐ Low alkalinity
☐ Low temperature
☐ Toxic shock
☐ Unknown
☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

○ Yes, actual limits in place now.
○ No limits currently. ANTICIPATE limits within 5 years.
○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

Service Area

1) Service area, square miles: 66.00

2) Number of pump stations:

3) What is source of back-up power at pump stations?

☐ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☐ Other (Describe):
☐ Portable Generator
☐ Battery
☐ None

4) Number of holding tanks:

5) Total holding tank capacity (gallons):

6) Sewer Districts included in service area (in whole or in part):

Artesian - ANSWRF *Proposed Planning Area*

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
	☐				

7) Population served:

	Current	Future, 2030
Resident		
Non-resident		
Total		

8) Is service area digitized?

9) Map obtained?

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

12) Service Area Comments:

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises?

2) If the revenue is not sufficient, please explain why:

3) Do you have a reserve account?

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise?

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise?

6) Reserve account restrictions / comments (example: "emergency repairs only"):

7) How are residential customer rates/bills computed (check all that apply)?

☐ EDU ☐ Metered ☐ Front-footage assessment

☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

9) Median Household Income (MHI) ($/year)

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	
2.0 percent of MHI	
2.5 percent of MHI	

11) Rates, Billing, and MHI Comments:

12) What is the debt borrowing limit ($)?	$0
13) How much of this limit ($) is allocated to the wastewater enterprise?	$0
14) How much of this limit ($) available to the wastewater enterprise is used overall?	$0

15) Borrowing Limit and Debt Comments:

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	◉	◉	◉	◉
Commercial/Industrial Use	◉	◉	◉	◉	◉
Residential Use	◉	◉	◉	◉	◉
Municipal Wastewater Sludge Reuse	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

- ◉ Yes
- ◉ No

4) Comments (to further explain your response to #3):

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)

8) If reuse is not an option, what other methods are available to manage effluent?

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

Delaware Wastewater Study System Report

Tidewater - Bay Front Regional

ID: 96

1100 South Little Creek Road
Dover, DE 19901

City ID: TIDBAY

Tidewater - Bay Front Regional

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Bruce Patrick	Vice President of Engineering	bpatrick@tuiwater.com	(302)747-1336		
Jerry Esposito	President	jesposito@tuiwater.com			

2) Interviewer Name: CSG, HKM

3) Interview Date: 3/9/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- ( ) Municipal
- ( ) Municipal Authority
- (•) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

This is MBR treatment facility (activated sludge) w/ RIBs disposal. Water also provided by Tidewater.

Treatment Plant

1) Wastewater Treatment Plant Name: Bay Front Regional

2) Physical Address 31758 Marsh Island Avenue
Lewes, DE 19958

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [x] Tertiary Treatment
- [x] Nitrogen removal
- [ ] Phosphorus removal
- [ ] Other (Describe):

4) What is source of treatment plant back-up power (check all that apply):

Tidewater - Bay Front Regional

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [x] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
204435-OPC	State	RIBS	RIBS - On Site	39. Inland Bays/Atlantic Ocean (Rehoboth Bay)			0.108	8/27/2007	8/27/2017

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.05	Average Daily Flow (MGD)	0.02
Peak Flow (MGD)	0.05	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.04	Future Design Flow in 2030 (MGD	0.11

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	Flow (Phase 1)	0.054		MGD					Continuous	Rcordr
001	Nitrogen, Total					10		MG/L		
001	Nitrogen, Total (annual average)		0.01843	S/DY/EI						
001	5-Day BOD					30		MG/L		
001	TSS					30		MG/L		

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Woods on Herring Creek to disconnect in May 2011 (~150 homes). Avg daily flow expected to drop to 0.012 MGD, then to increase as area is built-out. Currently in Phase I. 2030 flow is Phase II. Peak flow is summer 2010 (tourism).

Service Area

1) Service area, square miles: 0.40

2) Number of pump stations: 3

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [ ] Portable Generator
- [ ] Battery
- [ ] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - Sussex County	☐	100	77	$960.00	$73,920.00

7) Population served:

	Current	Future, 2030
Resident	189	845
Non-resident	0	0
Total	189	845

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

System is designed to serve Bay Front & Bay Point subdivisions. Because flows are low, it is temporarily providing service to Sussex Co. to serve Woods on Herring Creek until county system is available (Inland Bays), anticipated disconnect in May 2011.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

N/A. New.

12) Service Area Comments:

77 EDU does not include WOHC. 345 EDU is Phase II buildout. Population is 2.45 x EDU. Flows per EDU are less than design, so some capacity exists. Willing and able to serve nearby demand in the region.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? No

2) If the revenue is not sufficient, please explain why:

Tidewater - Bay Front Regional

The number of proposed EDUs are not as projected due to the economy. The rates need adjusting and a rate filing is anticipated in 2011. Currently operating at a deficit, but no transfers from other enterprises needed.

3) Do you have a reserve account? N/A.

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? N/A.

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

TESI does not need a reserve account because they are obligated under the PSC to have no interrupted service and to make investments as req'd as explained in #11. The PSC requires proper financing to ensure uninterrupted service.

7) How are residential customer rates/bills computed (check all that apply)?

- [x] EDU
- [ ] Metered
- [ ] Front-footage assessment
- [ ] Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

N/A.

9) Median Household Income (MHI) ($/year) $47,727

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	
2.0 percent of MHI	
2.5 percent of MHI	$17,954

11) Rates, Billing, and MHI Comments:

PSC utility rate making does not require reserves. However, utilities must demonstrate their financial solvency to the PSC when improvements are made. The utility then seeks a rate increase if necessary.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

Middlesex (parent company) provides working funds and capital investment funds as a combination of equity contribution or debt to establish a capital structure that is consistent with public utility regulatory practices.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○

Tidewater - Bay Front Regional

Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
RIBs - Aquifer recharge	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

RIBs being used. Clean Delaware does land application of sludge.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

◉ Yes

○ No

4) Comments (to further explain your response to #3):

MBR Treatment, TN < 5, BOD < 5, TSS < 5.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

This facility would not generate enough flow to meet peak agronomic demands.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

We consider regionalization in all of our plans for cost, energy, and resource efficiency.

