WELLHEAD PROTECTION PLAN

for

Dare County Water Department
Dare County, North Carolina

Public Water Supply Identification Numbers:

- Dare County Regional, 04-28-030
- Joseph "Mac" Midgett, 04-28-035
- Cape Hatteras, 04-28-025
- Stumpy Point WSD, 60-28-002

March 24, 2014
Revision 3

Mr. Ken Flatt, Public Utilities Director
Dare County Water Department
600 Mustain Street
Kill Devil Hills, North Carolina 27948
(252) 475-5606,
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COUNTY OF DARE
MANTEO, NORTH CAROLINA 27954

WATER DISTRIBUTION

600 MUSTIAN STREET
KILL DEVIL HILLS NC 27948
(919) 441-7788

Gale Johnson, P.G.
NC Public Water Supply
1634 Mail Service Center
Raleigh, NC 27699-1634

July 1, 2014

Dear Mr. Johnson:

Please find enclosed a copy of the Wellhead Protection Plan for Dare County. The plan has been revised with your recommendations, and includes a well construction record for the new Skyco Well 14. I have read and approve the plan as presented.

Dare County has provide public notice of the plan by advertising in the Coastland Times on June 1, 2014 and given the public 30 days to review the document. No public comments were received concerning the plan.

I have attached a copy of the newspaper affidavit confirming the notices publication.

Sincerely,

KC Flatt

Ken Flatt
Dare County Utilities Director

PUBLIC NOTIFICATION

The Dare County Water Department, with assistance from the North Carolina Rural Water Association, is in the process of updating their Wellhead Protection Program. This is a voluntary program intended to assist us in protecting the system's water supply from contamination, and to identify vulnerable areas around our wells called "Wellhead Protection Areas." Another goal of this program is to make residents and businesses aware that chemicals and other pollutants spilled or dumped in the vicinity of the "Wellhead Protection Areas" can be drawn into the wells, possibly contaminating the system's drinking water supply.

The Dare County Water Department is asking for your help in developing this program. A draft copy of the Wellhead Protection Plan will be available for review and comment at the Dare County Water Department, at 600 Mustian Street in Kill Devil Hills, for a period of thirty days. You can also review the Wellhead Protection Plan on line at the web link:

http://www.darenc.com/water/Papers/WellheadProtection2013.pdf

Please submit any comments or suggestions to the Dare County Water Department. All written public comments will be reviewed by the Wellhead Protection Committee, and any suggestions or comments that may be beneficial will be incorporated into the program.

If you have any questions or comments, please feel free to contact Mr. Ken Flatt, Utilities Director, at (252) 475-5606.

6-1c

NORTH CAROLINA

DARE COUNTY.

AFFIDAVIT OF PUBLICATION

Before the undersigned, a Notary Public of said County and State, duly commissioned, qualified, and authorized by law to administer oaths, personally appeared Susan M. Simpson, treasurer, who being first duly sworn, deposes and says: that he (she) is of The Times Printing Co., Inc., engaged in the publication of a newspaper known as THE COASTLAND TIMES, published, issued, and entered as second class mail in the Town of Manteo, in said County and State; that he is authorized to make this affidavit and sworn statement; that the notice or other legal advertisement, a true copy of which is attached hereto, was published in THE COASTLAND TIMES on the following dates:

June 1, 2014

and that the said newspaper in which said notice, paper, document, or legal advertisement was published was, at the time of each and every such publication, a newspaper meeting all of the requirements and qualifications of Sections 1-596 and 1-597 of the General Statutes of North Carolina and was a qualified newspaper within the meaning of Section 1-597 of the General Statutes of North Carolina.

This 26th ~~day of~~ June, 2014

Sworn to and subscribed to before me, this 26th day of June, 2014

Patricia A. McClenay
Notary Public

My Commission expires: Aug. 12, 2015

BACKGROUND

In 1986, Safe Drinking Water Act amendments added Section 1428, "State Programs to Establish Wellhead Protection Areas," which requires each state to develop a program to "protect wellhead areas within their jurisdiction from contaminants which may have any adverse affects on the health of persons". The term wellhead protection area (WHPA) is defined in the law as "the surface and subsurface area surrounding a water well or wellfield, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or wellfield". North Carolina's EPA-approved Wellhead Protection Program provides technical support to local governments and public water supply systems in their endeavors to develop and implement their own Wellhead Protection Plans (WHPPs).

North Carolina's objective in developing a protection plan is to provide a process for public water system operators to learn more about their groundwater systems and how to protect them. Wellhead Protection Plans allow communities to take charge of protecting the quality of their drinking water by identifying and carefully managing areas that supply groundwater to their public wells. Implementation of a WHPP in North Carolina is voluntary.

INTRODUCTION

Dare County is located entirely within the Tidewater Region of central eastern North Carolina. While most of the land area in the county is on the easternmost portion of the North Carolina mainland, the majority of the state's barrier islands are also within the county limits. Manteo, the County Seat, is located on Roanoke Island, between the mainland and the Outer Banks. Figure 1 shows the location of the county's five water treatment plants. This plan was developed as a five-year update of the 2006 WHPP.

Elevations in the county range from sea level to a height of 138 feet at Jockey's Ridge State Park, which is the largest natural sand dune in the eastern United States. The average elevation in the county is 11 feet above sea level. Surface sediments are of Pleistocene to recent age and consist of sands, clays, gravels, and peats, which were deposited in marine environments. With the exception of the dune ridges along the Outer Banks, the terrain in Dare County is flat with slopes of only a few feet per mile. Drainage in the area is directly to the ocean and sounds.

The economy in Dare County is driven by the tourist industry and because of Dare's beautiful beaches and attractions, the population is highly seasonal. There are approximately 34,573 year-round residents as of 2012 (US Census Bureau). During the peak summer vacation season, the population swells to more than 225,000. The county has numerous cultural and historical places of interest, including parks, gardens, and museums, which draw thousands of visitors to the Outer Banks each year. The county is

home to the famous Cape Hatteras and Bodie Island Lighthouses, the Wright Brothers National Memorial, Jockey's Ridge State Park, and the Bonner Bridge spanning Oregon Inlet. The adjacent Atlantic Ocean and sounds, with their prolific numbers of game fish of many species, make it a year-round attraction for fishermen.

The Dare County Water Department service area extends from the Town of Duck on the northern Outer Banks, to Cape Hatteras in the south. The system's water plants also serve Roanoke Island and a small area on the mainland. The population served by the Water Department is highly variable due to seasonal tourism. The average daily usage for the five water plants which comprise the Water Department is 8.15 million gallons per day. Dare County's water systems have a total of over 357 miles of distribution lines and the water supply comes entirely from groundwater.

The county water system is composed of four separate water systems, each with unique Public Water Supply identification numbers (PWSIDs):

- Dare County Regional Water System (composed of the Skyco ion exchange and North Reverse Osmosis water treatment plants);
- Joseph "Mac" Midgett reverse osmosis plant (formerly the RWS plant);
- Cape Hatteras reverse osmosis-ion exchange plant; and
- Stumpy Point WSD reverse osmosis plant.

Two of the service areas (Mac Midgett and Hatteras) are on the barrier islands, one is on the mainland (Stumpy Point), and one system serves portions of Roanoke Island and the northern Outer Banks (Dare Regional). Water sources include the confined Tertiary-age Yorktown aquifer, and the unconfined surficial aquifer of the Buxton Woods area, which is unique to the Hatteras water treatment plant. The County systems use a variety of techniques to purify and desalinate raw water. Table 1 lists available data for wells in the Dare County water systems. The well construction record for Skyco 14 well is included in the appendix, as the well was added since the last revision of this plan.

North RO Water Plant and Skyco Ion Exchange Water Plants

The Dare County Regional system (PWSID 04-28-030) is composed of the North reverse osmosis (NRO) plant, which serves the northern outer banks and all towns north of Oregon Inlet, and the Skyco plant, which serves portions of Roanoke Island. The Regional System serves approximately 22,800 persons.

The Skyco ion exchange plant (Figure 2), was brought on line in 1979. It can produce 6 million gallons of finished water from its ten water supply wells in the confined aquifer, and serves Manteo and the Dare beaches. One well has been constructed since the 2006 Wellhead Protection Plan in the northern portion of the Skyco wellfield. Skyco 14's location slightly enlarged the wellhead protection area, but included no new potential contaminant sources. The system has two million gallons of ground storage capacity, and a 200,000 gallon elevated storage tank. Skyco is interconnected to the NRO plant by a 24-inch main running under the Roanoke Sound. Auxiliary generators can operate the entire plant during power outages.

The NRO plant (Figures 3A through 3D), brought on line in 1989, is also part of the Dare Regional system. This plant is capable of producing 5 million gallons per day, and serves the northern Outer Banks towns of Duck, Southern Shores, and Kitty Hawk, with wholesale service to the towns of Nag's Head and Kill Devil Hills. The NRO plant has 14 water supply wells screened in the Yorktown aquifer, and two 5 million gallon ground storage tanks. Elevated water storage tanks are located in Duck (1 MG), Southern Shores (0.5 MG), and Colington (0.5 MG). Auxiliary diesel generators can support the production of two million gallons per day in the event of a power outage.

Stumpy Point Reverse Osmosis Water Plant

The Stumpy Point Reverse Osmosis plant (PWSID 60-28-002) has two deep wells that supply water to 138 accounts on the mainland (Figure 4). The system began operation in late 2002, and has a 75,000 gallon elevated storage tank. The system has a finished water production capacity of 60,000 gallons per day, and serves approximately 125 residences. Emergency generators can support operations for the entire plant. There are no interconnections with other systems.

Joseph "Mac" Midgett Reverse Osmosis Water Plant

The Joseph "Mac" Midgett (formerly the Rodanthe, Waves, and Salvo Plant) reverse osmosis drinking water plant (PWSID 04-28-035), located on the southern Outer Banks, was brought on line in 1996. Figure 5 shows the location of the Mac Midgett water plant wellhead protection area. The system has two deep wells screened in the mid-Yorktown aquifer, one-million gallons of ground storage, and a 200,000 gallon elevated storage tank at Chicomacomico. The plant is capable of producing 1.25 million gallons per day. Portable generators can support plant operations in the event of power outages. The system has no interconnections and serves approximately 1,800 customers.

Cape Hatteras Reverse Osmosis and Anion Exchange Water Plant

The Hatteras reverse osmosis and anion exchange water treatment plant (PWSID 04-28-035) is located on Hatteras Island, and is capable of producing 2 million gallons per day. The plant serves Avon, Buxton, Frisco, and Hatteras and uses two separate treatment processes: Anion exchange and filtration, and reverse osmosis. Figure 6 depicts the WHPA for the Cape Hatteras wellfield. The system has a total of 23 water supply wells, four of which are deep wells screened in the confined Yorktown aquifer, which are connected to the reverse osmosis plant, and 19 wells that produce fresh water from the surficial aquifer after treatment in the anion exchange/filtration system. The system began operation in early 2000. There is a 400,000 gallon elevated storage tank in the town of Avon, two elevated tanks in Buxton (100,000, and 400,000 gallons), and a 300,000 gallon tank in Hatteras. The system has two auxiliary generators and one portable generator that can support the production of one million gallons per day during power disruptions. There are no interconnections with other systems, and the plant serves approximately 5,500 customers.

Dare County Water Department Mission Statement

"Our water system personnel are dedicated to providing the community with safe, clean, healthy, fresh water for drinking and other purposes, 24 hours a day, for a reasonable cost."

Dare County is a beautiful vacation area and a valuable natural resource of state and national importance. The County water department prides itself on delivering safe, high quality drinking water to its year-round citizens and the thousands of tourists that visit each year.

I. THE WELLHEAD PROTECTION COMMITTEE

A Wellhead Protection Committee (WPC) was formed to develop a Wellhead Protection Plan for Dare County. The Committee consists of:

- Mr. Ken Flatt, Public Utilities Director,
- Mr. Ryan Brower, Dare County Public Utilities,
- Mr. Lawrence Battaile, Plant Superintendent, NRO Plant,
- Mr. Terry Goldman, Plant Superintendent, Cape Hatteras Plant,
- Mr. Jerry Lofland, Plant Superintendent, Mac Midgett Plant, and,
- Mr. Keith Starner, North Carolina Rural Water Association.

The Public Utilities Director and the Assistant Utilities Director are responsible for implementing the plan. They have accepted the recommendations made in the plan by the WPC. Dare County will begin implementation of the plan immediately following approval by the Public Water Supply Section of NCDENR and will complete implementation within ninety (90) days.

Upon completion of the implementation phase of the Wellhead Protection (WHP) Plan, the Utilities Director will submit notification to the Public Water Supply Section in accordance with the schedule set forth in the approved WHP Plan.

The purpose of this Wellhead Protection Plan is to protect the County's groundwater resources by effective management of potential contaminants through public education, and to obtain additional preference points for construction grants and loans.

II. DELINEATING THE WELLHEAD PROTECTION AREA

The majority of the wells in the Dare County Water System draw water from the confined Yorktown aquifer, which is isolated from the land surface by a clay sedimentary unit confining layer. The wellhead protection areas for these wells were delineated using a ten-year time of travel aquifer source volume method. The delineations resulted in a

single large wellhead protection area for the Skyco wellfield, a set of five WHPAs for the NRO wells, and a single, circular WHPA for the Stumpy Point and Mac Midgett wellfields.

The nineteen shallow wells located on Hatteras Island draw water from the Buxton Woods unconfined surficial aquifer. This aquifer receives water directly from recharge in the form of precipitation, and there are no clay confining units to isolate and protect the aquifer. The protection area was delineated using a version of the calculated fixed radius method, resulting in an ellipse-shaped WHPA. The Hatteras water plant also has deep wells screened into the Yorktown confined aquifer. The wellhead protection area for the shallow wells intersected the WHPA of the deep wells, resulting in a single large protection area.

The WHPAs around the wells in the confined and unconfined aquifers were delineated using techniques outlined in publications from the Public Water Supply Section of the North Carolina Division of Environmental Health [1, 2]. The Public Water Supply Section reviewed and commented on the delineation during the development of the 2006 Wellhead Protection Plan. Figures 2 through 6 show the location of the wells, the resulting wellhead protection areas, and the approximate location of potential sources of contamination.

A. Wellhead Protection Area delineation in the confined aquifer

A ten-year time of travel aquifer source volume method was used to establish wellhead protection areas for wells screened in the confined Yorktown aquifer. This technique was used for the wells in the Dare County Regional System (both the NRO and Skyco plants), the Mac Midgett plant, the Stumpy Point wells, and the deep reverse osmosis wells in the Hatteras wellfield. The size of the wellhead protection area was determined by estimating the volume of aquifer material in cubic feet (V_a) required to support water withdrawals over a ten-year period.

The volume of the aquifer that supplies withdrawals for a specified period of time can be estimated with the following equation:

$$V_p = Q\left(\frac{gal}{\min}\right) \times td\left(\frac{\min}{day}\right) \times \left(\frac{ft^3}{7.48\ gal}\right) \times \left(\frac{365.25\ days}{year}\right) \times \frac{P\ (years)}{n}$$

[1] Ralph C. Heath and M. Gale Johnson, Proposed Revisions to the North Carolina Wellhead Protection Program, North Carolina Public Water Supply Section, July, 2001.

[2] North Carolina State University Water Quality Group, Wellhead Protection Guidebook, North Carolina Public Water Supply Section, 2003.

