North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report

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C 16S, Merchants Millpond State Park, Gates County

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1.0 Introduction

The State of North Carolina (the State) relies on ground water for approximately 50 percent of its drinking (potable) water use. In addition, the State has thousands of agricultural and industrial ground water users. The North Carolina Department of Environmental Quality (DEQ), Division of Water Resources (DWR), and preceding agencies have operated, installed, and monitored a statewide monitoring well network from the 1960s to the present. The operation of this monitoring well network is an essential part of DWR's mission to ensure that the State has an adequate water supply for its citizens. Information collected quarterly from this well network include the following:

- Evaluating climatic influences on the State's ground water supply, including effects of drought and recharge-discharge relationships;
- Monitoring human-induced impacts on the State's ground water supply, particularly in the regional aquifer systems of the Coastal Plain physiographic province. These effects include local and regional water level declines as well as migration of the fresh water-salt water interface within various aquifers;
- Providing supporting data for enforcement and creation of current and future ground water usage regulations, such as the Central Coastal Plain Capacity Use Area rules;
- Periodic sampling of the monitoring well network to establish background levels for constituents (e.g. nitrates, etc.); and
- Providing high quality ground water data to local governments, ground water professionals, and the public to use in making informed decisions in ground water related issues.



Palmetto Swamp Station P 22U, Craven County

Data collected from the network are available to the public through DWR's internet website https://www.ncwater.org/GWMB. These data include ground water levels, water quality

measurements, well construction information, borehole log construction (lithological and geophysical), ground water monitoring station locations, and geophysical/lithological data collection from non-DWR well sites.

2.0 Purpose and Scope

The 2020 Annual Report summarizes field activities and conclusions derived from activities performed or associated with the Ground Water Management Branch during the July 1, 2019 through June 30, 2020 fiscal year (FY 2020). These activities include the ground water monitoring well network water level and water quality data statistics, monitoring well installations, including new installations and acquired wells, monitoring equipment usage and evaluations, site surveys, local monitoring well network information, and a summary of the Central Coastal Plain Capacity Use Area FY 2020 activities.

3.0 Background

DWR and its predecessor agencies have operated the statewide Ground Water Resource Monitoring Program from the 1960s to the present. The active monitoring well network has expanded by approximately forty-five percent (309 monitoring wells) by either installation or acquisition of new monitoring wells since 1998.

The U.S. Geological Survey (USGS) has also contributed to the monitoring of the State's ground water resources under a cooperative agreement between the State of North Carolina and the Federal government. The USGS cooperative well network consists of 13 monitoring wells, seven of which are also part of the DWR statewide network.

Three local cooperative networks whose water level data are currently being uploaded to the DWR database and contribute to both the



Boardman Station AA 43Q, Robeson County



Cedar Creek Fire Tower Station U 40Y, Cumberland County



St John Station E 21S, Hertford County



Cove City Station R 23X, Craven County

statewide monitoring well network and the drought network are the Orange Well Network (OWN) in Orange County, the Guilford County network, and the Western Carolina Hydrological Research Station (WCHRS) in Jackson County. The water level data can be viewed by the public on the DWR website https://www.ncwater.org/GWMB.

4.0 DWR Statewide Monitoring Well Network Overview

4.1 <u>Description</u>

The monitoring well network currently consists of 687 wells at 229 monitoring stations (sites), divided into six regions, comprising 67 counties (Figure 1). There are 52 wells located in the Piedmont and Mountain physiographic provinces (Piedmont and Mountain) and 635 wells located in the Coastal Plain physiographic province (Coastal Plain). The Coastal Plain relies more heavily on ground water supplies than either the Piedmont or Mountains. Consequently, ground water monitoring and research have been more concentrated in the Coastal Plain.

In the past few years, more resources have been invested in monitoring the Piedmont and Mountain ground water conditions to better understand the impact of drought cycles on ground

water supplies and their contribution to surface water flow. There are 49 DWR wells within the monitoring well network used to assess drought conditions in the FY 2020 (Figure 2).

Of the 229 monitoring stations, 85 are on State or Federal property, 59 are located on property owned by local governments, 81 are located on private property through agreements with landowners, and 4 stations are located on properties where the landowner indicates that the land property ownership may change. In the past, some wells have been abandoned at the landowner's request due to changes in land use or ownership. Due to the high cost of well construction, combined with the fact that the wells are most valuable when they are monitored continuously over a period of decades, every attempt is made to put new stations in secure, stable locations. A scale has been developed to rank new and existing well sites for potential well abandonment due to land-use issues in the future (Table 1). It is preferred that new wells be installed at sites with a susceptibility rating of 1 or 2.

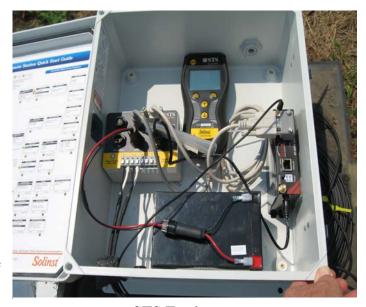


Video Camera, Stillwell Building, Q94J, Jackson County

4.2 <u>Monitoring</u>

The statewide monitoring network is divided into six regions (Figure 1). One staff member is responsible for each region. Staff member responsibilities include visiting the wells quarterly to collect water level data, collecting data from drought wells monthly if needed, performing routine site maintenance, keeping automatic data recorders in working order, and keeping sites accessible and aesthetically pleasing. Additional site activities (i.e. recorder removal/replacement, site maintenance, video-logging, etc.) are conducted on an as needed basis.

Depth to ground water level measurements are collected from the network in two different ways. Manual water levels are measured using electronic water level indicators. Hourly water level



STS Equipment Lewiston Station, H 22I, Bertie County

measurements are collected using unvented pressure transducers. Hourly water level data are extremely valuable in assessing aquifer recharge, impacts of large storms on ground water conditions, and delineation of aquifer boundaries. Manual water level readings and daily automatic recorder water level data are typically published on the DWR website. However, hourly data is available upon request for specific wells. Table 2 summarizes site and recorder distribution by region.

In addition to the recorders mentioned above, Solinst Telemetry System (STS) recording units have been installed in sixteen wells that are included in the Drought Indicator Well network. They consist of one pressure transducer, one barometer (corrects for air pressure), and are powered by a twelve-volt battery. Data is collected by a controller unit that stores hourly readings. The readings are sent to the home station (DWR web page server) every reporting interval (currently 3 hours) via a cell phone modem. DWR uses the STS system on the Drought Indicator Well network to take the place of monthly visits. They are serviced every quarter or semiannually depending on battery life. The STS data is especially helpful in keeping the Drought Indicator well water levels up to date (https://www.ncwater.org/?page=345). Table 3 summarizes STS system information.

4.3 Chloride Sampling

Chloride samples were collected from select wells in the Coastal Plain during the FY 2020. The samples were analyzed using the Quantab® field method. Field results were used to monitor the migration of the fresh water-salt water interfaces in the Coastal Plain aquifers.



STS Equipment, Wilkesboro Station. G 69J Wilkes County



Hobo Datalogger Bear Grass Station, K 21R Martin County

Additional chloride samples are collected for field analyses when new monitoring wells are installed and as needed for special projects. The next chloride sampling event will occur in September-October 2021 to track salt water encroachment conditions. Section 5.2 summarizes the FY 2020 chloride sampling event.

5.0 Well Network Statistics

5.1 Ground Water Data Collection

Depth to ground water was measured in 700 wells in the FY 2020. Table 4 contains DWR monitoring well network statistics from January 1, 2005 through June 30, 2020. Statistics may vary in comparison to previous years due to additional data entry in the DWR database as older field books are scanned and unrecorded data entered. Figure 3 compares the number of wells monitored to the water level data collected from the network from 1967 to present. Hourly water level data is not included in this graph. Calendar year 2019 represents the most water level data collected in any single year since starting the monitoring well network operation. The FY 2020 data was collected from January 1 through June 30, 2020.

Archived water level recorder charts obtained from DWR and its predecessor agencies, with records dating from the 1960s through 1980s, continue to be digitized and data recorded into the DWR online database. Additional digitized information recorded in the database includes, but is not limited to, well construction records, well development information, chloride sampling events, memorandums of agreement, and field notes.

5.2 <u>Chloride Sampling</u>

In 2019, a chloride sampling event was conducted at 413 DWR monitoring wells. Samples were collected from September 18, 2019 through October 25, 2019,



Depth to Water Level Measurement Dublin Station, Y 40G Bladen County



Chloride Sampling, Cove City Station, R 23X, Craven County

except for one site, Four Mile Desert, which was sampled on November 20, 2019. During the event, ground water was analyzed using Quantab® chloride test strips, and conductivity, salinity, and pH were measured using YSI® portable probes.

The purpose of chloride sampling is to monitor salinity levels and trends at the fresh water-salt water interface within each of the major coastal plain aquifers. Salinity levels and the location of the interface can change as a result of sea level rise, storm surges during hurricanes, ground water pumping, and mine dewatering. Chloride levels are used to determine if ground water is fresh (< 250 ppm chloride) or salty (≥ 250 ppm chloride). Chloride sampling is also used to identify the transition zone between the fresh and salty zones. This transition zone is characterized by a vertical salinity gradient within the aquifer in which salinity increases with depth, from fresh to salty. Salinity zones and chloride results for three of the state's major aquifers, the Black Creek and the Upper and Lower Cape Fear, are summarized in Figures 4, 5, and 6, respectively.

Figure 4 shows sample results from selected Black Creek aquifer wells sampled in 2019. Increasing chloride trends continued at Lee Creek and Aurora II, both of which are located near open-pit mines where large-scale dewatering is occurring. Increasing chloride was also observed at Long Creek. Chloride continues to decrease at Folkstone as a result of regional water level rebound attributed to reductions in Cretaceous aquifer pumping in accordance with CCPCUA mandates. A chloride decline was also seen at Holly Shelter, however, this likely is the result of fresh water entering the well during flooding of the Northeast Cape Fear River. During the 2019 sampling event, a total of 45 Black Creek wells were sampled. Of these, 8 wells showed chloride increases from the previous sampling event in 2017 and 9 wells had chloride levels exceeding 250 mg/l.

Figure 5 shows sample results from selected Upper Cape Fear aquifer wells sampled in 2019. In the northeastern part of the state, chloride levels continued to decrease at Moyock, Morgans Corner, Windsor well H 20T3, Gold Point, Bear Grass, Old Sparta, and North Pitt High School. These reductions are potentially attributable to CCPCUA pumping reductions. Chloride levels at Windsor well H 20T4, Clarks, West Research Campus, La Grange and Comfort increased by up to 167 mg/l since the 2017 sampling event. Holly Shelter showed a dramatic decrease in chloride, however as in the Black Creek well, this is attributed to inundation during flooding. In DWR's other Upper Cape Fear wells, chloride was either below 250 mg/l or not detected. During the 2019 sampling event, a total of 52 Upper Cape Fear wells were sampled. Of these, 5 wells showed chloride increases from the previous sampling event in 2017 and 11 wells had chloride levels exceeding 250 mg/l.

Figure 6 shows sample results from selected Lower Cape Fear aquifer wells sampled in 2019. With the exception of Morgans Corner, chloride levels in the northern coastal plain aquifer remained the same or decreased since the 2017 sampling event. The increase at Morgans Corner of 291 mg/l was unexpected since chloride levels had been decreasing since 2010. Within the central and southern coastal plain, chloride increased at North Pitt High School, Falkland and West Research Campus by up to 106 mg/l since the 2017 sampling event. South of West Research Campus, chloride levels decreased below 2017 levels in all wells except Kelly, which showed a chloride increase of 95 mg/l. The chloride decrease of over 4,000 mg/l at Jones

Middle School is attributed to fresh water entering the well during flooding. During the 2019 sampling event, a total of 27 Lower Cape Fear wells were sampled. Of these, 5 wells showed chloride increases from the previous sampling event in 2017 and 12 wells had chloride levels exceeding 250 mg/l.

Additional information on chlorides is available from the Ground Water Management Branch map interface and water quality data page at https://www.ncwater.org/?page=20.

5.3 <u>Well Installation and</u> <u>Development</u>

From June 2019 through September 2019 the following monitoring wells were installed using the mud rotary drilling method:

Merchants Millpond State
Park Monitoring Station,
Gates County, six wells
installed (C 16S1, C 16S2,
C 16S3, C 16S4, C 16S5, C
16S6); this station was
mentioned in the 2019
Annual Report, but was not
completed until FY 2020
so it is fully documented in
this report.

From July 2019 through October 2019, three new stations were installed at Camp LeJeune, Onslow County. In addition, one new well was installed at the existing Paradise Point Station and one well was installed at the existing Montford Point Station. All wells



Drilling (above)
Constructed Mudpit (below)
Chinquapin Elementary School Station, W 29D
Duplin County



in each station were installed using mud rotary drilling. The wells were installed on behalf of Camp LeJeune in a joint effort with the Onslow Water Resources Group, the primary organization. Once the wells were installed, they were added to the statewide monitoring well network. These stations include:

- Verona Loop Monitoring Station, four wells installed (X 25W1, X 25W2, X 25W3, X 25W4)
- Marines Road Monitoring Station, five wells installed (Y 24T1, Y 24T2, Y 24T3, Y 24T3, Y 24T5)
- Hwy 172, four wells Installed (Z 23C1, Z 23C2, Z 23C3, Z 23C4
- Paradise Point, one well installed (X 24G3)
- Montford Point, one well installed (X 24E3)

From April 2020 through June 2020, the following monitoring wells were installed using the mud rotary drilling method:

 Chinquapin Elementary School Monitoring Station, Duplin County, six wells (W 29D10, W 29D11, W 29D12, W 29D13, W 29D14, W 29D15).

A pilot hole was previously advanced at the newly installed Merchants Millpond State Park by Toano Well and Pump Service, Inc. from Toano, Virginia. A pilot hole was previously advanced at the newly installed Chinquapin Elementary School Station by AC Schultes of North Carolina from Rocky Point, NC. Both pilot holes were installed using the mud rotary drilling method. The boreholes were used to construct monitoring wells C 16S1, C 16S6, and W 29D10. DWR staff collected samples of the drill cuttings at ten-foot intervals in order to assess the borehole lithology. In addition, a borehole geophysical log was obtained by lowering a probe



Geophysical Logging Equipment Chinquapin Elementary School Station W 29D, Duplin County



Describing Sample Cuttings Merchants Millpond State Park C 16S, Gates County

into the borehole once the borehole was completed. The geophysical log makes a detailed record of the geologic formations in the borehole. Geophysical and lithologic log interpretation enabled the DWR staff to identify aquifers and confining units and optimize screen intervals. The wells were installed using 4-inch PVC riser and 10 to 20 feet of 4 to 4.5-inch stainless steel continuous wire wrap V-slot screen. The wells were constructed of a gravel pack extending from the bottom of the screen to a minimum of five feet, but no more than ten feet, above the screen. A minimum of ten feet of bentonite overlays the top of the gravel pack to provide a sufficient bentonite seal in the well. Table 5 summarizes the monitoring well construction information. The FY 2020 completed monitoring station wells are included in Figure 1. Well construction records for the FY 2020 completed wells are included in Appendix A.

Development removes fine-grained sediments from the vicinity of the well screen and ensures proper hydraulic connection with the aquifer. During development, field data were collected for pH, conductivity, salinity, and temperature in thirty minute or hourly intervals. Field data exhibiting overall consistency was used to assist in the decision to stop well development. DWR staff developed the Merchants Millpond State Park monitoring well station in the FY 2020 (Table 6).



Sample Cuttings Chinquapin Elementary School Station W 29D, Gates County



Well Development Chinquapin Elementary School Station W 29D, Gates County

5.4 Well Maintenance

The well network requires continual maintenance to keep active monitoring stations usable. Many of the wells exceed 30 years in age and are constructed of materials that are susceptible to corrosion, especially in acidic or saline ground water conditions. Some older wells were constructed with outdated, less than desirable construction practices including backfilling boreholes with cuttings instead of neat cement or bentonite grout. Boreholes backfilled with cuttings form an inadequate seal and allow other aquifers to influence the water level and water quality in that well. Another outdated practice included well construction using telescoped casing. Telescoped casing uses a reducer to trim the well to a smaller diameter casing at depth apparently to save money during well construction. Telescoped wells are very susceptible to blockage at the depth of the reducer.

Approximately 152 wells in the network were constructed with reducers. DWR has implemented a long-term program for replacing damaged or unsuitably constructed wells with new, properly constructed wells.

5.5 <u>Acquired Network Wells</u>

DWR acquired two existing wells, Bean Shoals Well, E 61P1, Pilot Mountain State Park, Surry County, and Ivy Bluffs Well, E 62U1, Pilot Mountain State Park, Yadkin County, during the FY2020.



Well Development Merchants Millpond State Park, C16S, Gates



Pump Removal
Ivy Bluffs Access Station, E 62U, Yadkin County

Details of the monitoring station are included in Table 5.

5.6 <u>Automatic Water Level Recorders</u>

Automatic water level recorders play an integral role in the DWR monitoring program. Hourly water level measurements are collected using unvented submersible pressure transducers. They allow for economical collection of near-continuous data at remote well stations. Two primary recorders (Onset Computer's Hobo U20 series and Solinst Telemetry System or STS) were utilized in the FY 2020 and are included in <u>Table 2</u>. <u>Table 7</u> lists the recorders present on network wells as of June 30, 2020.

5.7 <u>Site Surveys</u>

Concrete survey monuments have been installed at each of the 229 active monitoring well stations within the network. Five of those stations have more than one monument.

Each of the installed monuments have been surveyed using Survey Grade Global Positioning System (GPS) to calculate the most accurate horizontal and vertical location data possible. DWR was unable to get elevations at two monitoring stations, Beach Grove School Field Well (M93L) and Woody Creek (M93R), due to the inability to acquire a cell phone signal at the station's location. GPS surveying will be conducted again in the winter/spring of the FY 2021 to provide horizontal and vertical data on any newly installed and acquired monitoring well stations, as well as a select number of sites to obtain additional measurements.



Monument Installation Smokemont Campground G1 Station, N 95G Great Smoky Mountain National Park, Swain County



Leveling, Four Mile Desert, E 13M Perquimans County

6.0 Local Monitoring Well Network Information

6.1 Orange County Monitoring Well Cooperative Network

The creation of the Orange County Ground Water Observation Well Network, Orange Well Net (OWN), was proposed in May 2005. It was decided to utilize existing bedrock wells in lieu of installing new wells for monetary reasons. In March 2010, the OWN included six inactive bedrock wells for ground water data collection. In 2011, three regolith wells were added to the OWN as a result of a cooperative arrangement. In 2012, two bedrock wells, the Ray Road and Rocky Ridge wells were removed from the network and replaced with two bedrock wells, well 4D in Duke Forest and a well at the former Orange County 911 Center. The wells that were most recently added to the network are the Brumley East well, as the result of an agreement with the Triangle Land Conservancy, and the Duke Forest 4S and 4I wells, with the agreement (informal) of DWR and Duke Forest. Table 8 summarizes the OWN well information. Figure 7 is a map of the OWN well locations.

Ground water data is collected periodically from the OWN. This data is collected to assess ground water availability and concerns locally in Orange County. The data is formatted and uploaded to the DWR ground water database and is available to the public. <u>Table 9</u> is a summary of the OWN statistics from March 2010 through June 30, 2020. The 2011, 2012, and 2013 OWN Annual Reports are available on the DWR website. Wesley Poole (Water Resources Coordinator for the Orange County Department of Environment, Agriculture, Parks and Recreation), the OWN Annual Reports, and information provided by the DWR database, are the sources for the Orange County Monitoring Well Network information provided herein.

6.2 Guilford County Monitoring Well Cooperative Network

The Guilford County ground water monitoring network was established in 2002 and includes eight monitoring well stations located on public properties owned by Guilford County or the City of Greensboro. Each well site was selected to represent an area of the county and to minimize the influence of any existing water supply wells nearby. Table 10 summarizes the Guilford County monitoring well information. In addition, NC A&T State University uses the Knox Road Station for their hydrology class and the students use the data from this station for their course project.

Water levels are collected manually on the same day of each month. Hourly data is collected using Global Water WL16 submersible transducers and are downloaded at the time of manual collection of depth to ground water levels. The data is formatted and uploaded to the DWR ground water database and is available to the public.

<u>Table 11</u> summarizes the Guilford County monitoring well statistics from 2008 through June 30, 2020. <u>Figure 8</u> is a site map of the Guilford County monitoring well locations. Gene Mao (Guilford County Department of Health and Human Services, Division of Environmental Health, Health, Environment, & Risk Assessment Unit), and information obtained from the DWR database, are the sources for the Guilford County Monitoring Well Network information provided herein.

6.3 Western Carolina Hydrological Research Station Cooperative Network

The Western Carolina Hydrological Research Station, (WCHRS), was established in 2010 in a partnership between Western Carolina University (WCU) and DEQ. The WCHRS is comprised of approximately 40 monitoring wells and is located within the Cullowhee Creek watershed. It was decided in 2017 that the WCHRS cooperative well network would be comprised of seventeen of these wells, including two wells acquired by DWR, Stillwell Building Station (Q 94J1) and the CC Old Well Station (Q 94I1), both active wells in the statewide monitoring well network. According to the WCU description of the WCHRS located in the DWR database, "the well network was designed to study ground water interaction with streams in a headwaters region typical of the southern Appalachians. Most ground water levels are measured weekly by student researchers at WCU. A few wells have computer sensors so water level data are collected continuously at 15-minute intervals."

<u>Table 12</u> summarizes the WCHRS cooperative network well information. <u>Figure 9</u> is a map of the WCHRS cooperative network well locations.

Ground water data is collected periodically from the WCHRS. Data from select wells are formatted and uploaded to the DWR ground water database and is available to the public. <u>Table 13</u> is a summary of the WCHRS statistics from 2011 through June 30, 2019. Mark Lord and David Kinner, Professors of Geology with the Department of Geosciences and Natural Resources, WCU in Cullowhee, NC, the wcu.edu website, and information provided by the DWR database are the sources for the WCHRS information provided herein.



Grifton Station, P 24O, Pitt County

7.0 Planned Activities

7.1 New Well Installation

Monitoring well network expansion efforts for the FY 2021 will focus mainly on Sampson, Chowan, Currituck, Edgecombe and Robeson counties. <u>Table 14</u> summarizes the potential upcoming expansion of the network in FY 2021.

7.2 <u>Well Abandonment/Station</u> <u>Removal</u>

Some wells throughout the network that cannot be used due to bad construction, screening in multiple aquifers, unsafe location, owner decision to no longer allow access, etc., may be abandoned during the FY 2021.

Five stations, Town Creek (DD 33Y), Fuquay Varina (N 41G3), Savannah School (P 26U), Lonnie Kelley (S 26B), and Farmville (M 27U) were removed from the active monitoring well network during the 2020 FY. The original Chinquapin Station was abandoned. Table 15 summarizes which wells were moved to inactive status or abandoned with an explanation as to why.

8.0 Water Quality

Since 2015 the Ground Water Management Branch has supported Tasks 5 & 6 of the North Carolina FY 2016 Workplan for the Clean Water Act Section 106 Groundwater Grant (EPA).

Task 5 - Characterize the State's Ground Water Resources, and Task 6 -Groundwater Monitoring Program



Sample Collection (above), Preserving Samples (Below) Long Creek Station, AA32R, Pender County





Packing Samples on Ice for Delivery Long Creek, AA 32R, Pender County

The Division of Water Resources conducts an active program of ground water monitoring that advances the DWR mission by improving DWR's knowledge in the following areas:

- 1 Impacts of land-applied wastes, artificial infiltration practices, or other human activities, including:
 - Potential impacts of these activities on the surficial aquifer and the secondary impacts to the deeper aquifers or surface waters;
 - The occurrence of "emerging contaminants" related to these activities; and
 - Effectiveness of regulations and permits for these activities.
- 2 Threats to ground water quality, including:
 - The existence, nature, and scope of emerging or existing threats;
 - Assessment of the causes and factors affecting naturally-occurring contamination, agricultural contamination, or contamination resulting from activities permitted by DWR; and
 - Tracking the status of ground water quality across the state.

The goal of all characterization, monitoring, and investigation efforts is to improve DWR's understanding of the causes and extent of problems, to minimize human exposure to contaminants, and identify areas where regulations or best management practices can be improved to prevent contamination from occurring.

The state has an extensive network of ground water monitoring stations which can be utilized as an ambient ground water monitoring network. Prior to December 2015, the Piedmont-Mountain Resource Evaluation Program sampled wells annually from a well network installed and constructed for characterizing the relationship of water quality to underlying geology in the Piedmont and Mountain physiographic provinces. Less water quality monitoring occurred in the Coastal Plain in the last two decades.

The Ground Water Management Branch intends to collect samples from each active well in the statewide monitoring well network. In the FY 2020, samples were collected from 25 monitoring stations. The samples were analyzed for the following parameters:

- Standard private well parameters arsenic (As), barium (Ba), cadmium (Cd), chromium (Cr), copper (Cu), fluoride (Fl), lead, (Pb) iron (Fe), magnesium (Mg), mercury (Hg), nitrates (NO₃), selenium (Se), silver (Ag), sodium (Na), zinc (Zn), pH, and bacterial indicators:
- Ammonium (NH₄), total Kjeldahl nitrogen (TKN), organic nitrogen, and phosphate (PO₄);
- Volatile organic compounds (VOCs), and pesticides (also consult with area agricultural experts on local practices);
- Major ions (Na, calcium (Ca), potassium (K), manganese (Mn), sulfate (SO₄), (carbon trioxide (CO₃), bicarbonate (HCO₃) and chlorides (Cl);
- Per- and polyfluoroalkyl substances (PFAS);
- Metals
 - ➤ Dissolved (filtered in field) (geochemistry applications require dissolved metals)

- Total (drinking water standards are based on total metals)
- Cu and Zn, (in both swine permits and the standard private well suite)
- ➤ Coal ash metals this would incur only minor additional costs yet would increase our knowledge of naturally occurring contaminants of interest to the coal ash program.
 - Note, at this time chromium analysis performed by the DWR lab is not sufficiently precise enough to satisfy coal ash program needs. Analysis for hexavalent chromium would need to be sent to a private lab at some cost.
 - Note, at this time the DWR lab analyzes for total vanadium. The 2L standard for vanadium (V) is under review and will probably be based on particular species of V, not total V.
- Field parameters
 - Specific conductivity, pH, dissolved oxygen (DO), temperature (°C), oxidation-reduction potential (ORP)

In addition to the referenced ground water sampling events, five ground water stations in New Hanover County were sampled specifically for per-and polyfluoroalkyl substances (PFAS), a group of man-made chemicals that includes perfluorooctanoic acid (PFOA), perfluorooctanesulfonic acid (PFOS), GenX and others. The wells were sampled using a high-



Water Quality Sampling Site Long Creek, AA 32R, Pender County

density polyethylene (HDPE) Super/Skinny Sleeve. By using this method, a grab sample of ground water is collected from the screened interval (or any interval of interest) of the well with minimal disturbance and effort, thus eliminating the need for purging three well volumes.

Ground water sampling protocol is included in <u>Appendix B</u>. Field data information for the 2020 FY are included in <u>Table 16</u>. Laboratory analytical results received for the 2020 FY are available upon request. In the 2021 FY, ground water samples will continue to be collected from wells in the monitoring well network and analyzed for the parameters referenced above. Analytical data is now available to the public using the <u>GWMB webpages</u>.

