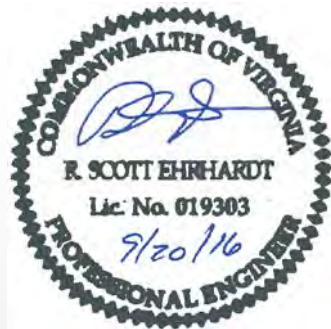


Preliminary Engineering Report

**Charlotte Court House
Sewer Infrastructure Upgrade
Town of Charlotte Court House, VA**

September, 2016



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1. EXECUTIVE SUMMARY

1.1 General

The Town of Charlotte Court House received grant funds from USDA Rural Development to develop a preliminary engineering report (PER). It is the primary intent of this PER to establish a better understanding of the physical layout and condition of the Town's existing sewer system, to identify any major deficiencies requiring corrective action, to estimate existing reserve capacity, and to evaluate the means by which a proposed apartment complex, new courthouse and other future miscellaneous service needs in the Town can be met.

The Town of Charlotte Court House owns and maintains limited sewer infrastructure within the town limits. The majority of the gravity sewer, force main and pump stations in the Town limits is owned and operated by Charlotte County. However, in order to meet the future sewer needs of the Town, especially in the event that the mass drainfield on Statesman Drive fails, a greater understanding of the sewer infrastructure and what is required to connect Town users to the central system is critical.

Based on discussions with Town and County personnel, it is important to note that although sewer infrastructure is shared among Town and County users, nearly all pump stations and the mass drainfield on Statesman Drive are owned and maintained by Charlotte County. Records obtained from the local VDH office regarding the mass drainfield indicates Charlotte County as the Owner.

The primary focus of the analysis of the existing infrastructure includes the collection system, pump stations and a mass drainfield that currently provides final disposal of the Town's sewer. In consideration of future sewer disposal needs of the Town, and/or in the event the existing mass drainfield fails, a disposal option that utilizes reserve capacity within the nearby County's regional pumping system is included in this report. This regional system consists of a regional sewer pump station located adjacent to the County Administration Building, and a force main that conveys sewer to the Town of Drakes Branch wastewater treatment plant (WWTP) for final disposal.

1.2 Collection System

The Town's sewer system was originally installed in the 1920's as a conventional gravity sewer consisting primarily of vitrified clay pipe. Several in-Town businesses and County buildings are connected to the gravity sewer that discharges directly to the mass drainfield on Statesman Drive, or the sewer is collected and pumped to this mass drainfield. The majority of businesses and homes within the Town, however, rely solely on onsite drainfield disposal systems. Due to the age of the existing collection system and periodic stoppages, there is an increased need for making necessary repairs. Further assessment by closed circuit television (CCTV) is recommended to fully assess the condition of sewer lines that have been experiencing periodic stoppages.

1.3 Pump Stations

The County owns five pump stations located in the Town of Charlotte Court House. Three of the five pump stations and related force mains were designed by Dewberry. The most recent installation was the administration building pump station in 2009. The current administration

building pump station, also referred to as the regional pump station, is evaluated herein for its current reserve capacity and its ability to be cost effectively modified to accommodate additional future sewer flows.

1.4 Wastewater Treatment/Disposal Facilities

The County utilizes two disposal facilities for the wastewater collected from the Town of Charlotte Court House. One is a mass drainfield that is located on Statesman Drive near the administration building. This drainfield was designed by Dewberry in 1993 along with the pump station behind Village Drive-in. The second facility is the WWTP located in Drakes Branch. Wastewater from the jail, administration buildings, and the schools are currently being pumped via the regional pump station to this WWTP for treatment and final discharge into Twittys Creek.

At this time, the mass drainfield is fully functional; however, should the drainfield begin to fail, there is currently sufficient reserve pumping capacity at the administration building pump station to transfer this sewer to the Drakes Branch WWTP. Should a failure of the mass drainfield begin to occur, a connection from the 1993 pump station force main that conveys sewer to the mass drainfield is currently available for diversion of the majority of the sewer that is being received by the mass drainfield system into the regional administration building pump station. This contingency feature significantly enhances the overall reliability of the sewer system.

The wastewater treatment plant at Drakes Branch is rated at 80,000 gpd. Should new apartments that are in the planning stages be constructed, a new school built, and the mass drainfield fails, an upgrade to both the County's regional pump station and to the Drakes Branch WWTP will be required. This upgrade will generally comprise of the replacement of two existing sewer pumps in the regional pump station with higher capacity pumps, and a relatively minor upgrades to the Drakes Branch WWTP to increase treatment capacity from 80,000 gpd to 100,000 gpd. The force main to Drakes Branch is already sufficiently sized to convey excess flows from the Town of Charlotte Court House and the surrounding County courthouse area.

1.5 Operations

Based on deficiencies of the existing infrastructure, and the degree of repair required for many of the facilities visited during the investigation, greater emphasis on preventive maintenance and general operational oversight is needed. Though the infrastructure is predominantly owned by the County, there is a lack of knowledge and understanding of the existing sewer infrastructure within the Town limits by Town and County personnel. Currently, repairs are typically performed under more of a reactionary mode to an immediate problem. By having a proactive approach to maintaining the sewer infrastructure, the Town will be better able to budget and appropriately prevent sewer infrastructure issues, and more effectively respond to unforeseen circumstances when a plan is put in place.

Additionally, it should be a priority of the Town and County to properly monitor sewer usage to adequately bill customers. If the Town or County wishes to receive funding for future infrastructure projects from Rural Development, they customarily require all sewer debt and operating expenses be fully covered by sewer billing revenue.

2. INTRODUCTION

The Town of Charlotte Court House received grant funds from USDA Rural Development to develop a preliminary engineering report (PER). It is the primary intent of this PER to establish a better understanding of the physical layout and condition of the Town's existing sewer system, to identify any major deficiencies requiring corrective action, to estimate existing reserve capacity, and to evaluate the means by which a proposed apartment complex, new courthouse and other future miscellaneous service needs in the Town can be met.

One of the sewer improvements included in the PER is an extension of sewer service along David Bruce Avenue, which will serve two former schools that will be converted into residential apartments. Potential growth and development and their respective sewer flows in the Town and County must be considered for capacity purposes in the determination as to how the sewer from a pump station serving the apartments will be routed.

Charlotte County has been evaluating renovation of Randolph Henry Middle School and High School. Based on current information, there still appears to be a significant amount of uncertainty regarding these renovations. The schools are located in the same vicinity of the Town's project area and should be taken into consideration in the event there is reasonable certainty about the future of these schools.

Final deliverables to the Town include this PER as well as a sewer map indicating location of critical components of the Town and County sewer system.