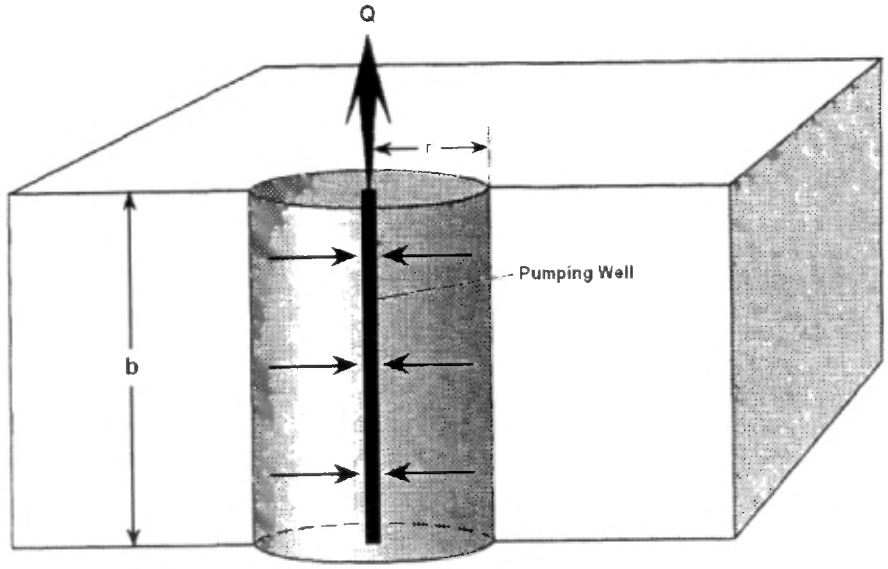
Where: V_P = the volume of aquifer in ft^3 that supplies withdrawals for period P,
Q = the well yield in gallons per minute,
t_d = the daily pumping period in minutes per day,
P = the period of withdrawals in years, and
n = the estimated porosity, dimensionless.

The well yield is the maximum sustained pumping rate possible for the well (not the daily pumping rate) as determined from a 24-hour drawdown test pursuant to North Carolina Administrative Code 15A NCAC 18C.0402(g). If well yield information is unavailable, the maximum capacity of the pump installed on the well may be substituted. The daily pumping period (t_d) is the number of minutes per day that the well is pumped and should equal 720 (the number of minutes in 12 hours). This value is used because State regulations require that the yield of a public water supply well provide the average daily demand in 12 hours. If the actual pumping period exceeds 12 hours, then the actual pumping period in minutes per day should be used. Using a daily pumping period t_d of 720 minutes per day, a period of withdrawal P of 10 years and an estimated porosity of 0.2, the above equation, rounded, reduces to:

$$V_{10} = 1{,}800{,}000 \times Q$$

Where: V_{10} = the volume of aquifer in ft^3 that supplies 10 years of withdrawals.

For ease (convenience) in applying the ASV method, it is assumed that the volume is contained in a cylinder centered on the well.



Aquifer Source Volume

$$r = \sqrt{\frac{V_{10}}{\pi b}}$$

Before the radius of the cylinder, and therefore the WHPA, can be determined, it is first necessary to determine or to estimate the thickness (b) of the aquifer (or the thickness of the part of the aquifer) that supplies water to the well. The actual thickness of the aquifer that supplies water to the well may be greater than the length of the screened sections in the well. For this reason and for convenience in applying the ASV method it was preferable to assume aquifer thickness based on pumping rates. The results of this approach are the recommended radii of WHPAs presented in Table 1 of the *North Carolina Wellhead Protection Guidebook.*

The radius for each well was determined by substituting aquifer thickness, along with the calculated volume (V_{10}) into the following equation:

$$r = \sqrt{\frac{V_{10}}{\pi b}}$$

Where: r = the radius in feet,
V_{10} = the volume of the aquifer, in ft^3, that supplies 10 years of withdrawals,
π = 3.1416, and
b = aquifer thickness or the length of screened section, in feet.

Overlap of WHPAs delineated around the individual wells was ignored, resulting in sets of intersecting circles around the Skyco, NRO, and Hatteras deep wells. Straight-line segments were then constructed tangent to the outer edges of the circles to remove scalloped edges. WHPAs were truncated at the shore lines.

The exceptions to this technique are the Stumpy Point and Mac Midgett systems. Each of these plants has two wells located in close proximity to one another. Because of their proximity, the well yields were added, and a point between the two wells was selected to delineate a single, circular WHPA. The aquifer thickness for the Stumpy Point wells was 20 feet for both wells. Of the Mac Midgett wells, RWS 1 has a screen length of 90 feet, and RWS 2 has a screen length of 70 feet. Seventy feet was used as the aquifer thickness to delineate a larger, more protective area for the Mac Midgett WHPA.

One additional well was constructed since the November 9, 2006 wellhead protection plan for Dare County. Skyco well 14 was drilled in the northern portion of the Skyco wellfield, and the WHPA was enlarged to accomodate the protection radius. Table 2 shows the wellhead protection area calculations for the wells screened in the confined aquifer.

B. Wellhead Protection Area delineation in the surficial aquifer

The Wellhead Protection Delineation Guidebook[3] specifically addresses the shallow wells in Hatteras wellfield: "The Frisco Wellfield at Cape Hatteras, ... consists of 19 wells in a line located in a swale near the base of a high dune ridge. The length of the line is about 9,200 feet, so the distance between wells is about 500 feet. The yield of the well field, based on a 12-hour (720 minute) pumping schedule is 1,200,000 gallons per day. The recharge to the surficial unconfined aquifer that supplies the wellfield is estimated to be about 1,000,000 gallons per day per square mile south of the wellfield and about 200,000 gallons per day per square mile north of the wellfield. Summing those rates and dividing by two give an average recharge rate of 600,000 gallons per day per square mile.

Because the wellfield consists of wells in a line, the WHPA is anticipated to be an elongated ellipse with a length of at least 11,200 feet long, that is, 2,000 feet (four times the well spacing) longer than the length of the well line. Using twice the well spacing to determine the boundary of the ellipse at each end of the wellfield is arbitrary". Heath's description was used to delineate this portion of the Hatteras WHPA.

The size of the wellhead protection area for the Hatteras wells located in the surficial aquifer was determined using the relationship between the combined yield of the wells over a 12-hour period (Q), and the recharge rate (W) of the aquifer[4].

The area that requires protection (A, in square miles) was determined using the combined yield for the wells, based on a 12-hour pumping cycle, by the formula:

$$A = \frac{Q}{W}$$

Q = 1,118,000 gallons per day, the combined yield of the surficial wells, from Table 3.
W = 600,000 gpd/mi^2, the recharge rate
A = 1.98 mi^2 = 55,199,232 ft^2

Heath defines the size of the Hatteras wellfield ellipse as follows: "If the... semi-major axis (a) is 5,600 feet in length, what is the length of the semi-minor axis (b)? The equation for the area of an ellipse is:"

$$A = \pi ab.$$

[3] Heath, p. 32, and Figure 9.

[4] Ralph C. Heath, Recharge Reaching the Water Table in North Carolina, Division of Water Quality, NCDENR, July 2001.

Rearranging the terms to solve for b,

$$b = \frac{A}{\pi a} = \frac{55{,}199{,}232 \text{ ft}^2}{3.1416 \times 5{,}600 \text{ ft}} = 3{,}137 \text{ ft}$$

The dimensions of the ellipse about the linear Hatteras are 5,600 feet by 3,137 feet. The resulting ellipse intersects the WHPA of the deep reverse osmosis wells. Because the shallow and deep wells in the Hatteras wellfield are in different aquifers, the overlap of the intersecting areas was ignored. Table 3 shows the calculations for determining the wellhead protection area of the Hatteras surficial wells.

III. INVENTORY OF POTENTIAL CONTAMINANT SOURCES

A database and literature search was conducted to determine potential contamination sources within the protection areas. The Public Water Supply Section's Source Water Assessment Program (SWAP) interactive viewer revealed potential sources of contamination within Dare County's Wellhead Protection Areas. The EPA's EnviroMapper interactive mapping program identified or confirmed several other potential sources. State databases online located and obtained information on Groundwater Incidents and registered Underground Storage Tanks (USTs) within the protection areas.

Finally, the sites listed in the inventory of contaminant sources in the 2006 wellhead protection plan [5], were compared to the current potential source inventory. Several businesses in the original inventory had closed. A table of the database, file, and previous inventory results is included in the appendix.

Records of the local fire department and county emergency management services were searched for any past incidents, spills, or potential contaminant sources within the wellhead protection area. Files at the Washington Regional Office of NCDENR were researched for animal waste operations, well abandonment records, injection well permits, and federally registered USTs.

Groundwater pollution incidents within the wellhead protection areas were researched, and a number of sites with USTs were identified. Waste handling facilities, landfills, and hazardous waste site records on file with the Washington region Solid and Hazardous Waste Section were also researched. Files were also searched for NPDES and non-NPDES permits.

[5] Debbie Maner, Wellhead Protection Plan for Dare County, Dare County Water Department, December, 1999, and Wellhead Protection for Dare County Revision 2, Dare County Water Department, 2006

A map reconnaissance identified land use activities and other terrain features on 1:24,000 scale, 7.5-minute topographic maps and 2013 infrared aerial photos. The state land use image layer was used to assist in the estimation. Determining land use activities identified terrain features, activities, and occupants that can affect the concentration and distribution of potential contaminant sources. Table 4 shows the estimated land use categories within the wellhead protection area.

On-site visits were conducted at the potential contaminant sources listed in the inventory to obtain contact and potential contaminant information. The "Inventory of Potential Contaminant Sources" survey forms are included in the appendix, which list owner contact information and data collected during visits. Similar types of potential contaminant sources were categorized to assist in plotting the site locations on the map. The categories of potential sources and map symbols are listed in Table 5. Table 5 also includes a risk category ranking used in the risk analysis.

The windshield and walk-through surveys identified the remainder of the potential contaminant sources, and obtained or verified owner contact information and data regarding the type and quantity of contaminants. All the potential contaminant sources identified in the database, literature, file, and on-site surveys are presented in the contaminant source inventory in Table 6.

Table 6 lists the potential contaminant sources and the symbols used to identify them on the map. Figures 2 through 6 illustrate the location of the potential contaminant sources within the wellhead protection areas.

Risk Analysis

Geological conditions and land use settings were examined to provide an overview of the risk of well contamination the various wellfields of the Dare County Water Department. Wells in the unconfined aquifer are at greater risk of contamination than wells screened in the confined aquifer. Wells located in areas with greater population densities, and more potential sources are at greater risk of contamination than their more rural counterparts.

In geological terms, the nineteen wells of the Hatteras wellfield that are finished in the surficial aquifer are at the greatest risk of contamination of any wells in the Dare County system. These wells are shallow, and have no protective clay confining layer, and are highly susceptible to spills or leaks at land surface that could enter the water table and contaminate the aquifer. These wells have historically been unaffected by storm surges and saltwater intrusion at their current pumping rates. The wellhead protection area is bordered on the east by the Buxton Woods Coastal Reserve, and on the south by the Cape Hatteras National Seashore. The wells are located along a swale between dune ridges in an area that is inaccessible to the public, and mostly away from potential sources. The protection area is bounded on the north and west by Hwy 12, and the traffic and businesses along this major road pose the greatest threat to the Hatteras wells.

The majority of the wells in the Dare County Water Department are screened in confined Yorktown aquifer. The clay confining bed above the aquifer acts to retard downward percolation or leakance of contaminants into the aquifer, should a surface release occur. The land use area estimate showed that the NRO and Skyco plants were located in areas with greater business and residential land usage. The Skyco and NRO wellfields are extensive in size, and have more potential contamination sources. Sand mining and dredging operations other than for beach nourishment are no longer permitted in North Carolina estuarine and near shore ocean waters as of October, 2004.

Although the NRO wellfield located in Kill Devil Hills, and the Skyco wellfield use wells in the confined aquifer, they are next most at risk because of their location in areas with high seasonal tourist traffic. This high turnover of population increases traffic flow, places greater demand on logistics, and causes rapid turnover of business inventories, which all increase the likelihood that a release will occur. The Mac Midgett and Stumpy Point wellfields are located in more rural areas with fewer potential sources of contamination, and are least at risk.

For each WHPA, the potential contamination sources were ranked according to the threat each presented to the nearest water supply well or wells. The following method was used to rank each potential source in each WHPA:

Each potential source was assigned a risk category of higher, moderate, or lower based on information adapted from the EPA (1993), and from the Oregon Wellhead Protection Program (see appendix). Table 5 lists the risk category for each type of potential source identified during the contaminant source inventory. Each potential contamination source was assigned a numerical "category" score to correspond with the risk category (e.g., higher-3, moderate-2, and lower-1). Each site of potential contamination was then assigned a "proximity" score calculated with the following equation:

Proximity score = 1 – (distance in feet from the well ÷ radius of the WHPA)

The overall risk ranking was obtained by multiplying the category score by the proximity score for each potential contaminant site. This resulted in a relative ranking of each potential source of contamination (PCS) within a given WHPA based on the threat posed to the water supply well or wells. This risk analysis provided information that was used to determine which water supply wells are at greater risk of contamination and which PCS should be considered first with regard to wellhead protection.

The risk analysis shown in Table 7 lists the potential sources of contamination for each protection area ranked according to the threat each PCS poses to the wells. Wells in the NRO wellfield are at greater risk of contamination due to their location near high traffic areas and businesses along Virginia Dare Trail and Highway 12. Wells in the Skyco wellfield are also more at risk than the more rural wells in the Hatteras, Mac Midgett, and Stumpy Point wellfields, as shown by the total estimated risk scores for each wellfield in Table 7.

Facilities with underground storage tanks or groundwater pollution incidents that resulted from leaking tanks pose the greatest risk to the wells in the Dare County Water System. Public facilities, such as recycling centers, lift stations, landfills, and water treatment plants present some risk to wells in the system. Businesses and residential areas are concentrated along the mostly north-south road networks in the area. Wells located near these major roads are at higher risk.

IV. MANAGING THE WELLHEAD PROTECTION AREA

Dare County chose a public education approach to protect the wellhead areas. The Public Utilities Director has primary responsibility for implementing the public education program; the alternate responsibility lies with the Assistant Utilities Director. The Wellhead Protection Committee may be consulted as required.

A Wellhead Protection Brochure (tri-fold) will be made available to each resident, farming operation, business, and industry within the Wellhead Protection Areas. Copies of this brochure will be made available at the Dare County Water Department, and at bill-paying locations, for public education on Wellhead Protection. In general, the brochure will convey to each citizen/business the following information:

- An explanation of what groundwater is and the number of wells in their particular system,
- An explanation of what a Wellhead Protection Program is,
- Sources of groundwater pollution,
- Tips on protecting their water supply,
- Proper disposal of household hazardous waste,
- Septic tank maintenance, and
- Phone numbers to contact for more information.

Dare County will provide information to each business, industry, and farm located within the WHPAs on waste handling practices, best management practices, standard operating procedures, and waste oil disposal methods which could be employed to reduce the potential for groundwater contamination. Dare County will also provide information regarding the North Carolina Division of Environmental Assistance and Customer Service (DEACS) to each business and industry located within the WHPAs. Owners/operators of potential contamination sources will be encouraged to contact the DEACS.

Personnel at County owned and/or operated facilities will be educated on Wellhead Protection and steps they can take to reduce the potential for contamination (e.g., information about best management practices, standard operating procedures, waste handling practices, etc.). The water system will also contact DEACS to investigate steps that Dare County can take to reduce the amount of waste released into the air and water

and on or near the protected area.

DEACS provides free technical and other non-regulatory assistance to reduce the amount of waste released into the air, water, and on the land. DEACS serves as a central repository for waste reduction and pollution prevention information. DEACS emphasizes waste reduction through pollution prevention, encourages companies and government agencies to go beyond compliance, and provides information about the environmental permitting process. This information is provided at no charge to North Carolina businesses, industries, government agencies, and the general public upon request. For additional information, DEACS may be contacted at (919) 715-6500 or (800) 763-0136.