Delaware Wastewater Study System Report

Tidewater - Breeder's Crown

ID: 100

1100 South Little Creek Road
Dover, DE 19901

City ID: TIDBRE

Tidewater - Breeder's Crown

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Bruce Patrick	Vice President of Engineering	bpatrick@tuiwater.com	(302)747-1336		
Jerry Esposito	President	jesposito@tuiwater.com			

2) Interviewer Name: CSG, HKM

3) Interview Date: 3/9/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- ○ Municipal
- ○ Municipal Authority
- ◉ Private Investor Owned
- ○ Private Non-Investor Owned
- ○ Other (Describe):

7) General Comments

Parkson Geo-Reactor with RIBs disposal. It is designed to serve the Breeders Crown subdivision. Water is provided by Artesian.

Treatment Plant

1) Wastewater Treatment Plant Name: Breeder's Crown

2) Physical Address 89 Cams Fortune Way
Harrington, DE 19952

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [ ] Tertiary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal
- [ ] Other (Describe):

Tidewater - Breeder's Crown

4) What is source of treatment plant back-up power (check all that apply):

- ☐ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☑ Portable Generator
- ☐ Battery
- ☐ None
- ☐ Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
188061-OPB	State	RIBS	RIBS - On Site	19. Delaware Bay (Murderkill River)			0.0189	3/17/2007	3/17/2017

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.02	Average Daily Flow (MGD)	0.01
Peak Flow (MGD)	0.01	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.01	Future Design Flow in 2030 (MGD	0.02

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	Flow	0.0189		MGD					Continuous	Rcordr
001	5-Day BOD					30		MG/L		
001	TSS					30		MG/L		

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ◉ About Normal (150-250 mg/l BOD and TSS)
- ○ Above Normal (>250 mg/l BOD and TSS) Reason:
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Unknown
- ☐ Other (explain):

- ☐ Design issues
- ☐ Operational issues
- ☐ Low temperature
- ☐ Toxic shock

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

- ☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
- ☐ Metals (any) ☐ PCBs ☑ Other (explain): BOD excursion for 2 consecutive months, DNREC aware, no violation issued at this time.

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☑ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

BOD reported as required, however no violations has been issued at this time. DNREC recently inquired and is aware that TESI is investigating options to address the issue. Clarifier not designed to remove solids adequately. TESI is investigating possible fixes w/additional sampling & looking at filter designs or clarifier modifications.

Tidewater - Breeder's Crown

Service Area

1) Service area, square miles: 0.10

2) Number of pump stations: 1

3) What is source of back-up power at pump stations?

- ☐ On-site Generator (diesel/gasoline)
- ☑ Portable Generator
- ☐ On-site Generator (natural gas from main)
- ☐ Battery
- ☐ On-site Generator (propane/natural from tank)
- ☐ None
- ☐ Other (Describe):

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - Kent County	☐	100	56	$1,125.00	$63,000.00

7) Population served:

	Current	Future, 2030
Resident	146	165
Non-resident	0	0
Total	146	165

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Serves Breeder's Crown subdivision. Population is 2.61 x EDU. 56 is current EDU. 63 is build-out.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

None.

12) Service Area Comments:

Designed to serve Breeder's Crown subdivision, although flows per EDU are less than design, so some capacity exists. TESI is willing and able to serve nearby demand in the region. Surrounding area is septic.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? No

2) If the revenue is not sufficient, please explain why:

Currently operating at a deficient, but no transfers from other enterprises are necessary. Operating expenses higher then anticipated, and customer connections didn't occur as anticipated. The rates need adjusting and a rate filing is anticipated in 2011.

3) Do you have a reserve account? N/A.

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? N/A.

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

TESI does not need a reserve account because they are obligated under the PSC to have no interrupted service and to make investments as req'd as explained in #11. The PSC requires proper financing to ensure uninterrupted service.

7) How are residential customer rates/bills computed (check all that apply)?

- [x] EDU
- [ ] Metered
- [ ] Front-footage assessment
- [ ] Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

N/A.

9) Median Household Income (MHI) ($/year) $55,179

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	
2.0 percent of MHI	
2.5 percent of MHI	$14,251

11) Rates, Billing, and MHI Comments:

PSC utility rate making does not require reserves. However, utilities must demonstrate their financial solvency to the PSC when improvements are made. The utility then seeks a rate increase if necessary.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

Middlesex (parent company) provides working funds and capital investment funds as a combination of equity contribution or debt to establish a capital structure that is consistent with public utility regulatory practices.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○

Tidewater - Breeder's Crown

Municipal Wastewater Sludge Reuse	○	○	○	○	◉
RIBs	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

Clean Delaware does land application of sludge. 6,000 gpd; not enough for spray app.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

Secondary treatment.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Not enough to meet agronomic demands (6,000 - 18,000 gpd)

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

Could spray on crops for non-direct consumption. Flow is too low for agronomic demand.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
Filtration, disinfection (plant has no disinfection).	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

TESI considers regionalization in all plans for cost, energy, and resource efficiency.

Delaware Wastewater Study System Report

Tidewater - Country Grove

ID: 98

1100 South Little Creek Road
Dover, DE 19901

City ID: TIDCOU

Tidewater - Country Grove

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Bruce Patrick	Vice President of Engineering	bpatrick@tuiwater.com	(302)747-1336		
Jerry Esposito	President	jesposito@tuiwater.com			

2) Interviewer Name: CSG, HKM

3) Interview Date: 3/9/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- ( ) Municipal
- ( ) Municipal Authority
- (•) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

SBR treatment with RIBs disposal. Water also provided by Tidewater. Site is southwest of Laurel.