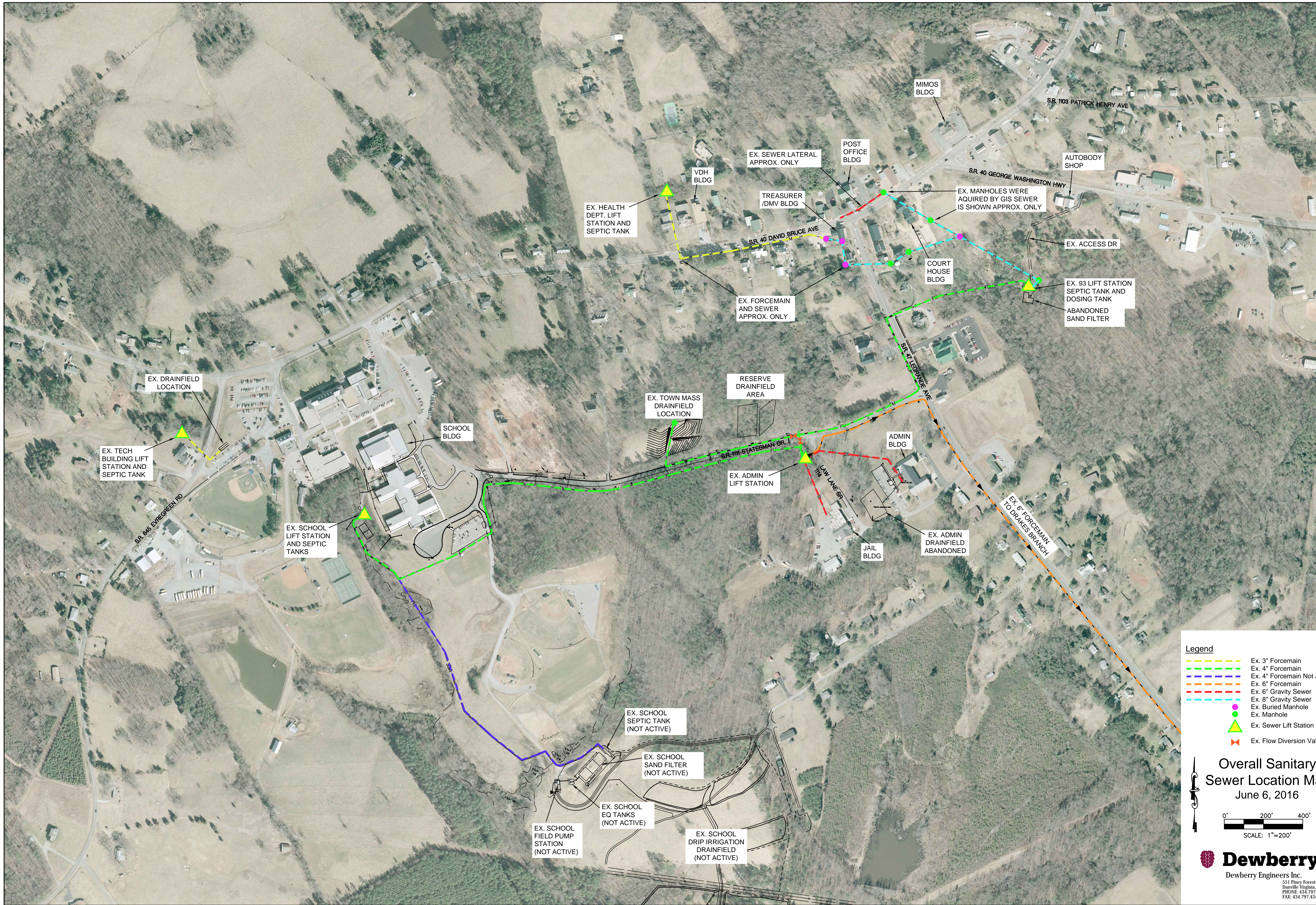
3. PROJECT PLANNING

3.1 Current Service Area

Currently, the sewer within the Town of Charlotte Court House serves all County-owned businesses and a few private businesses located along the northeastern side of David Bruce Ave. The businesses served are from the coffee and ice cream shop, Court House Coffee and The Scoop (farthest west), to the drug store, Charlotte Drug Co. (farthest east). This sewer discharges to the mass drainfield on Statesman Drive. The administration building, the prison, Randolph-Henry High School, and Central Middle School are also served by the County's sewer system within the Town, which is pumped to the Drakes Branch WWTP from the administration building pump station. Refer to the Overall Sanitary Sewer Location Map on the following page.

3.2 Proposed Service Area

This PER will evaluate the reserve capacity available in the forcemain from Charlotte Court House to Drakes Branch, as well as the impacts on the receiving WWTP in Drakes Branch to serve the old school houses should they be renovated into apartments, the proposed elementary school, and the existing mass drainfield and individual drainfields in the Town. Additionally, this report will evaluate the reserve capacity available should there be expansion in and around the Town of Charlotte Court House.



Legend

- Ex. 3" Forcemain
- Ex. 4" Forcemain
- Ex. 4" Forcemain Not Active
- Ex. 6" Forcemain
- Ex. 6" Gravity Sewer
- Ex. 8" Gravity Sewer
- Ex. Buried Manhole
- Ex. Manhole
- Ex. Sewer Lift Station
- Ex. Flow Diversion Valves

Overall Sanitary Sewer Location Map
June 6, 2016

0' 200' 400'
SCALE: 1"=200'

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4. EXISTING FACILITIES EVALUATION

4.1 History of Charlotte Court House Infrastructure

Charlotte County owns and operates a gravity sewer collection located in Charlotte Court House that was installed in the 1920's and 1930's. The collection system was originally intended to serve County-owned buildings, such as the courthouse, within the Town of Charlotte Court House. Since the original installation, several other buildings in the Town were tied on to the collection system, and these dates are unknown. The businesses on the north side of David Bruce Avenue are tied on to the gravity sewer and discharge to the mass drainfield on Statesman Drive. The businesses served are from the coffee and ice cream shop, Court House Coffee and The Scoop (farthest west), to the drug store, Charlotte Drug Co. (farthest east).

Two school houses are located on David Bruce Avenue directly west of the Health Department. The school houses were bought at auction by a private developer, but the sewer rights were not included in the sale of this property per Glenn Johnson of Charlotte County. The historical society would like to pursue the repurposing of these school buildings and need to verify that there is adequate capacity and feasibility to connect to the existing sewer system that pumps to Drakes Branch.

4.2 Existing Facilities

Information regarding existing facilities in Charlotte Court House and the surrounding County was compiled from several different sources. Dewberry conducted multiple field investigations and spoke with officials from VDH, Charlotte Court House, Charlotte County, and Drakes Branch.

4.2.1 Collection System

The main collection system located within Charlotte County consists of gravity sewer, five pump stations and their respective force mains. The wastewater is first pumped west to east along the south side of David Bruce Avenue from the Health Department Pump Station, discharges to a manhole behind the DMV on the south side of David Bruce Avenue, and converts to gravity to discharge to the 1993 Pump Station behind Village Drive-in, and eventually discharges at the mass drainfield of Statesman Drive

On the north side of David Bruce Avenue, the gravity sewer usage begins near Court House Coffee, flows west to east, and eventually discharges into the 1993 Pump Station behind Village Drive-in.

The characteristics of the gravity sewer include:

- Constructed in 1920's or 1930's.
- Approximately 0.4 miles of vitrified clay gravity sewer.
- Connection of several businesses and County owned buildings in Town.
- Some existing brick manholes are visible, however many are not (existing manholes shown in the appendix).

Some manholes were located by GPS and noted on the sewer map in the Appendix. However, many of the manholes are approximate based on information given by Glenn Johnson of Charlotte County. Due to the age of the gravity sewer in the northern part of Town, the existing manholes are covered and the location and route of the sewer is approximate and not well defined.

The force main from the administration building pump station in Charlotte Court House discharges into a manhole in Drakes Branch, and continues as an 8" asbestos cement (AC) gravity sewer, which increases to a 10" PVC gravity sewer to ultimately discharge at the WWTP. This AC sewer was slip lined in the late 2000's and this decreased the amount of I&I (inflow and infiltration) that the Town of Drakes Branch was experiencing.



Brick manhole in front of Commonwealth Attorney's office.

4.2.2 Pump Stations

Charlotte County has five pump stations within the vicinity of the Town of Charlotte Court House. Table 4.2.2-1 indicates the name and location of each pump station.

Table 4.2.2-1 Charlotte Court House Pump Stations

Pump Station Name	Location
Technology Building Pump Station	North side of R-H Technology Building
School Pump Station	West side of the middle school
Health Department Pump Station	North of old school houses
1993 Pump Station	Southeast of the courthouse in the bottom
Administration Building Pump Station	Corner of Statesman Dr. and Law Ln.

Administration Building Pump Station

The 1993 and Administration Building Pump Stations were designed by Dewberry. The 1993 Pump Station collects wastewater from the sewer located within the Town. The force main leaving this pump station discharges to the mass drainfield that is located on the north side of Statesman Drive. This force main also has a connection to the Administration Building Pump Station that will be utilized if the mass drainfield shows signs of failing

The Administration Building Pump Station includes:

- Service for the County Administration Buildings and Jail.
- A grinder to break up solids from the prison before reaching the pumps. This grinder is periodically experiencing bypasses due to problems being encountered with this piece of equipment.
- Hydromatic Model #H4H750M4-4 duplex three phase 7.5 hp submersible pumps with an 8" impeller.
 - Designed for 200 gpm at 50 ft. TDH
 - The pump operates at 48% efficiency.
 - Ability to upsize the impeller should the flow be increased.
- A control panel with Hand, Off and Auto run features.
- An out of service flow meter.



Administration Building Pump Station on Law Lane.



Comminutor Grinder at the Administration Building Pump Station.

1993 Pump Station behind Village Drive-In

The 1993 Pump Station includes:

- Service for the Town of Charlotte Court House. Service area consists of the area from the Health Department to the courthouse.
- Duplex single phase 5 hp submersible pumps with a 10.13" impeller.
 - The impellers installed in the pumps are maximum size allowable for that model pump.
 - One pump was replaced by Glenn Johnson in 2008.
 - The other pump was replaced Falwell Corp. from Lynchburg, VA in 2014.

Debris was found on the conduits near the top of the wet well at the pump station. This is evidence of overflow in the wet well due to a pump failure. This overflow condition is shown in Figure 4.



Wet Well at the 1993 Pump Station.

Drawdown tests were performed on both the Administration Building and 1993 Pump Stations by Dewberry on June 14, 2016. The 4.2.2-2 shows data collected from the drawdown tests.

Table 4.2.2-2 Pump Station Design versus Drawdown Test Data

	Administration Building Pump Station (6 inch force main)			1993 Pump Station (4 inch force main)		
	Design	Pump 1	Pump 2	Design	Pump 1	Pump 2
Pump Rate (gpm)	200	246	187	Minimum 80 gpm	150	118
Forcemain Velocity (fps)	2.27	2.79	2.12	0.00	3.91	3.07

These two pumps are performing satisfactorily with forcemain scouring velocities maintained above 2 fps. However, due to the notable lower pump rates for both No. 2 pumps, it is recommended that these pump tests be performed at least semiannually to verify that the difference in current performance (i.e. as compared to No. 1 Pumps) are not increasing/getting worse.

Health Department Pump Station

The pump station behind the Health Department is currently only serving the Health Department building. There are no records of the installation or maintenance on this station. From the field investigation, the Health Department Pump Station includes the following:

- A Myers Sump Pump not equipped to handle solids.
- Small building that surrounds the wet well and pump.



Image is of the pump house surrounding the wet well and pump at the Health Department Pump Station.



The forcemain leaving the wet well of the Health Department Pump Station inside the pump house.

School Pump Station

The School Pump Station recently started pumping wastewater to the Administration Building Pump Station to discharge to the wastewater plant at Drakes Branch. The School Board was previously told that this pump does meet the necessary head condition to reach the Administration Building Pump Station. However, this pump does not achieve scouring velocity ($>2\text{fps}$). If this pump is not upsized in the near future, the force main going to the Administration Building Pump Station may eventually clog as scouring velocity necessary to prevent settling out/depositing of solids inside the forcemain is not being met.