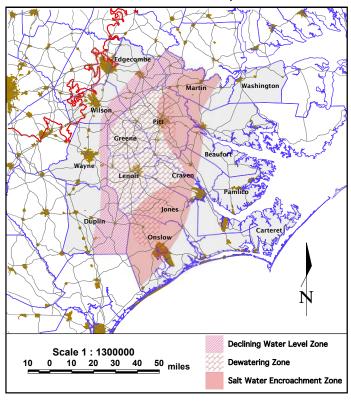
9.0 Central Coastal Plain Capacity Use Area

The Central Coastal Plain Capacity Use Area (CCPCUA) is a 15-county region in the coastal plain that is an example of a water overuse situation. On August 1, 2002, the CCPCUA rules came into effect because of significant ground water depletion problems. As stated in 15A NCAC 2E .0501, "the intent of this Section [the CCPCUA rules] is to protect the long term productivity of aquifers within the designated area and to allow the use of ground water for beneficial uses at rates which do not exceed the recharge rate of the aquifers..." For many years, water was withdrawn from the deep confined aquifers, which are a primary source of water in the CCPCUA, at a rate that was greater than they were naturally recharged. If this situation had been allowed to continue indefinitely, the aquifers could have been permanently damaged, impairing their ability to function as a water supply.

The goal of the DWR is to regulate water withdrawals in the Central Coastal Plain (CCP) under the authority of the Environmental Management Commission (EMC). The following summarizes how these withdrawals are regulated:

- Water withdrawal permits are required for ground water users who withdraw greater than 100,000 gallons of water per day;
- Annual registration and reporting of withdrawals is required for surface and ground water withdrawals greater than 10,000 gallons per day;
- Counties included in the CCPCUA are Beaufort, Carteret, Craven, Duplin, Edgecombe, Greene, Jones,

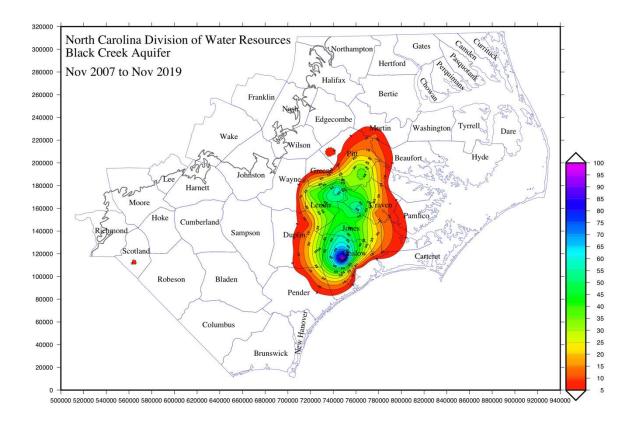




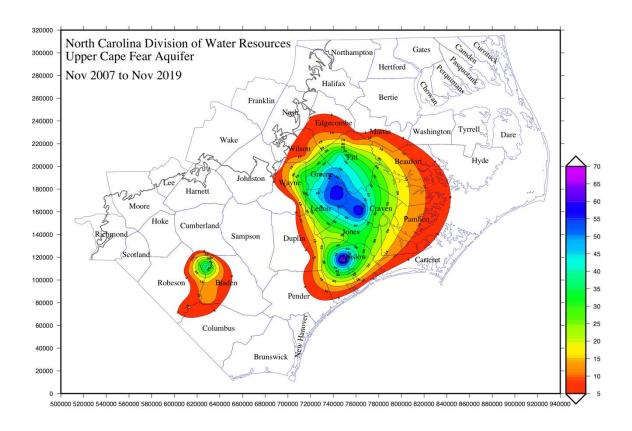
Lenoir, Martin, Onslow, Pamlico, Pitt, Washington, Wayne, and Wilson.

DWR collects depth to water level measurements and water quality sampling event data from monitor wells within the state's well network and CCPCUA permitted wells to assess aquifer conditions. 15A NCAC 2E .0503 requires that DWR assess aquifer conditions in 2008, 2013 and 2018 to determine if CCPCUA rule changes are necessary. Through the CCPCUA permitting system, large ground water users (>100,000 gpd) in some parts of the capacity use area are required to progressively reduce withdrawals in 2008, 2013, and 2018 to allow the aquifers to recover. The managed withdrawals from these aquifers have allowed the aquifers to recover as depicted in the following recovery maps of the Upper Cape Fear Aquifer and the Black Creek Aquifer.

The map of the Black Creek Aquifer shows the areas where ground water levels have risen between 5 feet (red) to more than 95 feet (purple) from November 2007 through November 2019. The largest recovery is observed in the Onslow County area where water users have made large investments in developing the Castle Hayne aquifer as an alternate water source.



The map of the Upper Cape Fear Aquifer shows the areas where ground water levels have risen between 5 feet (red) to more than 65 feet (blue) from November 2007 through November 2019. The largest recovery is observed in the Lenoir county area due to the development of a surface water treatment plant on the Neuse River in 2008 and Craven county area which developed wells in the Castle Hayne aquifer as an alternate water source.



Based on analysis of water level and water quality concentration data gathered through January 2013 in the CCPCUA, and a thorough review of aquifer conditions, DWR concluded that no action needed to be taken by the EMC to alter either the reduction zone boundaries or rule language in 15A NCAC 2E .0503, but recommended the use of temporary permits under rule .0502. This may give certain permit holders a stable withdrawal rate which is higher than indicated by their reduction schedule and reduction zone, provided that all well construction and reporting criteria are met as specified in the 2013 CCPCUA Assessment Report, which can be viewed at https://www.ncwater.org/CCPCUA under the miscellaneous link.

DWR uses a series of criteria to judge each production well and aquifer conditions by individual permit in the permitting process. This enhanced permit application review allows the division to alter an individual permit holder's reduction requirements if the permit holder can demonstrate they are using the ground water at a sustainable rate. As of July 2020, the following twelve permit holders have acquired temporary permits: Greene County Regional Water System, Craven

County Water, Jones County Regional Water, City of New Bern, Town of La Grange, Town of Snow Hill, Town of Winterville, Belfast-Patetown Sanitary District, Northwestern Wayne Sanitary District, Southeastern Wayne Sanitary District, Fork Township Sanitary District, and Chinquapin Water Association, Inc.

Although the CCPCUA rules require assessments to be produced in 2008, 2013, and 2018, the DWR staff will continue to constantly track aquifer conditions so as to best serve the permit holders in the region and to provide awareness of potential ground water supply issues. The 2018 assessment concluded with the EMC's approval of the report on October 10, 2018. The assessment report reviewed aquifer data in a similar fashion to previous efforts in 2008 and 2013. Water levels in the Black Creek and Upper Cape Fear aquifers were found to be equilibrating to the lower rate of aquifer use as water systems continue to shift demand to other sources which include surface water and shallower aquifers. While water level data are consistent with sustainable use of the aquifer system, chloride concentrations are somewhat inconsistent. Smaller and static cones of depression have developed in the Peedee and Castle Hayne aquifers in response to new well fields and are only visible using the combined DWR and permit holder water level data.

Reports referencing the CCPCUA rules along with water use and permit holder information may be viewed by visiting the DWR's CCPCUA website, https://www.ncwater.org/CCPCUA. A summary of water withdrawals reported by permit holders and registrants within the CCPCUA for 2019 is included in Appendix C. Historical years can be found on the CCPCUA website.

10.0 Summary and Conclusions

DWR and its predecessor agencies have maintained and monitored a statewide network of ground water monitoring wells used to assess North Carolina's ground water supply since the 1960s.

Data collected from the monitoring well network are available to the public through DWR's Internet website, https://www.ncwater.org/GWMB. These data include, but are not limited to, ground water levels, chloride measurements, well construction information, lithological and geophysical logs, ground water monitoring station locations, and well coordinates and elevations, and data from many non-DWR wells.

The monitoring well network consists of 687 monitoring wells at 229 individual stations. From July 2019 through June 2020, ground water level data were collected from 700 wells within the network. These data include manual measurements taken quarterly from wells plus hourly water levels collected using automatic data recorders from 586 wells.

Sixteen STS units have been installed as of FY 2020 on drought monitoring network wells. The addition of the STS units replace monthly site visits, allow access to current water level data, and provide positive economic impacts.

Chloride sampling was performed on 413 wells from September through November 2019. Sampling results indicated that there continues to be concern for salt water encroachment especially near larger pumping centers located near the fresh water – salt water interface. Chloride levels were collected in 45 Black Creek wells during the 2019 sampling event. Of these, eight wells showed chloride increases since 2017 and nine wells exceeded 250 mg/l. Chloride levels were collected in 52 Upper Cape Fear wells in the 2019 sampling event. Of these, five wells showed chloride increases since 2017 and eleven wells exceeded 250 mg/l. Chloride levels were collected in 27 wells from the Lower Cape Fear aquifer in 2019. Of these, five wells showed increases since 2017 and twelve wells had chloride levels exceeding 250 mg/l.

In FY 2020, six monitoring wells were installed at the Merchants Millpond State Park, Gates County, and six wells were installed at the Chinquapin Elementary School, Duplin County.

A joint effort between the Onslow Water Resources Group and Camp Lejeune resulted in three additional new monitoring stations at Camp LeJeune in Onslow County. These wells were added to the monitoring well network and include the Verona Loop (4 wells), Marines Road (5 wells), and Hwy 172 (4 wells). The same group also added one new well to the Paradise Point station and one new well to the Montford Point station.

Two monitoring well stations, Bean Shoals Access monitoring station, Surry County, and Ivy Bluffs Access monitoring station, Yadkin County, were acquired and added to the monitoring well network in FY 2020. Both acquired stations are located in Pilot Mountain State Park.

Three wells, Chinquapin (W 29D5, W 29D6, and W 29D9) were abandoned during the 2020 FY. Five stations, Town Creek (DD 33Y1, DD 33Y3), Fuquay Varina (N 41G3), Savannah School (P 26U4, P 26U5, P 26U6, P 26U7, P 26U8), and Farmville (M 27U7, M 27U8, M 27U11) were removed from the active well network.

There are three local networks whose water level data are currently being uploaded to the DWR database. The OWN in Orange County, the Guilford County network, and the WCHRS in Jackson County water level data can be viewed by the public on the DWR website.

Survey monuments have been installed at each of the well stations. Survey Grade GPS will be performed on the newly installed and acquired well stations, and select existing stations with installed monuments during FY 2021.

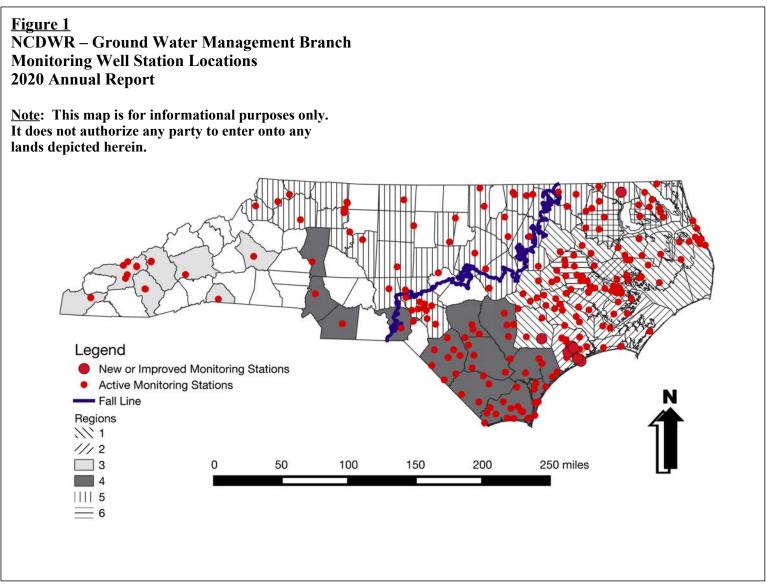
DWR has tentative plans to expand the monitoring well network by installing up to 25 wells at five sites in FY 2021.

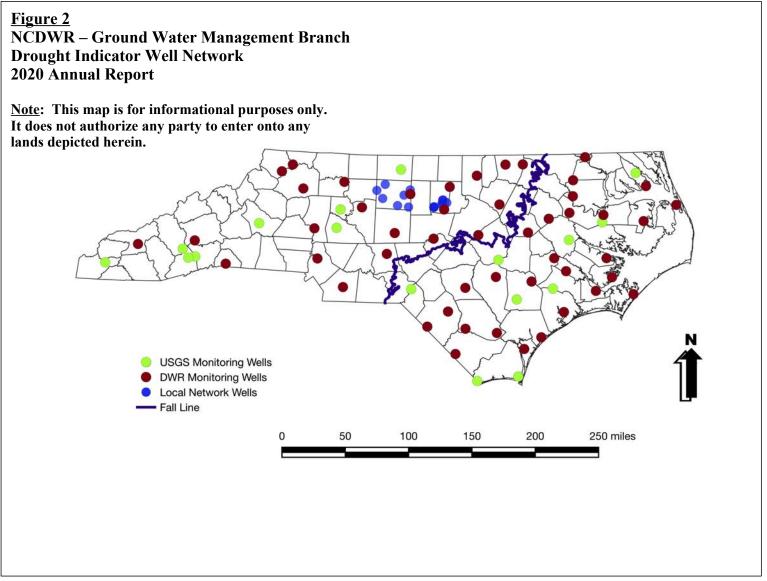
Monitoring well network expansion efforts for FY 2021 will focus mainly on Sampson, Chowan, Currituck, Edgecombe, Scotland and Robeson counties.

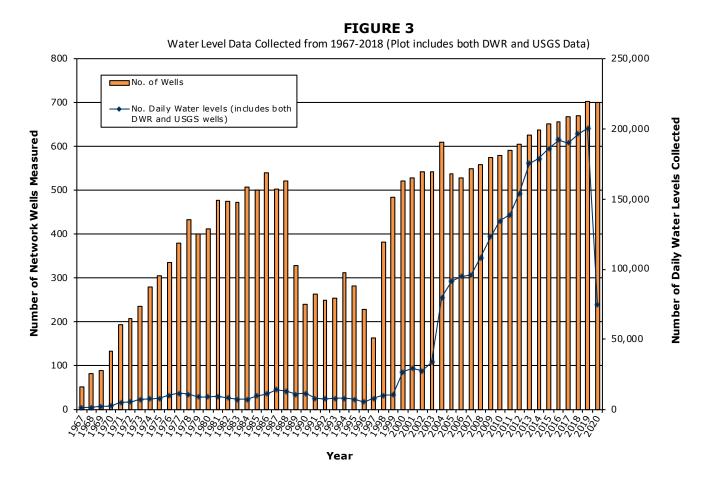
Ground water quality staff collected ground water samples from twenty-five monitoring stations in FY 2020. Samples were analyzed and results were added to the water quality database.

Fifteen counties in the Central Coastal Plain are governed by the Central Coastal Plain Capacity Use Area rules. Data collected from the monitoring well network is being used to assess aquifer conditions and determine whether or not changes to the rules are warranted. Based on the results of the 2018 assessment, concluding with the EMC's approval of the report on October 10, 2018, DWR will not pursue rule changes. Instead, DWR will continue issuing temporary permits under rule 15A NCAC 2E .0502 which can ease withdrawal reduction requirements for certain permit holders, but adds other permit conditions.

FIGURES







NCDEQ Division of Water Resources NC Ground Water Management Branch Monitoring Well Network 2018 Annual Report MONITORING STATION

Windsor

Chicod

Lee Creek

Wilmar-5

Wilmar-9

Palmetto Swamp

Grifton Ball Field

Gold Point

Bear Grass Sch

2010 2012 2015 2017 2019

CHLORIDES (mg/l)

-28 -31 -26

-33 -28 -31 -31 -32

-28 -31 -26

6766 6888 7904 9056 7906 400 434 -- 496 468

35 38 45

-28 -28 -31 -32 -32

49 35 38 45

61

46

39

188 211

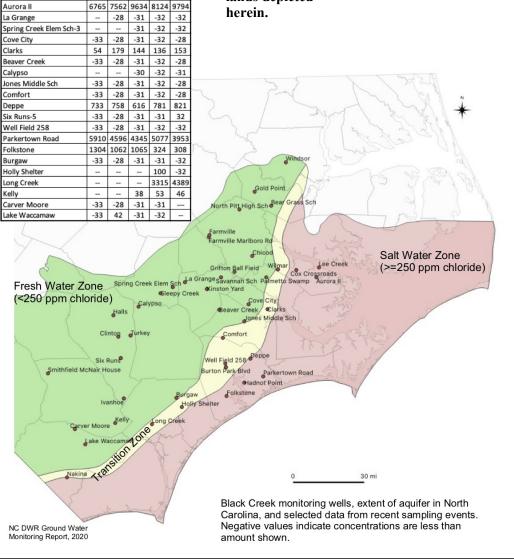
-33

239 194

49

Figure 4 NCDWR Ground Water Management Branch Chloride Levels in the Cretaceous Black Creek Aquifer 2020 Annual Report

<u>NOTE</u>: This map is for informational purposes only. It does not authorize any party to enter lands depicted herein.



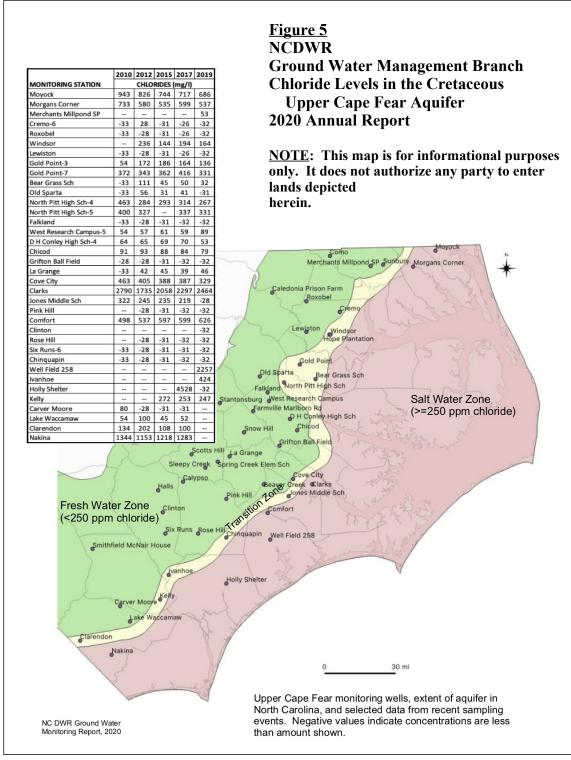
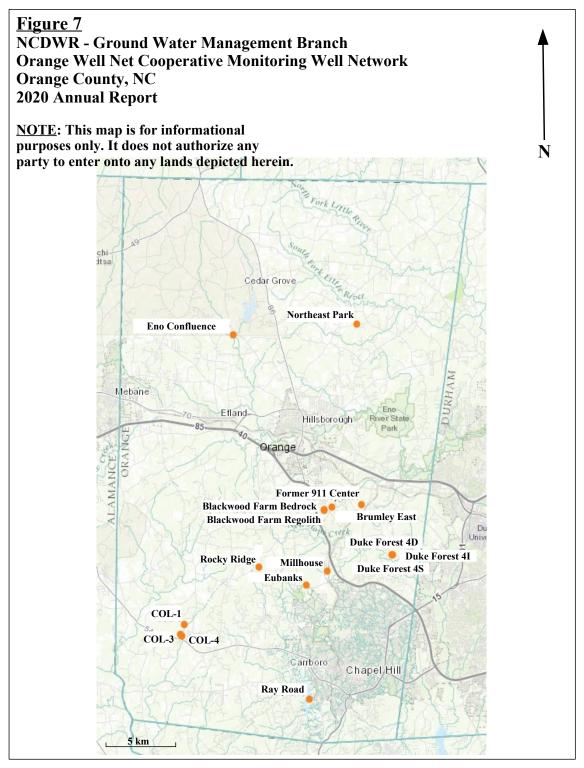
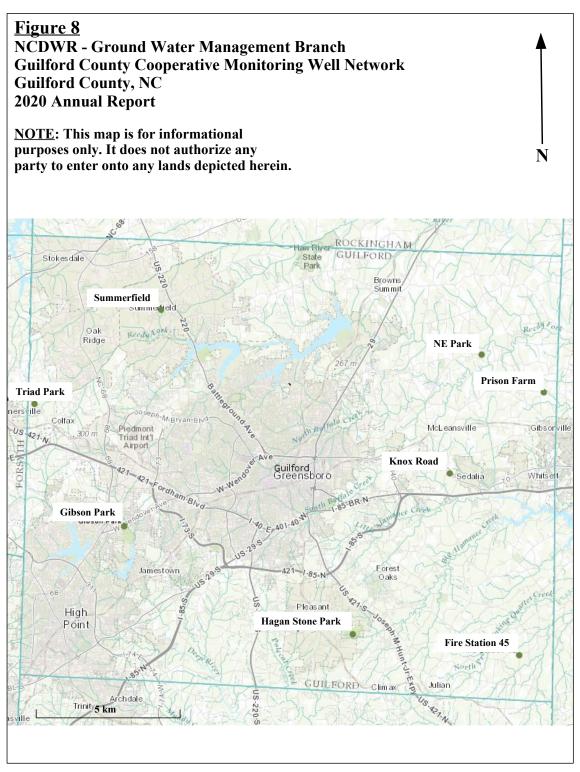
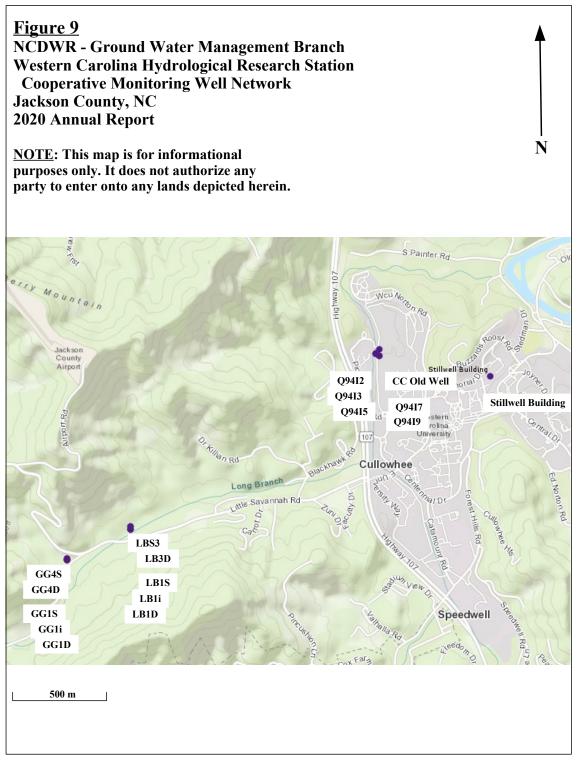


Figure 6 **NCDWR Ground Water Management Branch** 2010 2012 2015 2017 2019 **Chloride Levels in the Cretaceous** MONITORING STATION CHLORIDES (mg/l) Como-6 93 88 90 46 **Lower Cape Fear Aquifer** -33 28 -31 -31 -32 Como-7 2020 Annual Report Morgans Corner 5096 5095 3853 3662 3953 Sunbury 160 103 Merchants Millpond SP 308 **NOTE:** This map is for informational purposes NC Power -32 Four Mile Desert 1748 only. It does not authorize any party to enter 174 132 137 39 Cremo 126 lands depicted -31 26 Roxobel -33 28 -32 herein. Windsor 1220 430 449 381 40 35 -31 -26 -32 Lewiston Gold Point 868 892 791 781 751 Bear Grass Sch 1023 2420 655 1283 North Pitt High Sch 798 758 655 645 751 Falkland 239 227 201 -32 89 West Research Campus 463 327 144 415 468 Chicod 814 758 430 781 751 Snow Hill -32 Grifton Ball Field 369 352 362 387 284 NC Powe Four Mile Desert Cove City 2290 2224 1822 2745 2695 62 74 88 94 52 Beaver Creek Jones Middle Sch 3734 3145 3613 4062 -28 Pink Hill 42 52 94 32 Clinton-2 32 Clinton-3 -32 Gold Point -28 -31 -32 Rose Hill -32 Bear Grass Sch Six Runs 47 42 38 38 -1 Pitt High Sch 4149 3444 3107 Kelly 3224 3012 West Research Campus Lake Waccamaw 4149 3444 2808 Nakina 4528 Salt Water Zone (>=250 ppm chloride) Grifton Ball Field Cove City Jones Middle Sch Fresh Water Zone (<250 ppm chloride) 30 mi Lower Cape Fear monitoring wells, extent of aquifer in North Carolina, and selected data from recent sampling events. Negative values indicate concentrations are less NC DWR Ground Water Monitoring Report, 2020 than amount shown.







08-18-2020

TABLE 1 Site Susceptibility Rating North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report Susceptibility Rating Description						
1	Secure—station is located on State or Federal government property					
2	Secure —station is located on local government or school property					
3	Moderately secure—station is located on private property, but landowner does not give any indication that land use or property ownership may change					
4	Tenuous—station is located on public or private property and landowner is giving indications that land use or property ownership may change					
5	Imminent threat—station is on public or private property and landowner desires abandonment of well station.					

TABLE 2 Site and Recorder Distribution by Region as of 6/30/2020 North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report

	2020 Annuai Report										
Region	Parameter	Number	% of Region	% of Network							
	Wells	167		24.3							
1	Sites	48		21.0							
	Hobo	142	85.0	20.7							
	Solinst	1									
	Wells	172		25.0							
2	Sites	39		17.0							
	Hobo	160	93.0	23.3							
	Solinst	0									
	Wells	15		2.2							
3	Sites	15		6.6							
	Hobo	12	80.0	1.7							
	Solinst	2									
	Wells	179		26.1							
4	Sites	54		23.6							
	Hobo	134	74.9	19.5							
	Solinst	6									
	Wells	103		15.0							
5	Sites	60		26.2							
	Hobo	90	87.4	13.1							
	Solinst	7									
	Wells	51		7.4							
6	Sites	13		5.7							
	Hobo	48	94.1	7.0							
	Solinst	0									

These are counts of the number of wells which have at least one recorder of the stated variety. These numbers do not indicate the total number of recorders deployed. For example, there are always two Solinst recorders on a well and only one is counted per well. In addition, Solinst recorders are always installed on wells with Hobos, so the number of Solinst recorders does not increase the total number of wells with recorders.