Dare County will contact all facilities and agricultural operations within the WHPAs that store pesticides, or are otherwise involved with the application of pesticides, to ensure that they licensed by the State of North Carolina and that proper records are maintained to ensure observance of NC Pesticide Laws. Dare County will provide information to these facilities or agricultural operations regarding waste handling practices, best management practices, standard operating procedures, and proper waste disposal methods which could be employed to reduce the potential for groundwater contamination. These facilities will also be provided with information regarding the North Carolina Division of Environmental Assistance and Customer Service (DEACS).

In the event of a spill, the Dare County Emergency Management Agency will be contacted at the following number:

Dare County Emergency Management Agency: (252) 473-3355

Owners of improperly constructed or abandoned wells identified within the WHPAs will be provided information regarding the threat posed to the water supply by these wells, and wells that could potentially be flooded during hurricane conditions. Owners of improperly constructed or abandoned wells will be encouraged to have these wells properly abandoned in accordance with state well construction standards found in 15A NCAC 2C, "Criteria and Standards Applicable to Water Supply and Certain Other Wells". If information exists that a well is improperly constructed or is contributing to the contamination of groundwater, Dare County will notify the Aquifer Protection Section of the Division of Water Resources.

All owners/operators of regulated USTs and other facilities subject to federal and/or state regulations located within the WHPAs will be requested to supply documentation that their facility is in compliance with said regulations. Operators of USTs will be asked to supply the system with a copy of their UST permit. If any UST sites are found to be non-compliant, the Underground Storage Tank Section of the State Division of Waste Management will be notified.

If an abandoned UST site is found, the County will contact the North Carolina Division of Waste Management, UST Section, to determine if a closure report was submitted demonstrating that no soil or groundwater contamination was identified during

closure. If a closure report was not submitted, Dare County will notify the UST Section of the location of the facility within the WHPA and its proximity to a public water supply well.

For soil or groundwater contamination incidents occurring within the WHPAs, Dare County will contact the State agencies with oversight responsibilities for remediation to determine if remediation efforts are proceeding in a timely fashion and in accordance with any schedules established by these agencies. Through this process, the County will bring to the attention of the State agencies with oversight responsibilities for remediation, any failures by the responsible parties to comply with required monitoring and correction action. The County will also notify the State agencies with oversight responsibilities for remediation, of the location of the facility within the WHPAs and its proximity to a public water supply well. Dare County will also contact the State agencies with oversight responsibilities for the contamination incidents and notify them of the locations of the sites issued notices of "No Further Action" occurring within the WHPAs and will request a review of this assessment.

Dare County will notify any individual, industry, business, or government agency installing or planning to install a regulated UST within the wellhead protection areas of the following regulation: North Carolina Underground Storage Tank Regulation 15A NCAC 2N .0301 stipulates specific siting and secondary containment requirements for UST systems installed after January 1, 1991. The rule is summarized as follows:

- No UST system may be installed within 100 feet of a public water supply well or within 50 feet of any other well used for human consumption.
- Secondary containment is required for UST systems within 500 feet of a well serving a public water supply or within 100 feet of any other well used for human consumption.

Violations of this regulation will be reported to the Division of Waste Management, Underground Storage Tank Section. The UST Section will also be notified of the location of the facility within the WHPAs and its proximity to a public water supply well or any other well used for human consumption.

A regulated UST system is any underground storage tank and associated piping that contains petroleum (including gasoline, diesel and used oil) or a hazardous substance as defined by the State rules (15A NCAC 2N). Tanks containing heating oil for use on the premises where stored are not regulated.

Facilities with an underground buried storage capacity of more than 42,000-gallons of oil, or an aggregate above ground storage capacity greater than 1,320-gallons of oil, or an above ground storage capacity of a single container in excess of 660-gallons are subject to the Oil Pollution Prevention regulations contained in Federal Regulations found in 40 CFR 112. These facilities must prepare and implement a Spill Prevention Control and Countermeasures (SPCC) Plan. The County will verify the status of the SPCC Plan for each subject facility located within the WHPA. The North Carolina

General Statutes require registration of any facilities storing more than 21,000-gallons of petroleum product. Subject facilities not in compliance with these regulations will be notified of their regulatory responsibility under this regulation. The County will also notify the Division of Water Resources, Aquifer Protection Section if such facilities do not promptly come into compliance.

Dare County will contact the Division of Water Resources Water Quality Program regarding facilities permitted to discharge wastewater to the land surface (non-NPDES Permitted Facilities) to ensure that any such operations located within the WHPAs are in compliance with applicable regulatory and permit requirements pertaining to environmental protection, such as routine monitoring and reporting requirements.

Dare County operates an annual household hazardous waste collection day when funds permit, in cooperation from the NC Department of Agriculture. Notification of this service through the local paper will be made to businesses, industries, farming operations, and residents within the wellhead protection area several days prior to the event, which will advise the public how to label and package the waste for disposal, and where the collection points are located.

Sites with geothermal injection wells or vertical closed loop heat pump systems will be provided with educational materials on the importance of proper well construction to prevent the accidental injection of performance enhancing additives used in the aqueous coolant. Information from the County will be mailed to owners of injection wells regarding the location of nearby public water supply wells, and the importance of proper maintenance to prevent leaks which could contaminate either the surficial or the confined source aquifer.

The County of Dare will maintain a copy of any state permit files, including maps, of closed (no longer used), unlined landfills within the wellhead protection areas. Water system operators regularly test the water supply for coliform bacteria, pesticides, volatile organics, and semi-volatiles, and make information available to consumers annually in the Consumer Confidence Report (CCR). The County will continue to monitor drinking water standards as required by state and federal regulations to ensure water quality is not affected by landfill(s). System officials will plot the detected concentrations to watch for any trends that might serve as an early warning. Also, being watchful of any trends in the data might serve as an early warning if any of the contaminants from the dump were to migrate toward the well. Plotting the test results from test to test would help the water system remain vigilant with regard to the possible threat posed by landfills.

The County will use the public access television channel to promote awareness of the Wellhead Protection Program using materials developed by the Water Department and the Wellhead Protection Committee.

V. EMERGENCY CONTINGENCY PLAN

The Public Utilities Director is the primary individual responsible for implementing contingency plans. The alternate responsibility lies with the Assistant Utilities Director. The WPC may be involved in decision-making in the event that response actions are required.

For emergencies, refer to the County's Water Emergency Management Plan[6]. This is the primary document to refer to in case of water disruptions or emergencies. Portions of the plan's appendix for hurricane preparation include:

Plan overview,
Organizational charts and contact information,
Facilities and equipment,
Implementation criteria,
Specific emergencies,
Recordkeeping,
Return to normal operations,
Training exercises, and plan update.

The plan also defines the levels of emergencies from highest (3) to lowest (1). Contingencies for equipment failure, reduction of supply due to contamination, chemical over or under dosing, or spills and leaks are addressed. Other emergency situations that have plans for emergency operations include:

Contamination or failure of raw water wells,
Power failure,
Plant system failure,
Malfunction of process control computers or SCADA systems,
Loss or contamination of finished water storage tanks,
Failure of high service pumps,
Chemical or diesel fuel spills,
Main breaks or discharge transmission mains.

Short Term (less than 48 hours) Contingency

A copy of the latest Rules Governing Public Water Systems, NCAC Title 15A, Subchapter 18C, Water Supplies, are readily available at each water treatment plant. Paragraph .1523 identifies three Tiers of violations and the public notice requirements for each Tier. Tier 1 public notice is required as soon as possible, but not later than 24 hours after the system learns of the violation. Dare County will also consult with the Washington Regional Office Public Water Supply Section as soon as possible, but no later than 24 hours after discovery in the event of a Tier I violation. The Rules further define conditions and actions to be taken by Dare County upon discovery of violations.

[6] County of Dare, Water Emergency Management Plan, County of Dare Water Department, 2002.

Public notification must be made using the appropriate broadcast media in the contacts listed in Table 8.

Should a major oil or chemical spill occur within any of the Wellhead Protection Areas, the local volunteer fire departments and Dare County Emergency Coordinator will be notified first:

Fire Department 911

Dare County Emergency Management Agency (252) 473-3355

Refer to the Dare County Water Department Emergency Spill Program [7], in the event of a dangerous spill. The emergency spill program document addresses fuel or chemical spills, and the handling and transfer of materials. A short extract of emergency contact phone numbers for applicable agencies and personnel are listed in Table 8. Refer to the current contact list in the Water Emergency Management Plan during emergencies.

If evidence exists that a well is contaminated, it will immediately be taken off-line and not returned to service until it is determined that the well's water quality is in compliance with standards governing public water supplies. If the well becomes contaminated, it will be isolated from the rest of the system by the Public Utilities Director or his representative, by closing the gate valve at the wellhead. A schematic diagram of the existing system is available at each of the five water treatment plants to assist in identifying the valve locations and waterline sizes.

If it is determined that contaminants entered the distribution system, residents shall be notified not to drink the water until further notice, by using the emergency notification plan. Media contacts will be used to rapidly get information to the water users supplied by Dare County. High-risk water users, such as the schools, day care centers, and churches, will be notified by telephone. For long-term contamination or water outages, public notice will be mailed to all utility customers.

If contamination occurs, the regional office of the Public Water Supply Section shall be notified immediately of the situation and asked for assistance. Sampling (i.e. bacteriological, VOCs, SOCs, etc.) will begin to determine the contaminant involved and the extent of contamination. A systematic flushing of the distribution system will begin with follow-up sampling conducted as needed until the system was determined to be free of contamination and in compliance with standards governing public water supplies. After consultation with the Public Water Supply Section and any appropriate sampling, residents will be notified that Dare County water is once again safe for consumption.

[7] County of Dare, Dare County Water Department Emergency Spill Program, County of Dare Water Department, February 2006.

Long-Term (greater than 48 hours) Contingency

The Rules Governing Public Water Supply Systems NCAC Title 15A, Subchapter 18C also defines public notification requirements for Tier 2 and 3 violations. Tier 2 violations, as defined in the rule, require public notice as soon as practical, but not later than 30 days after discovery of the violation. Tier 3 violations require public notice no later than one year after discovery of the violation. Additional instructions and conditions are outlined in the rule.

In addition to contamination, long-term disruptions (greater than 48 hours) in service could result from:

- Long-term power outages,
- Pump failure,
- Decreased well yield,
- Water line breaks, or other system failures.

Ice storms, hurricanes, and floods can potentially disrupt water service. Elevated storage tanks will be filled before any major weather events that could disrupt service. County personnel will place a priority on restoring well operation once an outage is identified. The *Water Emergency Management Plan* identifies available logistical, technical, and financial resources. Should the well become inoperative, there are three mutually controlled interconnections, two of them metered, to Dare County Public Works Department. The Dare County Public Works Building maintains schematics of the interconnection locations.

NEW PUBLIC WATER SUPPLY WELLS

Dare County will amend its Wellhead Protection Plan to include any new wells added to its water systems. The following steps will be taken to address any new wells:

1. Develop a preliminary WHPA for the proposed well to determine the area of vulnerability.
2. Develop a contaminant source inventory for the preliminary WHPA.
3. Information obtained in items 1 and 2 above will be submitted to the Wellhead Protection Committee (WPC). Any information required by the Public Water Supply Section (PWSS) relating to the development and construction of new public water supply (PWS) wells must also be submitted.
4. If the WPC grants provisional approval of the proposed Wellhead Protection Plan, and the PWSS grants approval to construct or expand the PWS well or well system, then work may proceed with well construction.
5. Finalize the WHPA delineation for the new well.
6. Finalize the contaminant source inventory for the WHPA.
7. Submit finalized WHPA and contaminant source inventory to the WPC.

8. Once approval is received, implement any necessary regulatory and or non-regulatory potential source management practices.
9. Submit the amended WHP Plan and all necessary supporting information to the Public Water Supply Section for review and approval.

PUBLIC PARTICIPATION

Dare County incorporated public participation into the Wellhead Protection Plan by:

- Using public education as a method of managing the WHPAs.
- Informing local business owners and industry of best management practices and providing information on groundwater protection.
- Keeping this plan in the Dare Water Department for public review at any time.

After the plan is approved:

- A tri-fold brochure showing the Wellhead Protection Area, including the information listed in Section III, will be delivered to all residents living in the WHPA.

The Draft Wellhead Protection Plan was made available for a period of thirty days for review and comment after publishing a notice in the local paper. A copy of the public notice as printed is included in the appendix. No comments were received. However, the plan will be kept available for public review in the corporation offices. Any substantive comments received from the public will be incorporated into the plan, after review by the WPC.

WELLHEAD PROTECTION PROGRAM REVIEW

Dare County is aware that an effective local Wellhead Protection (WHP) Program is an ongoing process requiring monitoring of the Wellhead Protection Areas, and periodic review and updating of an approved WHP Plan. Therefore, the County's WHP Committee will monitor the WHPAs for any new or previously unidentified potential contaminant sources (PCSs) and activities occurring within the approved WHPAs. The County will amend the PCS inventory and other Plan components (e.g. the management strategies, emergency contingency plan, etc.) as necessary to incorporate any new threats to the County's groundwater source of drinking water. Additionally, the PCS inventory will be updated annually using the same procedures used to develop the original PCS inventory. The County will also fully update the WHP Plan every five years or at any time a new well is constructed for use with the County's water supply system or a major land use change occur within the WHPAs. The individual responsible for implementation of the WHP Plan will submit notification to the Public Water Supply

Section annually upon completion of the PCS inventory update or immediately following the completion of a major revision. Any amended or revised sections of the approved WHP Plan resulting from an update or revision will also be submitted upon completion.

Additional reviews will be conducted for new construction or development projects, such as new wells or well fields, shopping centers, industrial parks or subdivisions to determine whether any substantial changes to the plan are required.