Treatment Plant

1) Wastewater Treatment Plant Name: Country Grove

2) Physical Address 10242 Bocons Road
Laurel, DE 19956

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [ ] Tertiary Treatment
- [x] Nitrogen removal
- [ ] Phosphorus removal
- [ ] Other (Describe):

4) What is source of treatment plant back-up power (check all that apply):

Tidewater - Country Grove

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [x] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
204220-OPB	State	RIBS	RIBS - On Site	35. Chesapeake (Broad Creek)			0.054	11/5/2007	11/5/2017

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.05	Average Daily Flow (MGD)	0.01
Peak Flow (MGD)	0.02	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.03	Future Design Flow in 2030 (MGD	0.05

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	Flow	0.054		MGD					Continuous	Rcordr
001	Nitrogen, Total					10		MG/L		
001	Nitrogen, Total (annual average)		0.01843	S/DY/EI						
001	5-Day BOD					30		MG/L		
001	TSS					30		MG/L		
001	Iron (Residual)					250		MG/L		

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

Tidewater - Country Grove

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

- ☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
- ☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

No effluent issues. Don't monitor influent NH3-N.

Service Area

1) Service area, square miles: 0.16

2) Number of pump stations: 1

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [ ] Portable Generator
- [ ] Battery
- [ ] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - Sussex County	☐		59	$1,025.00	$60,475.00

7) Population served:

	Current	Future, 2030
Resident	145	434
Non-resident	0	0
Total	145	434

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Single subdivision s/w of Laurel (1-2 miles). Surrounded by individual units (septic) and farms, etc. 177 EDUs at buildout. Pop. is 2.45 x EDU.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

N/A.

12) Service Area Comments:

Designed to serve Country Grove subdivision. Flow per EDU is less than design, so capacity exists. TESI is willing and able to serve nearby demand in the region.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? Yes

2) If the revenue is not sufficient, please explain why:

N/A.

3) Do you have a reserve account? N/A.

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? N/A.

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

TESI does not need a reserve account because they are obligated under the PSC to have no interrupted service and to make investments as req'd as explained in #11. The PSC requires proper financing to ensure uninterrupted service.

7) How are residential customer rates/bills computed (check all that apply)?

- [x] EDU
- [ ] Metered
- [ ] Front-footage assessment
- [ ] Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

N/A.

9) Median Household Income (MHI) ($/year) $47,727

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	
2.0 percent of MHI	
2.5 percent of MHI	$9,922

11) Rates, Billing, and MHI Comments:

PSC utility rate making does not require reserves. However, utilities must demonstrate their financial solvency to the PSC when improvements are made. The utility then seeks a rate increase if necessary.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

Middlesex provides funds as a combination of equity contribution or debt to establish a capital structure that is consistent with public utility regulatory practices.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○

Tidewater - Country Grove

Municipal Wastewater Sludge Reuse	○	○	○	○	◉
RIBs - groundwater recharge	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

Clean Earth does land application of sludge.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

Could spray on non-consumptive use crops.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

There are farms nearby, but flow will not meet agronomic demands.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A, meeting current permit requirements.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

RIBS

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

TESI considers regionalization in all plans for cost, energy, and resource efficiency.

Delaware Wastewater Study System Report

Tidewater - Hart's Landing

ID: 99

1100 South Little Creek Road
Dover, DE 19901

City ID: TIDHAR

Tidewater - Hart's Landing

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Bruce Patrick	Vice President of Engineering	bpatrick@tuiwater.com	(302)747-1336		
Jerry Esposito	President	jesposito@tuiwater.com			

2) Interviewer Name: CSG, HKM

3) Interview Date: 3/9/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- ( ) Municipal
- ( ) Municipal Authority
- (•) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

MBR treatment with drip disposal. Water also provided by Tidewater. Similar to Bayfront.

Treatment Plant

1) Wastewater Treatment Plant Name: Hart's Landing

2) Physical Address 20729 Annondell Drive
Lewes, DE 19958

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [x] Tertiary Treatment
- [x] Nitrogen removal
- [ ] Phosphorus removal
- [ ] Other (Describe):

4) What is source of treatment plant back-up power (check all that apply):

Tidewater - Hart's Landing

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [x] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
205963-OP	State	Drip Irrigation	Drip - On Site	39. Inland Bays/Atlantic Ocean (Rehoboth Bay)			0.03915	5/29/2007	5/29/2017

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.04	Average Daily Flow (MGD)	0.01
Peak Flow (MGD)	0.02	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.03	Future Design Flow in 2030 (MGD	0.04

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	Flow	0.03915		MGD					Continuous	Rcordr
001	Nitrogen, Total					10		MG/L		
001	Nitrogen, Total (annual average)		0.01843	S/DY/EI						
001	5-Day BOD					30		MG/L		
001	TSS					30		MG/L		

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

Tidewater - Hart's Landing

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

- ☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
- ☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Don't monitor influent NH3-N, no effluent problems.

Service Area

1) Service area, square miles: 0.15

2) Number of pump stations: 2

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [ ] Portable Generator
- [ ] Battery
- [ ] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - Sussex County	☐		142	$995.00	$141,290.00

7) Population served:

	Current	Future, 2030
Resident	348	353
Non-resident	0	0
Total	348	353

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Route 24 w/in County's planning area (West Rehoboth, Love Creek). Neighboring developments on septic (Briarwood). Pop. is 2.45 x EDU.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

None.

12) Service Area Comments:

N/A.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? No

2) If the revenue is not sufficient, please explain why:

The number of proposed EDUs are not as projected due to the economy. The rates need adjusting and a rate filing is anticipated in 2011. Currently operating at a deficit, but no transfers from other enterprises needed.

Tidewater - Hart's Landing

3) Do you have a reserve account? N/A.

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? N/A.

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

TESI does not need a reserve account because they are obligated under the PSC to have no interrupted service and to make investments as req'd as explained in #11. The PSC requires proper financing to ensure uninterrupted service.

7) How are residential customer rates/bills computed (check all that apply)?

- [x] EDU
- [ ] Metered
- [ ] Front-footage assessment
- [ ] Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

N/A.

9) Median Household Income (MHI) ($/year) $47,727

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	
2.0 percent of MHI	
2.5 percent of MHI	$28,141

11) Rates, Billing, and MHI Comments:

PSC utility rate making does not require reserves. However, utilities must demonstrate their financial solvency to the PSC when improvements are made. The utility then seeks a rate increase if necessary.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

Middlesex (parent company) provides working funds and capital investment funds as a combination of equity contribution or debt to establish a capital structure that is consistent with public utility regulatory practices.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○

Tidewater - Hart's Landing

Municipal Wastewater Sludge Reuse	○	○	○	○	◉
Drip irrigation in open space	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

Clean Delaware does land application of sludge.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

◉ Yes

○ No

4) Comments (to further explain your response to #3):

N/A.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Farms nearby, but flow will not meet agronomic demands.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

TESI considers regionalization in all plans for cost, energy, and resource efficiency.