Technology Building Pump Station

Randolph-Henry High School also has a pump station behind the technology building that only serves that building. The pump station has a 220 foot forcemain that crosses Evergreen Road. The force main discharges to a drainfield located between Evergreen Road and the parking lot for Randolph Henry High School. The design discharge of the pump station was estimated to be 210 gpm. The pump station and force main were constructed and completed in 1999 by Francis Plumbing of Charlotte Court House.



View from the Randolph Henry Technology Building down toward the pump station that serves the building.

4.2.3 Wastewater Treatment/Disposal Facilities

Charlotte Court House utilizes two different treatment/disposal facilities for its wastewater (not including the Randolph-Henry Technology Building drainfield). The first is the mass drainfield on Statesman Drive, and the second is the WWTP at Drakes Branch.

Currently, the wastewater that is collected by the 1993 Pump Station is pumped to the mass drainfield on Statesman Drive. This mass drainfield has a capacity of 3,712 gpd as designed by Dewberry in 1993 along with the 1993 Pump Station. Additionally, there is a set aside reserve area that was intended be used should the drainfield fail. The majority of Charlotte Court House consists of sandy loamy soil which has moderate to high percolation rates that are desirable when selecting a location for a drainfield.



This image is of the grassy area between Evergreen Road and the Randolph-Henry High School parking lot that contains a drainfield for the technology building.



This image is of the mass drainfield on Statesman Drive

Furthermore, Dewberry designed the Administration Building Pump Station in 2008 to pump to the WWTP in Drakes Branch. A valved tie-in was made when the Administration Building Pump Station was constructed so the County can have the option to route wastewater from the 1993 Pump Station to the Administration Building Pump Station. The rerouting of flow from the 1993 pump station would most likely be practiced in the event the drainfield begins to fail, or if sewer flows increase beyond the permitted capacity of the drainfield.

The WWTP at Drakes Branch is rated at 80,000 gpd. The Drakes Branch wastewater treatment plant was also designed by Dewberry. It is designed with most of its treatment components sized to accommodate a future expansion from 80,000 gpd to 100,000 gpd. Major treatment units include the following:

- Manual bar rack
- Influent pump station
- Extended aeration basin with surface aeration
- Secondary Clarifier
- Return activated sludge pump station
- Liquid chlorine and Sodium Bisulfate feed
- Chlorine contact
- Post cascade aeration
- Aerobic digestion
- Sand Beds
- Final sludge disposal via landfilling
- Emergency generator

The wastewater treatment plant at Drakes Branch has received a significant amount of new equipment since it was constructed over 20 years ago. All of the following equipment has been recently replaced or rebuilt:

- Return sludge pumps
- Digester aerator
- Clarifier drive
- Chlorine contact tank motor
- Wet well pumps

Drakes Branch has been proficient in maintaining the condition of the wastewater treatment plant. Parts have been either fixed or replaced as needed and many pumps and motors are in stock at the plant should a pump or motor fail.

During heavy rainstorm events the average daily flow in the plant can exceed 100,000 gpd. Recently, the monthly average for May 2016 reached the maximum daily flow per month that the plant is rated to be able to handle (80,000 gpd). The wastewater plant recently received test results above the permitted limit for BOD (32 mg/L) at 42 mg/L. A violation was not issued, only a warning. During construction of new waterlines in the Town two years ago, the Town's water and sewer systems received copper violations. However, these concentrations have subsided since the completion of the construction project.

With grant funds, the WWTP purchased an oversized generator intended to operate the WWTP in the event of an expansion due to the potential construction of the regional prison. However, the prison was never constructed and is not expected to be in the near future. The Town of Drakes Branch is continually searching for new sewer customers. The Morgan Lumber Company located in Charlotte Court House and Drakes Branch are currently seeking approval by DEQ to discharge 6,000 gpd of industrial wastewater to the Drakes Branch WWTP.

The average daily dry flow is approximately 40,000 gpd. However, the rainy period flow is close to 80,000 gpd. The WWTP operators and the Town do not have conclusive evidence of where the excessive amount of infiltration is coming from. Even with infiltration, the WWTP monthly average for treatment is approximately 50% of the rated capacity.



This image is of one of the aeration basins at the Drakes Branch WWTP.



This image is of the clarifier at the Drakes Branch WWTP. The drive for the clarifier has been recently replaced.



This is an image of the return sludge pumps. Both pumps have been recently refurbished and there is one on standby.

5. NEED FOR PROJECT

5.1 Current Needs

Several upgrades need to be made to improve reliability of the sewer system as a whole, meet long term service requirements and/or achieve compliance with the Department of Environmental Quality (DEQ) Sewer Collection and Treatment (SCAT) Regulations.

5.1.1 Collection System

Neither Charlotte Court House nor Drakes Branch have urgent needs in their collection systems to be immediately addressed.

5.1.2 Pump Stations

The pump stations in Charlotte Court House are in need of upgrades and maintenance:

- Re-establish gravel access road to the 1993 Pump Station. This road is necessary in order to access the pump station for required maintenance. Current landowners may need to be contacted. The previous gravel access road crosses property owned by at least two different landowners. Gravel is still visible in certain locations along the route of the previous road. The original access road went behind the auto shop on George Washington Highway, and led to the bottom of the hill where the pump station is located.
- Repair or install new flow meter at the Administration Building Pump Station. Current flow meter may be under manufacturer's warranty and can be replaced at no cost to the County.
- Repair jail grinder comminutor or preferably replace with mechanical screen and compactor. Debris from the jail will adversely affect performance of the Administration Building Pump station and forcemain to Drakes Branch.
- Replace pumps at the School Pump Station in order to achieve scouring velocities (> 2fps). If not replaced, the force main leaving the pump station will eventually clog.
- Cleanout (mow, weed eat, or bush hog) around all existing pump stations to improve accessibility for maintenance.
- Contact Dominion Power to clear tree limbs leaning on the power line serving the 1993 Pump Station.
- Important! – perform regular annual maintenance on all air release valves (ARVs) on forcemain that conveys sewer from the Administration Building pump station to Drakes Branch. Failure of the pump station has recently occurred as a result of not maintaining these valves.



This image shows gravel that follows the path of the previous gravel access road that should be reinstalled for maintenance purposes.

5.1.3 Wastewater Treatment/Disposal Facilities

The mass drainfield on Statesman Drive is the largest sewer disposal facility located in Charlotte Court House. The drainfield appears to be functional and the soil is a sandy loam soil that generally percolates well. A tie-in connection has already been made and the valve can be switched at any time to send the wastewater to the Administration Building Pump Station. This will be necessary should the drainfield begin to fail.

The drainfield that serves the Randolph-Henry Technology Building is fully functional at this time. Should the drainfield fail, the school will be required to look into alternative disposal methods. One logical alternative is to tie into the School Pump Station and utilize the common forcemain that is routed to the Administration Building Pump Station.

Based on conversation with the wastewater operators during a site visit, the Drakes Branch Wastewater Treatment Plant near term needs include the following:

- Automatic restarts on the clarifier drive and the power loss alarm.
- New valve between the clarifier and the return sludge pumps in order to properly perform maintenance on pumps.

Expansion of the WWTP will be looked at in the “Future Needs” section since additional flow to the plant is not foreseeable in the immediate future.

5.2 Future Needs

5.2.1 Collection System

The County collection system needs the following upgrades in the future:

- Further inspection of the in-Town gravity sewer utilizing CCTV.
- A means to measure flow leaving customer buildings in order to properly bill them for sewer use.

Since the route of the sewer in some locations is unknown and manholes are not always visible, it is possible that there could be breaks in the line. CCTV should be performed to the gravity sewer to determine locations of buried manholes and to assess the condition of the very old piping. There have been backups in the system before, which indicates that some clogged or even collapsed sections of gravity sewer exist within the Town.

In consideration of the ability of Drakes Branch’s sewer system to receive future sewer flows from Charlotte Court House, it will be important to take into consideration the severity of the inflow and infiltration that is occurring in the collection system in Drakes Branch. The volume of I&I is currently de-rating the capacity of this facility. Though small increases in flows to Drakes Branch can be tolerated, significant additional flows (i.e. flows in excess of 5,000 gpd) will require further assessment of the severity of I&I in the Drakes Branch collection system. As flows in excess of 5,000 gpd +/- are added to the Drakes Branch WWTP, either the I&I will need to be reduced and/or the WWTP capacity will need to be increased from 80,000 gpd to 100,000 gpd. Based on the current problems already being experienced during large storm events, it is recommended that a continued effort be made to located point sources of inflow and perform repairs. This should include additional smoke testing and/or CCTV inspection.

5.2.2 Pump Stations

The following needs should be planned for in the near future:

- Replace the pump at the School Pump Station.
- Replace the Health Department Pump Station.

If the Town of Charlotte Court House plans to utilize the old school houses, an upgrade will need to be made to the current system. The pump station behind the buildings does not have the capacity to handle significant additional flows and is no longer considered reliable. The pump located in this pump station is not a grinder or solids handling pump that should be used if those buildings have a permanent tenant. The pump wetwell needs to have a secure lid and be brought above the ground so runoff does not reach the wet well.