Table 1. Dare County Water Department well data

Well	Depth	Screened interval	Casing dia., in.	Well yield gpm	Date Drilled	Date Tested
Dare County Regional PWSID 04-28-030 North RO WTP						
Well 1	425	320-420	8	500		
Well 2	425	320-420	8	500		
Well 3	425	320-420	8	500		
Well 4	425	320-420	8	500		
Well 5	425	320-420	8	500		
Well 6	425	320-420	8	500		
Well 7	425	320-420	8	500		
Well 8	425	320-420	8	500		
Well 9	410	282-297, 314-405	8	500	8/5/94	
Well 10	402	274-295, 312-396	8	500	8/5/94	
Well 15	395	290-390	8	600		12/20/04
Well 17	430	315-425	8	600		9/9/04
Orville	410	295-405	8	600		10/26/04
Wilbur	435	310-430	8	600		6/25/04
Skyco WTP						
Skyco 2	222	167-217	8	600		5/10/04
Skyco 4	250	170-220	8	500	6/22/78	6/21/78
Skyco 5	235	168-218	8	500	7/26/77	7/27/77
Skyco 6	225	150-220	10	605	12/23/04	
Skyco 7	250	165-215	8	703	3/1/78	2/28/78
Skyco 8	250	162-212	8	503	5/1/78	5/2/78
Skyco 10	250	142-192	8	620	3/30/78	3/30/78
Skyco 11	223	196-218	8	500	3/28/83	4/11/83
Skyco 13	225	176-216	8	500	3/21/83	3/28/83
Skyco 14	200	150-200	10	495	2/15/07	4/12/07

Fig. 1 Dare County Water Department Water Treatment Plants

Fig. 2 Skyco Plant Wellhead Protection Area

Fig. 3A NRO North WHPA

Fig. 3B NRO Main WHPA

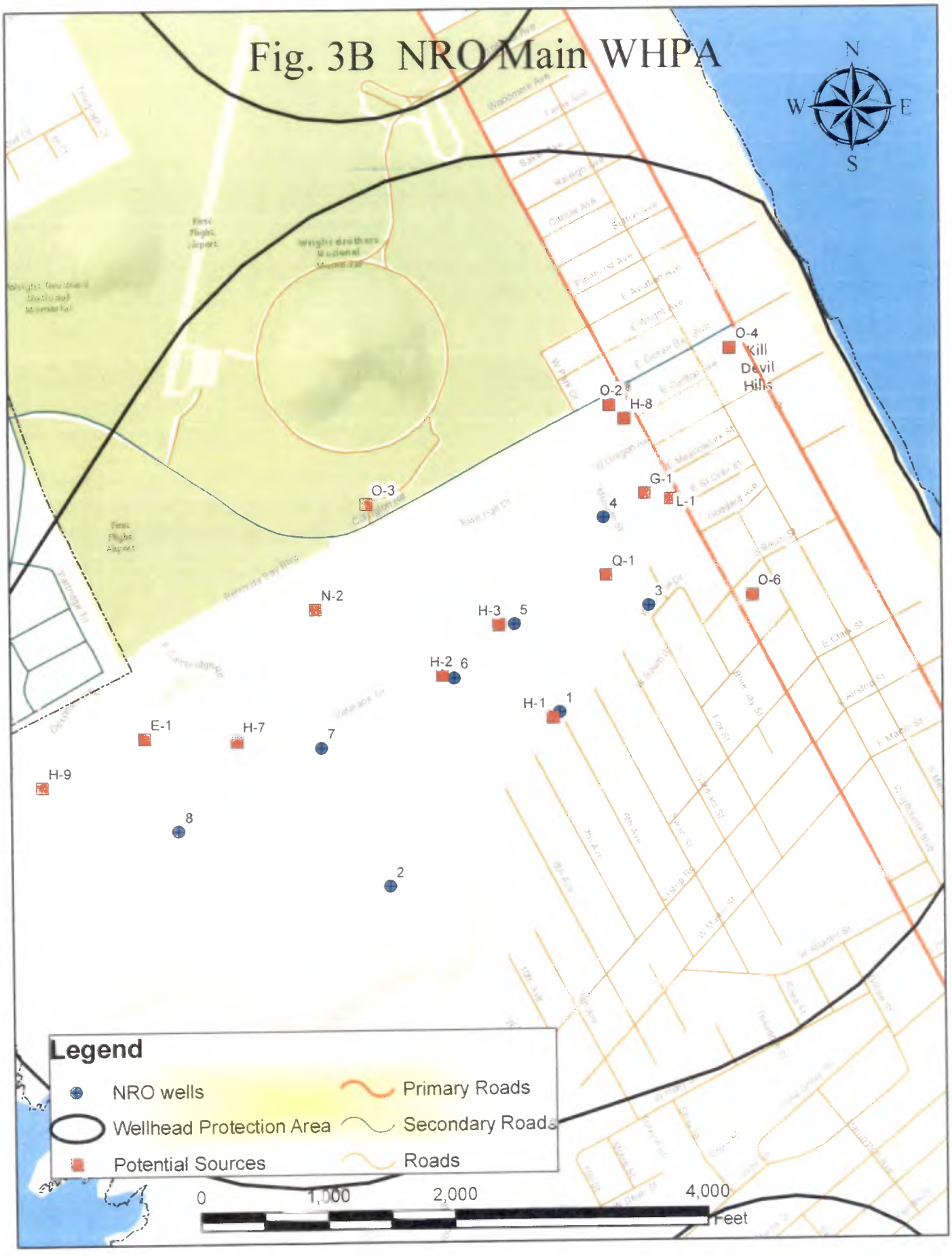


Fig. 3C NRO Kill Devel Hills WHPA

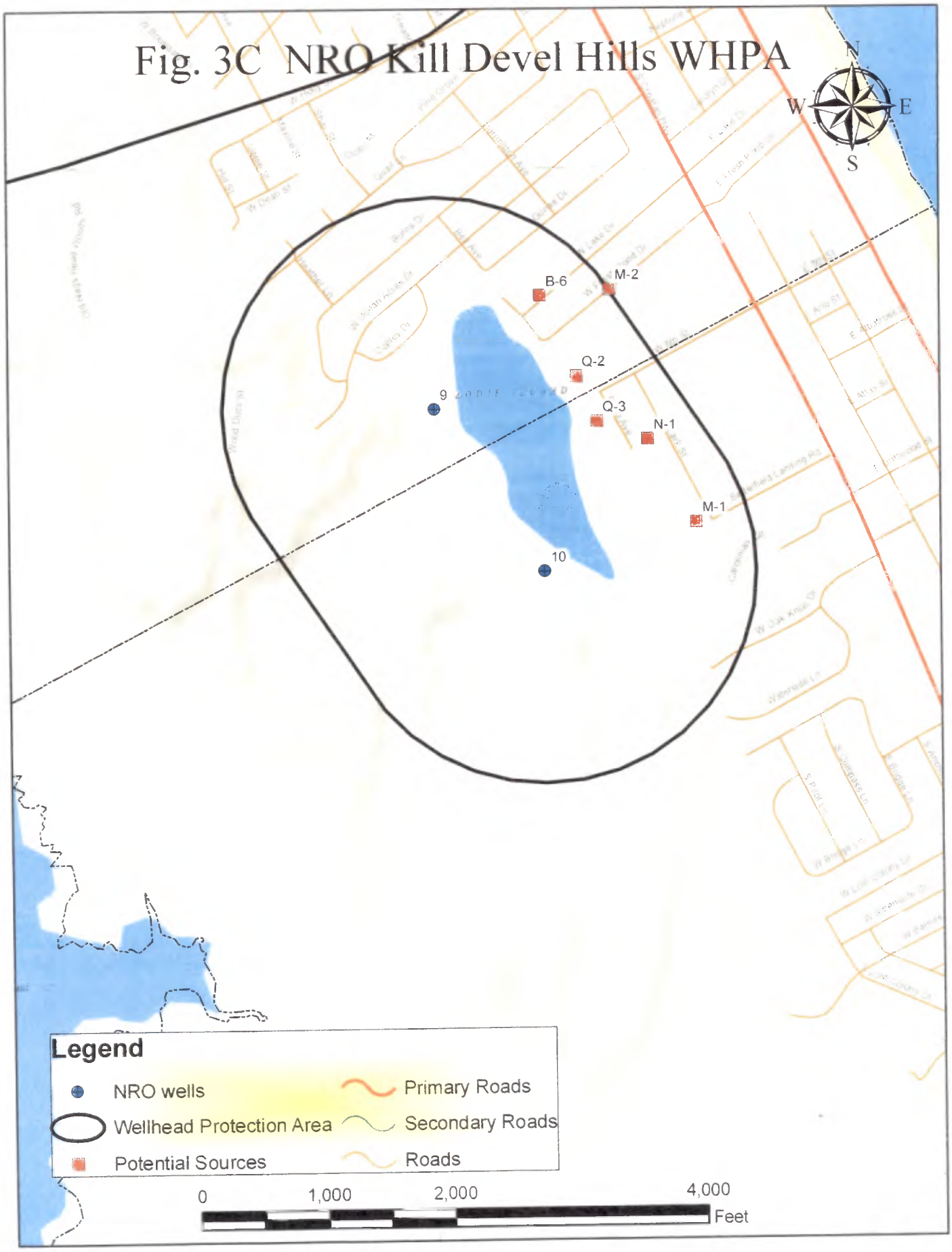


Fig. 3D NRO South WHPAs

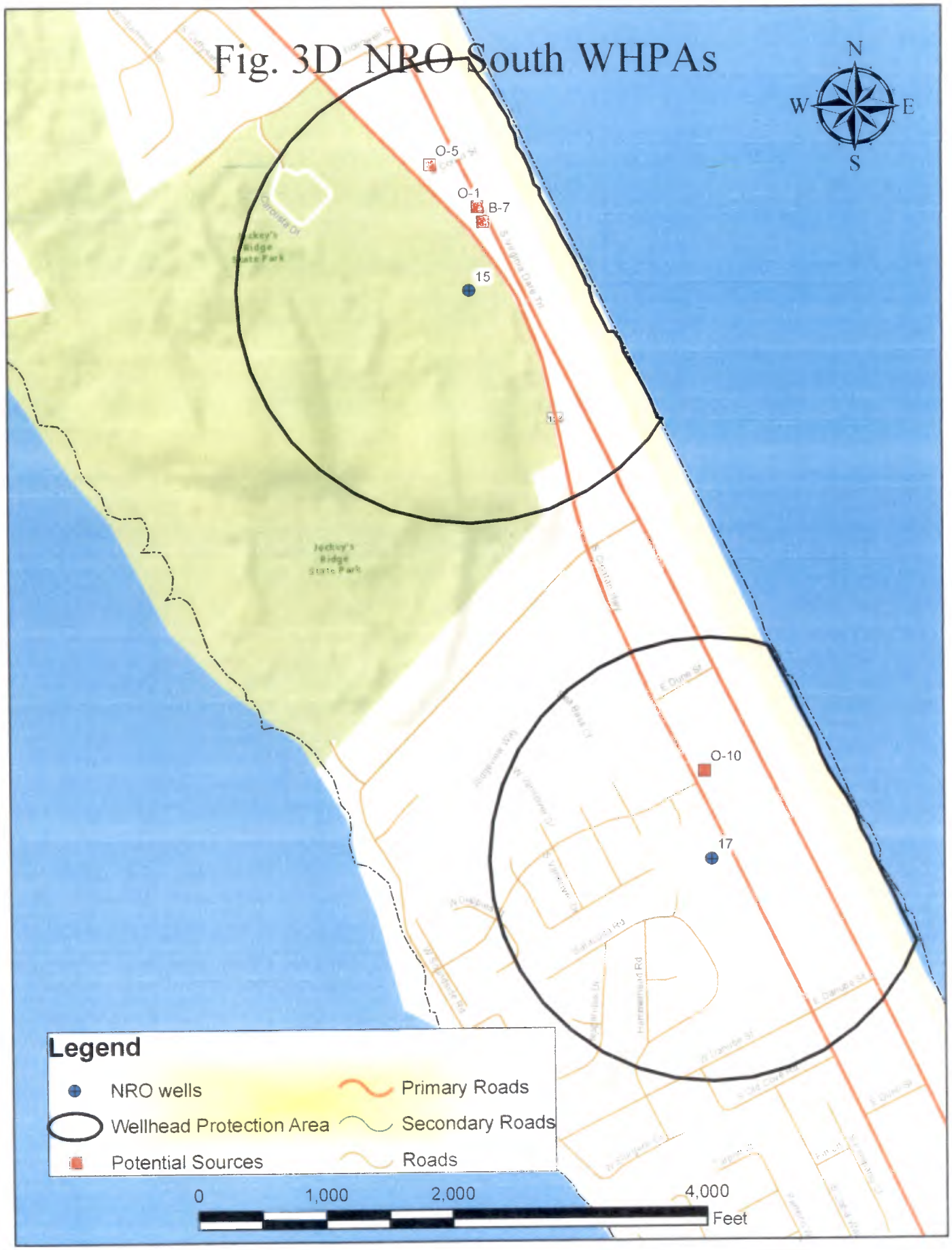
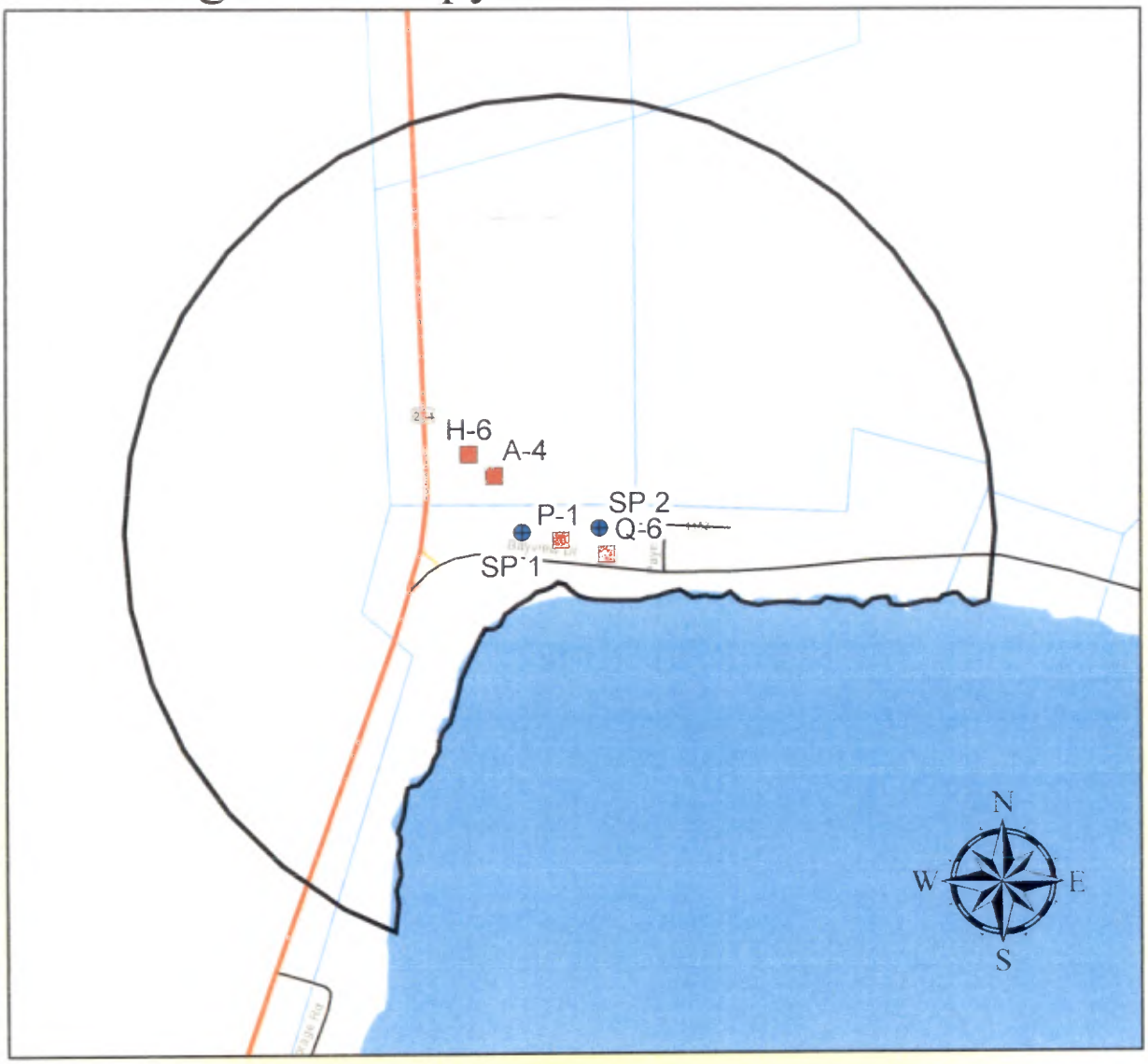


Fig. 4 Stumpy Point Plant WHPA



1,000 500 0 1,000 2,000 3,000 Feet

Legend

- Stumpy Point wells
- Wellhead Protection Area
- Potential Sources
- Primary Roads
- Secondary Roads
- Roads