TABLE 3 Solinst Telemetry System (STS) Distribution by Region as of 6/30/2020 **North Carolina Division of Water Resources Ground Water Management Branch** 2020 Annual Report Region **Station Name** Well Number **Date Installed** Como B 20U8 10/14/2014 1 H 22I3 Lewiston 06/20/2013 Manteo Airport I 4W5 06/04/2014 Bunn I 35K2 10/20/2016 2 Topsail Beach **BB 28J5** 06/12/2014 3 Bryson City O 97W2 02/18/2014 Clarendon 5 **DD 42N1** 04/24/2014 5 Rowland Z 47R5 04/24/2014 5 Laurel Springs C 71U1 10/11/2016 5 Gibsonville G 50W2 09/26/2016 5 Wilkesboro G 69J1 11/22/2016 5 Troutman L 67U2 8/27/2014 5 NC Zoo M 53L1 06/19/2014 5 Hornets Nest Q 66C1 10/07/2014 5 Columbus R 82I1 02/19/2014 5 U 62A1 07/02/2014 Monroe

	TABLE 4 Monitoring Well Network Statistics (1/1/2005 through 6/30/2020) North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report										
Parameter	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Number of monitored wells	537	538	550	559	568	579	591	605	626	637	
Manual water levels (tapedowns)	2,606	2,719	2,599	2,463	2,556	2906	2,624	2,952	3,265	2,703	
Daily water levels (automatic recorders	89,088	92,038	93,145	105,708	120,694	131,317	136,208	150,912	172,111	176,111	
Total hourly water levels	2,141,368	2,229,355	2,294,909	2,593,630	2,961,371	3,163,188	3,276,496	3,622,891	4,128,993	4,225,684	
Chloride Samples	17	22	175	12	17	251	21	274	13	10	
Geophysical & lithologic logs at new stations	2	1	3	1	1	0	2	1	1	1	

TABLE 4 (Continued) Monitoring Well Network Statistics (01/01-/005 through 06/30/2020) **North Carolina Division of Water Resources Ground Water Management Branch** 2020 Annual Report 2015 2016 2017 2018 2019 2020 **Parameter** Number of monitored wells 655 700 651 667 671 702 3,140 2,996 3,477 3,890 4,084 1,923 Manual water levels (tapedowns) Daily water levels (automatic 182,907 189,302 185,558 192,646 200,395 103,151 recorders Total hourly water levels 4,389,822 4,542,068 4,447,347 4,618,783 4,712,493 2,432,692 Chloride Samples 270 31 358 413 14 6 Geophysical & lithologic logs at new 2 2 3 3 1 5 stations

Well Construction Information for New Well Installation and Acquired Wells for the 2020 FY North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report

Well ID	Station Name	Date Installed	Well Diameter (inches)	Well Depth (ft bls)	Screened Interval (x to y ft bls)	Measuring Pt (MP)(ft)	Aquifer	**Water Level Date Measured (from MP) (ft)
C 16S1		06/14/2019	4	467	440-450	2.91	Kucf	51.37 (05/04/2020)
C 16S2		06/26/2019	4	255	235-245	2.94	Tb	34.56 (05/04/2020)
C 16S3	Merchants Millpond	06/18/2019	4	205	190-200	2.88	Tch	34.67 (05/04/2020)
C 16S4	State Park	07/01/2019	4	60	40-50	2.81	Ty	19.13 (05/04/2020)
C 16S5		07/01/2019	4	30	10-20	2.76	S	10.94 (05/04/2020)
C 16S6		09/25/2019	4	870	815-825	2.78	Klcf	105.21 (05/04/2020)
X 25W1		07/28/2019	4	50	10-30	2.84	S	10.04 (05/12/2020)
X 25W2	Verona Loop	08/02/2019	4	70	45-65	2.80	Tch	33.74 (05/12/2020)
X 25W3		08/03/2019	4	220	195-215	2.95	Tch	39.71 (05/12/2020)
X 25W4		08/01/2019	4	515	490-510	2.72	Kpd	36.20 (05/12/2020)
Y 24T1		08/25/2019	4	35	10-30	2.82	S	13.56 (05/12/2020)
Y 24T2		08/28/2019	4	85	60-80	2.78	Tch	21.67 (05/12/2020)
Y 24Y3	Marines Road	09/01/2019	4	160	135-155	2.92	Tch	21.41 (05/12/2020)
Y 24T4		08/29/2019	4	365	340-360	2.81	Tch	23.45 (05/12/2020)
Y 24T5		08/24/2019	4	445	420-440	2.94	Tb	24.68 (05/12/2020)
Z 23C1		09-26-2019	4	397	372-392	2.74	Tch	4.81 (05/12/2020)
Z 23C2	Hwy 172	10/01/2019	4	177	152-172	3.00	Tch	8.35 (05/12/2020)
Z 23C3		09/27/2019	4	105	80-100	2.91	Tch	7.78 (05/12/2020)
Z 23C4		09/26/2019	4	50	25-45	2.89	S	7.65 (05/12/2020)
X 24G3	Paradise Point	10/03/2019	4	35	10-30	3.03	S	13.32 (05/12/2020)
X 24E3	Montford Point	10/06/2019	4	35	10-30	2.78	S	10.24 (05/12/2020)

TABLE 5 (continued)

Well Construction Information for New Well Installation and Acquired Wells for FY 2020 North Carolina Division of Water Resources

Ground Water Management Branch

2020 Annual Report

Well ID	Station Name	Date Installed	Well Diameter (inches)	Well Depth (ft bls)	Screened Interval (x to y ft bls)	Measuring Pt (MP)(ft)	Aquifer	**Water Level Date Measured (from MP) (ft)
W 29D10		05/22/2020	4	134	115-125	2.84	Tch	7.09 (06/10/2020)
W 29D11	Chinquapin	04/14/2020	4	34	19-29	2.71	S	6.51 (06/10/2020)
W 29D12	Elementary	05/01/2020	4	800	624-644	2.02	Klcf	-4.61 (06/10/2020)
W 29D13	School	05/11/220	4	465	450-460	2.86	Kucf	42.81 (06/10/2020)
W 29D14		05/15/2020	4	359	344-354	2.63	Kbc	41.66 (06/10/2020)
W 29D15		05/27/2020	4	180	165-175	2.82	Kpd	7.30 (06/10/2020)
		Wall Constr	ustion Infor	mation for	Walla Aganinad i	n 4ha 2020 EV		

Well Construction Information for Wells Acquired in the 2020 FY

Well ID	Station Name	Date Acquired	Well Diameter (inches)	Well Depth (ft bls)	Screened Interval (x to y ft bls)	Measuring Pt (MP)(ft)	Aquifer	**Water Level Date Measured (from MP) (ft)
E 61P1	Bean Shoals Well	02/27/2020	6	178	30-178	0.02	Br	55.35 (04/27/2020)
E 62U1	Ivy Bluffs Well	02/27/2020	8	117	59-117	1.09	Br	25.19 (04/27/2020)

^{**}Water Levels Reported from the Most Recent Date Water Level Collected (2020 FY)

Note: E 62U1 Ivy Bluffs Well was completed on 01/11/1993 according to the well tag attached to the casing

TABLE 6 Well Development/Purging Information for FY 2020 North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report							
Well ID	Well ID Station Name Date						
C 16S1	Merchants Millpond State Park						
C 16S2	Merchants Millpond State Park						
C 16S3	Merchants Millpond State Park	Station Developed from 12/02/2019					
C 16S4	Merchants Millpond State Park	through 12/04/2019					
C 16S5	C 16S5 Merchants Millpond State Park						
C 16S6	Merchants Millpond State Park						

TABLE 7 Automatic Water Level Recorders as of 6/30/2020 North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report						
Recorder Type	Number in Service*					
HOBO U20 Water Level Logger (including separate barometer per station installed	793 (includes 218 barometers)					
Solinst Telemetry System (STS)	32 (includes 16 barologgers and 16 leveloggers)					

*As of June 30, 2020

Note: Due to the large number of recorders deployed by DWR, there are, at any given time, a number of units that are being serviced or replaced. These units are not reflected in the above totals.

Orange Well Net Monitoring Well Information Orange County, NC

North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report

			2020 111111141	ат тероте		2020 Milital IC 501 t									
Quad	Well Name	Total Depth (ft bgs)	Casing Depth (ft bgs)	Land Surface (ft)	Aquifer	Geology									
G 44G1	Northeast Park NES	45	15	622	Bs	Epiclastics									
G 45F1	Eno Confluence Property	192	37	611	Br	Felsic Tuff									
H 44P1	Blackwood Farm Bedrock	302	100	556	Br	Felsic Lavas and Tuffs (Dacite)									
H 44P2	Former 911 Center	400	85	581	Br	Altered Tuff									
H 44P3	Blackwood Farm Regolith	45	15	556	Bs	Felsic Lavas and Tuffs (Dacite)									
H 44R1	Brumley East	605	108	562.39	Br	Mafic Lavas and Tuffs									
I 44B1	Duke Forest DF-4D	397.09	82.1	424.91	Br	Felsic Plutonics									
I 44B2	Duke Forest DF-4S	25	15	428.81	Bs	Felsic Plutonics									
I 44B3	Duke Forest DF-4I	41	26	426.77	Br	Felsic Plutonics									
I 44F1	Millhouse Road	166	67	517	Br	Epiclastics									
I 45G1	Rocky Ridge			Removed from netv	vork in 2012										
I 45J1	Eubanks Road	141	33	525											
I 46R1	Andrews Rd. (COL-1)	30	10	514	Bs	Felsic Tuff									
I 46R2	Hwy 54 (COL-3)	40.5	25	516	Bs	Epiclastics									
I 46W1	Orange Grove Rd (COL-4)	32	17	502	Bs	Epiclastics									
J 45J1	Ray Road			Removed from netv	work in 2012										

bgs – below ground surface

^{**} Estimated Elevation

TABLE 9 Orange Well Net Network Statistics (2008 through 06/30/2020) North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report									
Parameter	2008	2009	2010	2011	2012	2013	2014	2015	2016
Manual water levels (tapedowns)	3	18	49	68	59	54	52	75	71
Daily water levels (automatic recorders	ı	1	1,612	2,783	3,095	3,281	3,468	4,286	5,096
Total hourly water levels	-	-	38,802	66,689	74,065	78,636	83,090	102,643	121,985

TABLE 9 (continued) Orange Well Net Network Statistics (2008 through 06/30/2020) North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report									
Parameter	2017	2018	2019	2020					
Manual water levels (tapedowns)	80	65	54	45					
Daily water levels (automatic recorders	4,865	4,865 4,744		2,214					
Total hourly water levels	116,515	113,565	114,948	51,415					

Guilford County Monitoring Well Information North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report

	2020 Annuai Report									
Quad	Station Name	Date Installed	Well Diameter (inches)	Well Depth (ft)	Casing Depth (ft)	Land Surface (ft)	Aquifer	City		
F 54O1	Summerfield (Jack Dent Park)	10/2/02	6.25	103	81	858.5	Br	Summerfield		
G 50H1	Prison Farm	5/14/04	6.25	120	45	685	Br	Gibsonville		
G 51B1	Northeast Park	6/24/15	6.125	100	77	683	Br	Gibsonville		
G 56L1	Triad Park	10/9/02	6.25	140	0	925	Br	Colfax		
H 51D1	Knox Road	10/9/02	-	1	39	715	Br	McLeansville		
H 55L1	Gibson Park	4/15/03	6.25	205	79	813	Br	Jamestown		
I 50P1	Station 45 (Humble Road)	12/15/04	6.25	180	124	679.5	Br	Liberty		
I 52N1	Hagan Stone Park	05/17/03	6.125	100	52	755	Br	Pleasant Garden		

TABLE 11 Guilford County Monitoring Well Network Statistics (2005 through 06/30/2020) North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report												
Parameter	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Manual water levels (tapedowns)	-	28	14	28	35	77	77	56	63	49	69	71
Daily water levels (automatic recorders	2,106	1,884	1,922	1,892	2,000	2,592	2,561	2,474	2,585	2,562	2,592	941
Total hourly water levels	-	-	-	-	-	3	-	-	-	-	36,415	22,636

TABLE 11 (continued) Guilford County Monitoring Well Network Statistics (2005 through 06/30/2020 North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report									
Parameter	2017	2018	2019	2020					
Manual water levels (tapedowns)	72	55	79	33					
Daily water levels (automatic recorders) 432 134 1,258 858									
Total hourly water levels	10,379	3,216	37,281	31,795					

Western Carolina Hydrological Research Station Network Monitoring Well Information North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report

Quad	Station Name	Date Installed	Well Depth (meters)	Casing Depth (meters)	Screen (meters)	MP (meters above land surface)	Land Surface (NED Elevation) (meters)	Geology	Aquifer
Q 94H1	GG1S	11/30/2009	2.41	0.88	0.88-2.4	1.02	683.26	colluvium/saprolite	Bs
Q 94H2	GG1i	11/30/2009	4.42	3.81	3.81-4.42	0.99	683.26	saprolite	Bs
Q 94H3	GG1D	11/30/2009	7.56	6.95	6.95-7.56	0.97	683.26	saprolite	Bs
Q 94H11	GG4S	11/30/2009	2.83	1.31	1.31-2.83	0.89	682.93	colluvium/saprolite	Bs
Q 94H13	GG4D	11/30/1999	7.80	7.19	7.19-7.8	1.01	682.93	saprolite	Bs
Q 94H14	LB3S	11/30/1999	2.65	1.13	1.13-2.65	1.02	667.35	colluvium/saprolite	Bs
Q 94H16	LB3D	11/30/2009	5.43	4.82	4.82-5.43	1.05	667.35	saprolite	Bs
Q 94H22	LB1S	11/30/2009	2.47	0.94	0.94-2.46	1.00	667.15	colluvium/saprolite	Bs
Q 94H23	LB1i	11/30/1999	3.87	3.26	3.26-3.87	1.00	667.15	saprolite	Bs
Q 94H24	LB1D	11/30/1999	5.67	5.06	5.06-5.67	0.96	667.15	saprolite	Bs
Q 94I1	CC Old Well	11/22/2004	6.28	0.30	0.30-6.40	0.82	634.00	saprolite	Bs
Q 94I2	CC1S	11/30/2009	2.53	1.01	1.01-2.53	1.01	633.07	alluvium/saprolite	Bs
Q 94I3	CC1i	11/30/1999	3.29	2.99	2.99-3.29	1.05	633.07	saprolite	Bs
Q 94I5	CC1D	11/30/1999	5.64	5.33	5.33-5.63	1.02	633.07	saprolite	Bs
Q 94I7	CC2S	11/30/1999	2.68	1.16	1.16-2.68	0.98	634.15	alluvium/saprolite	Bs
Q 94I9	CC2D	11/30/2009	6.31	5.70	5.70-6.31	0.99	634.15	saprolite	Bs
Q 94J1	Stillwell Building	-	61.27	25.91	25.91-61.27	0.65	655.45	-	Br

Note: All monitoring wells are located in Jackson County, NC

	TABLE 13 Western Carolina Hydrological Research Station Network Statistics (2011 through 06/30-/020) North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report										
Parameter	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Manual water levels (tapedowns)	Manual water levels 238 628 661 469 422 486 661 517 165 105										

TABLE 14 Network Expansion FY 2021 North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report

Proposed Station	County	Proposed Well Screens (ft bls)	Aquifer								
		20-30	Surficial								
Near Intersection of		41-51	Black Creek								
US Hwy 421 and US Hwy 13	Sampson	168-178	Upper Cape Fear								
		347	Pilot Hole (Estimated top of basement)								
		20-30	Surficial								
Near	Sampson	58-68	Black Creek								
Salemburg		129-139	Upper Cape Fear								
		368	Pilot Hole (Estimated Top of Basement)								
		20-30	Surficial								
Near Valhalla	Chowan	130-140	Yorktown								
		225-235	Castle Hayne								
		30-40	Surficial								
Near Moyock	Currituck	200-210	Yorktown								
		530-540	Castle Hayne								
		600-610	Beaufort								
Red Bank	Robeson	71-81	Black Creek								
		20-30	Surficial								
Turkey	Sampson	318-328	Upper Cape Fear								
		432-442	Lower Cape Fear								
		20-30	Surficial								
		60-70	Yorktown								
Near Macclesfield	Edgecombe	120-130	Upper Cape Fear								
		260-270	Lower Cape Fear								
		292	Pilot Hole (Estimated top of basement)								

TABLE 14 (continued) Network Expansion FY 2021 North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report								
Proposed Station	County	Proposed Well Screens (ft bls)	Aquifer					
		20-30	Surficial					
Near Laurinburg	Scotland	120-130	Black Creek					
		332-342	Upper Cape Fear					
		360	Pilot Hole (Estimated top of basement)					

Well Removal and Abandonment Information for FY 2020

Sorted by Well ID

North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report

Well ID	Station Name	Inactive Date	Comment
DD 33Y1 DD 33Y3	Town Creek	02/12/2020	Based on the hydrographs, the wells appear to be heavily influenced by rainfall and seasonal trends. DD 33Y1 was in a more confined portion of the Peedee, but it appears that the casing may have failed and it is a surficial aquifer well now. Both wells, DD 33Y1 and DD 33Y1, are showing the same water levels now (although there was a head difference early in their history).
N 41G3	Fuquay Varina	02/13/2020	Property owner decided to deny access to site. Removed box and recorders. Installed locking cap.
P 26U4, P 26U5, P 26U7, P 26U8	Savanah School	01/23/2020	Site was purchased by a salvage yard. The wells are located in the back of the property and due to ongoing hazardous conditions, it became unsafe for staff to collect data
S 26B1	Lonnie Kelley	02/07/2020	Monitoring well stations installed in the area and the data provided from those stations made it cost effective to place this well as inactive.
M 27U7, M 27U8, M 27U11	Farmville	10/26/2019	Data from the Farmville Marlboro Rd Station indicates that the Farmville Station is no longer needed due to issues with well construction. Farmville Marlboro Rd was originally installed with the hopes of replacing the Farmville station over time.
W 29D5, W 29D6 W 29D9	Chinquapin	05/20/2020	Each well was abandoned due to well construction issue and replaced with the new Chinquapin Elementary School station installed during the 2020 FY.

Table 16 Summary of Field Parameters (Sorted by Well) FY 2020 (Measured using a YSI ProDSS meters) North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report

Well	Station Name	County	Date	Temp	Conductivity	DO	pН	Salinity
vv en	Station Name	County	Date	°C	(µS/cm)	(ppmv or mg/L)	hm	(ppt)
AA 32R1	Long Creek	Pender	06/03/2020	19.6	167.2	0.22	5.65	0.08
AA 32R2	Long Creek	Pender	06/09/2020	20.1	11742	0.21	7.36	6.72
AA 32R3	Long Creek	Pender	06/03/2020	18.9	1119	0.12	8.36	0.56
AA 32R4	Long Creek	Pender	06/03/2020	19.8	5559	0.11	7.70	3.02
C 31Y1	Vaughan Elementary School	Warren	08/21/2019	17.9	234.5	0.18	5.84	0.11
C 33Y1	Warren County High School	Warren	06/30/2020	19.7	88.0	6.46	4.88	0.04
C 34L1	Northside Elementary School	Warren	06/30/2020	18.2	81.6	6.06	5.29	0.04
CC 33O2	Maco	Brunswick	02/04/2020	19.6	127.2	0.71	5.94	0.06
CC 33O5	Maco	Brunswick	02/04/2020	17.4	154.5	0.88	3.90	0.07
FF 32Y1	Boiling Springs RS2	Brunswick	02/19/2020	17.7	606	0.22	6.83	0.30
FF 32Y2	Boiling Springs RS2	Brunswick	02/19/2020	15.6	140.8	0.52	5.97	0.07
FF 33S1	Boiling Springs RS1	Brunswick	02/19/2020	17.2	443.7	0.26	7.15	0.21
G 50W2	Gibsonville	Guilford	03/10/2020	16.1	234.6	3.09	6.27	0.11
I 31M1	Nash County Well No. 3	Nash	02/27/2020	17.9	208.2	0.29	6.11	0.10
I 35K2	Bunn	Franklin	02/26/2020	17.5	113.8	7.88	5.08	0.05
J 44D1	Chi Psi Fraternity., UNC	Orange	03/10/2020	17.0	510.0	6.34	5.76	0.25
K 40M1	Powell Drive	Wake	10/22/2019	18.0	99.3	0.04	6.54	0.05
L 15T1	D Canal Road	Hyde	08/01/2019	18.6	778	0.18	7.56	0.38
L 15T2	D Canal Road	Hyde	08/01/2019	17.0	19269	0.19	7.10	11.50
L 15T3	D Canal Road	Hyde	08/01/2019	20.5	435.3	0.27	7.18	0.21
L 15T4	D Canal Road	Hyde	08/01/2019	16.9	781	0.25	7.16	0.38
L 15T5	D Canal Road	Hyde	08/01/2019	17.4	682	0.14	7.12	0.33

Table 16 (continued) Summary of Field Parameters (Sorted by Well) FY 2020 (Measured using a YSI ProDSS meters) North Carolina Division of Water Resources Ground Water Management Branch 2020 Annual Report

Well	Station Name	County	Date	Temp °C	Conductivity (µS/cm)	DO (ppmv or mg/L)	pН	Salinity (ppt)
L 24B3	North Pitt High School	Pitt	06/24/2020	20.0	5016	0.21	8.57	2.7
L 24B7	North Pitt High School	Pitt	06/24/2020	19.5	208	3.73	4.29	0.1
M 53L1	NC Zoo	Randolph	08/29/2019	19.9	62.8	4.57	5.33	0.03
O 28K3	Snow Hill	Greene	08/15/2019	19.5	61.8	0.10	5.97	0.03
O 28K4	Snow Hill	Greene	08/15/2019	18.9	75.7	0.11	6.77	0.04
O 28K5	Snow Hill	Greene	08/15/2019	21.3	82.9	4.55	6.42	0.04
O 28K6	Snow Hill	Greene	08/15/2019	23.4	240.6	0.24	6.22	0.11
R 48G2	Southern Pines Water Plant	Moore	11/14/2019	16.3	30.0	0.88	7.09	0.01
S 22J5	Clarks	Craven	11/19/2019	17.8	464.8	0.27	7.15	0.22
S 22J8	Clarks	Craven	02/05/2020	22.9	4724	0.22	8.63	2.53
S 22J9	Clarks	Craven	05/05/2020	20.1	4682	0.57	8.53	2.51
S 22J10	Clarks	Craven	11/19/2019	18.7	1997	0.26	8.58	1.02
S 22J12	Clarks	Craven	11/19/2019	18.5	7394	0.33	7.63	4.09
S 48H2	Weymouth Woods	Moore	01/16/2020	17.8	40.4	4.30	5.55	0.02
U 40Y1	Cedar Creek Fire Tower	Cumberland	11/13/2019	18.8	451.0	0.27	7.34	0.22
U 40Y2	Cedar Creek Fire Tower	Cumberland	10/23/2019	20.0	226.0	0.14	6.85	0.11
U 40Y3	Cedar Creek Fire Tower	Cumberland	10/23/2019	18.4	25.7	0.53	5.01	0.01
U 40Y4	Cedar Creek Fire Tower	Cumberland	10/23/2019	21.0	59.7	0.60	4.64	0.03
U 41A1	Seabrook School	Cumberland	11/12/2019	15.4	139.2	0.61	-	0.07
V 39O1	Bushy Lake	Cumberland	10/31/2019	20.1	342.2	0.28	7.59	0.16
V 39O2	Bushy Lake	Cumberland	10/31/2019	20.9	27.7	0.36	4.71	0.01
V 39O3	Bushy Lake	Cumberland	10/31/2019	19.1	134.7	0.17	6.92	0.06

Table 16 (continued)

Summary of Field Parameters (Sorted by Well) FY 2020 (Measured using a YSI ProDSS meters) North Carolina Division of Water Resources

Ground Water Management Branch

Well	Station Name	County	Date	Temp ⁰ C	Conductivity (µS/cm)	DO (ppmv or mg/L)	pН	Salinity (ppt)
Y 30S3	Burgaw	Pender	03/17/2020	18.1	581	0.23	7.18	0.28
Y 30S7	Burgaw	Pender	03/17/2020	18.6	655	0.17	8.37	0.32
Y 44O4	Robeson Correctional Center	Robeson	09/04/2019	21.5	63.2	0.24	5.52	0.03
Y 44O6	Robeson Correctional Center	Robeson	09/04/2019	20.5	660	0.1	8.22	0.32
Z 29N1	Holly Shelter	Pender	05/26/2020	18.0	247.3	0.27	7.51	0.12
Z 29N2	Holly Shelter	Pender	05/26/2020	19.7	55.7	0.10	5.06	0.02
Z 29N3	Holly Shelter	Pender	05/26/2020	18.6	445.4	0.20	6.84	0.21
Z 29N4	Holly Shelter	Pender	05/26/2020	18.8	60.0	0.25	5.31	0.03

APPENDICES

APPENDIX A WELL CONSTRUCTION RECORDS

MERCHANTS MILLPOND STATE PARK MONITORING STATION C 16S1, C 16S2, C 16S3, C 16S4, C 16S5, C 16S6

WELL CONSTRUCTION	RECODD (CTV 4)	9-00-200-04-00-07							
1. Well Contractor Information:	KECOKD (GW-I)	For Inte	rnal Use Or	nly:					
Charles A Doziar				1					
Well Contractor Name		14. WATE	RZONES				SCORE 1400	Car II -	
4088- A		FROM	(iC ₁) fi	DESCRIP					
NC Well Contractor Certification Number		ft.	450 ft	7,000			and the second of the		
Towns 2	1 11 1		R CASING (fo	1	malla)	ODITO	(N) (1)		
TOGNO WELL 3 A	ump service Inc	FROM Oft.	175 ft.	DIAMET	LK	THICK	CNESS	plicable MAT	e) ERIAL
2. Well Construction Permit #:			CASING OR		in.	Sch	40	Pu	C
List all applicable well construction permits (i.e.	e. UIC, County, State, Variance, etc.)		10	DIAMETE	R	THICK	NESS	MAT	ERIAL
3. Well Use (check well use):	, ,, ,, c.ic.,	13	440 ft.	11/3	in,	50r		Pu	R
Water Supply Well:		750 ft.	1455 ft.	4.5	in.	501	^17	Po	RE
□Agricultural	□Municipal/Public	FROM	TO	DIAMETER	SLO	T SIZE	THICK	NESS	MATERIAL
☐Geothermal (Heating/Cooling Supply)	□Residential Water Supply (single)			in.	.0	20	SCAL		Strinuss
□Industrial/Commercial	☐Residential Water Supply (shared)	ft.	ft.	in.					
□Irrigation	□Wells > 100,000 GPD	18. GROUT FROM	то	MATERIA		T Draw	200		
Non-Water Supply Well:		j 70 ft.	(2 ft.				PEJ	T METI	HOD & AMOUNT
Injection Well:	□Recovery	435 ft.	() ft.			1	imp	- 1	
□Aquifer Recharge	☐Groundwater Remediation	ft.	ft.	201010	11000	P	inpe	-	
☐ Aquifer Storage and Recovery	□Salinity Barrier	19. SAND/G	RAVEL PAC	K (if applicab	le)	1	310000	. E. T. 12.91	
□Aquifer Test	□Stormwater Drainage	FROM 447 ft.	TO	MATERIAI	,	= $=$	EMPLAC	EMENT	METHOD
□Experimental Technology	□Subsidence Control	ft.	435 ft.	Silica			Trem	mie	
☐Geothermal (Closed Loop)	□Tracer		4707					4	
☐Geothermal (Heating/Cooling Return)	☐Other (explain under #21 Remarks)	FROM	NG LOG (atta	DESCRIPTI	sheets ON (co	if necess lor, hardn	ess, soil/roo	ok type	grain size, etc.)
4. Date Well(s) Completed: 6 17-1		ft.	ft.					от Оред	gram size, etc.)
	Well ID#	ft.	ft.	500		Catal	ic hed		
5a. Well Location:	cma . I. II.	ft.	ft.						
NC DEC / V PRES CADE T	- Ward Mary	ft.	ft.						
racinty/Owner Name	Facility ID# (if applicable)	ft.	ft.					-	
		ft.	ft.						
Physical Address, City, and Zip		ft.	ft.						
6AW	-	21. REMARK	KS	APPROXIMENT		Miller E		3.75	
County	Parcel Identification No. (PIN)							***************************************	
5b. Latitude and longitude in degrees/mil (if well field, one lat/long is sufficient)	nutes/seconds or decimal degrees:								
(in well field, one lablong is sufficient)	_	22. Certificat	tion:	El Linde A. Linde					
N	w	n 10.	1.0						2 12
6. Is(are) the well(s): Permanent or	□Temporary	Signature of Cer	offied Well Co					10	12-19
	(1 - 1 → 10000,0000) • (1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1				He v		8.8	Date	_
7. Is this a repair to an existing well: If this is a repair, fill out known well construction repair under #21 remarks regions and the line.	information and to t					was (wei ell Consti	e) constru ruction Sta	icted in indards	accordance with and that a copy
repair under #21 remarks section or on the back of	of this form.	•	occii provide	u to the well t	wner.				ши и сору
8. For Geoprobe/DPT or Closed-Loop Ge	oothormol W-D- t	23. Site diagr	am or additi	onal well de	tails:	s - 2000			
construction, only I GW-1 is needed. Indic	ate TOTAL NUMBER of wells	You may use (add 'See Over	in Remarks	this page to Box). You n	provi	de addit	tional we	ell cons	truction info
drilled:		24. SUBMIT					accition	ar page	s if fiecessary.
9. Total well depth below land surface:	467 (ft.)			70/20					
For multiple wells list all depths if different (exam	ple- 3@200' and 2@100')	Submit this G							
10. Static water level below top of casing: f water level is above casing, use "+"	(ft.)	24a. For All	Wells: Orig	ginal form t	o Div	ision o	f Water	Resou	irces (DWR),
N. 78	1441.8	Information Pr							
11. Borehole diameter:	_ (in.)	Program, 1636	MSC. Ralei	Copy to DY	VR, U	Indergro	ound Inje	ction (Control (IUC)
2. Well construction method:	lary								
i.e. auger, rotary, cable, direct push, etc.)	/	24c. For Water county environ	mental healt	d Open-Loo h departmen	p Geo	therms	Where in	wells	s: Copy to the
FOR WATER SUPPLY WELLS ONLY:									
3a. Yield (gpm) M	ethod of test:	Permit Program	n, 1611 MSC	, Raleigh, N	C 276	99-161	D: Copy	to DW	R, CCPCUA
3b. Disinfection type:	Amount.								