If the Town plans to repurpose the old school houses, a grinder pump station will be required to utilize the existing 3" forcemain per SCAT regulations. The existing condition of the 3" forcemain is unknown; considering this, it may also be required to replace the forcemain at the time that the pumps are upgraded. Replacing the current pump station with a SCAT compliant station will be necessary in order to serve an apartment complex.

Table 5.2.2 Reserve Capacity of Administration Building Pump Station

Customers Served	Usage (gpd)	Peak Factor	Sewer Flow (gpm)	Pump Station Cumulative Reserve Capacity (based on 200 gpm design capacity)
Existing Connections to Administration Building Pump Station				
<i>Admin Building</i>				
	500	4	1.4	198.6
<i>Jail</i>				
	6,500	4	18.1	180.5
<i>Randolph Henry High School and Central Middle School</i>				
(based on water usage)	7,500	5	26.0	154.5
Current Reserve Capacity				154.5
Potential Future Connections to Administration Building Pump Station				
<i>New Apartments in Old School Buildings</i>				
(assume 14 apartments)	3,500	5	12.2	142.3
<i>Town of Charlotte Court House 1993 Pump Station</i>				
(area served by 1993 pump station)	4,000	4	11.1	131.2
<i>New Elementary School</i>				
1100 (preliminary planning population)	11,000	4	30.6	100.6
Total Reserve Capacity after Future Connections (assuming only minor inflow and infiltration)				100.6

Should the County or the Town decide to develop the apartments in the old school buildings, pump the existing flow from the 1993 Pump Station to the Administration Building Pump Station, and build a new elementary school, the Administration Building Pump Station has the reserve capacity necessary to handle these flows.

5.2.3 Wastewater Treatment/Disposal Facilities

Should the drainfield begin to fail, the Administration Building Pump Station has available reserve capacity to be handle the flow.

Should Charlotte County decide to proceed building new apartments, take the drainfield out of operation, and build a new school, they will need to consider minor expansion to the Drakes Branch wastewater treatment plant from 0.08 MGD to 0.1 MGD. However, much of the equipment is conservatively sized, so the expansion to a 0.1 MGD plant would require the installation of a mechanical bar screen and minor upgrades to some pieces of equipment.

The Drakes Branch flow was estimated in 2008 when the Administration Building Pump Station was designed by Dewberry. The flow was estimated to be 38,000 gpd. The flow coming from Charlotte Court House was designed to be 18,000 gpd. Table 5.2.3-1 shows the current reserve capacity in the wastewater treatment plant and the remaining capacity should there be new development within the Town.

Table 5.2.3-1 0.08 MGD WWTP Reserve Capacity

Flow (gpd)	Peak Factor	Sewer Flow (gpd)	Cumulative Reserve Average Daily Flow Capacity (gpd)	Cumulative Reserve capacity based on peak flow (gpd) contributions
Wastewater Treatment Plant (Average permitted design - gpd)				
80,000	3	0	80,000	240,000
Drakes Branch				
38,000	3	114,000	42,000	126,000
Charlotte Court House				
14,500	3	43,500	27,500	82,500
Morgan Lumber Company				
6,000	3	18,000	21,500	64,500
New Apartments				
3,500	5	17,500	18,000	47,000
Town of Charlotte Court House (1993 Pump Station)				
4,000	4	16,000	14,000	31,000
New Elementary School				
11,000	4	44,000	3,000	-13,000
0.8 MGD WWTP Reserve Capacity			3,000	-13,000

Table 5.2.3-2 evaluates the additional capacity gained by upsizing to a 0.1 MGD facility. If a new school, new apartments, and divergence of the drainfield wastewater were all connected, the wastewater treatment plant would most likely need to be upsized. The Virginia Sewer Collection and Treatment (SCAT) regulations states that plans need to be made if the average monthly discharge is greater than 95% of the design capacity to upsize the plant or reduce flow.

Table 5.2.3-2 Expanded WWTP Capacity to 0.10 MGD – Reserve

Flow (gpd)	Peak Factor	Sewer Flow (gpd)	Cumulative Reserve Average Daily Flow Capacity (gpd)	Cumulative Reserve capacity based on peak flow (gpd) contributions
Wastewater Treatment Plant Design Capacity				
100,000	2.5	0	100,000	250,000
Existing Flows to Drakes Branch WWTP				
Drakes Branch				
38,000	3	114,000	62,000	136,000
Charlotte Court House				
14,500	3	43,500	47,500	92,500
Potential Future Flow Additions				
Morgan Lumber Company				
6,000	3	18,000	41,500	74,500
New apartments				
3,500	5	14,000	38,000	60,500
1993 Pump Station Flow (assume 150 gpm pump operates 8 hours a day)				
4,000	4	16,000	34,000	44,500
New Elementary School				
11,000	4	44,000	23,000	500
0.1 MGD WWTP Reserve Capacity			23,000	500

Before the wastewater from the force main leaving Charlotte Court House reaches the WWTP, the wastewater discharges into Manhole-34 in Drakes Branch, and continues to an 8" asbestos cement pipe, and eventually to a 10" PVC pipe. The flow rate capacity for the 8" asbestos pipe is 385 gpm and the 10" PVC pipe is 1,000 gpm. Table 5.2.3-3 indicates the reserve capacity for discharge into Manhole-34.

Table 5.2.3-3 Drakes Branch 8" Sewer Line Capacity

Flow (gpm)	Peak Factor	Peak Flow Rate (gpm)	Sewer line Reserve Capacity (gpm)
			385 gpm (Design Capacity)
Drakes Branch			
19.8 (Based on 75% of WWTP flow conveyed in the 8" sewer line)	5	99.0	286
Administration Building Pump Station (pumping at 200 gpm/24 hrs/day)			
200	1	200	86
8" Sewer Reserve Capacity			86

Since there appears to be adequate reserve capacity in the 8" asbestos cement sewer line, it is safe to assume there is sufficient capacity in the downstream 10" PVC pipe as well.

6. CORRECTIVE ACTIONS

6.1 Current

The Town and County should proceed with the following improvements:

	Description	Estimated Cost
1	Replace the flow meter at the Administration Building Pump Station	\$5,000
2	Re-install the previously existing gravel access road. The gravel access road should be considered prescriptive since it has been used for over 20 years to access the 1993 Pump Station.	\$12,000
3	Update the 1993 Pump Station's alarm station. Either a 90 db or greater audible alarm and/or a radio/phone alarming system that will notify personnel off site.	\$3,000 - \$6,000
4	1993 Pump Station - Contact Dominion Power to clear tree limbs leaning on the power line serving the station.	(By Dominion)
5	Add adequate lighting in accordance VOSH and other applicable codes and standards around pump stations.	\$5,000
6	Mow or bush hog around all pump stations on a regular basis in order to better service them when needed.	\$ 3,000/year
7	Replace the School Pump Station pumps in order to achieve required scouring velocity.	\$35,000- \$55,000
8	Repair jail grinder comminutor at Administration Pump Station and repair/replace flow meter. A preferred long term solution it to replace the grinder with a new mechanical screen.	\$3,000 repair \$120,000 replace with mech. screen
9	Perform annual maintenance on all air release valves (ARVs) along forcemain to Drakes Branch.	\$2,500/year

6.2 Future

Potential future actions should take place including:

	Description	Estimated Cost
1	Upgrading the Health Department Pump Station with a standard submersible duplex grinder or solids handling pump station. Fully demolish existing structures and equipment.	\$120,000 - \$140,000
2	If the new school and apartments are built, the Town of Drakes Branch should immediately begin planning upsizing their WWTP to at least 0.1 MGD. This will give adequate capacity for the WWTP to treat the wastewater and reduce the likelihood that the design capacity is exceeded.	\$300,000 - \$500,000
3	Perform CCTV and utility location work if frequency in sewer blockages increase. Update mapping in this report with new findings.	\$5,000 – \$20,000
4	Perform I&I rehabilitation work to reduce peak flows entering the Drakes Branch WWTP as flows are increased significantly from Charlotte Court House (i.e. increase exceeding 5,000 gpd +/-)	\$25,000 - \$100,000
5	Investigate possibility of forming a public service authority.	N/A

6.3 General Implementation Criteria

6.3.1 Environmental Impacts

At this time there is no foreseeable project for construction. Considering this, there will be no environmental impacts. Shall there be any maintenance construction in the future regarding upgrading sewer or pump stations, this will all be done within existing easements or areas that are already disturbed. If there is a new project in the future and funding is sought through USDA Rural Development, an environmental review must first be completed.

6.3.2 Land Requirements

Should the Town of Charlotte Court House decide to expand its sewer collection system, easements will need to be acquired from landowners within the Town. The gravel access road that was designed by Dewberry in 1993 should be considered prescriptive and no additional easements are believed to be necessary; however, land ownership has changed within the route of the access road. Any additional maintenance work to existing infrastructure will be within existing easements.

6.3.3 Constructability Concerns

No unique constructability concerns are associated with this project.

6.3.4 Operations and Maintenance

Any upgrades or repairs to the Town's system will not affect its daily operation or staffing needs.

6.3.5 Cost Estimate

An estimate of costs related to addressing current and future needs are noted above in paragraphs 6.1 and 6.2 respectively. Due to the broad scope of the work performed under this PER, these costs indicated are approximate only and intended for general planning purposes only. For those items listed for which engineering will be needed for future implementation, it is recommended that above estimates be verified/updated during preliminary design.