Fig. 5 Mac Midgett Plant WHPA

Fig. 6 Hatteras Plant Wellhead Protection Area

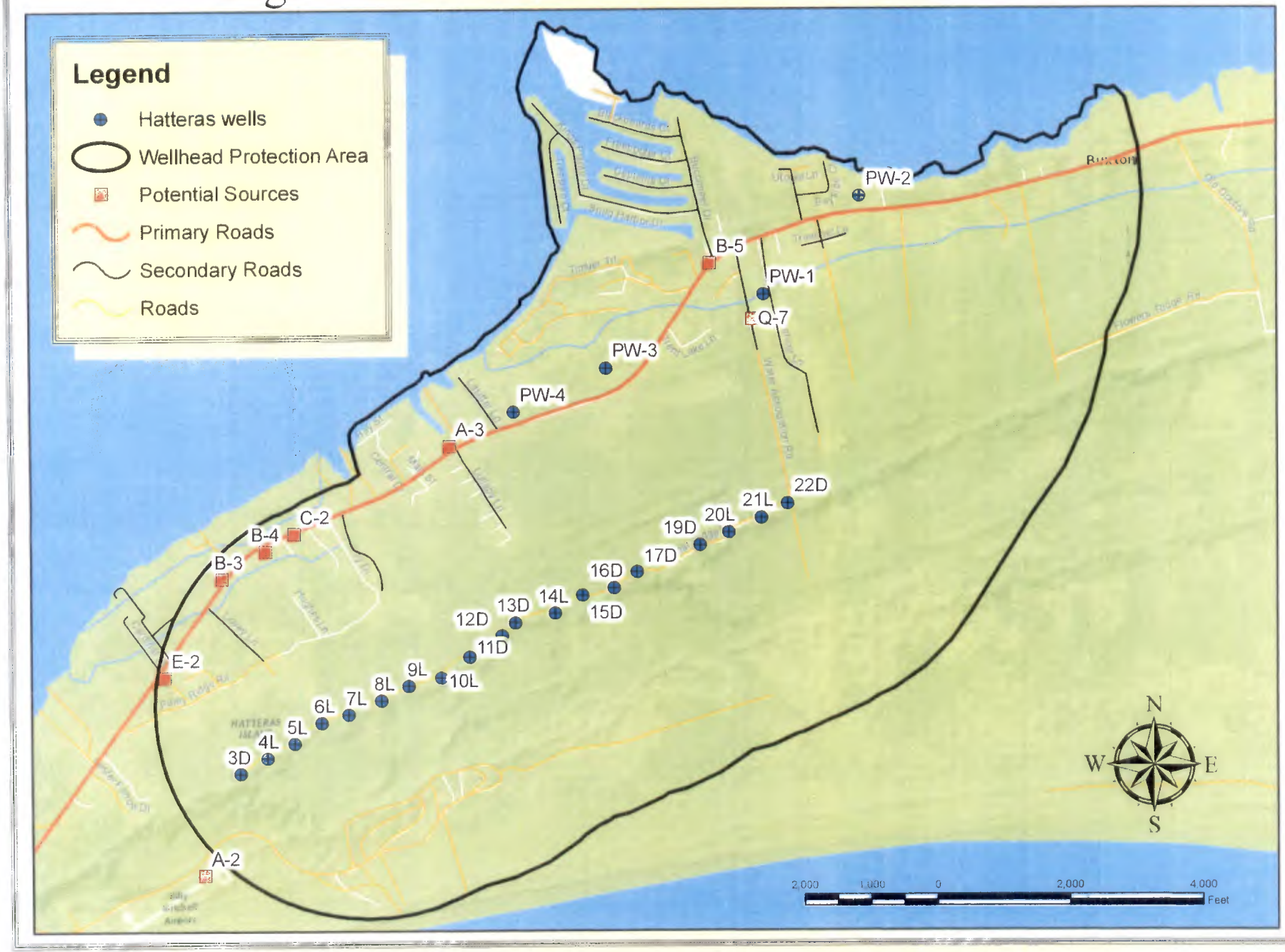


Table 1. Dare County Water Department well data

Well	Depth	Screened interval	Casing dia., in.	Well yield gpm	Date Drilled	Date Tested
Mac Midgett WTP PWSID 04-28-035						
RWS 1	410	305-395	12	700	1986	3/2/95
RWS 2	365	293-363	8	850	2/95	3/7/95
Stumpy Point WSD PWSID 60-28-002						
Stumpy Pt 1	197	172-192	6	125	5/1/02	5/6/02
Stumpy Pt 2	230	170-190	4	97	11/14/00	11/17/00
Cape Hatteras WTP PWSID 04-28-025						
3D	80	60-80	6	75	2/26/98	2/27/98
4L	75	62-72	6	100	12/14/98	12/15/98
5L	75	60-70	6	100	12/13/65	12/14/98
6L	75	63-73	6	100	12/1/95	12/2/95
7L	75	62-72	6	100	12/11/95	12/12/95
8L	72	62-72	6	100	12/7/95	12/8/95
9L	75	60-70	6	100	4/24/96	4/25/96
10L	75	60-70	6	100	4/26/96	4/27/96
11D	95	75-95	6	75	3/3/98	3/4/98
12D	95	75-95	6	75	5/13/98	5/14/98
13D	95	75-95	6	75	3/5/98	3/6/98
14L	70	60-70	6	100	5/3/96	5/4/96
15D	95	75-95	6	75	3/4/98	3/5/98
16D	95	75-95	6	75	5/12/98	5/13/98
17D	95	75-95	6	75	3/11/98	3/12/98
19D	95	75-95	6	75	5/14/98	5/15/98
20L	74	62-72	6	100	11/20/95	11/21/95
21L	74	63-73	6	100	9/24/95	3/17/98
22D	90	70-90	6	75	3/16/98	3/17/98
PW-1	260	243-260	10	820	11/1/98	11/18/98
PW-2	276	248-276	10	900	8/1/95	8/4/95
PW-3	308	270-308	12	500	11/1/98	11/11/98
PW-4	308	245-308	12	700	11/1/98	11/16/98

Table 2. Confined aquifer WHPA calculations

Well	Q Gal/day	well screen length, (b)	radius, feet
Dare County Regional PWSID 04-28-030			
North RO plant			
Well 1	360,000	100	1,673
Well 2	360,000	100	1,673
Well 3	360,000	100	1,673
Well 4	360,000	100	1,673
Well 5	360,000	100	1,673
Well 6	360,000	100	1,673
Well 7	360,000	100	1,673
Well 8	360,000	100	1,673
Well 9	360,000	100	1,673
Well 10	360,000	100	1,673
Well 15	432,000	100	1,832
Well 17	432,000	110	1,747
Orville	432,000	110	1,747
Wilbur	432,000	120	1,673
Skyco plant			
Skyco 2	432,000	50	2,591
Skyco 4	360,000	50	2,365
Skyco 5	360,000	50	2,365
Skyco 6	435,600	70	2,199
Skyco 7	506,160	50	2,805
Skyco 8	362,160	50	2,373
Skyco 10	446,400	50	2,634
Skyco 11	360,000	22	3,566
Skyco 13	360,000	40	2,645
Skyco 14	356,400	50	2,354
Cape Hatteras PWSID 04-28-025			
PW-1	590,400	17	5,195
PW-2	648,000	28	4,241
PW-3	360,000	38	2,713
PW-4	504,000	63	2,493

Table 2. Confined aquifer WHPA calculations

Well	Q Gal/day	well screen length, (b)	radius, feet
Mac Midgett PWSID 04-28-035			
RWS 1	504,000	90	
RWS 2	612,000	70	
Combined =	1,116,000	70	3,520
Stumpy Point PWSID 60-28-002			
Stumpy Pt 1	90,000	20	
Stumpy Pt 2	69,840	20	
Combined =	159,840	20	2,492

Table 3. Surficial aquifer WHPA calculations

Well	Q Gal/day	Contributing Area, sq. mi.	radius, feet
Cape Hatteras PWSID 04-28-025			
3D	54,000	0.09	4,223
4L	72,000	0.12	4,223
5L	72,000	0.12	4,223
6L	72,000	0.12	4,223
7L	72,000	0.12	4,223
8L	72,000	0.12	4,223
9L	72,000	0.12	4,223
10L	72,000	0.12	4,223
11D	54,000	0.09	4,223
12D	54,000	0.09	4,223
13D	54,000	0.09	4,223
14L	72,000	0.12	4,223
15D	54,000	0.09	4,223
16D	54,000	0.09	4,223
17D	54,000	0.09	4,223
19D	54,000	0.09	4,223
20L	72,000	0.12	4,223
21L	72,000	0.12	4,223
22D	54,000	0.09	4,223
Total:	1,206,000	2.01	

Table 4. Land Use Activities

Land Use	Skyco	NRO	Stumpy Pt.	RWS	Hatteras
Residential	2%	45%	3%	65%	3%
Nat'l/State parks, Reserves	20%	45%	92%	15%	87%
Swamps, wetlands	68%	-	3%	15%	7%
Business, industry	9%	7%	1%	3%	1%
Rights of Way	1%	3%	1%	2%	2%

Table 5. Types of Potential Sources

Type of Potential Source	Map Symbol	Risk Category
AST/Generators	**A**	Mod
Auto Repair/fleet vehicles	**B**	High
Cemetery	**C**	Low
Chemical Storage	**D**	High
Electrical Substation	**E**	Mod
Pollution Incident	**F**	High
Laundromat	**G**	High
Lift Station/WWTP	**H**	Mod
Injection well	**I**	High
Landfill	**J**	High
Primary Road	**K**	Mod
Printer	**L**	High
Self-Storage	**M**	Low
Solid Waste	**N**	Mod
UST/Gas Station	**O**	High
Pesticide/herbicide application	**P**	Low
Water Treatment Plant	**Q**	Mod

Table 6. Inventory of potential contaminant sources

Potential Contaminant Source Description	Type of Source	Map Symbol
NRO Plant		
Luke's Auto repair	Auto Repair	B-6
Nags Head Ocean Rescue	Auto Repair/fleet vehicles	B-7
Lowe's	Chemical Storage	D-3
Dominion Electrical Substation	Electrical Substation	E-1
Coin Op Laundry	Laundromat	G-1
Stormwater Sewer	Lift Station/WWTP	H-1
Stormwater Sewer	Lift Station/WWTP	H-2
Stormwater Sewer	Lift Station/WWTP	H-3
Stormwater Sewer	Lift Station/WWTP	H-7
Stormwater Sewer	Lift Station/WWTP	H-8
Stormwater Sewer	Lift Station/WWTP	H-9
US 158	Primary Road	K-3
NC 12	Primary Road	K-4
Master Graphics Printers	Printer	L-1
Nag's Head Self Storage	Self-Storage	M-1
Beach Warehouses Mini Storage	Self-Storage	M-2
Nag's Head Public Works	Solid Waste	N-1
KDH Recycle Center	Solid Waste	N-2
Austin Fish Co.	UST/Gas Station	O-1
Kangaroo (RAM 53)	UST/Gas Station	O-2
Wright Memorial Maintenance	UST/Gas Station	O-3
Stop n Shop Convenience & Deli	UST/Gas Station	O-4
Nag's Head Shell	UST/Gas Station	O-5
Quality Plus Oil	UST/Gas Station	O-6
Duck Thru 24	UST/Gas Station	O-10
NRO Water Treatment Plant	Water Treatment Plant	Q-1
KDH RO Water Treatment Plant	Water Treatment Plant	Q-2
Nag's Head Water Treatment Plant	Water Treatment Plant	Q-3

Table 6. Inventory of potential contaminant sources

Potential Contaminant Source Description	Type of Source	Map Symbol
Skyco Plant		
Midway Automotive	Auto Repair	B-1
Cudworth Cemetary	Cemetery	C-1
Outer Banks Pest Control	Chemical Storage	D-1
Marine NAPA (Murray Auto)	Chemical Storage	D-2
Dominion Electrical Substation	Electrical Substation	E-3
Eastern Service Center (former)	Pollution Incident	F-1
Decatur Partnership FTF Site	Pollution Incident	F-2
Lift Station	Lift Station/WWTP	H-4
Lift Station	Lift Station/WWTP	H-5
Coastal Studies Institute	Injection well	I-1
Baumtown Road Dump	Landfill	J-1
Walker Recreation Park	Landfill	J-2
US 64	Primary Road	K-1
NC 345	Primary Road	K-5
Dare Storage	Self-Storage	M-3
Mann's Red & White	UST/Gas Station	O-7
Skyco WTP	Water Treatment Plant	Q-4
Mac Midgett Plant		
Rodanthe Pier	AST/Generators	A-1
Chicamacomico Fire Department	Auto Repair/fleet vehicles	B-2
NC 12	Primary Road	K-4
N. Beach Campground	UST/Gas Station	O-8
Liberty Island Convenience	UST/Gas Station	O-9
RWS WTP	Water Treatment Plant	Q-5
Stumpy Point Plant		
Sprint cell tower emer. Gen.	AST/Generators	A-4
US 264	Primary Road	K-2
Pointer's Field	Pesticide/herbicide application	P-1
Stumpy Point WWTP	Lift Station/WWTP	H-6
Stumpy Point Water Treatment Plant	Water Treatment Plant	Q-6

Table 6. Inventory of potential contaminant sources

Potential Contaminant Source Description	Type of Source	Map Symbol
Hatteras Plant		
Billy Mitchell Airstrip	AST/Generators	A-2
Scotch Bonnet Marina	AST/Generators	A-3
Frisco Volunteer Fire Department	Auto Repair/fleet vehicles	B-3
Hatteras Body Shop	Auto Repair	B-4
Auto Banks Car Repair	Auto Repair	B-5
Fulcher Cemetary	Cemetery	C-2
Hatteras Elec. Coop. Substation	Electrical Substation	E-2
NC 12	Primary Roads	K-4
Hatteras WTP	Water Treatment Plant	Q-7

Table 7. Dare County Wells Risk Analysis

Site Description	Map Symbol	Closest Well	Protection radius, ft	Distance from well	Proximity Score	Risk Category	Overall Risk
NRO Potential Sources							
Luke's Auto repair	B-6	9	1,673	1,200	0.28	3	0.85
Nags Head Ocean Rescue	B-7	15	1,832	550	0.70	3	2.10
Lowe's	D-3	Orville	1,747	950	0.46	3	1.37
Dominion Electrical Substation	E-1	8	1,673	800	0.52	2	1.04
Coin Op Laundry	G-1	4	1,673	400	0.76	3	2.28
Stormwater Sewer	H-1	1	1,673	100	0.94	2	1.88
Stormwater Sewer	H-2	6	1,673	100	0.94	2	1.88
Stormwater Sewer	H-3	5	1,673	125	0.93	2	1.85
Stormwater Sewer	H-7	7	1,673	650	0.61	2	1.22
Stormwater Sewer	H-8	4	1,673	800	0.52	2	1.04
Stormwater Sewer	H-9	8	1,673	1,100	0.34	2	0.68
US 158	K-3	Multiple	1,747	200	0.89	2	1.77
NC 12	K-4	Multiple	1,747	200	0.89	2	1.77
Master Graphics Printers	L-1	4	1,673	600	0.64	3	1.92
Nag's Head Self Storage	M-1	10	1,673	1,300	0.22	1	0.22
Beach Warehouses Mini Storage	M-2	9	1,673	1,500	0.10	1	0.10
Nag's Head Public Works	N-1	10	1,673	1,300	0.22	2	0.45
KDH Recycle Center	N-2	7	1,673	1,100	0.34	2	0.68
Austin Fish Co.	O-1	15	1,832	650	0.65	3	1.94
Kangaroo (RAM 53)	O-2	4	1,673	900	0.46	3	1.39
Wright Memorial Maintenance	O-3	5	1,673	1,500	0.10	3	0.31
Stop n Shop Convenience & Deli	O-4	4	1,673	1,650	0.01	3	0.04
Nag's Head Shell	O-5	15	1,832	1,000	0.45	3	1.36
Quality Plus Oil	O-6	3	1,673	800	0.52	3	1.57
Duck Thru 24	O-10	17	1,747	700	0.60	3	1.80
NRO Water Treatment Plant	Q-1	3	1,673	400	0.76	2	1.52
KDH RO Water Treatment Plant	Q-2	9	1,673	1,150	0.31	2	0.63
Nag's Head Water Treatment Plant	Q-3	10	1,673	1,250	0.25	2	0.51
						Total:	**29.86**