Delaware Wastewater Study System Report

Tidewater - Milton Regional

ID: 95

1100 South Little Creek Road
Dover, DE 19901

City ID: TIDMIL

Tidewater - Milton Regional

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Bruce Patrick	Vice President of Engineering	bpatrick@tuiwater.com	(302)747-1336		
Jerry Esposito	President	jesposito@tuiwater.com			

2) Interviewer Name: CSG, HKM

3) Interview Date: 3/9/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- ( ) Municipal
- ( ) Municipal Authority
- (•) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

RBCs with sand filtration, discharge to Broadkill. Permit issued May 1, 2011 w/TMDL. Spent $1.35M out of pocket in various repairs. Only privately owned municipal system in DE (July 2007, operated since Feb 2007). Water provided by Milton.

Treatment Plant

1) Wastewater Treatment Plant Name: Milton Regional

2) Physical Address 207 Front Street
Milton, DE 19968

3) General level of treatment

- [x] Primary Treatment
- [x] Secondary Treatment
- [x] Tertiary Treatment
- [ ] Nitrogen removal
- [ ] Phosphorus removal
- [x] Other (Describe): Some solids

4) What is source of treatment plant back-up power (check all that apply):

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [ ] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	Permit Type	Dischg. Type	Discharge Location	Watershed	Lat (dec. degree)	Long (dec. degree)	Permit Capacity (MGD)	Permit Issuance Date	Permit Expir. Date
DE0021491	NPDES		BROADKILL RIVER	22. Delaware Bay (Broadkill River)	38.777394	75.306876	0.25	1/1/2005	12/31/2009

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.35	Average Daily Flow (MGD)	0.16
Peak Flow (MGD)	0.30	% of Average Daily Flow from Domestic Source	95.00
Anticipated Flow in 2020 (MGD)	0.19	Future Design Flow in 2030 (MGD	1.40

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	Parameter	Load Daily Avg	Load Daily Max	Load Units	Conc Daily Min	Conc Daily Avg	Conc Daily Max	Conc Units	Measurement Frequency	Sample Type
001	5-Day BOD	44	67	LBS/DY		15	23	MG/L	Weekly	Comp-8
001	pH				6		9	SU	Daily	Grab
001	TSS	44	67	LBS/DY		15	23	MG/L	Weekly	Comp-8
001	Enterococci					33		#/ 100ML	Weekly	Grab
001	Flow	0.35		MGD					Continuous	Rcordr
001	Chlorine, Tot Res						0	MG/L	Daily	Grab

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ◉ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits? nknov

18) What problems do you anticipate? May need to upgrade for TN limit; 48 months to meet the new limits in the permit.

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ◉ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits? No

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☑ Other (explain): Instantaneous chlorine, no violation.

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☑ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

Tidewater - Milton Regional

New permit issued at time of survey. Don't anticipate removal of NPDES permit any time soon. Brewery has own waste holding tank and hauls solids off-site. Buildout capacity is est 1.4 MGD. 0.350 MGD is current hydraulic capacity. Doing study for treatment capacity and TN upgrades, too. TP should not be issue (polymer addition).

Service Area

1) Service area, square miles: 1.65

2) Number of pump stations: 11

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [x] Portable Generator
- [ ] Battery
- [ ] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Milton	☐		1285	$350.00	$449,750.00

7) Population served:

	Current	Future, 2030
Resident	2,994	4,101
Non-resident	0	2,330
Total	2,994	6,431

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Currently serve town limits, but have capacity and ability to expand and serve others. Some gravity and FM/PS. Pretty sure no septic within proper limits. Pop is 2.33 x EDU. Non-Res is unincorp Ssx Co.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

Much has been addressed with bowls in manholes, repaired cleanouts, etc. During a heavy rain event flows may still increase by 50%. Investigating manhole repairs, fixing as needed, portions of the system has video'd.

12) Service Area Comments:

Capacity exists at the TESI-Milton plant and TESI is willing and able to serve nearby demands in the region.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? No

2) If the revenue is not sufficient, please explain why:

We are currently running deficiently, but no transfers from other enterprises are necessary. The number of EDUs are lower than projected. It is anticipated that rates will be adjusted in 2012.

3) Do you have a reserve account? N/A.

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? N/A.

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

TESI does not need a reserve account because they are obligated under the PSC to have no interrupted service and to make investments as req'd as explained in #11. The PSC requires proper financing to ensure uninterrupted service.

7) How are residential customer rates/bills computed (check all that apply)?

- ☐ EDU
- ☑ Metered
- ☐ Front-footage assessment
- ☑ Other (Describe): Metered by water usage.

8) How are commercial, industrial, and contract user rates/bills computed?

$40 flat + $3/1,000 gal. (same rate as residents). Estimate EDU ~1,500gal/quarter.

9) Median Household Income (MHI) ($/year) $40,313

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$327,283
2.0 percent of MHI	$586,294
2.5 percent of MHI	$845,305

11) Rates, Billing, and MHI Comments:

Water readings by Milton, bills from Tidewater. PSC utility rate making does not require reserves. However, utilities must demonstrate their financial solvency to the PSC when improvements are made. The utility then seeks a rate increase if necessary.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

Middlesex (parent company) provides working funds and capital investment funds as a combination of equity contribution or debt to establish a capital structure that is consistent with public utility regulatory practices.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	○	◉	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

Looking at all options including spraying on nearby farms (500 acres). Compost with Blessings site.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

Not required to meet the standard under current permit, but may be under new permit. Not sure if meet standard or not.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Nearby farmers are interested.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

Could spray on crops for non-direct consumptive use.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
Infrastructure (pipes/pumps/etc.).	
Get plant to unlimited access standard.	

8) If reuse is not an option, what other methods are available to manage effluent?

Will be cheaper to upgrade to a new plant for NPDES permit.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

TESI considers regionalization in all plans for cost, energy, and resource efficiency.