7. OPERATIONAL CONSIDERATIONS

7.1 Operational Deficiencies

Based on deficiencies of the existing infrastructure, and the degree of repair required for many of the facilities visited during the investigation, greater emphasis on preventive maintenance and general operational oversight is needed. Though the infrastructure is predominantly owned by the County, there is a lack of knowledge and understanding of the existing sewer infrastructure within the Town limits by Town and County personnel. Town employees involved in water and sewer management and maintenance should be proactive in better understanding the operations of the existing system to better plan for future improvements in the Town's sewer system. Due to limited funds and staffing to support this need, coordination with the County and Drakes Branch may be required to ensure that sewer service to all customers is reliable and consistent. Currently, repairs are typically performed under more of a reactionary mode to an

immediate problem. By having a proactive approach to maintaining the sewer infrastructure, the Town will be better able to budget and appropriately prevent sewer infrastructure issues, and more effectively respond to unforeseen circumstances when a plan is put in place.

7.2 Financial Considerations

Per correspondence with Patricia Berkeley, Charlotte County Treasurer, there are six businesses in the Town of Charlotte Court house that use the County owned sewer system. None of these businesses are billed based on metered usage; each business pays \$24 semi-annually, which is a fee that was determined in the 1950's - 1960's. Therefore, the County collects \$288 annually from the Town of Charlotte Court House for sewer usage.

The minimum sewer rate required by Rural Development for grant funding consideration is 1.5% of the median household income (MHI). Rates up to 1.5% of the MHI are typically associated with cost to the customer that does not place undue burden on the user. The MHI for the Town of Charlotte Court House, per the Census Bureau, is \$38,365. This equates to \$48 per month per household, which assumes a 5,000 gallon per month usage. This is also equivalent to \$9.60 per 1,000 gallons.

Assuming each business has approximately 25 employees, each using 20 gpd of wastewater, each business is using approximately 500 gpd, or 10,000 gallons per month. Applying the above calculated \$9.60/1000 gal, the County could be collecting up to \$96 per month per business, or \$1,152 per year without creating undue financial burden. All six businesses together would contribute a total of \$6,912 per year, as compared to the current collection of \$288 per year.

It should be a priority of all entities to properly monitor sewer usage to adequately bill customers. Additionally, the County pays the Town of Drakes Branch a flat fee of \$6,000/month in order to treat the wastewater sent from the regional pump station at the Administration Building. This fee was agreed upon by the County and the Town of Drakes Branch due to the lack of an operational flow meter. If the Town or County wishes to receive funding for future infrastructure projects from Rural Development, they customarily require all sewer debt and operating expenses be fully covered by sewer billing revenue.

8. IMPLEMENTATION SCHEDULE

Section 6 includes both near term (current) and future corrective action recommendations. The near term action items are largely comprised of repair to existing failed equipment needed for reliability/compliance issues and/or are needed for implementation of general maintenance. Near term action items should be address as quickly as possible.

Future corrective action items are those that are not and immediate need, but are anticipated as being required as new users are connected to the system or in the event a failure of the mass drainfield on Statesman Drive occurs.

9. CONCLUSIONS

1. The sewer system that is currently serving the Charlotte Court House is general comprised of very old gravity sewer collection lines installed in the 1920's and 1930's and newer pumping and treatment/disposal facilities generally constructed in the 1980's and 1990's. An exception to this is the VDH pump station that has undergone several retrofits and comprises of both pre-1980 and newer components.
2. The gravity collection system has periodically experienced blockages from tree roots and collapse. Local repairs have been implemented by contractors when these blockages have occurred.
3. Pump stations do not appear to be regularly maintained, but are all currently functional. Though most of the pump stations were designed to be fully compliant with the SCAT regulations, the VDH pump station consists of retrofits that are not fully compliant with the SCAT regulations and do not meet desired reliability standards.
4. The regional pump station (Administration Building Pump Station) and the Statesman Drive mass drainfield appear to have adequate reserve capacity to accommodate all additional sewer flows that are expected to occur as a result of near term (i.e. 10 years) in-Town growth.
5. As new sewer flows in excess of 5,000 gpd are diverted to the Administration Building Pump Station, improvements will likely be necessary at the Drakes Branch WWTP to reduce inflow and infiltration in the Town's collection system and/or expand the capacity of the Town's WWTP.
6. Though some maintenance activities are occurring on a regular basis (i.e. cutting grass), implementation of more critical operations and maintenance activities are not being performed. When failures occur, the County typically relies solely on contractors to make needed repairs.
7. Revenue currently collected from sewer users is not adequate to pay for near and long term maintenance and capital improvement needs.

10. RECOMMENDATIONS

1. Several current (near term) action items are listed in Section 6 which require implementation in order to maintain overall reliability of the sewer system.
2. In the event the mass drainfield were to fail, or new user demands exceeding 5,000 gpd occurs, future action items identified in Section 6 will need to begin being implemented.
3. Since Charlotte County is currently taking responsibility for operation of the majority of the sewer system that serves the Town of Charlotte Court House, it is recommended that this report be shared with the County.
4. Discussions should occur between the Town of Charlotte Court House and Charlotte County to determine how best to insure near and long needs term can be funded and implemented.
5. Due to the operational and capital needs associated with properly maintaining sewer conveyance, pumping and treatment facilities, it is recommended that further discussion on the possibility of forming a public service authority (PSA) continue. Operating under a PSA enables localities throughout the County to pool limited human and capital resources, thereby improving service to customers while simultaneously increasing reliability of both water and sewer systems.

APPENDIX

Drainfield Permits

Sewage Disposal System Construction Permit

PAGE 1 OF 2
Plus plans & specs

Commonwealth of Virginia
Department of Health
Charlotte County Health Department



Health Department
Identification Number _____
Map Reference _____

General Information

New ☒ Repair ☐ Expanded ☐ Conditional ☐ FHA ☐ VA ☐ Case No. _____
Based on the application for a sewage disposal system construction permit filed in accordance with Section 3.13.01, a construction permit is hereby issued to:
Owner Charlotte County Board of Supervisors Telephone (804) 542-5117
Address _____
For a Type II Sewage disposal system which is to be constructed on/at _____
Subdivision n/a Section/Block n/a Lot _____
Actual or estimated water use 3,712

DESIGN	NOTE: INSPECTION RESULTS
Water supply, existing: (describe) <u>Town</u> To be installed: class _____ cased _____ grouted _____	Water supply location: Satisfactory yes <input type="checkbox"/> no <input type="checkbox"/> comments _____ G. W. 2 Received: yes <input type="checkbox"/> no <input type="checkbox"/> not applicable <input checked="" type="checkbox"/>
Building sewer: _____ I.D. PVC 40, or equivalent. Slope 1.25" per 10' (minimum). <input type="checkbox"/> Other _____	Building sewer: yes <input type="checkbox"/> no <input type="checkbox"/> comments _____ Satisfactory <u>Exist.</u>
Septic tank: Capacity _____ gals. (minimum). <input checked="" type="checkbox"/> Other <u>see plans</u>	Pretreatment unit: yes <input type="checkbox"/> no <input type="checkbox"/> comments _____ Satisfactory <u>Existing</u>
Inlet-outlet structure: _____ PVC 40, 4" tees or equivalent. <input type="checkbox"/> Other _____	Inlet-outlet structure: yes <input type="checkbox"/> no <input type="checkbox"/> comments _____ Satisfactory
Pump and pump station: _____ No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> describe and show design. if yes: <u>see plans</u>	Pump & pump station: yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments _____ Satisfactory <u>see letter dated 1-19-95</u> <u>Tested 1-17-95 by Mike Hamner</u>
Gravity mains: 3" or larger I.D., minimum 6" fall per 100', 1500 lb. crush strength or equivalent. <input type="checkbox"/> Other _____	Conveyance method: yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments _____ Satisfactory <u>Tested 12-13-94</u>
Distribution box: _____ Precast concrete with _____ ports. <input checked="" type="checkbox"/> Other <u>see plans</u>	Distribution box: yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments _____ Satisfactory <u>grouted 8-5-94 - splitter box timed 1-17-95</u>
Header lines: _____ Material: 4" I.D. 1500 lb. crush strength plastic or equivalent from distribution box to 2' into absorption trench. Slope 2" minimum. <input type="checkbox"/> Other _____	Header lines: yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments _____ Satisfactory
Percolation lines: _____ Gravity 4" plastic 1000 lb. per foot bearing load or equivalent, slope 2" 4" (min. max.) per 100'. <input type="checkbox"/> Other _____	Percolation lines: yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments _____ Satisfactory
Absorption trenches: _____ Square ft. required <u>8550</u> ; depth from ground surface to bottom of trench <u>60"</u> ; aggregate size <u>1"</u> ; Trench bottom slope <u>2"</u> to <u>4"</u> per <u>100'</u> ; center to center spacing <u>9'</u> ; trench width <u>36"</u> ; Depth of aggregate <u>13"</u> ; Trench length <u>95'</u> ; Number of trenches <u>30</u>	Absorption trenches: yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments _____ Satisfactory <u>Completed 8-5-94</u>
Date <u>1-23-95</u> Inspected and approved by: _____ Sanitarian	

Schematic drawing of sewage disposal system and topographic features.

Show the lot lines of the building lot and building site, sketch of property showing any topographic features which may impact on the design of the system, all existing and/or proposed structures including sewage disposal systems and wells within 100 feet of sewage disposal system and reserve area. The schematic drawing of the sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be located on the same lot show all sources of pollution within 100 feet.