Table 7. Dare County Wells Risk Analysis

Site Description	Map Symbol	Closest Well	Protection radius, ft	Distance from well	Proximity Score	Risk Category	Overall Risk
Skyco Potential Sources							
Midway Automotive	B-1	Skyco 11	3,566	1,400	0.61	3	1.82
Cudworth Cemetary	C-1	Skyco 2	2,591	2,000	0.23	1	0.23
Outer Banks Pest Control	D-1	Skyco 11	3,566	2,675	0.25	3	0.75
Marine NAPA (Murray Auto)	D-2	Skyco 11	3,566	2,700	0.24	3	0.73
Dominion Electrical Substation	E-3	Skyco 11	3,566	2,250	0.37	2	0.74
Eastern Service Center (former)	F-1	Skyco 11	3,566	2,450	0.31	3	0.94
Decatur Partnership FTF Site	F-2	Skyco 11	3,566	2,600	0.27	3	0.81
Lift Station	H-4	Skyco 6	2,199	1,150	0.48	2	0.95
Lift Station	H-5	Skyco 2	2,591	400	0.85	2	1.69
Coastal Studies Institute	I-1	Skyco 6	2,199	1,800	0.18	2	0.36
Baumtown Road Dump	J-1	Skyco 2	2,591	2,100	0.19	3	0.57
Walker Recreation Park	J-2	Skyco 2	2,591	2,450	0.05	3	0.16
US 64	K-1	Skyco 14	2,354	500	0.79	2	1.58
NC 345	K-5	Multiple	2,199	150	0.93	2	1.86
Dare Storage	M-3	Skyco 6	2,199	600	0.73	1	0.73
Mann's Red & White	O-7	Skyco 2	2,591	550	0.79	3	2.36
Skyco WTP	Q-4	Skyco 11	3,566	1,400	0.61	2	1.21
						Total:	**17.50**
Mac Midgett Potential Sources							
Rodanthe Pier	A-1	RWS-2	3,520	3,000	0.15	2	0.30
Chicamacomico Fire Department	B-2	RWS-2	3,520	2,350	0.33	3	1.00
NC 12	K-4	Multiple	3,520	175	0.95	2	1.90
North Beach Campground	O-8	RWS-1	3,520	550	0.84	3	2.53
Liberty Island Convenience	O-9	RWS-1	3,520	800	0.77	3	2.32
RWS WTP	Q-5	RWS-1	3,520	350	0.90	3	2.70
						Total:	**10.74**

Table 7. Dare County Wells Risk Analysis

Site Description	Map Symbol	Closest Well	Protection radius, ft	Distance from well	Proximity Score	Risk Category	Overall Risk
Stumpy Point Potential Sources							
Sprint cell tower emer. Gen.	A-4	Stumpy Pt 1	2,492	375	0.85	2	1.70
US 264	K-2	Stumpy Pt 1	2,492	550	0.78	2	1.56
Pointer's Field	P-1	Stumpy Pt 1	2,492	200	0.92	1	0.92
Stumpy Point WWTP	H-6	Stumpy Pt 1	2,492	580	0.77	2	1.53
Stumpy Point Water Treatment Plant	Q-6	Stumpy Pt 2	2,492	100	0.96	2	1.92
						Total:	**7.63**
Hatteras Potential Sources							
Billy Mitchell Airstrip	A-2	3D	3,137	1250	0.60	2	1.20
Scotch Bonnet Marina	A-3	PW-2	4,241	1060	0.75	2	1.50
Frisco Volunteer Fire Department	B-3	6L	3,137	2650	0.16	3	0.47
Hatteras Body Shop	B-4	6L	3,137	2700	0.14	3	0.42
Auto Banks Car Repair	B-5	8L	3,137	2750	0.12	3	0.37
Fulcher Cemetary	C-2	8L	3,137	2820	0.10	1	0.10
Hatteras Elec. Coop. Substation	E-2	3D	3,137	1730	0.45	2	0.90
NC 12	K-4	Multiple	4,241	200	0.95	2	1.91
Hatteras WTP	Q-7	PW-1	5,195	375	0.93	2	1.86
						Total:	**8.72**

Table 8. Dare County Water System Contacts

Water System Management	
Utilities Director	(252) 480-2296
Assistant Utilities Director	(252) 441-4726
Water Treatment Plants	
NRO WTP	(252) 475-5990
Skyco WTP	(252) 475-5790
RWS WTP	(252) 475-5780
Hatteras WTP	(252) 475-5760
Stumpy Point WTP	(252) 473-6609
Radio	
WVOD 99.1 Manteo	(252) 475-1888
WCXL 104.1 Nags Head	(252) 441-1024
WOBR 95.3 Manteo	(252) 473-2444
Television	
Channel 3 WTKR	(757) 460-1000
Channel 4 WSKY	(757) 382-0004
Channel 7 WITN	(252) 473-4705
Channel 10 WAVY	(757) 393-1010
Channel 20 Gov't Access	(252) 475-5900
Newspapers	
Outer Banks Sentinel	(252) 480-2234
Virginian Pilot	(757) 446-2155
Coastland Times	(252) 473-2105
Law Enforcement	
NRO, Kill Devil Hills PD	(252) 449-5337
Dare Co Sheriff	(252) 475-5980

WELLHEAD PROTECTION PLAN

for

The County of Dare,

North Carolina

APPENDIX

- Dare County Wellhead Protection Ordinance
- Coastal Studies Institute injection wells site map and construction specifications
- Dare County Water Department educational brochure
- Potential Contaminant Sources Risk Categories
- Potential Contamination Source Inventory, 2013
- Dare County Well Construction Records

WEBSITE AND DATABASE SEARCH:

1. 2011 Water Supply System Report:
http://www.ncwater.org/Water_Supply_Planning/Local_Water_Supply_Plan/search.php

2. EPA's Envirofacts data warehouse (including Enviromapper) for information on air, community water sources, water dischargers, toxic releases, hazardous waste and superfund sites: http://www.epa.gov/enviro/index.html

3. Sourcewater Protection and Assessment in NC for information on Animal Operations, CERCLIS, NPL, NPDES, PCS, RCRA, septage disposal, soil remediation, and Tier II sites, non-discharge permits, landfills, pollution incidents, and UIC and UST permits:
http://204.211.89.20/Swap/

COUNTY OF DARE

KILL DEVIL HILLS, NORTH CAROLINA 27948

GROUNDWATER PROTECTION RESOLUTION
IN SUPPORT OF THE DARE COUNTY WELLHEAD PROTECTION PLAN

600 MUSTIAN ST.
PHONE (919) 441-7788

WHEREAS, the Dare County Water System derives their public water supply from ground wells, and

WHEREAS, the groundwater needs to be protected from contamination by activities of mankind, and

WHEREAS, the Dare County Water System desires to assume and maintain a leadership role in the protection of its drinking water resources through its own efforts and in cooperation with other local governments and state and federal agencies,

NOW THEREFORE BE IT RESOLVED by the Dare County Board of Commissioners that the Dare County Water System, NC does hereby adopt the following resolution titled "Groundwater Protection Resolution".

This resolution shall be known as the "Groundwater Protection Resolution".

It is the purpose of this resolution to promote public health, safety, and general welfare, and to minimize public and private losses due to contamination for the public water supply, to maximize groundwater protection/pollution abatement control procedures, and protect our groundwater resources:

1) Protect human life and health;
2) Minimize expenditure of public money for costly pollution projects;
3) Minimize business interruption;
4) Insure that the public is provided with a safe potable water supply now and for future generations;
5) Protect the natural groundwater resources of the state.

In order to accomplish its purpose, this resolution shall employ the following methods:

1) Establish a groundwater protection area.
2) Inventory and plot on a map all potential sources of contamination within the designated groundwater protection area.
3) Frequent monitoring of existing and future activities within the groundwater protection areas that have been identified as potential sources of contamination.
4) Develop contingency plans for alternative drinking water supplies to help mitigate contamination of the current public water supply.
5) Educate the public on groundwater, where it comes from, how it becomes contaminated, and the ways to protect it.
6) Use all local, state, and federal resources and regulations to protect groundwater.
7) Submit a copy of this program to the NC Department of Environment and Natural Resources, Public Water Supply Section for consent and approval.

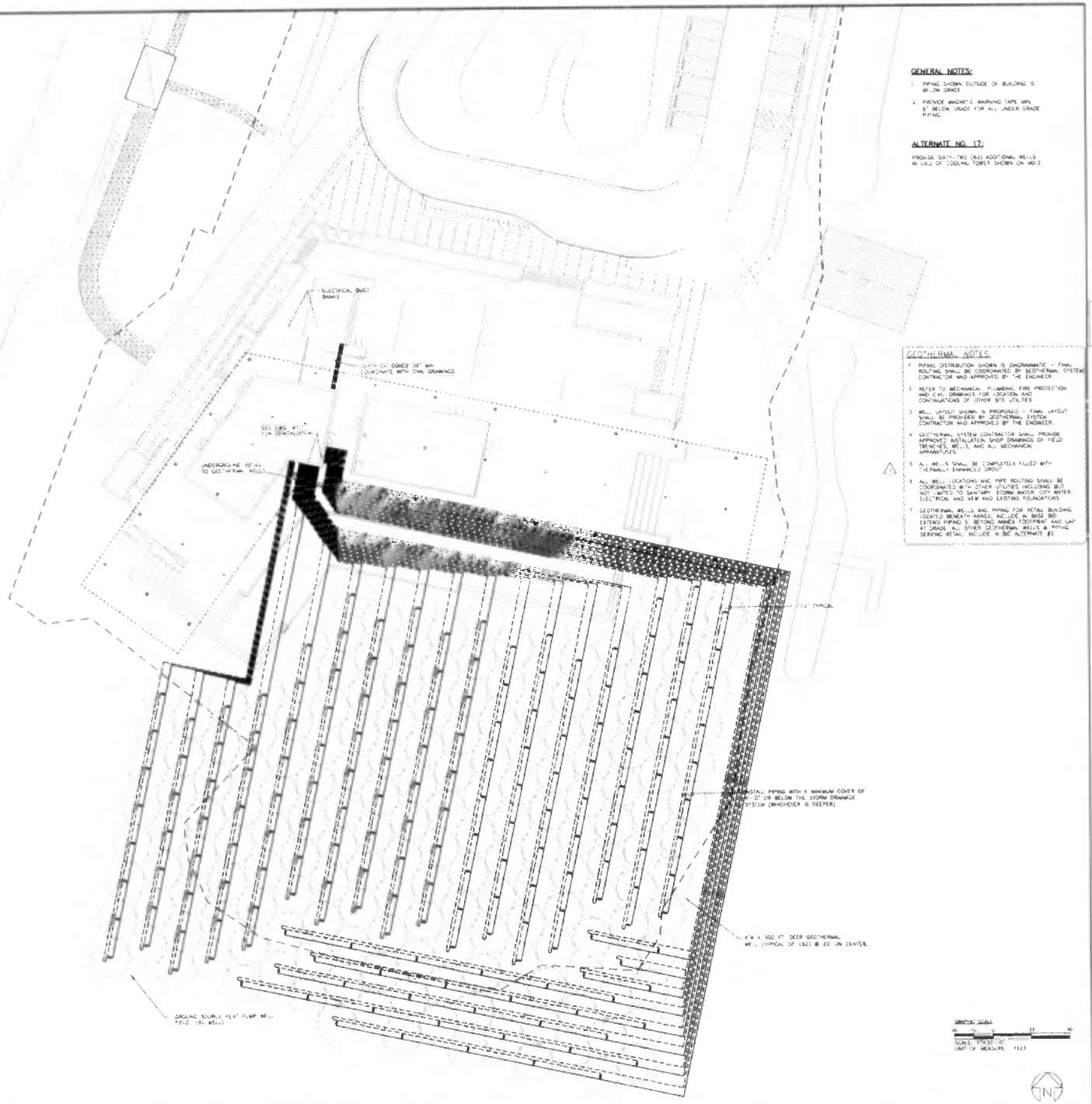
This the 7th day of September, 1999

DARE COUNTY BOARD OF COMMISSIONERS

By: Renova N. Perry
Chair

ATTEST:

Frances W. Harris
Clerk



GENERAL NOTES:

1. PIPING SHOWN OUTSIDE OF BUILDING IS BELOW GRADE
2. PROVIDE MAGNETIC WARNING TAPE MIN 6" BELOW GRADE FOR ALL UNDER GRADE PIPING

ALTERNATE NO. 17:

PROVIDE SIXTY-TWO (62) ADDITIONAL WELLS IN LIEU OF COOLING TOWER SHOWN ON MD.2

GEOTHERMAL NOTES:

1. PIPING DISTRIBUTION SHOWN IS DIAGRAMMATIC - FINAL ROUTING SHALL BE COORDINATED BY GEOTHERMAL SYSTEM CONTRACTOR AND APPROVED BY THE ENGINEER
2. REFER TO MECHANICAL, PLUMBING, FIRE PROTECTION AND CIVIL DRAWINGS FOR LOCATION AND CONFIGURATIONS OF OTHER SITE UTILITIES
3. WELL LAYOUT SHOWN IS PROPOSED - FINAL LAYOUT SHALL BE PROVIDED BY GEOTHERMAL SYSTEM CONTRACTOR AND APPROVED BY THE ENGINEER.
4. GEOTHERMAL SYSTEM CONTRACTOR SHALL PROVIDE APPROVED INSTALLATION SHOP DRAWINGS OF FIELD TRENCHES, WELLS, AND ALL MECHANICAL APPARATUSES
5. ALL WELLS SHALL BE COMPLETELY FILLED WITH THERMALLY ENHANCED GROUT
6. ALL WELL LOCATIONS AND PIPE ROUTING SHALL BE COORDINATED WITH OTHER UTILITIES INCLUDING BUT NOT LIMITED TO SANITARY, STORM WATER, CITY WATER, ELECTRICAL AND NEW AND EXISTING FOUNDATIONS
7. GEOTHERMAL WELLS AND PIPING FOR RETAIL BUILDING LOCATED BENEATH ANNEX, INCLUDE IN BASE BID EXTEND PIPING 5' BEYOND ANNEX FOOTPRINT AND CAP AT GRADE. ALL OTHER GEOTHERMAL WELLS & PIPING SERVING RETAIL, INCLUDE IN BIC ALTERNATE #2

EASTERN CAROLINA UNIVERSITY

UNC COASTAL STUDIES INSTITUTE

SKYCO SITE - MANTEO, NORTH CAROLINA

OWNER PROJECT IDENTIFICATION
SCO ID# 24363230A
CODE 40430
ITEM 307

ARCHITECT

PBCL
Pearce Brinkley Cease + Lee
333 Fayetteville St. Suite 1000
Raleigh, North Carolina 27601
p.(919)836.9751 f.(919)836.1751

SEAL

NORTH CAROLINA REGISTERED LANDSCAPE ARCHITECT SEAL MERRY L. MONROE

CONSULTANT

RMF ENGINEERING, INC.
1914 CAMPEROW BOULEVARD
SUITE 330
DURHAM, NORTH CAROLINA 27703
PHONE: 919-941-9075
FAX: 919-941-9087
NC LICENSE #C-1139

SUBMITTAL

APPROVED BID DOCUMENTS

15 NOVEMBER 2012

1	11.13.12	BID FINAL SUBMITTAL

REVISIONS

SHEET

MECHANICAL SITE PLAN (ALTERNATE NO. 17)

M0.3

PROJECT NUMBER
PBCL 1059 VOLUME 1
RESEARCH BUILDING

SECTION 232113.33 - GROUND-LOOP HEAT-PUMP PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes piping for vertical, direct-buried, ground-loop, heat-pump systems that operate between 23 and 104 deg F.

1.3 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure, unless otherwise indicated:
1. Ground-Loop, Heat-Pump Piping: 160 psig.