WELL CONSTRUCTION	V PECOPD (CV)										
1. Well Contractor Information:	For Internal Use Only:										
Charles A DOZIA	14. WATER ZONES										
Well Contractor Name		FROM	TO	DESCRIP	TION						
YUSS - A NC Well Contractor Certification Number	_	235 ft.	-	Sand							
		15. OUTEI	R CASING (for	r multi-cased	walle)	OPTIN	ED Ce				
Company Name	service Inc			DIAMETE	K	THICK	CNESS	MAT	e) ERIAL		
		116		1 / (3	in.	Sch	4/0	Po	ンピ		
2. Well Construction Permit #: List all applicable well construction permits	(i.e. UIC, County, State, Variance, etc.)	FROM ft.	CASING OR TO	DIAMETE	otherm R in,	THICK	NESS		ERIAL		
3. Well Use (check well use):	50 S\$500000 2	ft.	(A) in	4.5		SAM	17	D	uc		
Water Supply Well:		17. SCREE		1	in.						
□Agricultural	□Municipal/Public	FROM	то	DIAMETER	SLOT	T SIZE	THICK	VFSS	MATERIAL		
☐Geothermal (Heating/Cooling Supply		235 ft.	245 ft.	4/ in.	10		Sela		Striniss		
□Industrial/Commercial	☐Residential Water Supply (shared)	ft.	ft.	in.					JIVANIOSS		
□Irrigation	□Wells > 100,000 GPD	18. GROUT FROM					101-42-10-2	-	<u> </u>		
Non-Water Supply Well:		100 ft.	TO ft.	MATERIAL		EMPI	ACEMEN	T MET	HOD & AMOUNT		
Monitoring	□Recovery	100	4	Bensen	4	Tre	mmi	9/	esinfel		
Injection Well:		100	O ft.	Bensea	4		£	, ,	f «		
□Aquifer Recharge	☐Groundwater Remediation	ft.	ft.								
☐ Aquifer Storage and Recovery	☐Salinity Barrier	19. SAND/G FROM	RAVEL PACE	(if applicab	le)			No.	William Salam State		
□Aquifer Test	☐Stormwater Drainage	253 ft.	3.25 ft.	MATERIAL				100	METHOD		
☐Experimental Technology	☐Subsidence Control	ft	かよう ft.	Silicu	•		Tremp	nie			
☐Geothermal (Closed Loop)	□Tracer	11							22.00.00.00.00.00.00.00.00.00		
☐Geothermal (Heating/Cooling Return)	☐Other (explain under #21 Remarks)	FROM	NG LOG (attac	DESCRIPTI	Sheets ON (col	or, harde	sary)	le tuna	grain size, etc.)		
1 D. 1 W. W. 1 20		ן ft.	ft.	Sec	6	1+10	Cine	i type,	grain size, etc.)		
4. Date Well(s) Completed Collection	JOI Well ID#	ft.	ft.			1. 10	cresco				
5a. Well Location:	7	ft.	ft.								
W. NO BOULENCET	MEL #2	ft.	ft.								
Facility/Owner Name	Fooilin ID#CC II	-	0.000					400			
	Facility ID# (if applicable)	ft.	ft.					T. History			
Dh 1 4 1 1		ft.	ft.		0.000		-				
Physical Address, City, and Zip	1.5000.07 (44)	ft.	ft.								
OHID	<u> </u>	21. REMARI	KS			ng 1,215-11.		5,17	4 9 22 2		
County	Parcel Identification No. (PIN)										
5b. Latitude and longitude in degrees/ (if well field, one lat/long is sufficient)	minutes/seconds or decimal degrees:	22 Contis	.,								
N		22. Certifica	Hon:								
		NI AA						7-	22-19		
6. Is(are) the well(s): Permanent	or Temporary	Signature of Ce	ified Well Con	ntractor				Doto	12 //		
7. Is this a repair to an existing well: If this is a repair, fill out known well constructs repair under #21 remails continued.	□Yes or ZNo	By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.									
repair under #21 remarks section or on the bac	ck of this form.		as seen provide	a to the well o	wner.				563		
8. For Geoprobe/DPT or Closed-Loop construction, only 1 GW-1 is needed. Indirection:	Geothermal Wells having the same dicate TOTAL NUMBER of wells	You may use (add 'See Over	the back of t	his page to	provid	de addi	tional we	ll cons	struction info		
		24. SUBMIT							, ,		
9. Total well depth below land surface: For multiple wells list all depths if different (ex	(ft.) ample-3@200' and 2@100')	Submit this C			vell co	mpletio	on per th	e follo	wing:		
10. Static water level below top of casing fraction of the state of th	g:(ft.)	24a. For All Walles Original forms to Division of the									
11. Borehole diameter:	(in.)	24b. For Inje Program, 1636	ction Wells:	Copy to DV	VR. U	nderor			Control (IUC)		
i.e. auger, rotary, cable, direct push, etc.)		 24c. For Water Supply and Open-Loop Geothermal Return Wells: Copy to the county environmental health department of the county where installed 									
FOR WATER SUPPLY WELLS ONL	Y:										
3a. Yield (gpm)	Method of test:	24d. For Wat Permit Program	n, 1611 MSC	ducing over , Raleigh, No	C 2769	00 GP 99-161	<u>D:</u> Сору	to DW	/R, CCPCUA		
3b. Disinfection type:	Amount:										

WELL CONSTRUCTION RECORD (GW-1)								
1. Well Contractor Information:	For Internal Use Only:							
Tour Charles A Dozia								
Well Contractor Name	14. WATER ZONES FROM TO DESCRIPTION							
4088-4	190 th 200 th Brain Linestone							
NC Well Contractor Certification Number	ft. ft.							
Toque well from Service tha	15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)							
Company Name	ft DIAMETER THICKNESS MATERIAL							
2. Well Construction Permit #:	16. INNER CASING OR TUBING (geothermal closed-loop)							
List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)	1-2 ft. 1G(2) ft. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1							
3. Well Use (check well use):	On the office of the state of t							
Water Supply Well:	17. SCREEN L/1,5 in. SDr17 Puc							
□Agricultural □Municipal/Public	FROM TO DIAMETER SLOT SIZE THICKNESS MATERIAL							
☐ Geothermal (Heating/Cooling Supply) ☐ Residential Water Supply (single) ☐ Industrial/Commercial ☐ Presidential Water Supply (single)	140 ft. 200 ft. 41 in. 1020 Sen 40 Strings							
Direction Water Supply (shared)	ft. ft. in. 18. GROUT							
Non-Water Supply Well:	FROM TO MATERIAL EMPLACEMENT METHOD & AMOUNT							
Monitoring	183 O Benseil Tremme Dunnel							
injection Well:	Tt. It.							
□ Aquifer Recharge □ Groundwater Remediation □ Aquifer Storage and Recovery □ Salinity Barrier	ft. ft.							
DA 'C T	19. SAND/GRAVEL PACK (if applicable) FROM TO MATERIAL EMPLACEMENT METHOD							
□Experimental Technology □Subsidence Control	210 ft 183 ft Siliec Tremmie							
□Geothermal (Closed Loop) □Tracer	ft. ft.							
☐Geothermal (Heating/Cooling Return) ☐Other (explain under #21 Remarks)	20. DRILLING LOG (attach additional sheets if necessary) FROM TO DESCRIPTION (a)							
in state we record to the state of the state	FROM TO DESCRIPTION (color, hardness, soil/rock type, grain size, etc.) ft. ft. Sec Citable d							
4. Date Well(s) Completed: 49-19 Well ID#	ft. ft.							
5a. Well Location:	ft. ft.							
Facility/Owner Name	ft. ft.							
Facility/Owner Name Facility ID# (if applicable)	ft. ft.							
N	ft. ft.							
Physical Address, City; and Zip	ft. ft.							
County	21. REMARKS							
Parcel Identification No. (PIN)								
5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees: (if well field, one lat/long is sufficient)								
	22. Certification:							
	My 7-22-19							
6. Is(are) the well(s): ☑Permanent or □Temporary	Signature of Certified Well Contractor Date							
7. Is this a repair to an existing well: Yes or No	By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with ISA NCAC 02C 0100 or ISA NCAC 02C 0200 W. H. C.							
If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.	15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Constructed in accordance with of this record has been provided to the well owner.							
	23. Site diagram or additional well details:							
8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells	You may use the back of this page to provide additional wall and the							
united.	(and see over in Remarks Box). You may also attach additional pages if necessary.							
9. Total well depth below land surface: 205 For multiple wells list all depths if life. (ft.)	24. SUBMITTAL INSTRUCTIONS							
For multiple wells list all depths if different (example-3@200' and 2@100')	Submit this GW-1 within 30 days of well completion per the following:							
10. Static water level below top of casing: (ft.) If water level is above casing, use "+"	24a. For All Wells: Original form to Division of Water Resources (DWR), Information Processing Unit, 1617 MSC, Raleigh, NC 27699-1617							
11. Borehole diameter:	24b. For Injection Wells: Copy to DWR, Underground Injection Control (IUC) Program, 1636 MSC, Raleigh, NC 27699-1636							
12. Well construction method: Activy (i.e. auger, rotary, cable, direct push, etc.)	- 24c. For Water Supply and Open-Loop Coothermal Data W. H.							
FOR WATER SUPPLY WELLS ONLY:	of the county where installed							
13a. Yield (gpm) Method of test:	24d. For Water Wells producing over 100,000 GPD: Copy to DWR, CCPCUA Permit Program, 1611 MSC, Raleigh, NC 27699-1611							
13b. Disinfection type: Amount:								
Amount:								

WELL CONSTRUCTION	RECORD (CW 1)								
1. Well Contractor Information:	TECORD (GW-I)	For Inte	ernal Use O	nly:					
Charles A Porit						almosta.			
Well Contractor Name		14. WATE				1.75-69	3.0 M. 14.		
4088-A	40 ft.	50 1	DESCRII		_		than an		
NC Well Contractor Certification Number	ft.	+	t. Cary	9 .) nel				
TORNO WELL & PUMP	15. OUTER	R CASING (f	or multi-cased	wells)	OR LIN	ER (if.a)	nnlicabl	a)	
Company Name	sivile fre	- ft.		DIAMET	ER in.	THICI	KNESS	MA	TERIAL
2. Well Construction Permit #:		16. INNER FROM	CASING OF	TUBING (ge	othern	nal close	d-loop)	1	
List all applicable well construction permits (i.e.	2. UIC, County, State, Variance, etc.)	+3 ft.	48 40 f	DIAME	in.	THICH	CNESS	100	ERIAL
3. Well Use (check well use):		St. Suft.	55 ft		in.	Sch		Pu	
Water Supply Well: □Agricultural		17. SCREET	N			JC.11	40	Pu	C
Geothermal (Heating/Cooling Supply)	□Municipal/Public	40 ft.	50 ft.	DIAMETER in.		TSIZE		KNESS	MATERIAL
□Industrial/Commercial	☐Residential Water Supply (single)	6	ft.	in.	.01		Sch	40	3taness
□Irrigation	☐Residential Water Supply (shared) ☐Wells > 100,000 GPD	18. GROUT FROM				10-12-1-1			1
Non-Water Supply Well:		38 ft.	TO ft.	MATERIA		EMPI	ACEME	NT MET	HOD & AMOUNT
Injection Well:	□Recovery	ft.	ft.	Bense	46	pun	n cd	/ TV	Empil
□Aquifer Recharge	☐Groundwater Remediation	ft.	ft.			-			
□ Aquifer Storage and Recovery	☐Salinity Barrier	19. SAND/G FROM	RAVEL PAC	K (if applical	ole)				out a factoria de la companya de la
□Aquifer Test	☐Stormwater Drainage	34 ft.	GO ft.	MATERIA 5, 21					METHOD
□Experimental Technology □Geothermal (Closed Loop)	☐Subsidence Control	ft.	ft.	3,51			Trim	mile	
☐Geothermal (Heating/Cooling Return)	□Tracer	20. DRILLIN	NG LOG (atta	ach additional	sheets	if necess	sarv)		
	☐Other (explain under #21 Remarks)	FROM ft.	TO ft.	DESCRIPT	ION (co	lor, hardn	ess, soil/re	ock type,	grain size, etc.)
4. Date Well(s) Completed: 7-1-30	Well ID#	ft.	ft.	See	-	. /			
5a. Well Location:	.]	ft.	ft.	766	- CA	Liter	١١٤		
NC DEG/ YORKTON	IN WELL FIT	ft.	ft.						
Facility/Owner Name	Facility ID# (if applicable)	ft.	ft.						
Disciplant 1		ft.	ft.					-	
Physical Address, City, and Zip		ft.	ft.					******	
County		21. REMARK	KS .						
	Parcel Identification No. (PIN)								
5b. Latitude and longitude in degrees/min (if well field, one lat/long is sufficient)	nutes/seconds or decimal degrees:	L							
N		22. Certificat	ion:						
6. Is(are) the well(s): Permanent or	W	11/h	n	\supset				7-2	2-19
	□Temporary	Signature of Cer						Date	
7. Is this a repair to an existing well:	Yes or No	By signing this for 15A NCAC 02C	orm, I hereby . .0100 or 15A	certify that the NCAC 02C 0	well(s)	was (wei	e) constr	ucted in	accordance with and that a copy
If this is a repair, fill out known well construction is repair under #21 remarks section or on the back of	information and explain the nature of the fixed		p, ora	ed to the well (wner.	ar Consti	uction St	ianaaras	and that a copy
8. For Geoprobe/DPT or Closed-Loop Geopotruction only 1 CW/1 is a set of the construction of the co	othermal Walla bassing at	23. Site diagra	am or addit	ional well de	etails:				
construction, only 1 GW-1 is needed. Indicadrilled:	ate TOTAL NUMBER of wells	You may use (add 'See Over	in Remarks	this page to Box). You n	provio	de addit o attach	ional w	ell cons	truction info
umou.	-	24. SUBMITT			,		44411101	nu page	s it necessary.
9. Total well depth below land surface: For multiple wells list all depths if different (examp	(ft.)	Submit this G			vell co	mpletic	n ner f	he follo	wing.
10. Static water level below top of casing: If water level is above casing, use "+"	(ft.)	24a. For All Information Pr	Wells: Ori	ginal form	o Div	ricion o	£ 117.		
11. Borehole diameter: 10 '.	_(in.)	24b. For Injec	ction Wells:	Copy to Di	X/D 11	ndororo			Control (IUC)
12. Well construction method: 2014	7	24c. For Wate	r Sunnly an	d Open-Loc	9-163	6	ın.		10 S
FOR WATER SUPPLY WELLS ONLY:				ar departmen	t Of the	county	where	installe	ď
13a. Yield (gpm) Me	ethod of test:	Permit Program	er Wells pro n, 1611 MSC	ducing over C, Raleigh, N	C 276	00 GP 99-1611	<u>D:</u> Copy	to DW	R, CCPCUA
13b. Disinfection type:	Amount:								

WELL CONSTRUCTION	RECORD (CW 1)									
1. Well Contractor Information:	For Internal Use Only:									
Charles p Dozier										
Well Contractor Name	14. WATE									
4088 - A	10 ft.	20	ft. <							
NC Well Contractor Certification Number		ft,		ft. Sanc	<u> </u>					
		15. OUTER	R CASING (for multi-case	d wells)	OR LIN	FD (if an	-1:11		
TOGNO WELL & Dung Company Name	P Service Ine	FROM ft.		DIAMET	ER in.	THICK	NESS	MAT	ERIAL	
2. Well Construction Permit #:		16. INNER	CASING O	R TUBING (g	eothern	nal closed	l-loon)	<u></u>		
List all applicable well construction permits (i.e.	. UIC, County, State, Variance, etc.)	+3 ft.	10	ft. 411	ER in.	THICK	NESS	1	ERIAL	
3. Well Use (check well use):		20 ft.	10	t. 4"	in.	Sen.			eln105	
Water Supply Well:		17. SCREE	N N	1 7		Sin	40	350	in uss	
□ Agricultural □ Conthermal (V. v.)	☐Municipal/Public	FROM / O ft.	TO ft.	DIAMETER		T SIZE	THICK	NESS	MATERIAL	
☐Geothermal (Heating/Cooling Supply) ☐Industrial/Commercial	□Residential Water Supply (single)	ft.	ft.	in.	100	440	.07	U	Stahus	
□Irrigation	☐Residential Water Supply (shared)	18. GROUT		111.						
Non-Water Supply Well:	□Wells > 100,000 GPD	FROM	то	MATERI	AL.	EMPI	ACEMEN	T MET	HOD & AMOUNT	
✓Monitoring	□Recovery	8100 ft.	O f	L Bens	ear		mmie	- 1	Duped	
Injection Well:	Exceptory	ft.	fi	t.				-//	DUNITE	
□Aquifer Recharge	☐Groundwater Remediation	ft.	fi	SS 10		1				
□Aquifer Storage and Recovery	☐Salinity Barrier	19. SAND/G FROM	RAVEL PA	CK (if applica	ble)			(* L + #		
□Aquifer Test	☐Stormwater Drainage	8 ft.	20 ft						METHOD	
□Experimental Technology	☐Subsidence Control	ft.	ft				Dource	<u></u>		
Geothermal (Closed Loop)	□Tracer	20. DRILLIN	NG LOG (at	ach additions	l sheets	if pages	(ami)			
☐Geothermal (Heating/Cooling Return)	□Other (explain under #21 Remarks)	FROM ft.	10	DESCRIP	TION (co	lor, hardn	ess, soil/ro	ck type,	grain size, etc.)	
4. Date Well(s) Completed: 7-1-19	Wall ID#		ft							
5a. Well Location:	Well ID#	ft.	ft.	3,,	Ci	dtec.	i sol		***************************************	
NO DEQ! SURFICAL	in alt	ft.	ft.							
Facility/Owner Name	* *	ft.	ft.				1	1		
Tanie	Facility ID# (if applicable)	ft.	ft.							
Physical Address, City, and Zip		ft.	ft.			*****************				
ON THE ACTION OF THE PROPERTY		ft.	ft.				Medel Avide a Maria			
County		21. REMARK	XS .		1977					
- Caracana	Parcel Identification No. (PIN)				-					
5b. Latitude and longitude in degrees/min (if well field, one lat/long is sufficient)	nutes/seconds or decimal degrees:									
, the last ong is surnotent)		22. Certificat	tion:					-		
N	w	Ni da	1					- -		
6. Is(are) the well(s): Permanent or	□Temporary	Signature of Cer	rtified Well C	ontractor				1-2	2-19	
7 Is this a way to		By signing this fo	orm. I hereby	certify that the	a wall(a)			Date	accordance with	
If this is a repair, fill out known well construction i	information and explain the nature of the	15A NCAC 02C of this record ha				ell Consti	e) constru uction Sta	icted in andards	accordance with and that a copy	
repair under #21 remarks section or on the back of	f this form.	, , , , , , , , , , , , , , , , , , , ,	o occuprovi	zeu io ine weii	owner.					
8. For Geoprobe/DPT or Closed-Loop Geo	othermal Wells having the same	You may use	am or addi	tional well of	letails:	ن: الله عام		,,		
construction, only 1 GW-1 is needed. Indicadrilled:	ate TOTAL NUMBER of wells	(add 'See Over	in Remark	s Box). You	may als	de addit so attach	addition	ell cons al page	truction info	
	-	24. SUBMIT						P	o it necessary.	
9. Total well depth below land surface: 3	(ft.)									
For multiple wells list all depths if different (examp	ole- 3@200' and 2@100')	Submit this G								
10. Static water level below top of casing: . If water level is above casing, use "+"	(ft.)	24a. For All	Wells: Or	iginal form	to Div	vision o	f Water	Resou	irces (DWR),	
	0004	information 11	ocessing O	iiit, 1017 IVIS	C, Rale	eigh, NC	27699-	1617		
11. Borehole diameter: (in.)		Program, 1636	MSC Rela	Copy to E	WR, L	Jndergro	und Inje	ection (Control (IUC)	
12. Well construction method: 120+av 4		110grain, 1050	MISC, Rait	ign, NC 276	99-163	6				
i.e. auger, rotary, cable, direct push, etc.)		24c. For Water county environ	er Supply a mental hea	nd Open-Lo	op Geo	e count	l Return	Well:	s: Copy to the	
FOR WATER SUPPLY WELLS ONLY:										
13a. Yield (gpm) Me	ethod of tests	Permit Program	er Wells pr n, 1611 MS	C, Raleigh	r 100,0	000 GP	<u>D:</u> Copy	to DW	R, CCPCUA	
	ctilou of test:			,	210	->-1011	5			
3b. Disinfection type:	Amount:									

WELL CONSTRUCTION F	RECORD (GW-1)	For Inte	rnal Use Or	dve					
1. Well Contractor Information:		1 or mile,	mai Ose OI	ny:					
CHARLES N. DOZIER, II									
Well Contractor Name		14. WATE							
NCWC 4088-A		FROM ft.	TO	DESCRIP	TION	-			
The property of the contract o	ν	ft.	ft					-	
NC Well Contractor Certification Number	# 1524 TANTON AND TO SEE TO SEE TO SEE	288	R CASING (fo		vealle) (ND LTN	ED de		
TOANO WELL AND PUM	P SERVICE, INC-	FROM	10	DIAMETE	R	THICK	KNESS	MAT	ERIAL
Company Name		O ft.	800 ft		in,	SCL	40	P	vc
2. Well Construction Permit #:		FROM	CASING OR	DIAMETE	R	al close	d-loop) CNESS	MAT	ERIAL
List all applicable well construction permits (i.e.	. UIC, County, State, Variance, etc.)	+3 a.	815 ft.			SON		P	THE RESIDENCE OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NA
3. Well Use (check well use):		ft.	ft.		in.	-	•	,	
Water Supply Well:	The state of the s	17. SCREE	The state of the s						
□Agricultural	□Municipal/Public	Si5 ft.	725 ft.	DIAMETER in.	1	SIZE	THICK	NESS	MATERIAL
☐Geothermal (Heating/Cooling Supply)	☐Residential Water Supply (single)	ft.	ft.	-7 in.	.D.L	U			55
□Industrial/Commercial	☐Residential Water Supply (shared)	18. GROUT							
□Irrigation	□Wells > 100,000 GPD	FROM	то	MATERIA	L	EMP	LACEMEN	TMETI	IOD & AMOUNT
Non-Water Supply Well: □Monitoring		80,2 ft.	⊘ ft.	Benton	ite		mmi		
Injection Well:	□Recovery	ft.	ft.						
□Aquifer Recharge	☐Groundwater Remediation	ft.	ft.			-			
☐Aquifer Storage and Recovery	□Salinity Barrier	19. SAND/G	RAVEL PAC	K (if applicat	ole)				
□Aquifer Test	□Stormwater Drainage	FROM YOU ft.	CAT ft.	MATERIA		-			METHOD
□Experimental Technology	□Subsidence Control	870 m	802 ft.	Sicide	- Sec	205.	Tren	mi	6
Geothermal (Closed Loop)	□Tracer	1	NG LOG (atta	anh additional		10			
□Geothermal (Heating/Cooling Return)	□Other (explain under #21 Remarks)	FROM	TO	DESCRIPT	ION (col	or, hard	ness, soil/ro	ck type,	grain size, etc.)
e la sta		ft.	ft.						
1. Date Well(s) Completed: 9 25 10	Well ID#	ft.	ft.	See	a	Hac	hec		
5a. Well Location:	Lower Cape Fear	ft.	ft.						
MERCHANT'S MILLPOND	L. T.	ft.	ft.						
Facility/Owner Name	Facility ID# (if applicable)	ft.	ſt.						
STATE OF NORTH CARO	LINA	ft.	ft.				V		
Physical Address, City, and Zip	opposition and	ft.	ft.	-					
176 MILL POND ROAD, GATESVILLE, NC 27938		21. REMAR	789		-				
County	Parcel Identification No. (PIN)								
5b. Latitude and longitude in degrees/mi if well field, one lat/long is sufficient) NN		22. Certifica	yion:	一 つ				10	-24-2
o. Is(are) the well(s): Permanent or	□Temporary	Signature of C						Date	
7. Is this a repair to an existing well: [filts is a repair, fill out known well construction epoir under #21 remarks section or on the back of	□Yes or ❷No information and explain the nature of the of this form.	of this record I	as been provid	NCAC 02C (led to the well	0200 We owner.	was (we dl Cons	ere) constr struction Si	ructed in tandard	accordance with s and that a copy
For Geoprobe/DPT or Closed-Loop Geonstruction, only 1 GW-1 is needed. Indic rilled:	eothermal Wells having the same eate TOTAL NUMBER of wells		e the back of or in Remark	this page to s Box). You	provi	de add so attac	itional w h addition	ell cons nal pag	struction info es if necessary
. Total well depth below land surface:	\{\bigg\ 70\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	24. SUBMIT		The state of	well co	mplet	iòn per t	he foll	owing:
0. Static water level below top of casing: [water level is above casing, use "+"	(ft.)	24a. For Al Information I	I Wells: Or Processing U	iginal form nit, 1617 MS	to Div C, Rale	rision eigh, N	of Water C 27699	r Reso -1617	urces (DWR).
I. Borehole diameter:	_ (in.)	24b. For Inj Program, 163	ection Wells	Copy to D	WR, L	Inderg	round Inj	ection	Control (IUC)
2. Well construction method: Rote	ary muc		ter Supply a	nd Open-Lo	on Geo	thern	nal Retur	n Wel	ls: Copy to the
OR WATER SUPPLY WELLS ONLY:			ter Wells pr	oducing ove	r 100.6	000 GI	PD: Conv		WR, CCPCUA
3a. Yield (gpm) M	lethod of test:	. c.i.iii i togic	an, ioti MS	c, realeigh, l	VC 2/0	77-10	ы		