☐ The information required above has been drawn on the attached copy of the sketch submitted with the application.
Attach additional sheets as necessary to illustrate the design.

- I. System to be installed as shown by approved plans and specifications by Dewberry & Davis dated 2-17-94
- II. Contractor, Design Engineer, and Health Dept. to field review site before construction is begun
- III. Charlotte County Health Dept. will inspect component parts of system as it is being installed
- IV. Design Engineer will submit a written inspection approval of final installation and field testing to Charlotte County Health Dept.

The sewage disposal system is to be constructed as specified by the permit ☒ or attached plans and specifications ☒.

This sewage disposal system construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 3-30-94 Issued by: Robert B. Harris
Sanitarian

Date: 3-30-94 Reviewed by: [Signature]
Supervisory Sanitarian

This Construction
Permit Valid until
9-30-98

If FHA or VA financing

Reviewed by Date _____

Supervisory Sanitarian

Date _____

Regional Sanitarian

Water Supply and/or Sewage Disposal System Construction Permit

Commonwealth of Virginia

Department of Health

Health Department

Identification Number

Map Reference

Charlotte Health Department

General Information

Water Supply System: New ☐ Repair ☐ Public ☐ FHA ☐ VA ☐ Case No.
 Sewage Disposal System: New ☒ Repair ☐ Expanded ☐ Conditional ☐ Public ☐
 Based on the application for a sewage disposal system construction permit filed in accordance with Section 2.13 E, of the Sewage Handling and Disposal Regulations and/or Section 2.13 of the Private Well Regulations a construction permit is hereby issued to:
 Owner Charlotte Co. School Board Telephone
 Address P.O. 790 Charlotte CH. Va For a Type II Sewage Disposal System or Well to be constructed on/at Charlotte CH - 40 rd to lot 645 - 1st on Right
 Subdivision Section/Block Lot 2-12 Actual or estimated water use 210 gpd

DESIGN	NOTE: SEWAGE DISPOSAL SYSTEM INSPECTION RESULTS
Water supply, existing: (describe) <u>Town</u> To be installed: class <input type="text"/> cased <input type="checkbox"/> grouted <input type="checkbox"/>	Water supply location: Satisfactory yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments <input type="text"/> Completion Report <input type="text"/> G. W. 2 Received: yes <input type="checkbox"/> no <input type="checkbox"/> not applicable <input checked="" type="checkbox"/>
Building sewer: <u>3"</u> I.D. PVC Schedule 40, or equivalent. Slope 1.25" per 10' (minimum). <input type="checkbox"/> Other <input type="text"/>	Building sewer: yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments <input type="text"/> Satisfactory
Septic tank: Capacity <u>900</u> gals. (minimum). <input type="checkbox"/> Other <input type="text"/>	Pretreatment unit: yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments <input type="text"/> Satisfactory
Inlet-outlet structure: PVC Schedule 40, 4" tees or equivalent. <input type="checkbox"/> Other <input type="text"/>	Inlet-outlet structure: yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments <input type="text"/> Satisfactory
Pump and pump station: No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> describe and show design. if yes: <u>See Sheet 4 of 4</u>	Pump & pump station: yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments <input type="text"/> Satisfactory <u>1/3 HP Liberty</u>
Gravity mains: 3" or larger I.D., minimum 6" fall per 100', 1500 lb. crush strength or equivalent. <input type="checkbox"/> Other <input type="text"/>	Conveyance method: yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments <input type="text"/> Satisfactory
Distribution box: Precast concrete with <u>8</u> ports. <input type="checkbox"/> Other <input type="text"/>	Distribution box: yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments <input type="text"/> Satisfactory
Header lines: Material: 4" I.D. 1500 lb. crush strength plastic or equivalent from distribution box to 2' into absorption trench. Slope 2" minimum. <input type="checkbox"/> Other <input type="text"/>	Header lines: yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments <input type="text"/> Satisfactory
Percolation lines: Gravity 4" plastic 1000 lb. per foot bearing load or equivalent, slope 2" 4" (min. max.) per 100'. <input type="checkbox"/> Other <input type="text"/>	Percolation lines: yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments <input type="text"/> Satisfactory
Absorption trenches: Square ft. required <u>540</u> ; depth from ground surface to bottom of trench <u>72"</u> ; aggregate size <u>1/2-1 1/2"</u> ; Trench bottom slope <u>2-4" per 100'</u> ; center to center spacing <u>9'</u> ; trench width <u>36"</u> ; Depth of aggregate <u>13"</u> ; Trench length <u>60'</u> ; Number of trenches <u>3</u>	Absorption trenches: yes <input checked="" type="checkbox"/> no <input type="checkbox"/> comments <input type="text"/> Satisfactory

Date 2-2-98 2-26-98 Inspected and approved by:

Robert B. Harris
Sanitarian

* Keep tank out well
downslope of community well

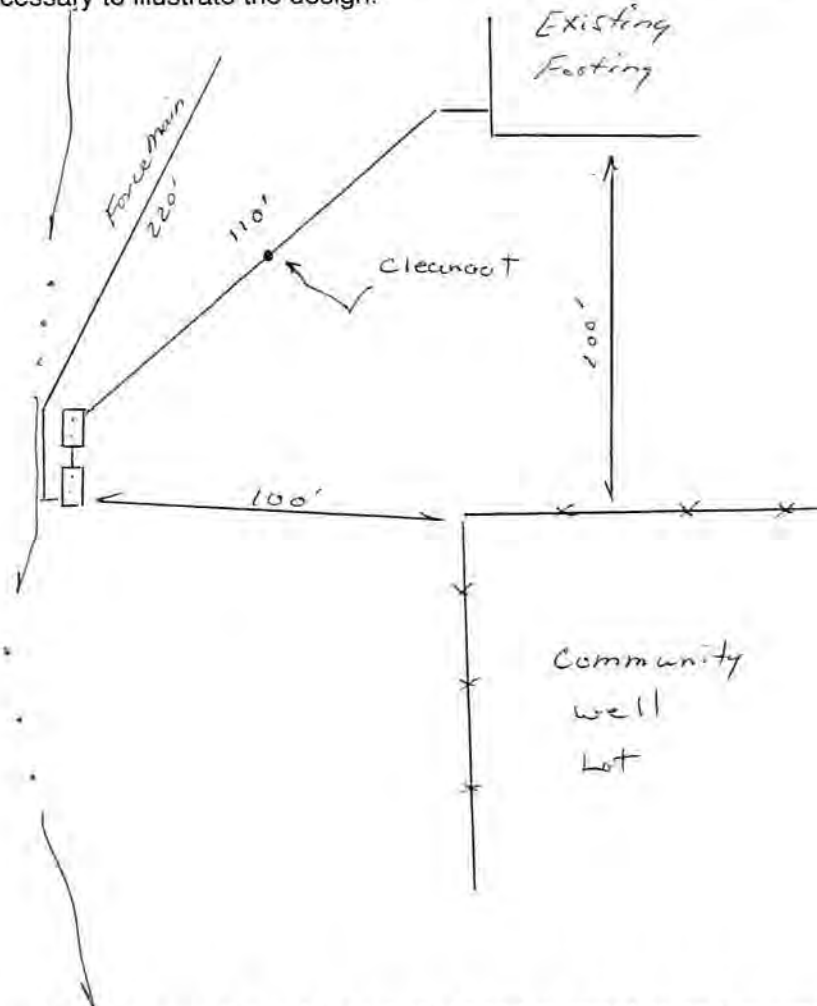
2014

Health Department
Identification Number _____

Schematic drawing of sewage disposal and/or water supply system and topographic features.

Show the lot lines of the building site, sketch of property showing any topographic features which may impact on the design of the well or sewage disposal system, including existing and/or proposed structures and sewage disposal systems and wells within 200 feet. The schematic drawing of the well site or area and/or sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be permitted, show all sources of pollution within 200 feet.

- ☒ The information required above has been drawn on the attached copy of the sketch submitted with the application.
Attach additional sheets as necessary to illustrate the design.



This sewage disposal system and/or water supply is to be constructed as specified by the permit _____ or attached plans and specifications _____.