Delaware Wastewater Study System Report

Tidewater - Retreat

ID: 97

1100 South Little Creek Road
Dover, DE 19901

City ID: TIDRET

Tidewater - Retreat

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Bruce Patrick	Vice President of Engineering	bpatrick@tuiwater.com	(302)747-1663		
Jerry Esposito	President	jesposito@tuiwater.com			

2) Interviewer Name: CSG, HKM

3) Interview Date: 3/9/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- ( ) Municipal
- ( ) Municipal Authority
- (•) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

SBR with subsurface trench disposal. Water also provided by Tidewater.

Treatment Plant

1) Wastewater Treatment Plant Name: Retreat

2) Physical Address 32732 Cedar Grove Road
Lewes, DE 19958

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [ ] Tertiary Treatment
- [x] Nitrogen removal
- [ ] Phosphorus removal
- [ ] Other (Describe):

4) What is source of treatment plant back-up power (check all that apply):

Tidewater - Retreat

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [ ] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
197427-OPC	State	Subsurface Trench	Subsurface Trench - On Site	39. Inland Bays/Atlantic Ocean (Rehoboth Bay)			0.0483	11/15/2005	11/15/2015

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.05	Average Daily Flow (MGD)	0.01
Peak Flow (MGD)	0.02	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.03	Future Design Flow in 2030 (MGD	0.05

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	Flow	0.0483		MGD					Continuous	Rcordr
001	Nitrogen, Total					10		MG/L		
001	Nitrogen, Total (annual average)		0.01843	S/DY/EI						
001	5-Day BOD					30		MG/L		
001	TSS					30		MG/L		

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

Tidewater - Retreat

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

- ☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
- ☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☐ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☐ Other (explain)

25) General Treatment Plant Comments.

No effluent issues. Don't monitor influent NH3-N.

Service Area

1) Service area, square miles: 0.22

2) Number of pump stations: 2

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [ ] Portable Generator
- [ ] Battery
- [ ] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - Sussex County	☐	100	86	$850.00	$73,100.00

7) Population served:

	Current	Future, 2030
Resident	211	397
Non-resident	0	0
Total	211	397

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Serves the Retreat subdivision. 86 EDUs is current. 162 EDUs is buildout. Population is 2.45 x EDU.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

None.

12) Service Area Comments:

Actual flows are less than designed, so some capacity available. TESI is willing and able to serve nearby demands in the region.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? No

2) If the revenue is not sufficient, please explain why:

The number of proposed EDUs are not as projected due to the economy. The rates need adjusting and a rate filing is anticipated in 2011. Currently operating at a deficit, but no transfers from other enterprises needed.

Tidewater - Retreat

3) Do you have a reserve account? N/A.

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? N/A.

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

TESI does not need a reserve account because they are obligated under the PSC to have no interrupted service and to make investments as req'd as explained in #11. The PSC requires proper financing to ensure uninterrupted service.

7) How are residential customer rates/bills computed (check all that apply)?

- [x] EDU
- [ ] Metered
- [ ] Front-footage assessment
- [ ] Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

N/A.

9) Median Household Income (MHI) ($/year) $47,727

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	
2.0 percent of MHI	$8,990
2.5 percent of MHI	$29,513

11) Rates, Billing, and MHI Comments:

PSC utility rate making does not require reserves. However, utilities must demonstrate their financial solvency to the PSC when improvements are made. The utility then seeks a rate increase if necessary.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

Middlesex (parent company) provides working funds and capital investment funds as a combination of equity contribution or debt to establish a capital structure that is consistent with public utility regulatory practices.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○

Tidewater - Retreat

Municipal Wastewater Sludge Reuse	○	○	○	○	◉
Subsurface disposal - groundwater recharge	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

Clean Delaware does land application of sludge.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

○ Yes

◉ No

4) Comments (to further explain your response to #3):

N/A.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Not enough flow to meet agronomic demands.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

TESI considers regionalization in all plans for cost, energy, and resource efficiency.

Delaware Wastewater Study System Report

Tidewater - The Ridings *In Process of Acquiring*

ID: 103

1100 South Little Creek Road
Dover, DE 19901

City ID: TIDRID

Tidewater - The Ridings *In Process of Acquiring*

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Bruce Patrick	Vice President of Engineering	bpatrick@tuiwater.com	(302)747-1336		
Jerry Esposito	President	jesposito@tuiwater.com			

2) Interviewer Name: CSG, HKM

3) Interview Date: 3/9/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- ○ Municipal
- ○ Municipal Authority
- ◉ Private Investor Owned
- ○ Private Non-Investor Owned
- ○ Other (Describe):

7) General Comments

SBR with drip disposal. Water also provided by Tidewater. System being acquired (have been operating it for about 1 year).

Treatment Plant

1) Wastewater Treatment Plant Name: The Ridings *In Process of Acquiring*

2) Physical Address East Side CR286, West of CR258, and South of CR262, Sussex County

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [x] Tertiary Treatment
- [x] Nitrogen removal
- [ ] Phosphorus removal
- [ ] Other (Describe):

Tidewater - The Ridings *In Process of Acquiring*

4) What is source of treatment plant back-up power (check all that apply):

- ☑ On-site Generator (diesel/gasoline)
- ☐ On-site Generator (natural gas from main)
- ☐ On-site Generator (propane / natural gas from tank)
- ☐ Portable Generator
- ☐ Battery
- ☐ None
- ☐ Other (Describe):

5) Permit Information: General

Permit ID	*Permit Type*	*Dischg. Type*	*Discharge Location*	*Watershed*	*Lat (dec. degree)*	*Long (dec. degree)*	*Permit Capacity (MGD)*	*Permit Issuance Date*	*Permit Expir. Date*
208353-OP	State	Drip Irrigation	Drip Irrig - On Site	39. Inland Bays/Atlantic Ocean (Rehoboth Bay)			0.0147	3/18/2009	3/18/2014

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.07	Average Daily Flow (MGD)	0.01
Peak Flow (MGD)	0.03	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.04	Future Design Flow in 2030 (MGD	0.07