13b. Disinfection type: _

Amount:

VERONA LOOP MONITORING STATION X 25W1, X 25W2, X 25W3, X 25W4

WELL CONSTRUCTION RECORD (GW-1)	For Internal Use Only:							
1. Well Contractor Information:								
Prancis Xavier Harrington	14. WATER ZONES FROM TO DESCRIPTION							
Well Contractor Name	FROM TO DESCRIPTION ft. ft.							
<u>4389 A</u>	ft. ft,							
NC Well Contractor Certification Number	15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)							
Walker Hill Environmental	FROM TO DIAMETER THICKNESS MATERIAL							
Company Name	16. INNER CASING OR TUBING (geothermal closed-loop)							
2. Well Construction Permit #:	FROM TO DIAMETER THICKNESS MATERIAL							
List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)	+3 ft. 10 ft. 4 in. sch 40 PUC							
3. Well Use (check well use):	30 ft. 35 ft. 4 in. Sch 40 PVC							
Water Supply Well:	FROM TO DIAMETER SLOT SIZE THICKNESS MATERIAL							
Agricultural Municipal/Public Geothermal (Heating/Cooling Supply) Residential Water Supply (single)	10 ft. 30 ft. 4 in. 020 Sch 40 PUC							
	ft, ft, in.							
Industrial/Commercial Residential Water Supply (shared)	16. GRUU1							
Non-Water Supply Well:	FROM TO MATERIAL EMPLACEMENT METHOD & AMOUNT							
Monitoring Recovery	c " & cement Irimmic / 10 Gals							
Injection Well:	5 it. 8 it. Pellets Trimmic 11.5 Buckets							
Aquifer Recharge Groundwater Remediation	19. SAND/GRAVEL PACK (if applicable)							
Aquifer Storage and Recovery Aquifer Test Stormwater Drainage	FROM TO MATERIAL EMPLACEMENT METHOD							
	8 th. 35 th 1 A Sand Trimmic							
	ft. ft.							
Geothermal (Closed Loop) Tracer	20. DRILLING LOG (attach additional sheets if necessary) FROM TO DESCRIPTION (color, hardness, soil/rock type, grain size, etc.)							
	ft. ft.							
4. Date Well(s) Completed: <u>7/28/2019</u> Well ID# <u>X25w-5</u>	tt. Please See Attachael							
5a. Well Location:	ft. Soil Log							
Camp Lejeune	ft. ft.							
Facility/Owner Name Facility ID# (if applicable)	ft. ft.							
Physical Address, City, and Zip	ft. ft.							
Physical Address, City, and Zip	ft. ft.							
onslow	21. REMARKS							
County Parcel Identification No. (PIN)								
5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees: (if well field, one lat/long is sufficient)	22. Certification:							
34,672123 N 27.463527 W	22. Certification:							
6. Is(are) the well(s) Permanent or Temporary	Signature of Certified Well Contractor Signature of Certified Well Contractor Date							
7. Is this a repair to an existing well: Yes or No If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.	By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that copy of this record has been provided to the well owner.							
8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:	23. Site diagram or additional well details: You may use the back of this page to provide additional well site details or wel construction details. You may also attach additional pages if necessary.							
9. Total well depth below land surface: 1-35, For multiple wells list all depths if different (example-3@200' and 2@100')' (ft.	244. For Air Wells: Subliff this form within 30 days of completion of well							
10. Static water level below top of casing: 12 (ft.	construction to the following:							
If water level is above casing, use "+" 11. Borehole diameter: (in.)	1617 Mail Service Center, Raleigh, NC 27699-1617							
12. Well construction method: Sonic (i.e. auger, rotary, cable, direct push, etc.)	24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit one copy of this form within 30 days of completion of well construction to the following:							
FOR WATER SUPPLY WELLS ONLY:	Division of Water Resources, Underground Injection Control Program, 1636 Mail Service Center, Raleigh, NC 27699-1636							
13a. Yield (gpm) Method of test:	24c. For Water Supply & Injection Wells: In addition to centing the farmer							
13b. Disinfection type: Amount:	the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed							

where constructed.

FIGURE NOT TO SCALE PVC = POLYVINYL CHLORIDE SCH 40 = SCHEDULE 40

	No.	Date	Remarks	
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CONTRACT NO.:	D.O. NO:
N40085-16-D-5517	F6786
JOB NO: 7096	<u> </u>
CHECKED BY:	
Jason Chebetar	
DRAWN BY:	
DATÉ:	
APRIL 2019	

WELL CONSTRUCTION RECORD (GW-1)			For Internal Use Only:								
1. Well Contractor Information:											
Francis Kavier Harr	naton	14. WATER ZONES									
Well Contractor Name		FROM ft.	то	ft.	DESCRIPTIO	NC					
4389 A		ft.		ft.							
NC Well Contractor Certification Number	, ,			for t	nulti-cased we						
Walker Hill Eng	vison mental	FROM ft.	TO	ft.	DIAMETER	in.	THICK	NESS	MATE	RIAL	
Company Name		16. INNER	CASING O	RT	UBING (geoti	herma	l closed	-loop)	· n		
2. Well Construction Permit #: List all applicable well construction permits (i.e.	IIIC County State Vaniones atc.)	FROM	TO	ft.	DIAMETER		THICK	NESS	MATE		_
			10	ft.		_	564	40		VĈ IC	_
3. Well Use (check well use):		65 ft.			3(4.) (1)		Sch	40	F	12	
Water Supply Well: Agricultural	Municipal/Public	FROM	то	_	IAMETER in.	SLOT		THICK		MATERIAL	
Geothermal (Heating/Cooling Supply)	Residential Water Supply (single)	45 ft.	63	+-	in.	-0	30	Sch	40	Stanles	<u>S</u> _
Industrial/Commercial	Residential Water Supply (shared)	ft. 18. GROUT	ft.		111.		-				
Irrigation		FROM	TO		MATERIAL		EMPI	ACEMEN	т метн	OD & AMOU	NT
Non-Water Supply Well:		Oft.	10	ft.	Cement		To	inmi 4	- 18	32 Gals	
Monitoring Injection Well:	Recovery	40 ft.	7.5	ft.	Pollet.	<u>.</u> 2	TI	imm		5 Buck	45
Aquifer Recharge	Groundwater Remediation	ft.	1	ft.							
Aquifer Storage and Recovery	Salinity Barrier	19. SAND/C	TO	ACK	(if applicable	e)		EMPLAC	EMENT	METHOD	_
Aquifer Test	Stormwater Drainage	43 ft.	70	ft.	* 2 .	San	1	1	MIC		
Experimental Technology	Subsidence Control	ft.		ft.							
Geothermal (Closed Loop)	Tracer	20. DRILLI FROM	NG LOG (attac	h additional	sheets	if neces	sary)	als toma	grain size, etc.)	_
Geothermal (Heating/Cooling Return)	Other (explain under #21 Remarks)	ft.		ft.	DESCRIPTIVE	011 (60)	or, naru	ness, soib10	ick type,	gram size, etc.)	
4. Date Well(s) Completed: 8/2/26	019 Well ID# X25W-TCh-YCh	ft.		ft.	Please	<u> </u>	See	At	4.6	/	_
5a. Well Location:		ft.		ft.	Car	1	Loc	170	q://	24	
		ft.		ft.	301		-5				
Camp Lejeune Facility/Owner Name	Facility ID# (if applicable)	ft.		ft.					·		_
	, , ,,	ft.	-	ft.							
Physical Address, City, and Zip	JACIESONDILLE, 28540	ft.		ft.		•••					_
onslow		21. REMAI	uks	,							
County	Parcel Identification No. (PIN)										
5b. Latitude and longitude in degrees/n	ninutes/seconds or decimal degrees:										
(if well field, one lat/long is sufficient) 34.672099	27 4/2000	22. Certific	ation:		<i>@</i>		4				
31.6/2011 N	<i>77.463500</i> w	Ira	106)	Sa	W I	sw	engli	2	8	119/20	11
6. Is(are) the well(s) Permanent o	r Temporary	Signature of (d	"		Date		
7. Is this a repair to an existing well:	Yes or X No	with 15A NC	4C 02C .01	00 oı	y certify that t r 15A NCAC 0 rovided to the	02C .02	200 Wel	s (were) c l Construc	onstruct ction Sta	ed in according and the cordinate of the	ance iat a
If this is a repair, fill out known well construction repair under #21 remarks section or on the bac	on injormation and explain the nature of the k of this form.			·							
8. For Geoprobe/DPT or Closed-Loop	Genthermal Wells having the same				tional well d this page to			litional w	vell site	details or	well
construction, only 1 GW-1 is needed. Inc		construction	details.	You	may also atta	ach ac	ldition	al pages i	f neces	sary.	
drilled:		SUBMITT	AL INSTI	RUC	CTIONS						
9. Total well depth below land surface: For multiple wells list all depths if different (ex	(ft.) ample- 3@200' and 2@100')	24a. For A	dl Wells: to the fol	Su lowi	bmit this fo	orm w	ithin 3	0 days	of com	pletion of	well
10. Static water level below top of casing: 37.2 (ft.) If water level is above casing, use "+;"					ter Resource Service Cent						
11. Borehole diameter:	(in.)	24b. <u>For Ir</u>	ijection V	<u>Vell</u> s	: In additio	n to s	ending	the form	n to the	address in	24a
12. Well construction method:(i.e. auger, rotary, cable, direct push, etc.)	Sonic	above, also construction	submit or	ne c	opy of this f	form	within	30 days	of com	pletion of	well
FOR WATER SUPPLY WELLS ONL	Y:	Division	of Water 1636 M	Res	sources, Und Service Cent	dergr ter, R	ound I aleigh	njection , NC 276	Contro 99-163	ol Program 6	,
13a. Yield (gpm)	Method of test:	24c. <u>For W</u>	ater Sup	ply	& Injection	Well	<u>s</u> : In :	addition	to send	ing the form	n to
13b. Disinfection type:	Amount:	the address completion	(es) above of well c	e, al	lso submit o	one c	opy of	this for	m with	nin 30 days	s of
		where const	ructed.								

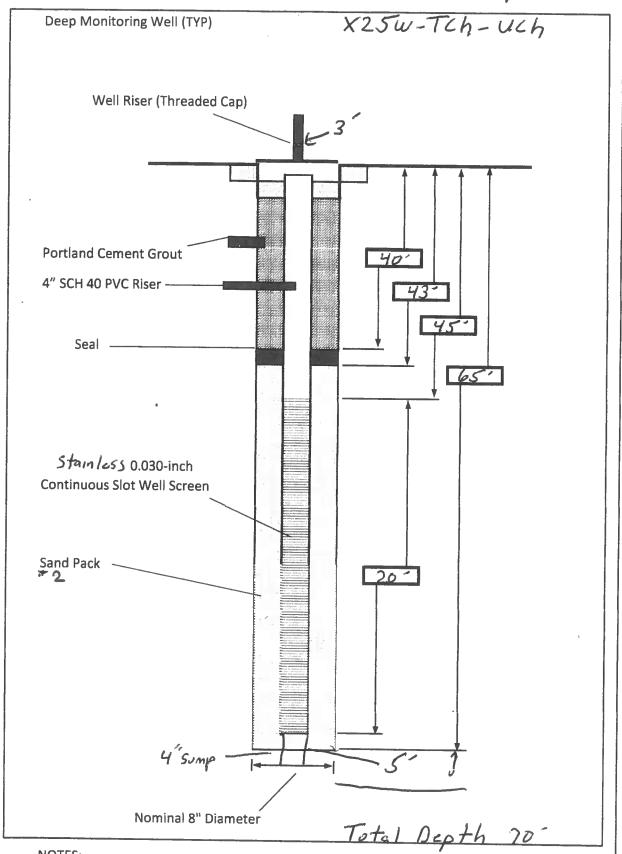


FIGURE NOT TO SCALE PVC = POLYVINYL CHLORIDE SCH 40 = SCHEDULE 40

TIKIGAO

No.	Date	Remarks
<u> </u>		

CONTRACT NO.:	D.O. NO:
N40085-16-D-5517	F6786
JOB NO: 7096	
CHECKED BY:	
Jason Chebetar	
DRAWN BY:	
DATE:	
APRIL 2019	

WELL CONSTRUCTION RECORD (GW-1)	For Internal Use Only:
1. Well Contractor Information:	
Francis Xavier Harrington	14. WATER ZONES
Well Contractor Name	FROM TO DESCRIPTION ft. ft.
4389 A	ft, ft,
NC Well Contractor Certification Number	15. OUTER CASING (for multi-cased wells) OR LINER (if applicable)
Walker Hill Environmental	FROM TO DIAMETER THICKNESS MATERIAL ft. in.
Company Name	16. INNER CASING OR TUBING (geothermal closed-loop)
2. Well Construction Permit #:	FROM TO DIAMETER THICKNESS MATERIAL
List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)	73 ft. 195 ft. 4.5 in. SDR 17 Shuralock Pu
3. Well Use (check well use):	17. SCREEN 40 Stanless
Water Supply Well: Agricultural Municipal/Public	FROM TO DIAMETER SLOT SIZE THICKNESS MATERIAL
Geothermal (Heating/Cooling Supply) Residential Water Supply (single)	195 th. 215 th. 4 in030 sch 40 stanless
Industrial/Commercial Residential Water Supply (shared)	ft. ft. in. 18. GROUT
Irrigation	FROM TO MATERIAL EMPLACEMENT METHOD & AMOUNT
Non-Water Supply Well:	0' ft. 182 ft. Cement Trimmic 1605 gals
Monitoring Recovery Injection Well:	182 11. 185 11. Pellets Trimmie/2-Buckets
Aquifer Recharge Groundwater Remediation	ft. ft.
Aquifer Storage and Recovery Salinity Barrier	19. SAND/GRAVEL PACK (if applicable) FROM TO MATERIAL EMPLACEMENT METHOD
Aquifer Test Stormwater Drainage	185 th. 220 th. F2 Sand Trimmie
Experimental Technology Subsidence Control	ft, ft,
Geothermal (Closed Loop) Geothermal (Heating/Cooling Return) Other (explain under #21 Remarks)	20. DRILLING LOG (attach additional sheets if necessary) FROM TO DESCRIPTION (color, hardness, soll/rock type, grain size, etc.)
	ft. ft.
4. Date Well(s) Completed: 8/3/2019 Well ID# x25w-Tch-LCH	st. Please See Attached
5a. Well Location:	ft. Soil log
Camp Leieune	ft. ft.
Facility/Owner Name Facility ID# (if applicable)	ft. ft.
verona Loup, Jacksonville, 28540	ft. ft.
Physical Address, City, and Zip	ft. ft.
onslow	21. REMARKS
County Parcel Identification No. (PIN)	
5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees: (if well field, one lat/long is sufficient)	22. Certification:
34.672058 N 77.463527 W	Francis Xaun Harrets 8/19/2019
6. Is(are) the well(s) Permanent or Temporary	Signature of Certified Well Contractor Date
7. Is this a repair to an existing well: Yes or No	By signing this form, I hereby certify that the well(s) was (were) constructed in accordance with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a
If this is a repair, fill out known well construction information and explain the nature of the repair under #21 remarks section or on the back of this form.	copy of this record has been provided to the well owner.
	23. Site diagram or additional well details:
8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells	You may use the back of this page to provide additional well site details or well construction details. You may also attach additional pages if necessary.
drilled:	SUBMITTAL INSTRUCTIONS
9. Total well depth below land surface: 220 (ft.) For multiple wells list all depths if different (example-3@200' and 2@100')	24a. For All Wells: Submit this form within 30 days of completion of well
10. Static water level below top of casing: 45.5	construction to the following:
If water level is above casing, use "+"	Division of Water Resources, Information Processing Unit, 1617 Mail Service Center, Raleigh, NC 27699-1617
11. Borehole diameter:(in.)	24b. For Injection Wells: In addition to sending the form to the address in 24a
12. Well construction method:	above, also submit one copy of this form within 30 days of completion of well construction to the following:
FOR WATER SUPPLY WELLS ONLY:	Division of Water Resources, Underground Injection Control Program, 1636 Mail Service Center, Raleigh, NC 27699-1636
13a. Yield (gpm) Method of test:	24c. For Water Supply & Injection Wells: In addition to sending the form to
13b. Disinfection type: Amount:	the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.

FIGURE NOT TO SCALE PVC = POLYVINYL CHLORIDE

Diameter

WELL CONSTRUCTION RECORD (GW-1)			For Internal Use Only:							
1. Well Contractor Information:										
Francis Xavier Harri Well Contractor Name	ngton	14. WATER	ZONES	DESCRIPTION						
4389		ft.	ft.				-			
NC Well Contractor Certification Number		ft.	ft.							
Walker Hill En	Variable to 1	FROM	CASING (for)	multi-cased wells DIAMETER	OR LINER () ERIAL			
Company Name	rronmenia	O ft.	40 ft.	12 in.	56h 41	P	VC			
2. Well Construction Permit #:		16. INNER	CASING OR T	UBING (geother	mai closed-loo THICKNES	p) S MATE	ERIAL			
List all applicable well construction permits (i.e.	. UIC, County, State, Variance, etc.)	+3 ft.	490 ft.	4.5 in.	SDRI		molock Puc			
3. Well Use (check well use):		510 ft.	515 ft.	4 in.	Sch 4		inless			
Water Supply Well:		FROM	TO I	DIAMETER SL	OT SIZE T	HICKNESS	MATERIAL			
Agricultural Geothermal (Heating/Cooling Supply)	Municipal/Public Residential Water Supply (single)	490 ft.	510 ft.	4 in.	030 5	ch 40	Stanless			
Industrial/Commercial	Residential Water Supply (single) Residential Water Supply (shared)	ft.	ft.	in.						
Irrigation		18. GROUT FROM	ТО	MATERIAL	EMPLACI	EMENT METH	HOD & AMOUNT			
Non-Water Supply Well:		O ft.	476 ft.	Cement	Trimm	5	o Gals			
Monitoring Injection Well:	Recovery	476 ft.	480 ft.	Pellets	Trimm		Buckets			
Aquifer Recharge	Groundwater Remediation	ft.	ft.							
Aquifer Storage and Recovery	Salinity Barrier	19. SAND/G FROM	RAVEL PACE TO	(if applicable) MATERIAL	EM	PLACEMENT	METHOD			
Aquifer Test	Stormwater Drainage	480 ft.	515 ft.	₹2 San		rimmic				
Experimental Technology	Subsidence Control	ft.	ft.		1					
Geothermal (Closed Loop)	Tracer	20. DRILLI FROM	NG LOG (attac	b additional shee	ts if necessary	soll/rock type	grain size etc.)			
Geothermal (Heating/Cooling Return)	Other (explain under #21 Remarks)	ft.	ft.		color, Baroness,	зопотоск туре,	gram size, etc.)			
4. Date Well(s) Completed: 8/1/20	19 Well ID# X 25w - KPD	ft.	ft.	Plase	Sce F	Hach	ed			
5a. Well Location:		ft.	ft.	Soil	log					
Camp Lejeune		ft.	ft.							
Facility/Owner Name	Facility ID# (if applicable)	ft,	ft.							
Verona Loop	Jacksonville, 28540	ft.	ft.							
Physical Address, City, and Zip	•	ft.	ft.							
On Slow	Parcel Identification No. (PIN)	ZI. KEWLAN	us							
5b. Latitude and longitude in degrees/m	` '									
(if well field, one lat/long is sufficient)	-	22. Certifica	ation:							
*	7-463560 w	Trans	is Xaur	Hancte		81	19/2019			
6. Is(are) the well(s) Permanent of	Temporary		Certified Well Co			Date				
7. Is this a repair to an existing well: If this is a repair, fill out known well construction repair under #21 remarks section or on the back	n information and explain the nature of the	with 15A NCA copy of this re	C 02C .0100 or cord has been p	· 15A NCAC 02C . rovided to the well	0200 Well Cor owner.	ere) construct estruction Sta	ted in accordance ndards and that a			
8. For Geoprobe/DPT or Closed-Loop Construction, only 1 GW-1 is needed. Ind drilled:	Geothermal Wells having the same icate TOTAL NUMBER of wells	You may us	e the back of	donal well detain this page to pro may also attach	vide addition	nal well site ges if neces:	details or well sary.			
		SUBMITTA	AL INSTRUC	TIONS						
9. Total well depth below land surface: For multiple wells list all depths if different (exa		24a. For A construction	ll Wells: Su to the followi	bmit this form	within 30 d	ays of com	pletion of well			
10. Static water level below top of casing If water level is above casing, use "+"	· · · · · · · · · · · · · · · · · · ·	Di	ivision of Wat 1617 Mail S	ter Resources, I Service Center,	nformation Raleigh, NC	Processing 27699-161	Unit, 7			
11. Borehole diameter: 10	(in.)	24b. For In	jection Wells	: In addition to	sending the	form to the	address in 24a			
12. Well construction method: (i.e. auger, rotary, cable, direct push, etc.)	otary	above, also construction	to the following	opy of this forming:	within 30 c	lays of com	pletion of well			
FOR WATER SUPPLY WELLS ONLY	/:	Division	of Water Res 1636 Mail S	ources, Underg Service Center,	round Injec Raleigh, NC	tion Contro 27699-163	ol Program, 6			
13a. Yield (gpm)	Method of test:	24c. <u>For W</u>	ater Supply &	& Injection We	lls: In addit	ion to sendi	ing the form to			
13b. Disinfection type:	Amount:	completion	es) above, all of well constr	so submit one ruction to the c	conv of this	form with	vin 30 days of			
		where constr	ructed.				•			

FIGURE NOT TO SCALE PVC = POLYVINYL CHLORIDE

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N40085-16-D-5517	F6786
JOB NO: 7096	
CHECKED BY:	
Jason Chebetar	
DRAWN BY:	
DATÉ:	
APRIL 2019	

MARINES ROAD MONITORING STATION Y 24T1, Y 24T2, Y 24T3, Y 24T4, Y 24T5

Division of Water Resources, Underground Injection Control Program, 1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.

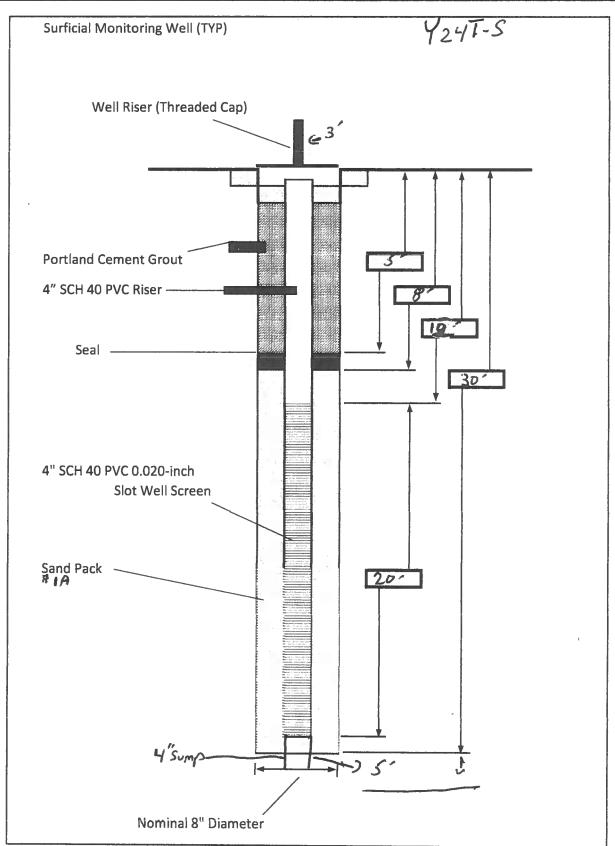
13a. Yield (gpm)

13b. Disinfection type: _

Method of test:

Amount:

Marines Road



TIKIGAQ

No.	Date	Remarks

CONTRACT NO.: | D.O. NO: | N40085-16-D-5517 | F6786 | F6786 | T096 | F6786 | F

NOTES:

FIGURE NOT TO SCALE

PVC = POLYVINYL CHLORIDE

SCH 40 = SCHEDULE 40

Total Pepth 35

12. Well construction method: (i.e. auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ON	LY:
13a. Yield (gpm)	Method of test:
13b. Disinfection type:	Amount:

construction to the following:

Division of Water Resources, Underground Injection Control Program, 1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county where constructed.

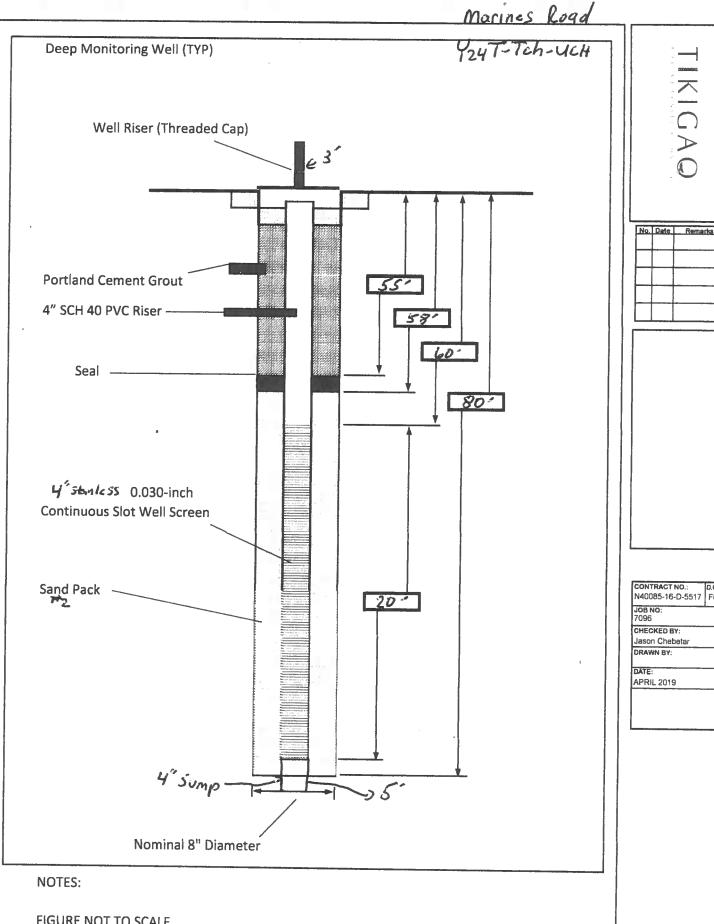


FIGURE NOT TO SCALE

PVC = POLYVINYL CHLORIDE

SCH 40 = SCHEDULE 40

Total Depth 85'

D.O. NO: F6786

13b. Disinfection type: _

where constructed.

completion of well construction to the county health department of the county

RETURNING

marines Road Y24T-Tch-MCH Deep Monitoring Well (TYP) TIKIGAQ Well Riser (Threaded Cap) **Portland Cement Grout** 1221 4,5" Shuralock 125 135-155 4"Stanless 0.030-inch **Continuous Slot Well Screen** Sand Pack -20' 4"Sump -10 Diameter

NOTES:

FIGURE NOT TO SCALE PVC = POLYVINYL CHLORIDE

Total Depth 160°

No.	Date	Remarks	
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-			
		<u> </u>	

N40085-16-D-5517 JOB NO: 7096 CHECKED BY:	F6786
7096 CHECKED BY:	
CHECKED BY:	
Jason Chebetar	
DRAWN BY:	
DATE:	
APRIL 2019	
APRIL 2019	

13a. Yield (gpm) _____ Method of test: ____

24c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county

where constructed.