This sewage disposal system and/or well construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 1-30-98 Issued by: Robert B. Harris
Sanitarian

Date: _____ Reviewed by: _____
Supervisory Sanitarian

This Construction
Permit Valid until

7-30-99

If FHA or VA financing

Reviewed by Date _____ Date _____
Supervisory Sanitarian Regional Sanitarian

* 1 1/2" or 2" force main to be placed inside 3" schedule 40. Ditch line to ditch line. minimum 18" depth

* Locate any underground utilities before starting construction

Health Department
Identification Number

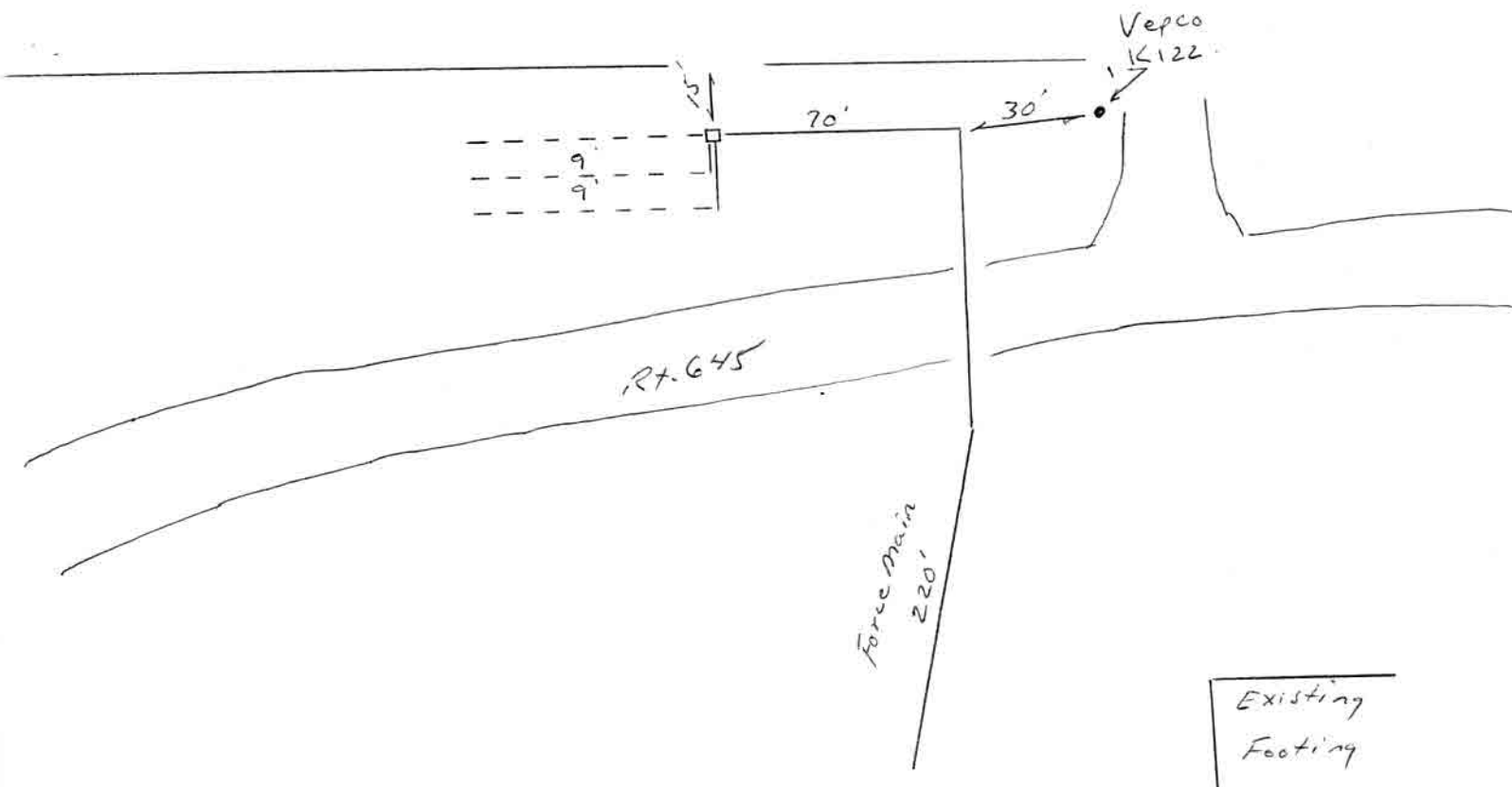
3044

Schematic drawing of sewage disposal and/or water supply system and topographic features.

Show the lot lines of the building site, sketch of property showing any topographic features which may impact on the design of the well or sewage disposal system, including existing and/or proposed structures and sewage disposal systems and wells within 200 feet. The schematic drawing of the well site or area and/or sewage disposal system shall show sewer lines, pretreatment unit, pump station, conveyance system, and subsurface soil absorption system, reserve area, etc. When a nonpublic drinking water supply is to be permitted, show all sources of pollution within 200 feet.

- ☐ The information required above has been drawn on the attached copy of the sketch submitted with the application. Attach additional sheets as necessary to illustrate the design.

Parking Lot



This sewage disposal system and/or water supply is to be constructed as specified by the permit _____ or attached plans and specifications _____.

This sewage disposal system and/or well construction permit is null and void if (a) conditions are changed from those shown on the application (b) conditions are changed from those shown on the construction permit.

No part of any installation shall be covered or used until inspected, corrections made if necessary, and approved, by the local health department or unless expressly authorized by the local health dept. Any part of any installation which has been covered prior to approval shall be uncovered, if necessary, upon the direction of the Department.

Date: 1-30-98 Issued by: [Signature]

Sanitarian

Date: _____ Reviewed by: _____

Supervisory Sanitarian

This Construction
Permit Valid until

7-30-99

If FHA or VA financing

Reviewed by Date _____

Supervisory Sanitarian

Date _____

Regional Sanitarian

Commonwealth of Virginia
Application for a Sewage Disposal and/or Water Supply Permit

Health Department ID _____

To Be Completed By The Applicant

Type of sewage system: ☒ New ☐ Repair ☐ Expanded ☐ Conditional
FHA/VA yes ☐ no ☒ Case No. _____

Owner Charlotte County Schools Address P.O. Box 790 Phone 804-542-5151
Charlotte CT Va.

Agent Larry Dunn Address Same Phone Same

Directions of Property South on Hwy 645 from Hwy 40 approximately
200 yards on the right side of Hwy 645 from Hwy 40.

Subdivision _____ Section _____ Block _____ Lots 2, 3, 4

Other Property Identification Attached copy

Dimension/size of Lot/Property 2.1 acres

Other Application Information

I. Building/facility ☒ New ☐ Existing
Intermittent Use ☐ Yes ☒ No If yes, describe _____

II. Residential Use ☐ Yes ☐ No
Termite Treatment ☐ Yes ☐ No
☐ Single Family ☐ Multi-family
(Number of Bedrooms _____) (Number of Units _____)

Basement ☐ Yes ☐ No
Fixtures in Basement ☐ Yes ☐ No

III. Commerical Use ☒ Yes ☐ No Describe: Education

Commerical/Wastewater ☐ Yes ☐ No Number of Patrons 18
Number of Employees 3

If yes, give volumes and describe 21 X 10 = 2109 gal

IV. Water Supply: ☒ Public ☐ New ☐ Existing
☐ Private ☐ New ☐ Existing

Describe: _____

V. Proposed Sewage Disposal Method:

Onsite Sewage Disposal System: ☐ Septic Tank ☐ Drainfield ☐ LPD ☐ Mound ☒ Other

Public Sewerage System

Attach a site plan (rough sketch) showing dimensions of property, proposed and/or existing structures and driveways, underground utilities, adjacent soil absorption system, bodies of water, drainage ways, and wells and springs within 200 feet radius of the center of the proposed well or drainfield. Distances may be paced or estimated.

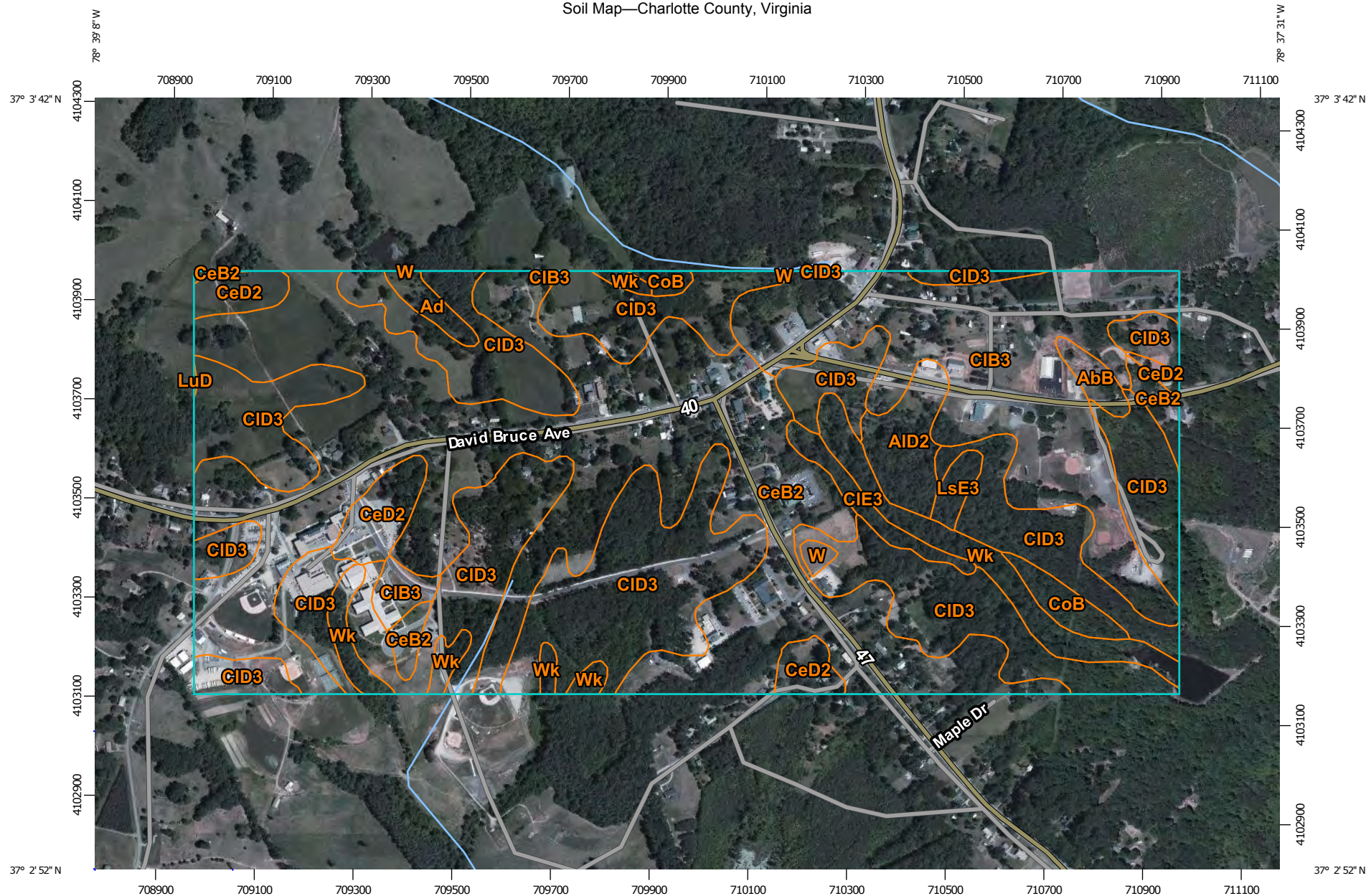
The property lines and building location are clearly marked and the property is sufficiently visible to see the topography. I give permission to the Department to enter onto the property described for the purpose of processing this application.