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Outfall	*Parameter*	*Load Daily Avg*	*Load Daily Max*	*Load Units*	*Conc Daily Min*	*Conc Daily Avg*	*Conc Daily Max*	*Conc Units*	*Measurement Frequency*	*Sample Type*
001	Flow	0.0147		MGD					Continuous	Rcordr
001	Nitrogen, Total					10		MG/L		
001	Nitrogen, Total (annual average)		0.01843	S/DY/EI						
001	5-Day BOD					30	45	MG/L		
001	TSS					30	45	MG/L		

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ◉ About Normal (150-250 mg/l BOD and TSS)
- ○ Above Normal (>250 mg/l BOD and TSS) Reason:
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

Tidewater - The Ridings *In Process of Acquiring*

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Equipment failure
- ☐ Design issues
- ☐ Operational issues
- ☐ Low dissolved oxygen
- ☐ Low alkalinity
- ☐ Low temperature
- ☐ Toxic shock
- ☐ Unknown
- ☐ Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ◉ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years? No

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ○ No limits currently. ANTICIPATE limits within 5 years.
- ◉ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☑ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☑ Other (explain): Temporary issue, no violation.

24) What was the cause of the above non-compliance?

- ☐ Wash out of biomass due to inflow and infiltration
- ☐ Toxic shock
- ☐ Equipment failure
- ☐ Unknown
- ☑ Low temperature
- ☐ Operational issues
- ☐ Design issues
- ☑ Other (explain) Low flows created algae in dose tank, corrected by chlorinating.

25) General Treatment Plant Comments.

Regulations for most existing sites <~ 20,000 TP "to be determined by dept".

Tidewater - The Ridings *In Process of Acquiring*

Service Area

1) Service area, square miles: 0.34

2) Number of pump stations: 1

3) What is source of back-up power at pump stations?

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane/natural from tank)
- [ ] Other (Describe):
- [ ] Portable Generator
- [ ] Battery
- [ ] None

4) Number of holding tanks: 0

5) Total holding tank capacity (gallons): 0

6) Sewer Districts included in service area (in whole or in part):

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - Sussex County	☐		49	$1,245.00	$61,005.00

7) Population served:

	Current	Future, 2030
Resident	120	551
Non-resident	0	0
Total	120	551

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Buildout is 225. Pop is 2.45 x EDU.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

N/A.

12) Service Area Comments:

Designed to serve the Ridings subdivision, but flows are less than design, so some capacity is available. TESI is willing and able to serve nearby demand in the region.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises?

2) If the revenue is not sufficient, please explain why:

Currently do not own. Acquisition expected to be complete by 3-15-11.

Tidewater - The Ridings *In Process of Acquiring*

3) Do you have a reserve account? N/A.

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? N/A.

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

TESI does not need a reserve account because they are obligated under the PSC to have no interrupted service and to make investments as req'd as explained in #11. The PSC requires proper financing to ensure uninterrupted service.

7) How are residential customer rates/bills computed (check all that apply)?

- [x] EDU
- [ ] Metered
- [ ] Front-footage assessment
- [ ] Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

N/A.

9) Median Household Income (MHI) ($/year) $47,727

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	
2.0 percent of MHI	
2.5 percent of MHI	

11) Rates, Billing, and MHI Comments:

PSC utility rate making does not require reserves. However, utilities must demonstrate their financial solvency to the PSC when improvements are made. The utility then seeks a rate increase if necessary.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

Middlesex (parent company) provides working funds and capital investment funds as a combination of equity contribution or debt to establish a capital structure that is consistent with public utility regulatory practices.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○

Tidewater - The Ridings *In Process of Acquiring*

Municipal Wastewater Sludge Reuse	○	○	○	○	◉
Drip irrigation	○	○	○	○	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

Clean Delaware does land application of sludge.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

◉ Yes

◉ No

4) Comments (to further explain your response to #3):

N/A.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Farms nearby, but not enough flow to meet agronomic demands.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

TESI considers regionalization in all plans for cost, energy, and resource efficiency.

Delaware Wastewater Study System Report

Tidewater - Trussum *Proposed*

ID: 102

1100 South Little Creek Road
Dover, DE 19901

City ID: TIDTRU

Tidewater - Trussum *Proposed*

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Bruce Patrick	Vice President of Engineering	bpatrick@tuiwater.com	(302)747-1336		
Jerry Esposito	President	jesposito@tuiwater.com			

2) Interviewer Name: CSG, HKM

3) Interview Date: 3/9/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- ( ) Municipal
- ( ) Municipal Authority
- (•) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

This is a proposed 400,000 gpd facility southeast of Laurel. SBR with RIBs disposal.

Treatment Plant

1) Wastewater Treatment Plant Name: Trussum *Proposed*

2) Physical Address North side CR 463, just north of CR 72. Sussex County, DE (east of Laurel)

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [ ] Tertiary Treatment
- [x] Nitrogen removal
- [ ] Phosphorus removal
- [ ] Other (Describe):

4) What is source of treatment plant back-up power (check all that apply):

Tidewater - Trussum *Proposed*

- [x] On-site Generator (diesel/gasoline)
- [ ] On-site Generator (natural gas from main)
- [ ] On-site Generator (propane / natural gas from tank)
- [ ] Portable Generator
- [ ] Battery
- [ ] None
- [ ] Other (Describe):

5) Permit Information: General

6) Treatment Plant Capacity:

Current Design Flow (MGD)	0.40	Average Daily Flow (MGD)	0.00
Peak Flow (MGD)	0.00	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.08	Future Design Flow in 2030 (MGD	0.40

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- (•) About Normal (150-250 mg/l BOD and TSS)
- ( ) Above Normal (>250 mg/l BOD and TSS) Reason:
- ( ) Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

- [ ] Wash out of biomass due to inflow and infiltration
- [ ] Equipment failure
- [ ] Design issues
- [ ] Operational issues
- [ ] Low dissolved oxygen
- [ ] Low alkalinity
- [ ] Low temperature
- [ ] Toxic shock
- [ ] Unknown
- [ ] Other (explain):

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ( ) Yes, actual limits in place now.
- (•) No limits currently. ANTICIPATE limits within 5 years.
- ( ) No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits? No

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ◉ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits? No

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

Proposed Facility.