Form GW-1

13b. Disinfection type: __

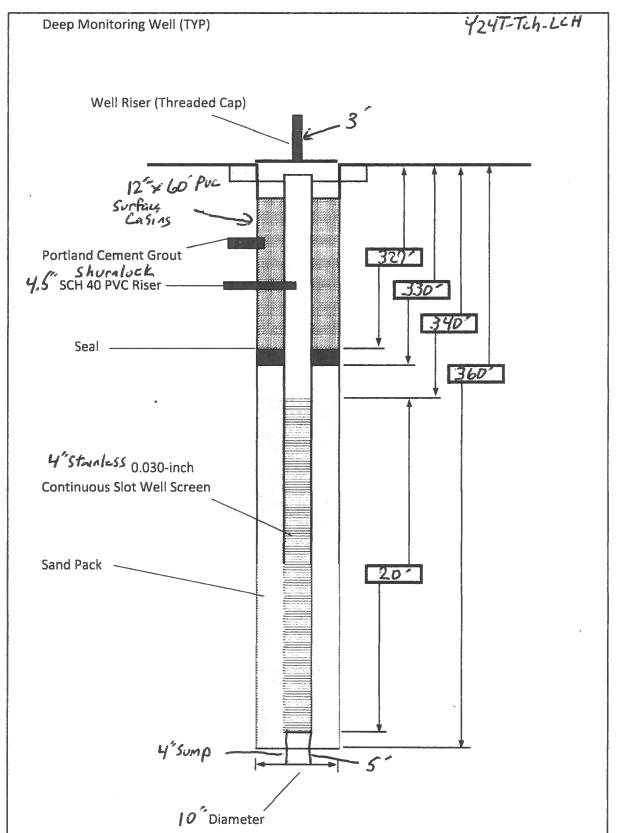
(i.e. auger, rotary, cable, direct push, etc.)

FOR WATER SUPPLY WELLS ONLY:

Division of Water Resources, Underground Injection Control Program,

1636 Mail Service Center, Raleigh, NC 27699-1636

Marines Road



NOTES:

FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE

Total Depth 365'

TIKIGAO

	No.	Date	Remarks	
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CONTRACT NO.: N.40085-16-D-5517 F6786

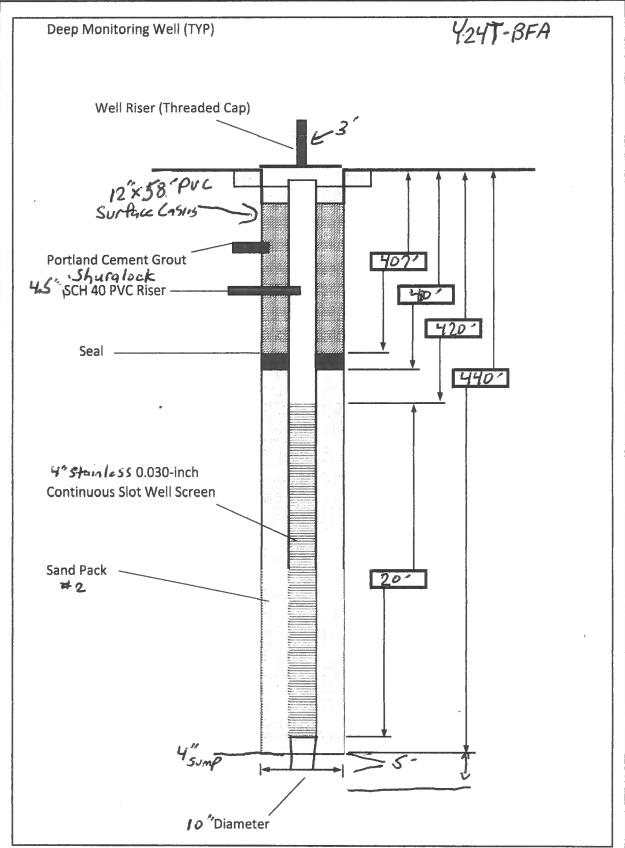
JOB NO: 7096
CHECKED BY: Jason Chebetar
DRAWN BY:

DATE: APRIL 2019

WELL CONSTRUCTION	DECORD (CW 1)	I Pan	Yandan	al Usa On	1				Intritute.		
WELL CONSTRUCTION	RECORD (GW-1)	For	interr	nal Use On	ly:						
1. Well Contractor Information:											
Francis Xavier Harrington			14. WATER ZONES FROM TO DESCRIPTION								
Well Contractor Name 4389A			ft.	ft							
NC Well Contractor Certification Number			ft.	fi							
Walker Hill Environ	mental	15. O		CASING (fo	r multi-cased DIAMETE		OR LINE		able) MATERIAL		
	menai — — — — — — — — — — — — — — — — — — —	0	ft.	58 ft		in.	SCH		PVC		
Company Name		16. IN		CASING OR	TUBING (ged	therm	tiliciosed	-loop)	MATERIAL		
2. Well Construction Permit #:	(i.e. UIC, County, State, Variance, etc.)	+3	ft.	420 ft		in.	SDR		Shuralock PVC		
. Well Use (check well use):		440) ft.	445 ft	• 4	in.	SCH4	10 ;	Stainless		
Vater Supply Well:		17. SO	CREE	i TO	DIAMETER	SLOT	r SIZE	THICKNES	SS MATERIAL		
Agricultural	Municipal/Public	420	$\overline{}$	440 ft.	4 in.	.03		SCH40			
Geothermal (Heating/Cooling Supply			ft.	ft.	in.						
Industrial/Commercial	Residential Water Supply (shared)	18. G	ROUT		MATERIA		EMBI	ACEMENT	METHOD & AMOUNT		
Irrigation Ion-Water Supply Well:		0	ft.	TO ft					00 Gallons		
Monitoring	Recovery	407	ft.	410 ft			-	nmie/2 E			
njection Well:			ft.	fi			<u> </u>				
Aquifer Recharge Aquifer Storage and Recovery	Groundwater Remediation Salinity Barrier				CK (if applica		<u> </u>				
Aquifer Test	Stormwater Drainage	FROM 410	ft.	TO 445 ft	MATERIA #2 Sar			Trimmie	IENT METHOD		
Experimental Technology	Subsidence Control	 	ft.	li li		-	\rightarrow				
Geothermal (Closed Loop)	Tracer	20. Di	RILLE	NG LOG (at	tach additiona	l sheets	if neces	sary)			
Geothermal (Heating/Cooling Return	Other (explain under #21 Remarks)	FROM	ft.	TO		TON (co	ler, bardı	tess, soil/rock	type, grain size, etc.)		
Bar Well(s) Completed 8/24/2	2019 Well ID# Y24T-BFA	-	ft.	fi) F A		LIED OC	NI 1 00		
	Well ID#	<u> </u>	ft.	fi	PLEA	SE A	TIAC	HED SC	OIL LOG		
Sa. Well Location:		-	ft.	ft							
Camp Lejeune	P. W. W. C. L. L.	\vdash	ft.	ft							
acility/Owner Name Building# 1657S Ma	Facility ID# (if applicable)	-	ft.	ft							
Physical Address, City, and Zip	Tilles Road	-	ft.	fi							
Onslow		21. R	EMAR	KS							
County	Parcel Identification No. (PIN)										
ib. Latitude and longitude in degrees	s/minutes/seconds or decimal degrees:										
if well field, one lat/long is sufficient)		22. Ce	ertifica	ation:				,			
34.601222 _N	77.338367 _w	Lan	1000	in Vac	9	-	7		9/9/2019		
. Is(are) the well(s) Permanent	or Temporary	Signatu	re of C	ertified Well	Contractor	שוינט	300	<u>-</u> 2≥ _	ate		
. is(aic) the wen(s)[x]1 el manent									structed in accordance		
Is this a repair to an existing well:	Yes or No ction information and explain the nature of the	with 15A NCAC 02C .0100 or 15A NCAC 02C .0200 Well Construction Standards and that a copy of this record has been provided to the well owner.									
epair under #21 remarks section or on the b		23. Sit	te diag	ram or ade	litional well	details	i:				
B. For Geoprobe/DPT or Closed-Loo	p Geothermal Wells having the same	23. Site diagram or additional well details: You may use the back of this page to provide additional well site details or well									
onstruction, only I GW-1 is needed. I rilled: 1	ndicate TOTAL NUMBER of wells	construction details. You may also attach additional pages if necessary.									
	445	SUBM	1ITTA	L INSTRU	CTIONS						
. Total well depth below land surfactor multiple wells list all depths if different (C: (11.)			Il Wells:		form v	vithin 3	0 days of	completion of wel		
0. Static water level below top of car	26.4	COIISII			J	T	e	n	* X7 *4		
water level is above casing, use "+"	sing:(ft.)		Di		'ater Resour I Service Ce						
1. Borehole diameter: 10	(in.)	24b. F	or In			-					
2. Well construction method: e. auger, rotary, cable, direct push, etc.)	otary	 24b. For Injection Wells: In addition to sending the form to the address in 24a above, also submit one copy of this form within 30 days of completion of well construction to the following: 									
OR WATER SUPPLY WELLS ON	LY:	Div	vision		esources, Ui I Service Ce				ontrol Program, -1636		
3a. Yield (gpm)	_ Method of test:	24c. <u>F</u>	or W	ater Supply	& Injection	n Well	<u>s</u> : In a	ddition to	sending the form to		
13b. Disinfection type:	Amount:	the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county									

where constructed.

Marines Road



CONTRACT NO.: N40085-16-D-5517 F6786

JOB NO: 7096

CHECKED BY: Jason Chebetar

DRAWN BY:

APRIL 2019

TIKIGAO

No. Date Remarks

NOTES:

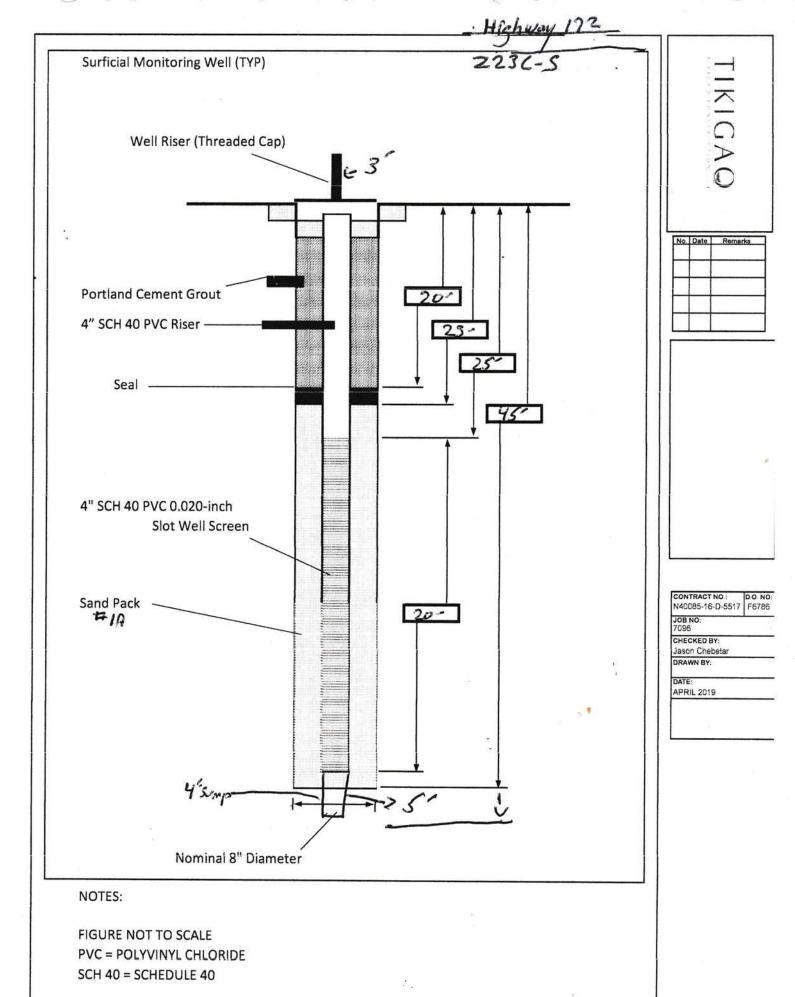
FIGURE NOT TO SCALE

PVC = POLYVINYL CHLORIDE

Total Depth 445

HWY 172 MONITORING STATION Z 23C1, Z 23C2, Z 23C3, Z 23C4

WELL CONCEDUCTION D	ECODD (CW 1)	F 1.	-111-0-1						1111111		
WELL CONSTRUCTION R	ECORD (GW-1)	For Inter	nal Use Only	' :							
1. Well Contractor Information:											
Francis Xavier Harring	gton	14. WATER									
Well Contractor Name		FROM ft.	TO ft.	DESCRIPT	ION						
4389A		ft.	ft.	 							
NC Well Contractor Certification Number			CASING (for	multi-cased v	vells) (OR LINE	CR (if an	nlicable)		
Walker Hill Environme	ental	FROM	то	DIAMETER	1	THICK			ERIAL		
Company Name		ft.	ft.	TIDANIC (in.						
2. Well Construction Permit #:		FROM	CASING OR T	DIAMETER	1	THICK	NESS	MAT	ERIAL		
List all applicable well construction permits (i.e.	UIC, County, State, Variance, etc.)	+3 ft.	25 ft.	4	in.	SCH4	0	PVC			
3. Well Use (check well use):		45 ft.	50 ft.	4	in.	SCH4	0	PV	2		
Water Supply Well:		FROM		DIAMETER	SLO	SIZE	THICK	NESS	MATERIAL		
Agricultural-	Municipal/Public	25 ft.	45 ft.	4 in.	.020		SCH		PVC		
Geothermal (Heating/Cooling Supply)	Residential Water Supply (single)	ft.	ft.	in.							
Industrial/Commercial	Residential Water Supply (shared)	18. GROUT									
Irrigation Non-Water Supply Well:		FROM Oft.	то 20 ft.	Comoni		_	acemen nmie/4		HOD & AMOUNT		
Monitoring	Recovery	20 ft.		Cement		-	nmie/1		CHECK SCHOOL SERVICE CONTROL		
Injection Well:	Incorreig	20 m	23 ft.	Pellets		Hin	imie/ i	.5 Bu	ckets		
Aquifer Recharge	Groundwater Remediation		RAVEL PACE	(if applicab	la)						
Aquifer Storage and Recovery	Salinity Barrier	FROM	то	MATERIAL	,		EMPLAC	CEMEN	г метнор		
Aquifer Test	Stormwater Drainage	23 ft.	50 ft.	#1A sar	nd		Trimmi	ie			
Experimental Technology	Subsidence Control	ft.	ft.								
Geothermal (Closed Loop)	Tracer	FROM	NG LOG (attac					ock type.	grain size, etc.)		
	Other (explain under #21 Remarks)	ft.	ft.			,			B		
4. Date Well(s) Completed: 9/26//20	019 Well ID# Z23C-S	ft.	ft.	PLEAS	ES	EE A	TACH	HED	SOIL LOG		
5a. Well Location:		ft.	ft.								
Camp Lejeune		ft.	ft.								
Facility/Owner Name	Facility ID# (if applicable)	ft.	ft.								
GP-18 Highway 172		ft.	ft.								
Physical Address, City, and Zip	•	ft.	ft.								
Onslow		21. REMAR	RKS	***************************************							
County	Parcel Identification No. (PIN)										
5b. Latitude and longitude in degrees/mi	nutes/seconds or decimal degrees:										
(if well field, one lat/long is sufficient)	202040	22. Certific	ation:								
34.569345 _N 77	.293019	Toon	· Yau	. 91		1		10/	10/2019		
6. Is(are) the well(s) Permanent or	Temporary	Signature of C	Certified Well Co	ontractor	1000	in		Date			
o. istarcy the wents) [27] or manent	Litemporary						(were)	construc	ted in accordance		
7. Is this a repair to an existing well: If this is a repair, fill out known well construction			AC 02C .0100 or ecord has been p				Construc	ction Sta	andards and that a		
repair under #21 remarks section or on the back			gram or addit								
8. For Geoprobe/DPT or Closed-Loop G	enthermal Wells having the same						itional v	vell site	e details or well		
construction, only 1 GW-1 is needed. Indic		construction	details. You	may also att	ach ac	ditiona	l pages i	if neces	ssary.		
drilled: 1		SUBMITTA	AL INSTRUC	CTIONS							
9. Total well depth below land surface: _	50 (ft.)	24a. For A	II Wells: Su	bmit this fo	orm v	vithin 3	0 days	of con	pletion of well		
For multiple wells list all depths if different (exam			to the followi						•		
10. Static water level below top of casing If water level is above casing, use "+"	: 9.5 (ft.)	D	ivision of Wa								
11. Borehole diameter: 8	(in)		1617 Mail S								
11. But choic diameter:	(in.)								e address in 24a		
12. Well construction method: Soni	U	above, also submit one copy of this form within 30 days of completion of construction to the following:									
(i.e. auger, rotary, cable, direct push, etc.)		Division	of Water Res	sources. Un	derar	ound I	niection	Contr	ol Program.		
FOR WATER SUPPLY WELLS ONLY	:	DIVISION	1636 Mail S								
13a. Yield (gpm) N	Method of test:								ling the form to		
									hin 30 days of		
13b. Disinfection type:	Amount:	where const		i decion to ti		unty ne	aitii dep	ai tiileli	to the county		



Total Depth 50

13a. Yield (gpm) _

13b. Disinfection type: _

where constructed.

Method of test:

Amount:

24c. For Water Supply & Injection Wells: In addition to sending the form to

the address(es) above, also submit one copy of this form within 30 days of

completion of well construction to the county health department of the county

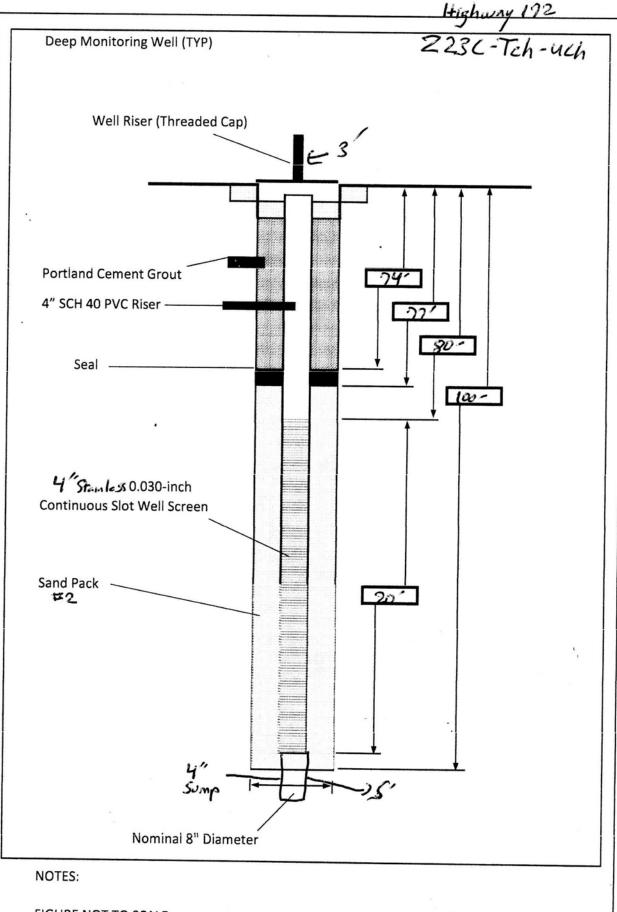


FIGURE NOT TO SCALE PVC = POLYVINYL CHLORIDE SCH 40 = SCHEDULE 40

Total Defth LOS

TIKIGAO

No.	Date	Remarks
_		
_	-	

CONTRACT NO.:	D.O. NO
N40085-16-D-5517	F6786
JOB NO: 7096	
CHECKED BY:	
Jason Chebetar	
DRAWN BY:	
DATE:	
APRIL 2019	

where constructed.

I HITCH OTH

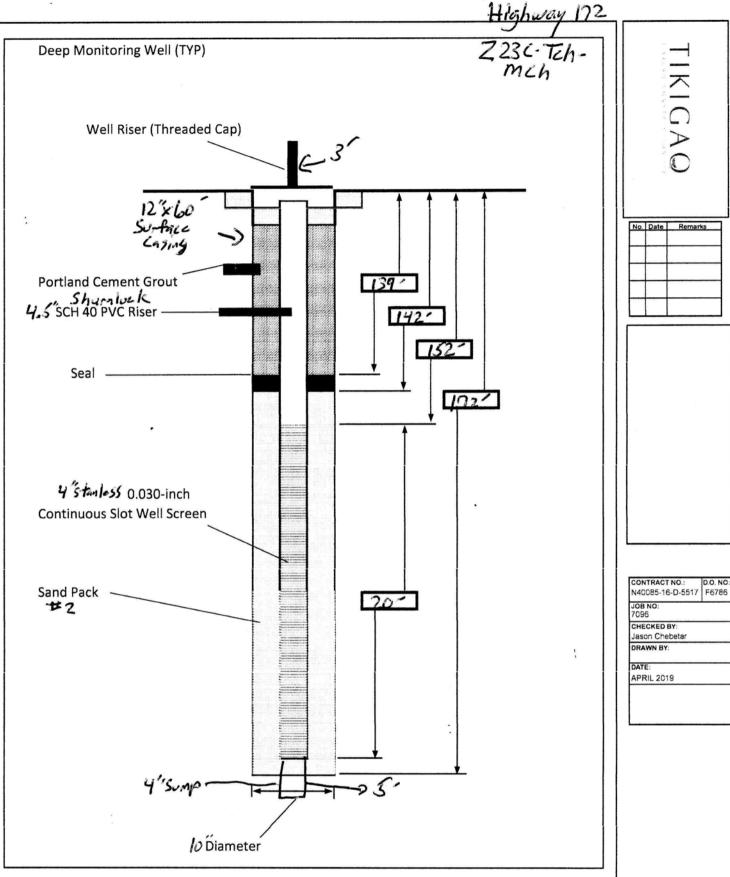


FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE

Total DePth 197'

13a. Yield (gpm)

13b. Disinfection type: ___

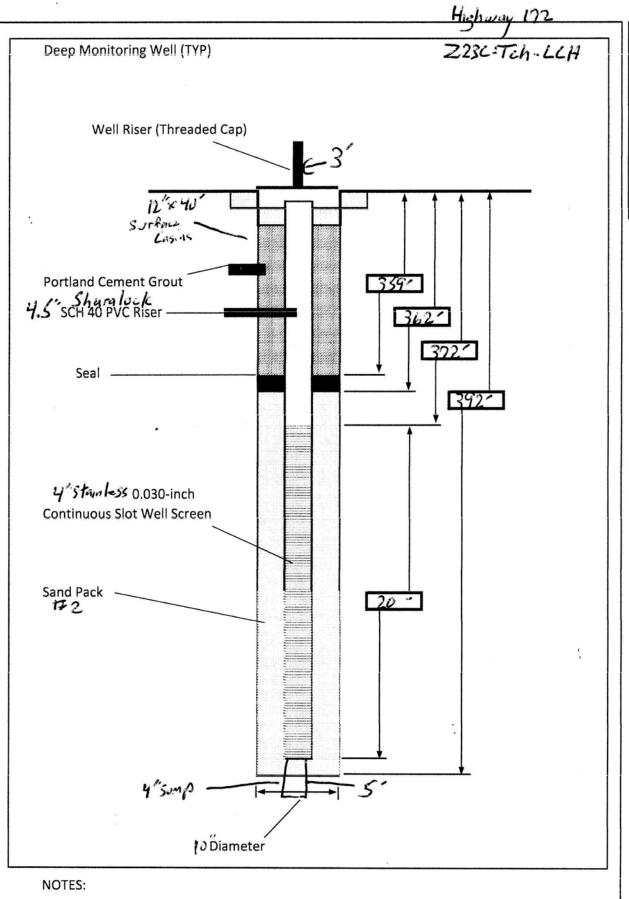
where constructed

Method of test:

24c. For Water Supply & Injection Wells: In addition to sending the form to

the address(es) above, also submit one copy of this form within 30 days of

completion of well construction to the county health department of the county



TIKIGAQ

No. Date Remarks

CONTRACT NO.: D.O. NO: N40085-16-D-5517 F6786

JOB NO: 7000

CHECKED BY: Jason Chebetar

DATE:

APRIL 2019

FIGURE NOT TO SCALE PVC = POLYVINYL CHLORIDE

Total Depth 397'

PARADISE POINT MONITORING STATION X 24G3

13a. Yield (gpm)

13b. Disinfection type: _

where constructed

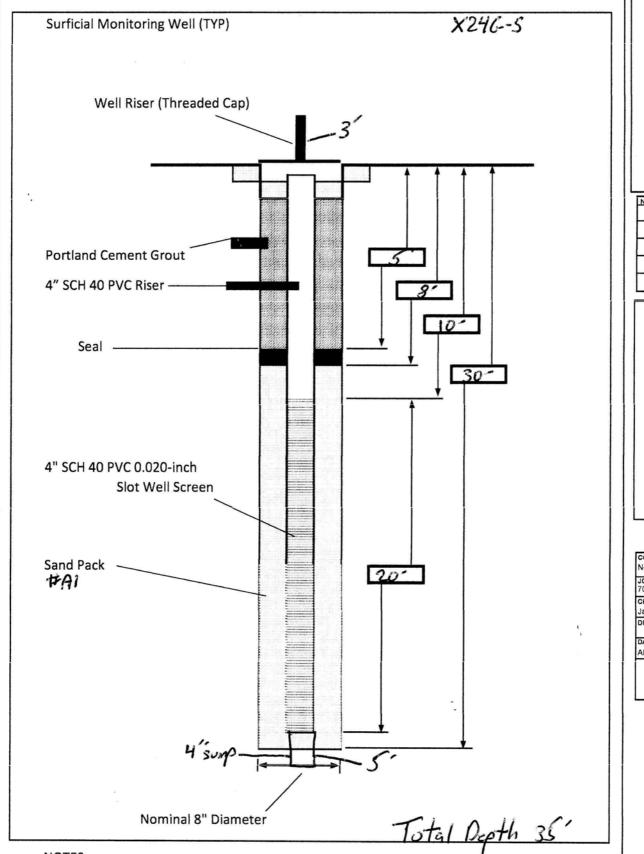
Method of test:

Amount:

24c. For Water Supply & Injection Wells: In addition to sending the form to

the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county

Paradise Point



NOTES:

FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE
SCH 40 = SCHEDULE 40

TIKIGAO

No.	Date	Remarks

D.O. NO
F6786

MONTFORD POINT MONITORING STATION X 24E3

13a. Yield (gpm) _

13b. Disinfection type: _

where constructed

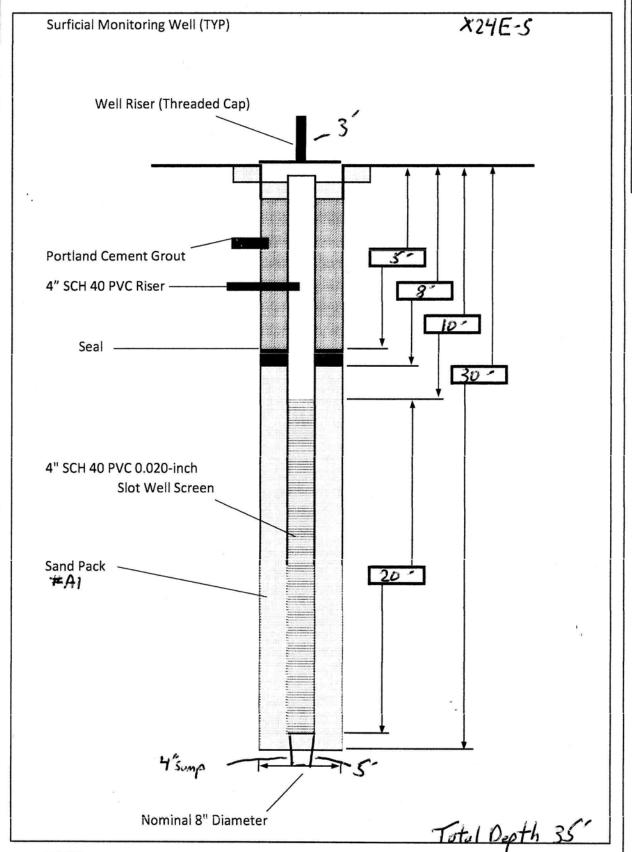
Amount:

1636 Mail Service Center, Raleigh, NC 27699-1636

24c. For Water Supply & Injection Wells: In addition to sending the form to

the address(es) above, also submit one copy of this form within 30 days of completion of well construction to the county health department of the county

Montford Point



TIKIGAQ

No.	Date	Remarks
		,
	\vdash	

GONTRACT NO:
N40085-16-D-5517
F6786
JOB NO:
7096
CHECKED BY:
Jason Chebetar
DRAWN BY:

DATE:
APRIL 2019

NOTES:

FIGURE NOT TO SCALE
PVC = POLYVINYL CHLORIDE
SCH 40 = SCHEDULE 40

CHINQUAPIN ELEMENTARY SCHOOL MONITORING STATION W 29D10, W 29D11, W 29D12, W 29D13, W 29D14, W 29D15

WELL CONSTRUCTION R	ECORD (GW-1)	ror	merr	iai Us	Chry	•					
1. Well Contractor Information:											
Jeovany Gutierrez Bautista	a	14. W	ATER	ZONE	S	,					
Well Contractor Name		FROM		TO		DESCRIPT	-				
4125 A		115	ft.	125	ft.	Sand - Iir	nesto	ine			
NC Well Contractor Certification Number		15.63	ft.	CACE	ft.		all-\ 4	OD LINI	ED GE	nline hl-V	
A.C. Schultes of Carolina,	Inc	FROM		TO		DIAMETEI	3	THICK	ERIAL		
Company Name	illo.	0	ft.	0	ft.		in.				
		16. IN		TO	G OR T	DIAMETER		al closed		MATE	ERIAL
2. Well Construction Permit #: List all applicable well construction permits (i.e.	UIC, County, State, Variance, etc.)	+3	ft.	115	ft.	4	in.	SDR1		PVC	
3. Well Use (check well use):	1.00 (125	ft.	130	ft.	4	in.	SCH 8	30	PVC	
Water Supply Well:		17. SC	CREE	N							
□Agricultural	□Municipal/Public	FROM	777.5	то 125	ft. 4	DIAMETER in.	.020	T SIZE	THICK	CNESS	SS
☐Geothermal (Heating/Cooling Supply)	□Residential Water Supply (single)	115	ft.	125	ft.	in.	.020		-		33
□Industrial/Commercial	□Residential Water Supply (shared)	19 C	ROUT	-		5000			_		
□lrrigation	□Wells > 100,000 GPD	FROM		ТО		MATERIA	L	EMP	LACEME	NT METI	HOD & AMOUNT
Non-Water Supply Well:		0	ft.	98	ft.	BENTON	NITE	PUN	1PED		
¹ Monitoring	□Recovery	98	ft.	100	ft.	BENTON	NITE	POL	IRED		
Injection Well:	Groundwater Remadiation		ft.		ft.						
□ Aquifer Recharge	□Groundwater Remediation				L PAC	K (if applica			CAID	CEMEN	ГМЕТНОD
□Aquifer Storage and Recovery	□Salinity Barrier	100	ft.	134	ft.	#2 GRA			POUR		METHOD
□Aquifer Test	□Stormwater Drainage □Subsidence Control	100	ft.	134	ft.	#2 GRA	<i>/</i> LL		1 0010		
□Experimental Technology □Geothermal (Closed Loop)	□Tracer	20 D	7.550	ING LO	1098	ich additiona	l sheet	s if nece	ssarv)		
☐Geothermal (Closed Loop) ☐Geothermal (Heating/Cooling Return)	☐Other (explain under #21 Remarks)	FROM	1	TO						rock type.	grain size, etc.)
		1	ft.		ft.	See a	attac	hed			
4. Date Well(s) Completed: 5/22/20	20 Well ID# W29D10		ft.		ft.						
5a. Well Location:			ft.		ft.						
NCDEQ - DWR	Chinquapin Elem. School		ft.		ft.						
Facility/Owner Name	Facility ID# (if applicable)		ft.		ft.						
3894 S. NC 50 Hwy, Chine	guapin, NC		ft.		ft.						
Physical Address, City, and Zip	1 1 /		ft.		ft.						
Duplin	335900537011	21. R	EMA	RKS		-					
County	Parcel Identification No. (PIN)										
5b. Latitude and longitude in degrees/m	inutes/seconds or decimal degrees:										
(if well field, one lat/long is sufficient)	inaces/seconds of decimal degrees.	22. C	ertific	ation:							
34.825978	7.816368 w			0	•5:55	Δ				_	2- 2
		Signat	can	Ju	tun	Dantes	ti_			S.	-30-20
6. Is(are) the well(s): Permanent or	· Temporary	1		1	I barrah		ha wall	(v) were (warat wan	remoted	in accordance with
7. Is this a repair to an existing well:	□Yes or ♠No	$V_{15A\ N}$	CACO	2C .010	0 or 15.	A NCAC 02C	.0200	Well Con			rds and that a copy
If this is a repair, fill out known well construction		of this	record	I has be	en provi	ded to the we	l owne	T.			
repair under #21 remarks section or on the back	of this form.					itional well			. 11. 10.000		
8. For Geoprobe/DPT or Closed-Loop C	Geothermal Wells having the same										nstruction info iges if necessary.
construction, only 1 GW-1 is needed. Ind drilled:	icate TOTAL NUMBER of wells						į.	tilbo titti		Tomas pe	ges in increasing,
Or and the second secon	134	24. 5	UBM	HIAL	, INS1	RUCTION	2				
9. Total well depth below land surface: For multiple wells list all depths if different (exa	mple- 3@200' and 2@100') (ft.)	Subn	nit thi	s GW-	1 with	in 30 days o	f well	compl	etion pe	r the fo	llowing:
		24a.	For .	All W	ells: O	riginal form	n to l	Division	n of Wa	ater Re	sources (DWR).
10. Static water level below top of casing If water level is above casing, use " "	g: (ft.)	Infor	nation	1 Proce	ssing U	Jnit, 1617 N	ISC, R	Raleigh,	NC 276	99-161	7
\$5.1 CT CT CT CT CT CT CT CT	(in)	24b.	For I	njectio	n Wel	ls: Copy to	DWR	. Under	rground	Injectio	n Control (IUC)
11. Borehole diameter: 9-7/8	(in.)					leigh, NC 2			522	551	
12. Well construction method:	Rolary	24c. l	For W	ater S	upply	and Open-l	.00p (Geothei	rmal Re	turn W	ells: Copy to the
(i.e. auger, rotary, cable, direct push, etc.)		count	y env	ironme	ntal he	alth departn	nent of	the cou	unty whe	ere însta	lled
FOR WATER SUPPLY WELLS ONLY	Y:	24d.	For V	Vater '	Wells 1	oroducing o	ver 1	00,000	GPD: C	opy to l	DWR, CCPCUA
13a. Yield (gpm)	Method of test	Perm	it Pro	gram. 1	611 M	SC, Raleigh	. NC :	27699-1	1611	90000	
ion. Tieru (gpin)	method of test.										
13b. Disinfection type:	Amount:	1									

WELL CONSTRUCTION R	ECORD (GW-1)	For	Inte	rnal U	Ise Only	y:						
1. Well Contractor Information:												
Jeovany Gutierrez Bautista	a	14 19	7 A TITLE	R ZON	TEC							
Well Contractor Name		FROM		TO	(ES)	DESCRIP	TON					
4125 A		19	ft.	29	ft.	Sand						
NC Well Contractor Certification Number			ft.		ft.							
	Inc	15. O	15. OUTER CASING (for multi-cased wells) OR LINER FROM TO DIAMETER THICKNE									
A.C. Schultes of Carolina,	ing.	. FAGI	ft.	10	ft.	DIAMETE	in.	IMCK	TAROO	MAL	ERIAL	
Company Name		16. IP	NER		NG OR T	UBING (ge				9		
2. Well Construction Permit #: List all applicable well construction permits (i.e.	VIIC County State Vinions at 1	+3	ft.	19	ft.	DIAMETE 4	R in.	THICK			ERIAL	
	Oic, County, Sidie, Varunce, esc.)		ft.	+	ft.	<u> </u>	in.	SDR1		PVC		
3. Well Use (check well use):		29 17. Se		34	16.	4		SCH 8	30	PVC		
Water Supply Well:	Differential and the late.	FROM		TO		DIAMETER	SLO	r SEZE	THICK	NESS	MATERIAL	
□ □ Agricultural □ Geothermal (Heating/Cooling Supply)	☐Municipal/Public	19	ft.	29	ft. 4	in.					SS	
□Industrial/Commercial	☐ Residential Water Supply (single) ☐ Residential Water Supply (shared)		ft.	19	ft.	in.		_				
□Irrigation	□Wells > 100,000 GPD	18. G		TO		MATERIA		PMDI	A CTETTA COURS	er alema	HOD & AMOUNT	
Non-Water Supply Well:	□ Wells > 100,000 GPD	10	ft.	12	ft.	BENTON		POU		(I MUE11	HOD & AMOUNT	
△Monitoring	□Recovery	11	ft.	 -	ft.	5211101	-	1.00				
Injection Well:		1	ft		ft.			-				
□Aquifer Recharge	☐ Groundwater Remediation	10 54		SPAVE		(if applical	dal	<u> </u>				
□Aquifer Storage and Recovery	☐Salinity Barrier	FROM		ТО		MATERIA			EMPLAC	EMIENT	METHOD	
□Aquifer Test	□Stormwater Drainage	34	ft.	12	ft.	#2 GRA\	/EL	[POURE	ED		
☐Experimental Technology	☐Subsidence Control		ft.		ft.	ŀ						
□Geothermal (Closed Loop)	□Tracer				DG (attac	h additional	sheets	if neces	sary)			
☐Geothermal (Heating/Cooling Return)	□Other (explain under #21 Remarks)	FROM	ft.	12	ft.	CLAY	IUN (co	lor, hards	ess, soil/ro	ck type,	grain size, etc.)	
4. Date Well(s) Completed: 4/14/202	20 Well ID# W29D11	12	ft.	34	ft.	SAND						
	Wtil ID#	12	ft.	34	ft.	SAND						
5a. Well Location:	Obianania Elan Oabaal	-	ft.		ft.		1					
NCDEQ - DWR	Chinquapin Elem. School			-								
Facility/Owner Name	Facility ID# (if applicable)		ft.		ft.	y de						
3894 S. NC 50 Hwy, Chinq	uapin, NC		ft.		ft.							
Physical Address, City, and Zip			ft.		ft.							
Duplin	335900537011	21. RF										
County	Parcel Identification No. (PIN)		G	eoph	ysical S	Survey Co	nduct	ed 4/28	3/20 Flo	wing \	Vell	
5b. Latitude and longitude in degrees/min	nutes/seconds or decimal degrees:											
(if well field, one lat/long is sufficient)		22. Cer	rtifica	ation:								
34.825912 _N 77.8	816403 _w	1		a	100	R		_				
CTC ME BOOK AND		Signatur	M	urtified	Well Co	<u>Labri</u>	113/		_	5-2	1-20	
6. Is(are) the well(s): Dermanent or	□Temporary		l /	\ /	1					Date	accordance with	
	∃Yes or ≜ No	15A NC.	AC 02	C .010	0 or 15A	NCAC 02C .	9200 W	was (we ell Cons	re) constr truction S	uctea in tandard	s accoraance with Is and that a copy	
If this is a repair, fill out known well construction repair under #21 remarks section or on the back o		of this re	cord	has bee	n provide	ed to the well	owner.					
						onal well d						
8. For Geoprobe/DPT or Closed-Loop Ge	cothermal Wells having the same	You ma	ayus se Ow	e the t	back of ≀emarks	this page to Box) You	provi	ide addi	itional w h additio	ell con	struction info	
construction, only 1 GW-1 is needed. Indic drilled:	ate IOTAL NUMBER of wells						inery ear	so anac	ii dayayay	nan pag	es il necessary.	
0.75-4-1	34	24. SU	BIMIL	TAL	INSTR	<u>UCTIONS</u>						
9. Total well depth below land surface:	rple- 3@200' and 2@100') (ft.)	Submit	this	GW-1	l within	30 days of	well c	ompleti	ion per t	he foll	owing:	
	6.75	24a. F	or A	ll We	lls: Ori	ginal form	to Di	vision	of Wate	r Reso	urces (DWR),	
10. Static water level below top of casing: If water level is above casing, use "+"	(ft.)	Informa	tion l	Proces	sing Un	it, 1617 MS	C, Ral	eigh, N	C 27699	-1617	(27111),	
11. Borchole diameter: 9-7/8	(in)	24b. Fe	r In	ection	Wells:	Copy to D	WR. I	Indergr	ound Ini	ection	Control (IUC)	
Mud D	_(in.)					gh, NC 276					(100)	
12. Well construction method: Mud R	Otaly	24c. For Water Supply and Open-Loop Geothermal Return Wells: Copy to the										
(i.e. auger, rotary, cable, direct push, etc.)		county	enviro	onmen	tal healt	h departme	nt of th	e count	y where	installe	ed	
FOR WATER SUPPLY WELLS ONLY:		24d. Fa	r Ws	iter W	ells pro	ducing ove	r 100.	000 GF	D: Com	v to DV	WR, CCPCUA	
13a. Yield (gpm) M	ethod of test:	Permit 1	rogr	am, 16	11 MSC	, Raleigh, l	VC 27	599-161	1	,	TIS COLOUR	
(8hm)												

13b. Disinfection type: _

Amount:

WELL CONSTRUCTION R	ECORD (GW-1)	For	Inter	nal Us	e Only	7:				-	
1. Well Contractor Information:											
Jeovany Gutierrez Bautista	a	14. W	ATE	R ZONE	S						
Well Contractor Name		FROM		TO		DESCRIPT	TON				
4125 A		624	ft.	644	ft.	Sand					
NC Well Contractor Certification Number		45.07	ft.	C + CT	ft.		** >		-		
A.C. Schultes of Carolina,	Inc.	FROM		TO	(G (for		ulti-cased wells) OR LINER (if applicable DIAMETER THICKNESS MAT				
Company Name		0	ft.	40	ft.	10	in.	SCH 8		PVC	
		16. IN FROM	NER	CASING	GORT	UBING (geo	rtherm	al closed THICK	-loop)	MATE	ERTAY.
2. Well Construction Permit #:	UIC, County, State, Variance, etc.)	+3	ft.	624	ft.	4	in.	SDR17		PVC	- CARPALI
3. Well Use (check well use):		644	ft.	649	ft.	4	in.	SCH 8	0	PVC	
Water Supply Well:		17. SC FROM		TO	- (r	DIAMETER	ero	r seze	THICK	MECC	BEATTONYAY
□Agricultural	□Municipal/Public		-	644	ft. 4	in.	.020		IBICA	NESS	MATERIAL
☐Geothermal (Heating/Cooling Supply)	□Residential Water Supply (single)			624	ft.	in.	1.020				
□Industrial/Commercial	□Residential Water Supply (shared)	18. GI			+		_				
□Irrigation	□Wells > 100,000 GPD	FROM	-	TO	_	MATERIA				T METE	OD & AMOUNT
Non-Water Supply Well:	Преселен	0	ft.	608	ft.	BENTON		PUM			
Injection Well:	□Recovery	608	ft.	610	ft.	BENTON	IITE	POU	RED		
□Aquifer Recharge	☐Groundwater Remediation		ft.	<u> </u>	ft.						
□Aquifer Storage and Recovery	□Salinity Barrier	19. SA FROM	ND/G	TO	L PACE	(if applicat	ole) L	- 1	EMPLAC	EMIENT	METHOD
□Aquifer Test	□Stormwater Drainage	610	ft.	800	ft.	#2 GRAV			POURE		
□Experimental Technology	□Subsidence Control		ft.		ft.						· · · · · · · · · · · · · · · · · · ·
□Geothermal (Closed Loop)	□Tracer		ILLI		G (attac	h additional	sheets	if neces	ary)		
☐Geothermal (Heating/Cooling Return)	□Other (explain under #21 Remarks)	FROM	ft.	то	ft.	SEE ATT			ess, soil/ro	ck type, ;	grain size, etc.)
4. Date Well(s) Completed: 5/1/2020) Well 1D# W29D12		ft.		ft.	SEE ATT	АСП	ED			
5a. Well Location:			ft.		ft.						
NCDEQ - DWR	Chinquapin Elem. School		ft.		ft.						
Facility/Owner Name	Facility ID# (if applicable)		ft.		ft.						
3894 S. NC 50 Hwy, Ching			ft.		ft.						
Physical Address, City, and Zip	, and pill, 110		ft.		ft.						
Duplin	335900537011	21. RE	MAR	KS							
County	Parcel Identification No. (PIN)		G	eophy	sical S	Survey Co	nduct	ed 4/28	3/20 Flo	wing V	Vell
5b. Latitude and longitude in degrees/min											
(if well field, one lat/long is sufficient)	046260	22. Cer	tifica	ition:							
34.825978 _N 77.8	816368 w	1		Q-		Ah. +	7				2-25
6. Is(are) the well(s): Permanent or	□Temporary	Signatur	of	ertified	Well Co	ntractor				Date	<u> </u>
7. Is this a repair to an existing well:	□Yes or ≜No										accordance with and that a copy
If this is a repair, fill out known well construction repair under #21 remarks section or on the back of	information and explain the nature of the					ed to the well					сору
			-	•		ional well d			tional w	oll con	struction info
8. For Geoprobe/DPT or Closed-Loop Go construction, only 1 GW-1 is needed. Indic		(add 'Se	e Ov	er' in Ro	emarks	Box). You	may al	lso attac	h additio	nal page	es if necessary.
drilled:	-	24. SUI	ВМП	TAL 1	NSTR	UCTIONS					
9. Total well depth below land surface: For multiple wells list all depths if different (exam	800 (ft.) pple-3@200' and 2@100')	Submit	this	GW-1	within	30 days of	well o	omplet	ion per t	he folk	owing:
10. Static water level below top of casing:	0.75 (ft.)	24a. Fo	or A	II Well	ls: Origing Un	ginal form it, 1617 MS	to Di	ivision leigh, N	of Water C 27699	r Reso	urces (DWR),
If water level is above casing, use "+" 11. Borchole diameter: 9-7/8 (in.)			r In	ection	Wells:	Copy to D	WR,	Undergi			Control (IUC)
12. Well construction method: Mud Rotary Pilot Hole				A HELL		gh, NC 276			al D		L- 0 1 2
(i.e. auger, rotary, cable, direct push, etc.)		county (r wa envir	onment	opry an al healt	h departme	nt of t	he coun	y where	rn Well installe	ls: Copy to the
FOR WATER SUPPLY WELLS ONLY:	24d. Fo	r Wa	iter W	ells pro	ducing ove	er 100	,000 GI	D: Copy	y to DV	WR, CCPCUA	
13a. Yield (gpm) M	lethod of test:	reimit l	Togn	аш, 10	II MS(, Raleigh,	NC 21	01 - 440	. 1		
13b. Disinfection type:	Amount:										

WELL CONSTRUCTION RE	ECORD (GW-1)	For I	ntern	al Use Onl	ly:								
1. Well Contractor Information:													
Jeovany Gutierrez Bautista			TER	ZONES									
Well Contractor Name		450	ft.	то 460 ft		descriptio Sand	N						
4125 A		430	ft.	400 ft	`	Janu							
NC Well Contractor Certification Number		15.01	Arrest I	483.5		ulti-cased we	lls) C	R LINE	R (if app	olicable)			
A.C. Schultes of Carolina,	Inc.	FROM		TO	1	nulti-cased wells) OR LINER (if applicable) DIAMETER THICKNESS MATERIAL							
Company Name	2005X	0	ft.	40	ft. 10 in. SCH 80 PVC NG OR TUBING (geothermal closed-loop)								
		FROM	NER	TO TO	10	DIAMETER	ERIAL						
2. Well Construction Permit #: List all applicable well construction permits (i.e.	UIC, County, State, Variance, etc.)	+3	ft.	450 ft	t. 4	4	in.	SDR17	7	PVC			
3. Well Use (check well use):		460	ft.	465 ft	t. 2	4	in.	SCH 8	0	PVC			
Water Supply Well:		17. SC FROM	REE	N TO	DI	AMETER	SLO	r SIZE	THICK	NESS	MATERIAL		
□Agricultural	□Municipal/Public		ft.	460 ft.	4		020				SS		
□Geothermal (Heating/Cooling Supply)	□Residential Water Supply (single)		ft.	ft.		in.							
□Industrial/Commercial	□Residential Water Supply (shared)	18. GI						Lesses		NOT A COMM	HOD & AMOUNT		
□Irrigation	□Wells > 100,000 GPD	FROM 0	ft.	436 f	t.	MATERIAL BENTONI	TF	PUM		NI METI	HOD & AMOUNT		
Non-Water Supply Well:	□Recovery	2	ft.	430		BENTONI		POU	Net control of the				
Monitoring Injection Well:	□Recovery	436	ft.	430	t.	DENTON	16	, 00	,,,,,,				
□Aquifer Recharge	☐Groundwater Remediation	10 84		GRAVEL PA	~~	(if applicable	e)						
□Aquifer Storage and Recovery	□Salinity Barrier	FROM	0	ТО	_	MATERIAL					Г МЕТНОD		
□Aquifer Test	□Stormwater Drainage	438	ft.	400	-	#2 GRAVE	EL		POUR	ED			
□Experimental Technology	□Subsidence Control		ft.		ît.								
□Geothermal (Closed Loop)	□Tracer	FROM		ING LOG (at	ttacl	n additional s DESCRIPTION	on (c	s if neces olor, hard	ssary) ness, soil/r	rock type.	grain size, etc.)		
☐Geothermal (Heating/Cooling Return)	□Other (explain under #21 Remarks)	J	ft.		ft.	See at							
4. Date Well(s) Completed: 5/11/202	20 Well ID# W29D13		ft.		ft.								
5a. Well Location:			ft.		ft.								
NCDEQ - DWR	Chinquapin Elem. School		ft.		ft.								
Facility/Owner Name	Facility ID# (if applicable)		ft.		ft.								
3894 S. NC 50 Hwy, Chind	quapin, NC		ft.	f	ft.								
Physical Address, City, and Zip			ft.		ft.								
Duplin	335900537011	21. R	EMAI	RKS									
County	Parcel Identification No. (PIN)												
5b. Latitude and longitude in degrees/m (if well field, one lat/long is sufficient)	inutes/seconds or decimal degrees:	22. Ce	rtific	ation:									
34.825912 _N -77	7.816403 w	١		^ .	_	1				_	20.20		
6. Is(are) the well(s): Permanent or	20 M. C.	Signatu	(<i>X</i> /	ع	Stude	700	(a) reserve	-	Date	- 80-80		
7. Is this a repair to an existing well:	□Yes or ♠No (15 NO	AC 0	2C .0100 or 1	15A	NCAC 02C .0	200	Well Con			in accordance with ds and that a copy		
If this is a repair, fill out known well construction	n information and explain the nature of the	of this	recora	l has heen pro	wide	ed to the well o	owne	r.					
repair under -21 remarks section or on the back	oj inis form.	23. Sit	e dia	gram or ad	lditi	ional well d	etail	s:	ditional	wall -	meterration last-		
 For Geoprobe/DPT or Closed-Loop Geonstruction, only 1 GW-1 is needed. Indidrilled: 		(add 'S	ice ()	ver in Rema	arks	Box). You r					onstruction info ages if necessary		
9. Total well depth below land surface: For multiple wells list all depths if different (exa	465 (ft.)			S GW-1 wit			well	comple	etion pe	r the fo	ollowing:		
10. Static water level below top of casing if water level is above casing, use "-"	12.5			All Wells: n Processing							sources (DWR)		
11. Borehole diameter: 9-7/8	(in.)			njection W 636 MSC, F					ground	Injectio	on Control (IUC		
12. Well construction method: Mud I (i.e. auger, rotary, cable, direct push, etc.)	Rotary	24c. For Water Supply and Open-Loop Geothermal Return Wells: Copy to the county environmental health department of the county where installed											
FOR WATER SUPPLY WELLS ONLY	/:	24d. For Water Wells producing over 100,000 GPD: Copy to DWR, CCPCUA Permit Program, 1611 MSC, Raleigh, NC 27699-1611											
13a. Yield (gpm)		1 cmil	, 110	grain, 1011	1410	C, Raicigil,	.10.	-10//-1	MIN				
13b. Disinfection type:	Amount:	99											