1.4 SUBMITTALS

A. Product Data: For the following:
1. Pipe and fittings.
2. Joining method and equipment.

B. Field quality-control test reports.

PART 2 - PRODUCTS

2.1 PIPES AND FITTINGS

A. PE Pipe: ASTM D 2239, SIDR Numbers 5.3, 7, 9, or 11.5; with PE compound number required to achieve required system working pressure.
1. Molded PE Fittings: ASTM D 2683 or ASTM D 3261, PE resin, socket- or butt-fusion type, made to match PE pipe dimensions and class.

B. U-Bend Assembly: Factory fabricated with embossed depth stamp every 24 inches from U-bend.

2.2 BOREHOLE BACKFILL

A. Surface Seal: Cement with thermal conductivity greater than 1.2 Btu/h x sq. ft. x deg F.

B. Backfill below Surface Seal: Natural or manufactured sand specified in Division 31 Section "Earth Moving."

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, warning tape, and backfilling are specified in Division 31 Section "Earth Moving."

3.2 VERTICAL PIPING INSTALLATION

A. Install PE piping in boreholes according to ASTM D 2774 or ASTM F 645.
   1. Clean PE pipe and fittings and make heat-fusion joints according to ASTM D 2657. Minimize number of joints.

B. Purge, flush, and pressure test piping before backfilling boreholes.

C. After installation of loop pipe in borehole, fill piping loop with water or antifreeze solution, and pump backfill into borehole to discharge at base of borehole.

D. Fill borehole with backfill to a point at least 60 inches below grade and backfill remainder with surface seal material.

E. Extend piping and connect to water-source, ground-loop, heat-pump piping systems at outside face of building wall in locations and pipe sizes indicated.
   1. Terminate water-service piping at building wall until building water-source, ground-loop, heat-pump piping systems are installed. Terminate piping with caps. Make connections to building water-source, ground-loop, heat-pump piping systems when those systems are installed.

F. Wall sleeves are specified in Division 23 Section "Common Work Results for HVAC."

G. Mechanical sleeve seals are specified in Division 23 Section "Common Work Results for Plumbing."

3.3 FIELD QUALITY CONTROL

A. Piping Tests: Fill piping 24 hours before testing and apply test pressure to stabilize piping. Use potable water only.

B. Hydrostatic Tests: Test at not less than 1-1/2 times the pipe working-pressure (100 psi minimum) rating allowing for static pressure of borehole depth.
   1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 30 minutes. Slowly increase to next test pressure increment and hold for 30 minutes. After testing at maximum test pressure, reduce pressure to 30 psig. Hold for 90 minutes, and measure pressure at 30-minute intervals. Repair leaks and retest until no leaks exist.

C. Prepare reports of testing activity.

END OF SECTION 232113.33

WELLHEAD PROTECTION PROGRAM

The County of Dare

Protecting Our Community's Water Supply

WHAT IS GROUNDWATER?

Groundwater is rain or snow that soaks down into the ground and is stored in pores between the soil or in cracks in the bedrock. Dare County uses groundwater as its water supply, using wells to pump water from the Yorktown aquifer to provide high-quality drinking water to the citizens of the county.

THE WELLHEAD PROTECTION PROGRAM

Dare County has developed a Wellhead Protection Program to protect its water supply from contamination. As a part of the program, it has identified vulnerable areas around its wells called a "Wellhead Protection Area". Chemicals and other pollutants spilled or dumped in this area can be drawn into the well, possibly contaminating our community's drinking water supply. Residents and businesses in these areas must be very careful with chemicals and other potential pollutants.

POLLUTION SOURCES!

Many things we do in our daily lives can pollute our surface water and groundwater. Sources of groundwater pollution include:

- Used oil, paint thinner, gasoline and other chemicals poured on the ground
- Leaking storage tanks (aboveground and underground)
- Overuse of pesticides and fertilizers on lawns, golf courses and agricultural fields
- Chemical spills at businesses, farms and along highways
- Illegal dumps and poorly managed landfills
- Failing septic tanks
- Leaking sewer lines
- Improperly abandoned wells
- Unlined waste pits, ponds and lagoons

NEED MORE INFORMATION?

The County of Dare
Public Utilities Department
(252) 475-5606
NC Rural Water Association
(336) 731-6963

HOW CAN YOU HELP?

Water is our most valuable natural resource – we must protect it! You can help by doing your part to protect our supply and by supporting this program.
Here are some tips:

- Never pour used oil, paint thinner or other hazardous chemicals on the ground or down the drain. Take them to a recycling center or to a Household Hazardous Waste Collection Day
- Check for and fix leaks in storage tanks (i.e. home heating oil/kerosene) at your home or business
- Inspect and pump your septic tank as needed
- Have any unused wells on your property properly abandoned
- Minimize your use of pesticides and fertilizers and store them properly
- Clean up junk and debris on your property
- Report all chemical spills immediately
- Encourage community leaders and businesses to do everything possible to protect our drinking water supply

Potential Contamination Sources by Risk Category

Higher Risk Potential Contamination Sources for Ground Water PWS Systems

COMMERCIAL/INDUSTRIAL

- Automobile Body shops
  Gas stations
  Repair shops
- Chemical /petroleum processing/storage
- *Sewer lines
- Utility right-of-way/pesticide use
- Chemical/petroleum pipelines
- Wood/pulp/paper processing and mills
- Dry cleaners
- Electrical/electronic manufacturing
- Fleet/trucking/bus terminals
- Furniture repair/manufacturing
- Home manufacturing
- Junk/scrap/salvage yards
- Machine shops
- Metal plating/finishing/fabricating
- Mines/sand or gravel excavations
- Parking lots/malls (>50 spaces)
- Photo processing/printing
- Plastics/synthetics producers
- Research laboratories

OTHER

- Road salt storage areas
- Military installations (for classified risks not otherwise listed)

AGRICULTURAL/RURAL

- Farm machinery repair
- Rural machine shops
- *Intensive livestock operations: Lagoons, spray fields
- Fertilizer, pesticide, and petroleum storage, distribution, handling, mixing, and cleaning areas
- *Sewage sludge (biosolids) storage, handling, mixing and cleaning areas
- *Sewage sludge (biosolids) land application
- Unauthorized/illegal disposal of wastes/chemicals

RESIDENTIAL/MUNICIPAL

- Airports - maintenance/fueling areas
- Railroad yards/maintenance/fueling areas
- Landfills/dumps
- Utility stations - maintenance areas
- *Septic systems - high density (>1/acre)
- *Sewer lines
- *Stormwater drains/discharges
- Fertilizer, pesticide, sewage sludge

Notes: 1. This is a list of potential sources of contamination not a list of known databases of contaminants.

2. Higher risk potential contaminant sources are considered to have a higher potential for drinking water contamination than those designated moderate risk or lower risk Facility-specific management practices are not taken into account in estimating risks and assigning these categories.

3. An asterisk [*] indicates activities that may be associated with microbiological contamination.

Potential Contamination Sources by Risk Category (Con't)

Moderate Risk PCSs

COMMERCIAL/INDUSTRIAL

- Car washes
- Cement/concrete plants
- Food processing
- Hardware/lumber/parts stores

AGRICULTURAL/RURAL

- *Auction lots
- *Boarding stables
- Crops, irrigated (berries, Christmas trees, hops, mint, orchards, vineyards, nurseries, greenhouses, vegetables, sod)

NOTE: Drip-irrigated crops are considered lower risks.

- Drinking water treatment plant residuals/sludge application

RESIDENTIAL/MUNICIPAL

- Drinking water treatment plants
- Golf courses
- Housing - high density (>1 house/.5 acres)
- Motor pools
- Parks
- Waste transfer/recycling stations

Wastewater treatment plants collection stations

OTHER

- Above ground storage tanks
- Construction/demolition areas
- Hospitals
- Transportation corridors

Freeways/state highways
Railroads
Right-of-way maintenance (herbicide use areas)

- Irrigation, water supply, or monitoring wells

Lower Risk PCSs

COMMERCIAL/INDUSTRIAL

- Office buildings/complexes
- RV/mini storage

AGRICULTURAL/RURAL

- Crops, non-irrigated (grains, grass seeds, hay)
- *Rangeland
- Managed forests/silviculture

RESIDENTIAL/MUNICIPAL

- Apartments and condominiums
- Campgrounds/RV parks
- Fire stations
- Schools
- Housing – low density (< 1 house/.5 acres)

OTHER

- Medical/dental offices/clinics
- Veterinary offices/clinics

SOURCE: Adapted from EPA (1993), and from the Oregon Wellhead Protection Program

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code A-1

Closest Well _____

FACILITY NAME: RODANTHE PIER

ADDRESS:
24138 HOLIDAY BLVD S.
RODANTHE, NC 27968

PHONE #: (252) 987-2345

OWNER/RP:
HATTERAS PARTNERS
PO BOX 9
RODANTHE, NC 27968

PHONE #: _____

MUNICIPALITY: MAC MIDGETT

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
CHEM STORAGE (SWIMMING POOL)	
RECREATION VEHICLE DUMPING STATION	± 2,000-gal
KEROSENE AST	500-gal

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code A2

Closest Well _____

FACILITY NAME: BILLY MITCHELL AIRSTRIP

ADDRESS:
NC 12
FRISCO, NC

PHONE #: (252) 995-3735

OWNER/RP:
DARE COUNTY REGIONAL AIRPORT
410 AIRPORT RD
MANTEO, NC 27954

PHONE #: (252) 473-2600

MUNICIPALITY: HATTERAS

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
TEMPORARY STORAGE OF AVGAS FOR EMER. REFUELING	1 5,000-GAL

ADDITIONAL INFORMATION:
TANKER TRUCK ONLY, NO PERMANENT AST
2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code A-3

Closest Well _____

FACILITY NAME: SCOTCH BONNET MARINA

ADDRESS:

NC HWY 12, PO BOX 70
FRISCO, NC 27936

PHONE #: (252) 995-4242

OWNER/RP:

PHONE #: _____

MUNICIPALITY: HATTERAS

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
AST - DIESEL	2,500-GAL

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Map Symbol A-4

FACILITY NAME: CELL TOWER, SPRINT

ADDRESS: 20 BAYVIEW DR.
STUMPY PT NC 27978

PHONE #:

OWNER/RP: SPRINT TELEPHONE CO
502 WESLYAN BLVD
TARBORO, NC 27886

PHONE #:

MUNICIPALITY: STUMPY PT WHPA:

POTENTIAL CONTAMINATION SOURCES: QUANTITY:

EMERGENCY GENERATOR

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code B1

Closest Well _____

FACILITY NAME: MIDWAY AUTOMOTIVE & TOWING

ADDRESS:
HWY 64 & 345
MANTEO, NC 27954

PHONE #: (252) 473-5232

OWNER/RP:
JAMES CAHOON
PO BOX 518
MANTEO, NC 27954

PHONE #: _____

MUNICIPALITY: SKYCO

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
AUTO REPAIR WASTE OILS	SMALL QTY

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code B-2

Closest Well _____

FACILITY NAME: CHICAMACOMICO BANKS FIRE DEPT

ADDRESS:
24297 NC 12
RODANTHE, NC 27968

PHONE #: (252) 987-2347

OWNER/RP:
GLEN THOMPSON, CHIEF
PO BOX 125
RODANTHE, NC 27968

PHONE #: (252) 996-0520 CELL

MUNICIPALITY: MAC MIDGETT

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
AST	
2 x DIESEL 500-g	1000 GAL

ADDITIONAL INFORMATION:
FAX (252) 987-2347

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code B3

Closest Well _____

FACILITY NAME: FRISCO VOLUNTEER FIRE DEPT.

ADDRESS:
52470 NC HWY 12
FRISCO, NC 27936

PHONE #: (252) 995-5522

OWNER/RP:
RICHARD MARLIN, CHIEF
PO BOX 324
BUXTON, NC 27920

PHONE #: (252) 995-4793

MUNICIPALITY: HATTERAS

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
3-BAY GARAGE AND PUBLIC & STORAGE	
WASTE OIL, SOLVENTS	SMALL QTY

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code B4

Closest Well _____

FACILITY NAME: HATTERAS BODY SHOP

ADDRESS:

NC 12
HATTERAS, NC 27936

PHONE #: (252) 986-2767

OWNER/RP:

PHONE #: _____

MUNICIPALITY: HATTERAS

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
AUTO BODY PAINTS & SOLVENTS	< 150 GAL

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code B-5

Closest Well _____

FACILITY NAME: AUTO BANKS CAR REPAIR

ADDRESS: 50766 NC HWY 12
HATTERAS, NC

PHONE #: (252) 995-3200

OWNER/RP:

PHONE #:

MUNICIPALITY: HATTERAS

POTENTIAL CONTAMINATION SOURCES: AUTO RESIDUALS, WASTE OIL, SOLVENTS

QUANTITY: <150 GAL

ADDITIONAL INFORMATION:

2013 V

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Map Symbol B6

FACILITY NAME: LUKE'S AUTO REPAIR

ADDRESS: 506 W LAKE DR
KITTY HAWK, NC

PHONE #: 252 441-6825

OWNER/RP:

PHONE #:

MUNICIPALITY: WHPA:

POTENTIAL CONTAMINATION SOURCES: QUANTITY:

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Map Symbol B-7

FACILITY NAME: NAGS HEAD OCEAN RESCUE

ADDRESS: 3719 N CROATAN HWY
NAGS HEAD, NC

PHONE #:

OWNER/RP: TOWN OF NAGS HEAD

PHONE #:

MUNICIPALITY: WHPA:

POTENTIAL CONTAMINATION SOURCES: QUANTITY:

2- BAY GARAGE
FLEET VEHICLE STORAGE
& ROUTINE MAINTENANCE

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code C1

Closest Well _____

FACILITY NAME: CUDWORTH CEMETERY

ADDRESS:
CUDWORTH CEMETERY RD.
WANCHESE, NC 27981

PHONE #: _____

OWNER/RP:
LLEWELLYN & ALMA CUDWORTH
PO BOX 164
WANCHESE, NC 27981

PHONE #: _____

MUNICIPALITY: SKYCO

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
PESTICIDE / HERBICIDE APPLICATION AT AG. RATES	SMALL QTY

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code C2

Closest Well _____

FACILITY NAME: FULCHER CEMETERY

ADDRESS:

NC HWY 12
HATTERAS, NC

PHONE #: _____

OWNER/RP:

_____

_____

_____

PHONE #: _____

MUNICIPALITY: HATTERAS

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
PESTICIDE / HERBICIDE APPLICATION AT AG. RATES	SMALL QTY

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code DI

Closest Well _____

FACILITY NAME: OUTER BANKS PEST CONTROL

ADDRESS:
925 HWY 64 - 264 S
MANTEO, NC 27954

PHONE #: (252) 473-1633 / 338-2323

OWNER/RP:

PHONE #: _____

MUNICIPALITY: SKYCO

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
PESTICIDES, LIQUID	< 150 gal
DRY	< 50 lbs

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code D2

Closest Well _____

FACILITY NAME: MARINE NAPA (MURRAY AUTO)

ADDRESS:
1011 HWY 64/264 S
MANTEO, NC 27954

PHONE #: (252) 473-3466

OWNER/RP:
CHARLES MURRAY
PO BOX 575
MANTEO, NC 27954

PHONE #: _____

MUNICIPALITY: SKYCO

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
AUTO CARE PRODUCTS, PAINTS, OILS, SOLVENTS	<500 GAL

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Map Symbol D-3

FACILITY NAME: LOWES

ADDRESS: 1500 N CROATAN HWY
KILL DEVIL HILLS, NC

PHONE #: 252 449-2060

OWNER/RP: LOWES HOME CENTER, INC.