Service Area

1) Service area, square miles: 22.90

2) Number of pump stations:

3) What is source of back-up power at pump stations?

☐ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☐ Other (Describe):
☐ Portable Generator
☐ Battery
☐ None

4) Number of holding tanks:

5) Total holding tank capacity (gallons):

6) Sewer Districts included in service area (in whole or in part):

Tidewater - Trussum *Proposed*

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - Sussex County	☐		950		$0.00

7) Population served:

	Current	Future, 2030
Resident	0	2,328
Non-resident		
Total	0	2,328

8) Is service area digitized? Yes

9) Map obtained? Yes

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Pop is 2.45 x EDU.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

N/A. New.

12) Service Area Comments:

N/A.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? No

2) If the revenue is not sufficient, please explain why:

Proposed Facility.

3) Do you have a reserve account? N/A.

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? N/A.

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

TESI does not need a reserve account because they are obligated under the PSC to have no interrupted service and to make investments as req'd as explained in #11. The PSC requires proper financing to ensure uninterrupted service.

7) How are residential customer rates/bills computed (check all that apply)?

☑ EDU ☐ Metered ☐ Front-footage assessment

☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

N/A.

Tidewater - Trussum *Proposed*

9) Median Household Income (MHI) ($/year) $49,484

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$705,147
2.0 percent of MHI	$940,196
2.5 percent of MHI	$1,175,245

11) Rates, Billing, and MHI Comments:

PSC utility rate making does not require reserves. However, utilities must demonstrate their financial solvency to the PSC when improvements are made. The utility then seeks a rate increase if necessary.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

Middlesex (parent company) provides working funds and capital investment funds as a combination of equity contribution or debt to establish a capital structure that is consistent with public utility regulatory practices.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	◉	○	○	○	○
Commercial/Industrial Use	◉	○	○	○	○
Residential Use	◉	○	○	○	○
Municipal Wastewater Sludge Reuse	○	○	○	◉	○
RIBs disposal proposed	○	○	○	◉	○
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

Clean Delaware does land application of sludge.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

◉ Yes

○ No

4) Comments (to further explain your response to #3):

N/A.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

There are several farms nearby.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

TESI considers regionalization in all plans for cost, energy, and resource efficiency.

Delaware Wastewater Study System Report

Tidewater - Wandendale *Proposed* ID: 101

1100 South Little Creek Road
Dover, DE 19901

City ID: TIDWAN

Tidewater - Wandendale *Proposed*

General

1) Contact(s):

Name	*Title*	*Email*	*Telephone*	*Ext.*	*Fax*
Bruce Patrick	Vice President of Engineering	bpatrick@tuiwater.com	(302)747-1336		
Jerry Esposito	President	jesposito@tuiwater.com			

2) Interviewer Name: CSG, HKM

3) Interview Date: 3/9/2011

4) Entity responsibilities (check all that apply):

- [x] Collection
- [x] Transmission
- [x] Treatment (including solids)
- [ ] Other (Describe):

5) Entity is responsible for multiple treatment plants? (If "yes", the survey must be filled out for each treatment plant / service area) Yes

6) Ownership

- ( ) Municipal
- ( ) Municipal Authority
- (•) Private Investor Owned
- ( ) Private Non-Investor Owned
- ( ) Other (Describe):

7) General Comments

This is a proposed 1.45 MGD facility in permitting process. MBR w/ N&P removal; RIBs and spray.

Treatment Plant

1) Wastewater Treatment Plant Name: Wandendale *Proposed*

2) Physical Address Route 24 and Camp Arrowhead Road, Angola, Sussex County, DE

3) General level of treatment

- [ ] Primary Treatment
- [x] Secondary Treatment
- [x] Tertiary Treatment
- [x] Nitrogen removal
- [x] Phosphorus removal
- [ ] Other (Describe):

4) What is source of treatment plant back-up power (check all that apply):

Tidewater - Wandendale *Proposed*

☐ On-site Generator (diesel/gasoline)	☐ Portable Generator	☑ Other (Describe):
☐ On-site Generator (natural gas from main)	☐ Battery	Multiple electric feeds available
☐ On-site Generator (propane / natural gas from tank)	☐ None	

5) Permit Information: General

6) Treatment Plant Capacity:

Current Design Flow (MGD)	1.45	Average Daily Flow (MGD)	0.00
Peak Flow (MGD)	0.00	% of Average Daily Flow from Domestic Source	100.00
Anticipated Flow in 2020 (MGD)	0.16	Future Design Flow in 2030 (MGD	1.45

7) Has the plant exceeded its current design flow capacity for 2 or more consecutive months in the past 2 years? No

8) Are the flows above the permitted limit due to excessive infiltration and inflow? (See Service Area Question #11 to describe I/I problem) No

9) Permit Limits

Influent Wastewater Strength

10) Over the last 12 months, what was the typical average strength of the influent wastewater BOD and TSS?

- ◉ About Normal (150-250 mg/l BOD and TSS)
- ○ Above Normal (>250 mg/l BOD and TSS) Reason:
- ○ Below Normal (<150 mg/l BOD and TSS) Reason:

Nitrification

11) What is the typical average strength of the influent wastewater NH3-N?

12) Is the facility required to remove ammonia nitrogen (NH3-N, nitrification)? No

13) Has the facility been in non-compliance for ammonia nitrogen for 2 or more consecutive months within the last 2 years?

14) What was the cause of the non-compliance with the ammonia nitrogen limits?

☐ Wash out of biomass due to inflow and infiltration	☐ Low dissolved oxygen	☐ Unknown
☐ Equipment failure	☐ Low alkalinity	☐ Other (explain):
☐ Design issues	☐ Low temperature	
☐ Operational issues	☐ Toxic shock	

Total Nitrogen

15) Does the facility have or anticipate having (within 5 years) total nitrogen limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ◉ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

16) Has the facility experienced problems in meeting actual total nitrogen limits within the last 2 years?

17) Do you anticipate any problems in complying with the ANTICIPATED total nitrogen limits?

18) What problems do you anticipate?

Total Phosphorus

19) Does the facility have or anticipate having (within 5 years) total phosphorus limits in the permit based on TMDL or other control strategies?