Larry Dunn
Signature of Owner/Agent

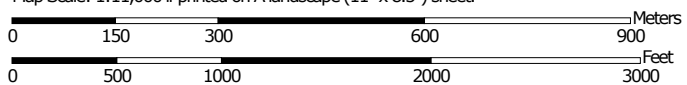
8-26-97
Date

NRCS Soil Maps

Town of Charlotte Court House
Soil Map—Charlotte County, Virginia



Map Scale: 1:11,000 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84




Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

7/14/2016
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Charlotte County, Virginia

Survey Area Data: Version 12, Dec 11, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 10, 2010—Jul 4, 2010

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Charlotte County, Virginia (VA037)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
AbB	Abell soils, 2 to 6 percent slopes	2.5	0.6%
Ad	Alluvial land	2.5	0.6%
AID2	Appling fine sandy loam, 6 to 15 percent slopes, eroded	8.4	2.0%
CeB2	Cecil fine sandy loam, 2 to 6 percent slopes, eroded	146.7	34.7%
CeD2	Cecil fine sandy loam, 6 to 15 percent slopes, eroded	13.2	3.1%
CIB3	Cecil clay loam, 2 to 6 percent slopes, severely eroded	63.3	15.0%
CID3	Cecil clay loam, 6 to 15 percent slopes, severely eroded	156.0	36.9%
CIE3	Cecil clay loam, 15 to 25 percent slopes, severely eroded	4.0	1.0%
CoB	Colfax fine sandy loam, 2 to 6 percent slopes	4.8	1.1%
LsE3	Louisa and Louisburg soils, 15 to 25 percent slopes, severely eroded	2.2	0.5%
LuD	Louisburg sandy loam, 10 to 15 percent slopes	0.1	0.0%
W	Water	1.0	0.2%
Wk	Wehadkee-Chewacla complex	18.2	4.3%
Totals for Area of Interest		422.9	100.0%

Statesman Drive Mass Drainfield and Adjacent Reserve Area
Soil Map—Charlotte County, Virginia



Map Scale: 1:1,590 if printed on A landscape (11" x 8.5") sheet.

0 20 40 80 120 Meters

0 50 100 200 300 Feet

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84




Natural Resources
Conservation Service

Web Soil Survey
National Cooperative Soil Survey

6/9/2016
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Charlotte County, Virginia
Survey Area Data: Version 12, Dec 11, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 10, 2010—Jul 4, 2010

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Map Unit Legend

Charlotte County, Virginia (VA037)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CeB2	Cecil fine sandy loam, 2 to 6 percent slopes, eroded	2.2	35.4%
CID3	Cecil clay loam, 6 to 15 percent slopes, severely eroded	4.0	64.6%
Totals for Area of Interest		6.2	100.0%

Water Service Sharing Article

Article Published: June 3, 2016

Newspaper: The Roanoke Times

Title: Our view: Why 1983 mattered for Deschutes, Ballast Point announcements

We've written a lot lately about how decisions made decades ago have led to the recent announcements that Deschutes Brewery, Ballast Point Brewery and the Eldor auto parts maker will locate in the Roanoke Valley. We've mentioned Botetourt County's acquisition of the Greenfield farm in 1995, Roanoke's assembly of the land for the Roanoke Centre for Industry and Technology in the early '80s. Today, let's carbon-date some other important dates that lead directly to the Deschutes and Ballast Point announcements. The first is 1983. That was the year that a committee of valley government leaders recommended building a reservoir in western Roanoke County – what we know today as Spring Hollow. Spring Hollow will not be the water source for either Deschutes or Ballast Point – Carvins Cove will be – but the decision to build Spring Hollow factors in as a key one, anyway.

Roanoke County had been looking to develop a new water source since the 1970s, alternately looking at dams in Back Creek or Montgomery County, or pumping water from Smith Mountain Lake – eventually rejecting all of those as too expensive or too politically troublesome. Then came that 1983 committee recommendation.

By then, the county saw the need for a second big water supply as critical for economic development. Three years of controversy followed. One opponent warned that pumping water out of the Roanoke River into Spring Hollow would cause “the destruction of the Roanoke River as it is presently known.” The public, though, was persuaded otherwise.

In 1986, Roanoke County voters overwhelmingly approved a \$16 million bond referendum to build Spring Hollow. The reservoir opened in 1994. Five years later, the wisdom of that decision was borne out when a drought drained Carvins Cove so low that the foundations of some of the old buildings submerged under it became visible again.

Spring Hollow, though, had plenty of water.

The 1999 water crisis produced what The Roanoke Times called “an unprecedented water-sharing agreement” between the city and county. At the time the two localities sometimes acted more like rivals than neighbors, and the mere act of working out a deal to sell each other water in the middle of a drought was considered historic. “This is the most talked-about issue in the history of my 16 years in office,” declared county supervisors chairman Bob Johnson.

The 1999 water crisis called attention to a deeper problem, though, quite literally. The city and county water systems weren't really connected. Oh, there were a few connections here or there, but not in a way that made large-scale water transfers possible. The two localities could now help each other out in a crisis, but it was still something of a patchwork solution. There was talk of what seemed both eminently practical but perhaps politically undoable: A single valleywide water distribution system. It took another, even worse, drought in 2002 – this one dropping Carvins Cove to its lowest levels in 55 years – to bring about the necessary political resolve.

Two years later, in 2004, the city and county created the Western Virginia Water Authority (Salem and Vinton opted to stick with their own water systems). In the 12 years since, the authority has laid more than 105,000 feet of water lines to more fully knit the systems together.

In 2009, Franklin County joined, and now water lines run all the way to Wirtz. There's also a separate network of lines around Westlake, which will someday be hooked up to the main system. Last year, the

authority signed a deal with the Bedford Regional Water Authority to create a joint water treatment plant in Moneta, so both can pull water from Smith Mountain Lake and not have to build separate plants.

Also last year, Botetourt County voted to join; by December, Greenfield had a new source of water — just in time to be considered by Ballast Point. Twice in the recent past, the Roanoke Regional Partnership had shown beverage-making prospects sites in Greenfield; twice they had passed, citing concern over water. Greenfield had been served by wells, pumping out notoriously “hard” mineral-heavy water that required further treatment — 688 parts per million. The authority’s water from Carvins Cove to Greenfield is quite soft — only 52 parts per million.

And because it’s connected to a wider system — in a future drought, Spring Hollow water could easily be piped to Greenfield or anywhere else — it’s far more reliable, another concern for any industrial user. “If you’re going to make a large financial investment in a community to make a product whose main ingredient is water, you want to make sure that water is available,” says authority spokeswoman Sarah Baumgardner.

There’s also plenty of excess capacity built into the system now — both on the water supply end, as well as the wastewater end. Some municipalities are maxed out and charge extra for high-strength discharges that breweries produce; we’re not and we don’t — one of many reasons why the Roanoke Valley got the attention of these two breweries.

Big picture: In just 14 years, we’ve gone from having a water crisis — with restrictions imposed on water use — to having a water surplus that has now attracted not one but two high-profile employers.

Who should get the credit? Lots of people, over lots of years, far too many to mention. Don Flanders was the county administrator who helped make that initial recommendation for Spring Hollow in 1983. Or what about the Roanoke County voters in 1986 who agreed to pay for it? Or consider Elmer Hodge, the administrator who shepherded the project through. How about Ralph Smith? One highlight of his single term as Roanoke mayor from 2000-2004 was building better relations with Roanoke County, which paved the way for the water authority. Or how about Darlene Burcham and Elmer Hodge (again), who were city manager and county administrator when the authority was negotiated? Or the city council members and county supervisors over the years who evolved from combatants into partners?

Or how about voters in multiple localities who have increasingly tended to elect local officials with a broader view than their predecessors once had?

Go toast yourselves. You don’t need to wait for the beer; a glass of tap water will do.

Additional Photos



Old School Houses that are being considered to be developed into apartments



1993 Pump Station behind Village Drive-in



1993 Pump Station Alarm



Check valve that can shut off Statesman Drive mass drainfield and send flow to the Administration Building Pump Station

Charlotte County Commissioner of the Revenue
is issued on 6/14/16



Tax parcel map for the area that the 1993 Pump Station gravel access road goes through.