WELL CONSTRUCTION RECORD (GW-1)	For I	ntern	al Use	Only:								
1. Well Contractor Information:												
Jeovany Gutierrez Bautista	14. W	ATER	ZONE	S								
Well Contractor Name	FROM		TO		DESCRIPTION	ON						
4125 A	344	ft.	354	ft.	Sand							
NC Well Contractor Certification Number	15.01	1,132.3	CASIN	20,4315	sulti-cared w							
A.C. Schultes of Carolina, Inc.	FROM		TO		DIAMETER							
	0	ft.	40	F 357-44	10		SCH 8		PVC			
Company Name	16. IN		TO	G OR T	DIAMETER	BING (geothermal closed-loop) DIAMETER THICKNESS MATER						
2. Well Construction Permit #: List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.)	+3	ft.	344	ft.	4	in.	SDR1	7	PVC			
	354	ft.	359	ft.	4	in.	SCH 8	0	PVC			
3. Well Use (check well use):	17. SC				eren	CI O	E CLTE	ТНІСК	NECC	MATERIAL		
Water Supply Well: □Agricultural □Municipal/Public	FROM		то 354	ft. 4	IAMETER in.	.020	ΓSIZE	THICK	NESS	SS		
□Geothermal (Heating/Cooling Supply) □Residential Water Supply (single)	344	ft.	354	ft.	in.	.020		-				
□Industrial/Commercial □Residential Water Supply (shared)	19.0	ROUT	r		***							
□Irrigation □Wells > 100,000 GPD	FROM		ТО		MATERIAI	l.	EMPI	ACEME	NT MET	HOD & AMOUNT		
Non-Water Supply Well:	0	ft.	333	ft.	BENTON	IITE		IPED				
	333	ft.	335	ft.	BENTON	IITE	POU	RED				
Injection Well:		ft.		ft.								
□Aquifer Recharge □Groundwater Remediation				L PACE	(if applicab			EMBL 1	CEMEN	г метнор		
□Aquifer Storage and Recovery □Salinity Barrier	FROM	ft.	TO	ft.	#2 GRAV			POUR	N. S.	IMETHOD		
□Aquifer Test □Stormwater Drainage	335	ft.	359	ft.	#2 GRAV	/ EL		roon				
□Experimental Technology □Subsidence Control	20 D		INCLO		h additional	l choot	e if nacas	earu)				
□Geothermal (Closed Loop) □Tracer	FROM		TO	JG (attac	h additional DESCRIPT	ION (c	olor, hard	ness, soil/i	rock type.	, grain size, etc.)		
□Geothermal (Heating/Cooling Return) □Other (explain under #21 Remarks)]	ft.		ft.	See a	attac	hed					
4. Date Well(s) Completed: 5/15/2020 Well ID# W29D14		ft.		ft.								
5a. Well Location:		ft.		ft.								
NCDEQ - DWR Chinquapin Elem. School		ft.		ft.								
Facility/Owner Name Facility ID# (if applicable)		ft.		ft.								
3894 S. NC 50 Hwy, Chinquapin, NC		ft.		ft.								
Physical Address, City, and Zip		ft.		ft.								
Duplin 335900537011	21. R	EMA	RKS									
County Parcel Identification No. (PIN)	·											
5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees: (if well field, one lat/long is sufficient) 34.825978 N -77.816368 W	22. C	ertific	cation:	L Y	Դ	6				-20-20		
6. Is(are) the well(s): □Permanent or □Temporary 7. Is this a repair to an existing well: □Ves or □No	5A N	ni CAC 0	02C .010	00 or 15A		.0200	Well Con			in accordance wit		
If this is a repair, fill out known well construction information and explain the nature of the repair under =21 remarks section or on the back of this form.					tional well							
8. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same construction, only 1 GW-1 is needed. Indicate TOTAL NUMBER of wells drilled:	You i	may ι See Ο	ise the ever in	back of Remarks	this page to Box). You	to pro i may	vide ad			onstruction info ages if necessary		
9. Total well depth below land surface: 359 For multiple wells list all depths if different (example-3@200° and 2@100°) (ft.	Subn	nit thi	is GW-	l withi	n 30 days o	f well						
10. Static water level below top of easing: 40.9 If water level is above easing, use "-" (ft.	lnfor	For a	All W	ells: Or essing U	riginal form nit, 1617 M	n to l	Division Raleigh,	NC 276	ster Re 99-161	sources (DWR 7		
11. Borchole diameter: 9-7/8 (in.)								ground	Injectio	on Control (IUC		
12. Well construction method: Mud Rotary (i.e. auger. rotary. cable, direct push, etc.)	Program, 1636 MSC, Raleigh, NC 27699-1636 24c. For Water Supply and Open-Loop Geothermal Return Wells: Copy to the county environmental health department of the county where installed											
FOR WATER SUPPLY WELLS ONLY:	24d.	For V	Vater V	Wells p	roducing o	ver 10	00,000 (GPD: C	ору то	DWR, CCPCU.		
13a. Yield (gpm) Method of test;	- Perm	11 110	grain, l	IOI I IVIS	oc, Kaicign	, IVC .	£1077°1	OH				
13b. Disinfection type: Amount:	-											

WELL CONSTRUCTION RE	ECORD (GW-1)	For I	ntern	al Use (Only:								
1. Well Contractor Information:													
Jeovany Gutierrez Bautista		14. WA	TER	ZONES									
Well Contractor Name		FROM 165	ft.	то 175	ft.	DESCRIPTIO	ON						
4125 A		100	ft.	1/5	ft.	Sand							
NC Well Contractor Certification Number		15. OU	0.00	CASING	0.000	nulti-cased w	ells) C	R LINI	ER (if app	plicable)			
A.C. Schultes of Carolina,	Inc.	FROM		то		DIAMETER THICKNESS MATERIAL							
Company Name		0	ft.	40	ft.	10 UBING (geot		SCH 8	2570	PVC			
2. Well Construction Permit #:		FROM	VER	TO	OK I	DIAMETER		THICK		MATE	RIAL		
List all applicable well construction permits (i.e.	UIC, County, State, Variance, etc.)	+3	ft.	165	ft.	4	in.	SDR1	7	PVC			
3. Well Use (check well use):		175	ft.	180	ft.	4	in.	SCH 8	30	PVC			
Water Supply Well:		17. SC FROM		TO	D	IAMETER	SLOT	SIZE	THICK	NESS	MATERIAL		
□Agricultural	□Municipal/Public		7	175 f		in.	.020				SS		
□Geothermal (Heating/Cooling Supply)	□Residential Water Supply (single)		ft.	· f		in.							
□Industrial/Commercial	□Residential Water Supply (shared)	18. GF	OUT		1				· · cevies	er Mer	IOD & IMOUNT		
□lrrigation Non-Water Supply Well:	□Wells > 100,000 GPD	FROM 0	ft.	158	ft.	BENTON			1PED	NI MEII	IOD & AMOUNT		
Monitoring	□Recovery	158	ft.	160	ft.	BENTON		-	IRED		-		
Injection Well:		100	ft.	100	ft.	BENTON		1 00	110				
□Aquifer Recharge	☐Groundwater Remediation	19. SA		RAVEL	7000	(if applicabl	le)						
□Aquifer Storage and Recovery	□Salinity Barrier	FROM	, v	ТО	70.00	MATERIAL			D. EGS. W. C. S.		METHOD		
□Aquifer Test	□Stormwater Drainage	160	ft.	180	ft.	#2 GRAV	EL		POUR	ED			
□Experimental Technology	□Subsidence Control		ft.		ft.	<u> </u>							
Geothermal (Closed Loop)	□Tracer	FROM		TO	(attac	h additional DESCRIPTI				ock type.	grain size, etc.)		
☐Geothermal (Heating/Cooling Return)	□Other (explain under #21 Remarks)		ft.		ft.	See a	ttac	hed					
4. Date Well(s) Completed: 5/27/202	20 Well ID# W29D15		ft.		ft.								
5a. Well Location:			ft.		ft.								
NCDEQ - DWR	Chinquapin Elem. School		ft.		ft.								
Facility/Owner Name	Facility ID# (if applicable)		ft.		ft.								
3894 S. NC 50 Hwy, Chind	quapin, NC		ft.		ft.								
Physical Address, City, and Zip			ft.		ft.								
Duplin	335900537011	21. RI	EMAI	RKS									
County	Parcel Identification No. (PIN)												
5b. Latitude and longitude in degrees/m (if well field, one lat/long is sufficient)	inutes/seconds or decimal degrees:	22. Ce	rtific	ation:									
34.825978 _N -77	7.816368 w	Ñ		0		- A		n		_	2.2-70		
6. Is(are) the well(s): Permanent or			/ /	crtified	Vell C	operación de	_	7		Date	30-20		
7. Is this a repair to an existing well:	□Yes or •No	JEA NO	AC 0	20,0100	or 15/	NCAC 02C.	0200	Well Con			in accordance with eds and that a copy		
If this is a repair, fill out known well construction	n information and explain the nature of the	of this i	ecora	has been	provid	led to the well	owne	r.					
8. For Geoprobe/DPT or Closed-Loop Construction, only 1 GW-1 is needed. Indi	Geothermal Wells having the same	You n	nay u	se the ba	ack of		o pro	vide ad			enstruction info		
drilled:	—	24. SI	ВМ	ITTAL I	NSTI	RUCTIONS							
9. Total well depth below land surface: For multiple wells list all depths if different (exa	180 (ft.)	Subm	it thi	s GW-1	withi	n 30 days of	f well						
10. Static water level below top of casing If water level is above casing, use "-"	g:(ft.)	Inform	ation	1 Process	ing U	nit, 1617 M	SC, R	taleigh,	NC 276	99-161			
	(in.)					s: Copy to I eigh, NC 27			rground	Injectio	on Control (IUC		
12. Well construction method: Mud I (i.e. auger, rotary, cable, direct push, etc.)	Rotary	24c. For Water Supply and Open-Loop Geothermal Return Wells: Copy to the county environmental health department of the county where installed											
FOR WATER SUPPLY WELLS ONLY		24d. For Water Wells producing over 100,000 GPD: Copy to DWR, CCPCUA Permit Program, 1611 MSC, Raleigh, NC 27699-1611											
13a. Yield (gpm)													
13b. Disinfection type:	Amount:												

WELL ABANDONMENT RECORD For Internal Use ONLY: WELL ABANDONMENT DETAILS 1. Well Contractor Information: 7a. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same well construction/depth, only 1 GW-30 is needed. Indicate TOTAL NUMBER of Jeovany Gutierrez Bautista Well Contractor Name (or well owner personally abandoning well on his/her property) wells abandoned:_ 7b. Approximate volume of water remaining in well(s): _ . 2 5 4125 A NC Well Contractor Certification Number FOR WATER SUPPLY WELLS ONLY: A. C. Schultes of Carolina, Inc. 7c. Type of disinfectant used: ____ Chloring Company Name 2. Well Construction Permit #: List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.) if known 3. Well use (check well use): 7e. Sealing materials used (check all that apply): Water Supply Well: ☐ Bentonite Chips or Pellets ■ Neat Cement Grout ☐Municipal/Public □Agricultural □ Dry Clay ☐ Sand Cement Grout □Residential Water Supply (single) ☐Geothermal (Heating/Cooling Supply) ☐ Drill Cuttings ☐ Concrete Grout □Residential Water Supply (shared) □Industrial/Commercial ☐ Gravel ☐ Specialty Grout □lrrigation ☐ Other (explain under 7g) Non-Water Supply Well: ☐ Bentonite Slurry □Recovery ■Monitoring 7f. For each material selected above, provide amount of materials used: Injection Well: ☐Groundwater Remediation □Aquifer Recharge ·5 yards □Aquifer Storage and Recovery ☐Salinity Barrier ☐Stormwater Drainage □Aquifer Test □Subsidence Control 7g. Provide a brief description of the abandonment procedure: □Experimental Technology ☐Geothermal (Closed Loop) Tremie pipe used to pump grout to fill bottom. ☐Geothermal (Heating/Cooling Return) □Other (explain under 7g) Topped off with neat cement 4. Date well(s) abandoned: 5/20/2020 5a. Well location: Chinquapin Elem. School NCDEQ - DWR 8. Certification: Facility ID# (if applicable) Facility/Owner Name 3894 S. NC 50 Hwy, Chinquapin, NC Physical Address, City, and Zip 335900537011 Duplin By signing this form, I hereby certify that the well(s) was (were) abandoned in accordance with 15A NCAC 02C .0100 or 2C .0200 Well Construction Standards Parcel Identification No. (PIN) County and that a copy of this record has been provided to the well owner. 5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees: (if well field, one lat/long is sufficient) 9. Site diagram or additional well details: You may use the back of this page to provide additional well site details or well -77.812048 34.824016 abandonment details. You may also attach additional pages if necessary. CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED SUBMITTAL INSTRUCTIONS Attach well construction record(s) if available. For multiple injection or non-water supply wells ONLY with the same construction abandonment, you can submit one form 10a. For All Wells: Submit this form within 30 days of completion of well 6a. Well ID#: W29D5 abandonment to the following: Division of Water Resources, Information Processing Unit, 6b. Total well depth: 160 1617 Mail Service Center, Raleigh, NC 27699-1617 10b. For Injection Wells: In addition to sending the form to the address in 10a 6c. Borehole diameter: 3 7/8 above, also submit one copy of this form within 30 days of completion of well abandonment to the following: 6d. Water level below ground surface: 7.6 Division of Water Resources, Underground Injection Control Program, 1636 Mail Service Center, Raleigh, NC 27699-1636 6e. Outer easing length (if known): N/A 10c. For Water Supply & Injection Wells: In addition to sending the form to the

6f. Inner casing/tubing length (if known): 100

6g. Screen length (if known): 60

abandoned.

address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where

WELL ABANDONMENT RECORD 1. Well Contractor Information: Jeovany Gutierrez Bautista Well Contractor Name (or well owner personally abandoning well on his/her property) 4125 A NC Well Contractor Certification Number A. C. Schultes of Carolina, Inc. Company Name 2. Well Construction Permit #: List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.) if known 3. Well use (check well use): Water Supply Well: ☐Municipal/Public □Agricultural □Residential Water Supply (single) ☐Geothermal (Heating/Cooling Supply) □Residential Water Supply (shared) □Industrial/Commercial □Irrigation Non-Water Supply Well: □Recovery **■**Monitoring Injection Well: ☐Groundwater Remediation □Aquifer Recharge ☐Salinity Barrier ☐ Aquifer Storage and Recovery ☐Stormwater Drainage □Aquifer Test □Subsidence Control □Experimental Technology □Geothermal (Closed Loop) □Other (explain under 7g) Geothermal (Heating/Cooling Return) 5a. Well location: Chinquapin Elem. School NCDEQ - DWR Facility ID# (if applicable) Facility/Owner Name 3894 S. NC 50 Hwy, Chinquapin, NC Physical Address, City, and Zip 335900537011 Duplin Parcel Identification No. (PIN) County 5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees: (if well field, one lat/long is sufficient) 34.824016 -77.812048 CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED Attach well construction record(s) if available. For multiple injection or non-water supply wells ONLY with the same construction abandonment, you can submit one form. 6a. Well ID#: _W29D6

WELL ABANDONMENT DETA	AILS
well construction/depth, only 1 GV wells abandoned:	I-Loop Geothermal Wells having the same V-30 is needed. Indicate TOTAL NUMBER of
7b. Approximate volume of wate	er remaining in well(s):(gal.)
FOR WATER SUPPLY WELL	
	Chlorine
7d. Amount of disinfectant used	-
7d. Amount of disinfectant used	:
7e. Sealing materials used (chec	k all that apply):
■ Neat Cement Grout	☐ Bentonite Chips or Pellets
☐ Sand Cement Grout	☐ Dry Clay
☐ Concrete Grout	□ Drill Cuttings
☐ Specialty Grout	□ Gravel
☐ Specially Grout ☐ Bentonite Slurry	☐ Other (explain under 7g)
5040 AMBERIO 2009 AMERICA (A.C. 1981)	
L	bove, provide amount of materials used:
2 yards	
7g. Provide a brief description of	
Tremie pipe used to	pump grout to fill bottom.
Topped off with neat	Cement
8. Certification:	
0 - 6	
July July Davi	5-30-20
Signature of Certified Well Contractor	r or Well Owner Date
By signing this form hereby of	certify that the well(s) was (were) abandoned in
accordance with 15A NCAC 02C	.0100 or 2C .0200 Well Construction Standards
and that a copy of this record has	s been provided to the well owner.
9. Site diagram or additional w	ell details:
You may use the back of this pa	age to provide additional well site details or well
abandonment details. You may a	also attach additional pages if necessary.
SUBMITTAL INSTRUCTION	<u>'S</u>
10a. For All Wells: Submit t abandonment to the following:	his form within 30 days of completion of well
	sources, Information Processing Unit, e Center, Raleigh, NC 27699-1617
10b. For Injection Wells: In a above, also submit one copy of abandonment to the following:	ddition to sending the form to the address in 10a this form within 30 days of completion of well
Division of Water Resource 1636 Mail Service	es, Underground Injection Control Program, e Center, Raleigh, NC 27699-1636
10c. For Water Supply & Injec	tion Wells: In addition to sending the form to the

address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where

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6b. Total well depth: 470

6c. Borchole diameter: 4.5

6d. Water level below ground surface: 46.12

6e. Outer easing length (if known): N/A

6f. Inner casing/tubing length (if known): 460

6g. Screen length (if known): 10

abandoned.

WELL ABANDONMENT DETAILS 1. Well Contractor Information: 7a. For Geoprobe/DPT or Closed-Loop Geothermal Wells having the same Jeovany Gutierrez Bautista well construction/depth, only 1 GW-30 is needed. Indicate TOTAL NUMBER of Well Contractor Name (or well owner personally abandoning well on his/her property) wells abandoned: 4125 A 7b. Approximate volume of water remaining in well(s): 2.6 NC Well Contractor Certification Number FOR WATER SUPPLY WELLS ONLY: A. C. Schultes of Carolina, Inc. Company Name 7c. Type of disinfectant used: ___ 2. Well Construction Permit #: List all applicable well construction permits (i.e. UIC, County, State, Variance, etc.) if known 7d. Amount of disinfectant used: 3. Well use (check well use): 7e. Sealing materials used (check all that apply): Water Supply Well: ☐ Bentonite Chips or Pellets ■ Neat Cement Grout ☐Municipal/Public □Agricultural ☐ Dry Clay ☐ Sand Cement Grout □Residential Water Supply (single) ☐Geothermal (Heating/Cooling Supply) ☐ Drill Cuttings □Residential Water Supply (shared) ☐ Concrete Grout □Industrial/Commercial ☐ Gravel ☐ Specialty Grout □Irrigation ☐ Other (explain under 7g) Non-Water Supply Well: □ Bentonite Slurry □Recovery **■**Monitoring 7f. For each material selected above, provide amount of materials used: Injection Well: ☐Groundwater Remediation □Aquifer Recharge · 10 yords □Aquifer Storage and Recovery ☐Salinity Barrier □Stormwater Drainage □Aquifer Test □Subsidence Control □Experimental Technology 7g. Provide a brief description of the abandonment procedure: □Geothermal (Closed Loop) □Tracer Tremie pipe used to pump grout to fill bottom to top □Other (explain under 7g) Geothermal (Heating/Cooling Return) 4. Date well(s) abandoned: 5/20/2020 5a. Well location: Chinquapin Elem. School NCDEQ - DWR 8. Certification: Facility ID# (if applicable) Facility/Owner Name 3894 S. NC 50 Hwy, Chinquapin, NC Physical Address, City, and Zip 335900537011 Duplin signing this form. I hereby certify that the well(s) was (were) abandoned in Parcel Identification No. (PIN) accordance with 15A NCAC 02C .0100 or 2C .0200 Well Construction Standards County and that a copy of this record has been provided to the well owner. 5b. Latitude and longitude in degrees/minutes/seconds or decimal degrees: (if well field, one lat/long is sufficient) 9. Site diagram or additional well details: You may use the back of this page to provide additional well site details or well · -77.812048 34.824016 abandonment details. You may also attach additional pages if necessary. CONSTRUCTION DETAILS OF WELL(S) BEING ABANDONED SUBMITTAL INSTRUCTIONS Attach well construction record(s) if available. For multiple injection or non-water supply wells ONLY with the same construction abandonment, you can submit one form 10a. For All Wells: Submit this form within 30 days of completion of well 6я. Well ID#: _W29D9 abandonment to the following: Division of Water Resources, Information Processing Unit, 6b. Total well depth: 10 1617 Mail Service Center, Raleigh, NC 27699-1617 10b. For Injection Wells: In addition to sending the form to the address in 10a 6c. Borehole diameter: 7 5/8 above, also submit one copy of this form within 30 days of completion of well abandonment to the following: 6d. Water level below ground surface: 5.6 Division of Water Resources, Underground Injection Control Program, 1636 Mail Service Center, Raleigh, NC 27699-1636 6e. Outer casing length (if known): N/A 10c. For Water Supply & Injection Wells: In addition to sending the form to the address(es) above, also submit one copy of this form within 30 days of completion of well abandonment to the county health department of the county where 6f. Inner casing/tubing length (if known): 6 abandoned.

For Internal Use ONLY:

WELL ABANDONMENT RECORD

6g. Screen length (if known): 4

APPENDIX B GROUND WATER SAMPLING PROTOCOL

Ground Water Sampling Protocol

Samples for the ambient monitoring program were collected in accordance with DWR procedures outlined in NCDWQ/APS 2006 to ensure that high quality, defensible data was collected. To ensure that only newly recharged ground water was being sampled, wells were pumped until three well volumes had been removed. Where a well's total volume was too high to feasibly pump out three volumes, wells were purged until water quality parameters (temperature, pH, specific conductance, and dissolved oxygen) of purge water stabilized. Both submersible and peristaltic pumps were used in the field at the sampler's discretion depending on the total depth of the well and the hydraulic head difference to be overcome when pumping from the water table to the surface. To prevent contamination introduced while sampling, nitrile gloves were worn during all sampling events. Pumps were decontaminated after each use. In addition, blanks and duplicate samples were collected to provide quality assurance/quality control information. Trip blanks were taken on each sampling trip, and equipment blanks were taken from all equipment then analyzed. Field duplicates were taken to comprise 10% of the total samples collected.

The ground water was analyzed for a broad suite of water quality and water chemistry parameters (see table below). Data from the ambient monitoring program may be used to characterize ground water throughout the state as well as to address the concerns other programs and projects. Within DWR these concerns include for example salt water intrusion due to overpumping, the source of organic nitrogen found in surface water bodies, the impact of concentrated farming activities on drinking water supplies, and the levels of naturally occurring contaminants such as metals. Since most of these wells are somewhat geographically isolated from human activities, the water collected is more likely to represent ambient conditions and not contamination.

Table of Sampling Parameters								
Parameter Group	Parameters							
Private Well Analytes	arsenic, barium, cadmium, chromium, copper, fluoride, lead, iron,							
(15A NCAC 18A .3803)	magnesium, manganese, mercury, nitrate, nitrite, selenium, silver, sodium, zinc, pH							
Nutrients*	Ammonia, total kjeldahl nitrogen, organic nitrogen, phosphorus							
Metals (Dissolved and	Aluminum, antimony, beryllium, boron, calcium, cobalt, lithium,							
Total)*	molybdenum, nickel, potassium, strontium, thallium, tin, titanium,							
	vanadium							
Major Ions	Bromide, chloride, fluoride, sulfate, carbonate, bicarbonate							
PFAS	Per-and Polyfluoroalkyl compounds							
Field Parameters	Specific conductivity, pH, dissolved oxygen (DO), oxidation-							
	reduction potential (ORP), temperature							
Organic Compounds	Volatile organic compounds, Semi-volatile organic compounds,							
	Pesticides, select Per- and Polyfluoroalkyl Substances (PFAS)							
Other	Alkalinity, total organic carbon, turbidity, total dissolved solids,							
	silica, sulfide							

^{*}In addition to those required by 15A NCAC 18A .3803

References:

DCDWQ/APS, 2006, Quality Assurance/Quality Control and Standard Operating Procedures Manual for Sample Collection, December 2006

15a NCAC 18a Section .3800 - Private Drinking Water Well Sampling, .3803 - Sample Analysis

APPENDIX C

CENTRAL COASTAL PLAIN CAPACITY USE AREA 2019 WATER WITHDRAWAL SUMMARY TABLES

Choose a year... 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2002 return to CCPCUA page

Central Coastal Plain Capacity Use Area 2019 Water Withdrawal Summary Tables

Permitted Reported for 2019								Reported for 2019												
	Ground Water Surface Water						Current Permit Limits					Ground Water					Surface Water			
County	max daily	yearly (ABRs)	yearly (2018)	by all permits	# of permits		by yearly permits	by registrations	by registrations	Type of Use		max daily	yearly (ABRs)	yearly (2018)	by all permits	# of permits r	% eported	by yearly permits	by registrations	by registrations
eaufort	179,624,400			41,296,130	40	60		7,163	94,172	Agricultural	20	04,248,125	620,61	400,004	7,286,307	128	64	109,177	164,526	1,323,321
arteret	27,428,080			7,253,007	19	74		158,839		Golf Course Irriga	ation	3,954,000	85,58	85,589	149,305	11	64		39,774	83,577
raven	74,816,800	6,956,526	1,814,132	22,305,774	35	74	2,968,146	9,387	16,887,539	Industrial	1	15,643,200	4,473,11	2,471,853	4,386,875	14	100	1,203,729	182,190	47,951,183
uplin	69,952,325	2,805,747	2,297,255	8,540,366	57	81	1,894,362	99,924	3,635	Mine Dewatering	25	54,218,080			64,882,794	65	75		49,388	1,253,476
dgecombe	12,564,000	527,697	429,388	1,164,774	11	91	274,022	11,951	1,357,348	Other		8,858,480	368,56	300,003	209,714	12	75	116,699		
reene	191,000	3,058,197	914,551	1,059,090	4	100	1,037,882	48,462	577,184	Public Water Sup		37,147,680	50,393,01	15,601,016	61,375,408	87	95	15,640,923	345,247	31,337,583
ones	48,929,600	679,282	169,821	14,330,809	11	82	329,018			Thermal Electric F										
enoir	-	13,522,312		4,952,474	16	81	3,121,852			Totals:	62	24,069,565	55,940,89	1 18,858,465	138,290,404	317	77	17,070,528	781,126	81,949,140
lartin	4,440,000	4,895,506		1,379,013	14	79	759,642	115,330	27,062,547	Permitted Reported for 2019										
nslow	62,650,600	9,845,143	2,461,286	23,911,331	19	79	3,881,964	134,227				Ground Water								
amlico	34,028,000			2,080,334	12	67	10	<u> </u>		Aquifer	max d		early	yearly	by all	# of	%		yearly	by
itt		8,651,572	2,521,003	1,964,965	22	86	1,316,270	58,882	14,359,655		The second	-	BRs)	(2018)	permits	permits	repor		ermits I	registrations
/ashington	65,628,000			2,170,780	35	71				Basement rock	14,306				1,812,528	1		91		219,694
/ayne	19,129,200	4,340,026	2,010,532	4,853,266	23	87	1,133,321	a .		Black Creek	33,085		884,121	7,173,409	12,709,238	6			9,203,800	148,566
/ilson	7,164,160	658,883	491,218	1,028,290	6	83	354,050	136,961	9,593,158	Peedee	20,380		877,228	1,785,236	1,633,043	2	100	78	128,890	61,758
	624,069,565						17,070,528	781,126		Upper Cape Fear	47,835	5,362 27,	129,542		13,271,254	8	5	100	7,727,119	115,035
arly permit li nits allow per	mits are linked to mit holders more t	withdrawals from lexibility to plan	n the Cretaceou when withdraw	us aquifers where	e reduction: ABR refers t	s are mand o "Approve	ated. As phas d Base Rate*:	ed reductions oc and is the annual	cur, annual rate calculated	Lower Cape Fear	101 001		50,001	50,001	62,751		1		10,719	171.000
sed on 1997	or August 1, 1999	through July 3	1, 2000 withdra	wals. The ABR	is the annu	al rate from	which reducti	ons take place (s	ee CCPCUA	Surficial	131,631				24,317,530	7	_	69		174,886
	(2018)" is the fina ported by all permi				ion are aon	iinisterea.	rigures in the	by all permits: ci	olumns are total		339,624				83,646,881	12	9	66		343,126
				in two counties	so those p	ermits are	counted twice.			Beaufort	3,495	5,250								63,15
										Upper Tertiary	00.744	1 000	_	-	007.470			00		20.454
										Yorktown	33,711	40000			837,178	1	200	60		32,451
										Totals:	624,069	9,565 55,	940,891	18,858,465	138,290,404	406*		76 1	7,070,528	781,126