- ○ Yes, actual limits in place now.
- ◉ No limits currently. ANTICIPATE limits within 5 years.
- ○ No limits currently. DO NOT ANTICIPATE any limits in the future.

20) Has the facility experienced problems in meeting actual total phosphorus limits within the last 2 years?

21) Do you anticipate any problems in complying with the ANTICIPATED total phosphorus limits?

22) What problems do you anticipate?

Effluent Problems

23) Has the facility experienced non-compliance with any other parameters for 2 or more consecutive months within the last 2 years (excluding ammonia nitrogen, total nitrogen, and phosphorus)?

☐ pH ☐ cBOD ☐ TSS ☐ DO ☐ Total Residual Chlorine ☐ Enterococcus / Fecal Coliform
☐ Metals (any) ☐ PCBs ☐ Other (explain):

24) What was the cause of the above non-compliance?

☐ Wash out of biomass due to inflow and infiltration
☐ Toxic shock
☐ Equipment failure
☐ Unknown
☐ Low temperature
☐ Operational issues
☐ Design issues
☐ Other (explain)

25) General Treatment Plant Comments.

Proposed facility. Buildout will be phased. TN<= 5. TP<=3.9.

Service Area

1) Service area, square miles: 22.50

2) Number of pump stations:

3) What is source of back-up power at pump stations?

☐ On-site Generator (diesel/gasoline)
☐ On-site Generator (natural gas from main)
☐ On-site Generator (propane/natural from tank)
☐ Other (Describe):
☐ Portable Generator
☐ Battery
☐ None

4) Number of holding tanks:

5) Total holding tank capacity (gallons):

6) Sewer Districts included in service area (in whole or in part):

Tidewater - Wandendale *Proposed*

City/Town	*Contract User*	*Percent Service Area*	*Number of Households*	*Average Sewer Rate ($/yr)*	*Total Annual Residential Revenue ($)*
Unincorporated - Sussex County	☐		1900		$0.00

7) Population served:

	Current	Future, 2030
Resident	0	4,655
Non-resident		
Total	0	4,655

8) Is service area digitized?

9) Map obtained?

10) Provide a narrative description and status of the service area (include information about your combined sewer system, if applicable).

Planning area is next to Ssx Co.'s Inland Bays facility. Pop. is 2.45 x EDU.

11) Describe your system's I / I problem. Include details on flow or percent flow to help quantify the issue.

N/A. New.

12) Service Area Comments:

N/A.

Finance

1) Is sufficient revenue being generated to meet the cost of the wastewater enterprise without transfers from other enterprises? No

2) If the revenue is not sufficient, please explain why:

Proposed Facility.

3) Do you have a reserve account? N/A.

4) Is your reserve account, or a portion of the reserve account, restricted to the wastewater enterprise? N/A.

5) What is the percent value (%) in the wastewater reserve account when compared to the overall operating revenue of the wastewater enterprise? N/A.

6) Reserve account restrictions / comments (example: "emergency repairs only"):

TESI does not need a reserve account because they are obligated under the PSC to have no interrupted service and to make investments as req'd as explained in #11. The PSC requires proper financing to ensure uninterrupted service.

7) How are residential customer rates/bills computed (check all that apply)?

☑ EDU ☐ Metered ☐ Front-footage assessment

☐ Other (Describe):

8) How are commercial, industrial, and contract user rates/bills computed?

N/A.

Tidewater - Wandendale *Proposed*

9) Median Household Income (MHI) ($/year) $54,881

10) How much additional revenue could be generated per year if residential sewer charges were increased to:

1.5 percent of MHI	$1,564,109
2.0 percent of MHI	$2,085,478
2.5 percent of MHI	$2,606,848

11) Rates, Billing, and MHI Comments:

PSC utility rate making does not require reserves. However, utilities must demonstrate their financial solvency to the PSC when improvements are made. The utility then seeks a rate increase if necessary.

12) What is the debt borrowing limit ($)? $0

13) How much of this limit ($) is allocated to the wastewater enterprise? $0

14) How much of this limit ($) available to the wastewater enterprise is used overall? $0

15) Borrowing Limit and Debt Comments:

Middlesex (parent company) provides working funds and capital investment funds as a combination of equity contribution or debt to establish a capital structure that is consistent with public utility regulatory practices.

Reuse

1) Has this reporting entity evaluated opportunities for reuse via:

	No	No, but interested	Yes, but not viable	Yes, some planning performed	Yes, currently implementing some reuse now
Land Application for Agriculture Use	○	○	○	◉	○
Commercial/Industrial Use	◉	◉	◉	◉	◉
Residential Use	◉	◉	◉	◉	◉
Municipal Wastewater Sludge Reuse	○	○	○	◉	○
RIBs	○	○	○	◉	○
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉
N/A-Additional reuse method not specified	◉	◉	◉	◉	◉

2) Comments (options considered, opportunities, barriers):

No financial or regulatory incentive to do residential purple pipe.

3) If interested in beneficial reuse via irrigation, can the domestic wastewater effluent consistently meet the effluent limitations for Unlimited Public Access Sites as required in Part II, B, Section 303, (2) c of the Guidance and Regulations Governing the Land Treatment of Wastes?

◉ Yes

○ No

Tidewater - Wandendale *Proposed*

4) Comments (to further explain your response to #3):

Subject to TMDL and will have tertiary treatment via MBR.

5) What is the availability and potential interest of owners of agricultural lands nearby for irrigation?

Spray site planned. The farm fields where spray will take place is “existing” Ag land.

6) What are the current permit requirements that may be satisfied with a wastewater reuse alternative(s) to the current situation?

N/A.

7) What are the necessary wastewater facilities upgrades needed and associated costs for wastewater reuse options?

Description	Cost Estimates ($)
N/A.	

8) If reuse is not an option, what other methods are available to manage effluent?

N/A.

9) List any other reuse, green technologies, or energy efficiency upgrades that the wastewater enterprise has, or plans to have, and the funding strategy used to implement or convert to new technologies (examples: methane capture, solar panels, N/P pelletizing):

TESI considers regionalization in all plans for cost, energy, and resource efficiency.