PHONE #: _____

MUNICIPALITY: _____ WHPA: _____

POTENTIAL CONTAMINATION SOURCES: QUANTITY:

SMALL SCALE CHEMICAL STORAGE

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code E1, E3

Closest Well _____

FACILITY NAME: DOMINION ELECTRICAL SUBSTATION

ADDRESS: _____

_____

PHONE #: (888) 667-3000

OWNER/RP:

DOMINION NC POWER
PO BOX 26666
RICHMOND, VA 23261

PHONE #: _____

MUNICIPALITY: NRO PLANT (H1) SKYCO (H3)

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
MINERAL OIL IN TRANSFORMERS	~10,000 GAL

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Map Symbol E2

FACILITY NAME: HATTERAS SUBSTATION

ADDRESS: 47109 LIGHT PLANT RD PO BOX 9
BUXTON, NC 27920

PHONE #: 800 454 5616

OWNER/RP: CAPE HATTERAS ELECTRICAL COOPERATIVE

PHONE #:

MUNICIPALITY: HATTERAS WHPA:

POTENTIAL CONTAMINATION SOURCES: QUANTITY:

MINERAL OIL IN TRANSFORMERS

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code FI

Closest Well _____

FACILITY NAME: EASTERN SERVICE CENTER

ADDRESS:
1102 HWY 64/264 S
MANTEO, NC 27954

PHONE #: (252) 473-2122

OWNER/RP:
EASTERN FUELS, INC
PO BOX 1386 HWY 42 W
AHOSKIE, NC 27910

PHONE #: (252) 482-7401

MUNICIPALITY: SKYCO

POTENTIAL CONTAMINATION SOURCES: QUANTITY:

GAS UST INCIDENT 12279 OCCURRED DURING UST CLOSURE,
RISK = 30/B FREE PRODUCT PRESENT, QUARTERLY
MONITORING UNTIL 1996; RERANKED TO HIGH 5/98

ADDITIONAL INFORMATION:

4 USTS REMOVED 4/94

2013 - FILES NOT AVAILABLE; NFA LETTER
ISSUED

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code F2

Closest Well _____

FACILITY NAME: DECATUR PARTNERSHIP FTF SITE
OLD CAR WASH

ADDRESS:
1115 HWY 64/264 S
MANTEO, NC 27954

PHONE #: (252) 473-6343

OWNER/RP:
SHANNON NAGLE; DECATUR FTF SITE
PO BOX 26268
RALEIGH, NC 27611-6268

PHONE #: (919) 250-2000

MUNICIPALITY: SKYCO

POTENTIAL CONTAMINATION SOURCES: QUANTITY:

INCIDENT 12483 5/94 SITE ASSESSMENT
REVEALED SOIL CONTAMINATION; RISK: 30/B
PLACED AS FEDERAL TRUST FUND (FTF) SITE
5/95

ADDITIONAL INFORMATION:

FEDERAL TRUST FUND (FTF) SITE WITH CLEANUP
DIRECTED BY FEDERAL PRIORITY

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code G1

Closest Well _____

FACILITY NAME: COIN-OP LAUNDRY

ADDRESS:
107 MEADOWLARK ST
KILL DEVIL HILLS, NC 27948

PHONE #: _____

OWNER/RP:
DARE RESORTS, INC.
PO BOX 348
KILL DEVIL HILLS, NC 27948

PHONE #: (252) 441-7494

MUNICIPALITY: NRO PLANT

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
LAUNDROMAT: GRAY WATER	~10,000 GAL/MO

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code H-1, -H-3 H7, H8, H9

Closest Well _____

FACILITY NAME: STORM WATER LIFT STATION

ADDRESS:
FIRST FLIGHT HIGH SCHOOL
100 VETERAN'S DRIVE, KDH, NC 27948

PHONE #: (252) 449-7000

OWNER/RP:
DARE COUNTY SCHOOLS
3020 WRIGHTSVILLE AVE. PO BOX 1508
NAGS HEAD, NC 27959

PHONE #: (252) 480-8888

MUNICIPALITY: NRO PLANT

POTENTIAL CONTAMINATION SOURCES: QUANTITY:

STORMWATER EST. 10,000-GAL +

PUMP-ASSISTED, ALARMED STORMWATER SEWERS

ADDITIONAL INFORMATION:

USED DURING INTENSE RAINFALL TO DRAIN BALL FIELDS, ROADS, LOWER SURFACE WATER

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Map Symbol H4, H5

FACILITY NAME: LIFT STATIONS

ADDRESS:
NEAR COASTAL STUDIES INSTITUTE
NEAR MANNS RED & WHITE

PHONE #:

OWNER/RP:
DARE COUNTY PUBLIC UTILITIES
600 MUSTIAN ST
MANTEO, NC 27954

PHONE #:

MUNICIPALITY: SKYCO WHPA:

POTENTIAL CONTAMINATION SOURCES: QUANTITY:
FORCE SEWAGE MAIN

ADDITIONAL INFORMATION:
2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Map Symbol H-6

FACILITY NAME: STUMPY POINT WWTP

ADDRESS:
98 BAY VIEW DR
STUMPY PT NC 27978

PHONE #: 252 475 5606

OWNER/RP:
DARE COUNTY PUBLIC UTILITIES
600 MUSTAIN ST
MANTEO, NC 27954

PHONE #: 252 473 1101

MUNICIPALITY: STUMPY PT WHPA: _____

POTENTIAL CONTAMINATION SOURCES: QUANTITY:

RAW WASTEWATER

ADDITIONAL INFORMATION:

2013 V

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Map Symbol I-1

FACILITY NAME: COASTAL STUDIES INST GEOTHERMAL

ADDRESS: 850 NC 345 PO BOX 699
MANTEO NC 27954

PHONE #: (252) 475-5400

OWNER/RP: UNC COASTAL STUDIES INSTITUTE

PHONE #: _____

MUNICIPALITY: _____ WHPA: _____

POTENTIAL CONTAMINATION SOURCES: QUANTITY:

VERTICAL CLOSED LOOP ARUCOUS FLUID INJECTION WELL

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code J1

Closest Well _____

FACILITY NAME: BAUMTOWN RD. DUMP

ADDRESS:
550 BAUMTOWN RD
WANCHESE, NC

PHONE #: _____

OWNER/RP:
PHILIP QUIDLEY

PHONE #: _____

MUNICIPALITY: SKYCO

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
ABANDONED LANDFILL	UNKNOWN
HOUSEHOLD HAZ WASTE	ESTIMATE MOD.
SOLID WASTE	HIGH

ADDITIONAL INFORMATION:
GROUNDWATER DISCHARGE AREA
2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code J2

Closest Well _____

FACILITY NAME: WALKER RECREATION PARK

ADDRESS:
POND RD.
WANCHESE, NC

PHONE #: _____

OWNER/RP:
COUNTY OF DARE
PO BOX 1000
MANTEO, NC 27954

PHONE #: (252) 473-1101

MUNICIPALITY: SKYCO

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
PESTICIDE HERBICIDE APPLICATION OVER ≥ 4 ACRES	SMALL QTY EST HIGHER
ABANDONED LANDFILL LEACHATES	UNKNOWN

ADDITIONAL INFORMATION:
LOCATED IN DISCHARGE AREA
2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code K1-K5

Closest Well _____

FACILITY NAME: PRIMARY ROADS: US 64, US 158, US 264, NC 12
NC 345

ADDRESS:
SEE FIGURES; VARIOUS ROUTES

PHONE #: _____

OWNER/RP:
NCDOT DISTRICT ENGINEER
PO BOX 1405
ELIZABETH CITY, NC 27909

PHONE #: (252) 331-4737

MUNICIPALITY: NRO, SKYCO, RWS, HATTERAS, STUMPY PT.

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
TANKER TRUCKS HAULING HAZARDOUS LIQUIDS: PETROLEUM, ACIDS/BASES, SOLVENTS,	±10,000-gal

ADDITIONAL INFORMATION:
2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code 11

Closest Well _____

FACILITY NAME: MASTER GRAPHICS PRINTERS

ADDRESS:
402 CROATAN HIGHWAY
KILL DEVIL HILLS, NC 27948

PHONE #: (252) 441-7783

OWNER/RP:
STUART CARDEN
PO BOX 2377
KILL DEVIL HILLS, NC 27948

PHONE #: 441-4221(H) 441-7783(W)

MUNICIPALITY: MRO PLANT

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
PRINT INK, ORGANIC SOLVENTS	< 150 gal

ADDITIONAL INFORMATION:

2013

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code M1

Closest Well _____

FACILITY NAME: NAG'S HEAD SELF STORAGE

ADDRESS:
209 W. EIGHTH ST.
NAG'S HEAD, NC 27959

PHONE #: (252) 441-3093

OWNER/RP:

PHONE #: _____

MUNICIPALITY: NRO PLANT

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
HOUSEHOLD HAZARDOUS WASTE	SMALL QTYS

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Map Symbol M 2

FACILITY NAME: BEACH WAREHOUSES MINI STORAGE

ADDRESS: 405 N FRESH POND DR
KILL DEVIL HILLS, NC

PHONE #: 252 441 5425

OWNER/RP:

PHONE #:

MUNICIPALITY: WHPA:

POTENTIAL CONTAMINATION SOURCES: QUANTITY:

HOUSEHOLD HAZARDOUS WASTE

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code M3

Closest Well _____

FACILITY NAME: DART STORAGE

ADDRESS:
HWY 64 S
MANTEO, NC

PHONE #: (252) 473-5682

OWNER/RP:

PHONE #: _____

MUNICIPALITY: SKYCO

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
HOUSEHOLD HAZARDOUS WASTE	SMALL QTY

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code N1

Closest Well _____

FACILITY NAME: NAGS HEAD PUBLIC WORKS

ADDRESS:
2200 LARK AVE
NAGS HEAD, NC 27959

PHONE #: (252) 441-1122

OWNER/RP:
NAGS HEAD PUBLIC WORKS DEPT.
PO BOX 99
NAGS HEAD, NC 27959

PHONE #: (252) 441-5508

MUNICIPALITY: NRO PLANT

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
HOUSEHOLD HAZ WASTES	SMALL QTYS
GAS & DIESEL USTS	2,000-~~gal~~
AUTO REPAIR, WASTE OILS SOLVENTS	~150 gal
PAINT, MISC CUTTING OILS	

ADDITIONAL INFORMATION:

2013 /

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code N2

Closest Well _____

FACILITY NAME: KILL DEVIL HILLS RECYCLE CENTER

ADDRESS: _____

PHONE #: (252) 480-4080

OWNER/RP:
KDH PUBLIC SERVICES
PO BOX 1719
KILL DEVIL HILLS, NC 27948

PHONE #: (252) 480-4000

MUNICIPALITY: NRO PLANT

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
HOUSEHOLD HAZ. WASTE	SM. QTY
SOLID WASTE, 5 CU YD BINS	25-50 yds^3

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code G1

Closest Well _____

FACILITY NAME: AUSTIN FISH CO

ADDRESS:
3711 S CROATAN HWY
NAGS HEAD, NC 27959

PHONE #: (252) 441-7412

OWNER/RP:
WINSLOW OIL CO
PO BOX 25
HERTFORD, NC 27944

PHONE #: (252) 426-5092

MUNICIPALITY: NRO PLANT

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
USTS, INCIDENT GASOLINE	
4 @ 4,000-GAL USTS INSTALLED '88	16,000-GAL
INCIDENT 3040 RANK 25/C : GAS/DIESEL ODOR	
DISCOVERED WHEN EXCAVATING FOR H2O LINES	

ADDITIONAL INFORMATION:
REMOVED 8 4,000-GAL USTS 12/1988

2013 - NO FURTHER ACTION LETTER FM NCDENR
NOTICE OF RESIDUAL PETROLEUM ON DEED 13 MAR 07
SITE CLOSURE REPORT SUBMITTED.

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code 02

Closest Well _____

FACILITY NAME: KANGAROO (RED APPLE MART 53)

ADDRESS:
100 N. CROATAN HWY
KILL DEVIL HILLS, NC 27948

PHONE #: (252) 441-7188

OWNER/RP:
EASTERN FUELS, INC.
PO BOX 1386
AHOSKIE, NC 27910

PHONE #: (252) 482-7401

MUNICIPALITY: NRO PLANT

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
UST'S - GAS & DIESEL	
2 X 5000, 2X 8000, 12,000-GAL USTS	48,000-GAL
CORRECTIVE ACTION SYSTEM IN PLACE; MONITOR WELLS SHOW GROUNDWATER CONTAMINATION	
INCIDENT 3040	

ADDITIONAL INFORMATION:
6 @ 4,000-GAL, 2000-GAL UST REMOVED 3/83
PERMIT NCG510185 - PUMP & TREAT DISCHARGE PERMIT
CONTACT CES ENVIRONMENTAL SERVICES AT (252) 346-1902
FOR PROBLEMS WITH PUMP & TREAT CORRECTIVE ACTION
SYSTEM PERMIT EXPIRES 8/11.

2013 - MONITORING GROUNDWATER SEMI-ANNUALLY
BTEX & MTBE TRENDS DECREASING; NAPTHALENE
BELOW GCL'S

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code 03

Closest Well _____

FACILITY NAME: WRIGHT BROS. NATIONAL MEMORIAL

ADDRESS:
1401 NATIONAL PARK DR.
MANTEO, NC 27954

PHONE #: (252) 441-7430

OWNER/RP:
CAPE HATTERAS NATIONAL SEASHORE
RT 1 BOX 675
MANTEO, NC 27954

PHONE #: (252) 473-2111

MUNICIPALITY: NRO PLANT

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
UST 500-GAL HEATING OIL	500-GAL
PESTICIDE / HERBICIDE STORAGE (TEMPORARY) & APPLICATION	SMALL QTY

ADDITIONAL INFORMATION:
http://www.nps.gov
2000 & 1000-GAL USTS REMOVED 09/95
2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code 04

Closest Well _____

FACILITY NAME: STOP N SHOP CONVENIENCE & DELI

ADDRESS:
100 S. VIRGINIA DARE TRAIL
KILL DEVIL HILLS, NC 27948

PHONE #: (252) 441-6105

OWNER/RP:
TOM & VICKY BYERS
PO BOX 2615
KILL DEVIL HILLS, NC 27948

PHONE #: (252) 261-0634 (H) 441-6105 (W)

MUNICIPALITY: NRO PLANT

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
USTS & INCIDENTS	
8000 & 15000-GAL USTS GASOLINE	23,000-GAL
(3) INCIDENTS: 19232, 21915, 22042,	
UST CLOSURE REVEALED SOIL CONTAMINATION	
BY GAS RISK: LOW	

ADDITIONAL INFORMATION:
3000, 2x 2000. USTS REMOVED 3/90
2x 2000, 1000, & 550-GAL USTS REMOVED <'81

2013 NFA ISSUED; FILE NOT AVAIL

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code 05

Closest Well _____

FACILITY NAME: NAGS HEAD SHELL SERVICE

ADDRESS:
3643 S CROATAN HWY
NAGS HEAD, NC 27959

PHONE #: (252) 441-5195

OWNER/RP:
QUALITY OIL CO
PO BOX 2736, 1540
WINSTON-SALEM, NC 27102

PHONE #: (336) 722-3441

MUNICIPALITY: NRO PLANT

POTENTIAL CONTAMINATION SOURCES: QUANTITY:

USTS, GASOLINE
2 x 10,000 & 8,000-GAL USTS 18,000-GAL
INCIDENT 12112 GROUNDWATER GAS
CONTAMINATION CONFIRMED AFTER UST
REMOVAL, RISK: 40/E

ADDITIONAL INFORMATION:
USTS REMOVED < 90 (24,550-GAL TOTAL)

2013 - OUT OF BUSINESS, UST's STILL
INSTALLED

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code 06

Closest Well _____

FACILITY NAME: QUALITY PLUS OIL

ADDRESS:
601 CROATAN HWY
KILL DEVIL HILLS, NC 27948

PHONE #: _____

OWNER/RP:
QUALITY OIL CO.
1540 SILAS CREEK PARKWAY
WINSTON-SALEM, NC 27127

PHONE #: (336) 721-9546

MUNICIPALITY: NRO PLANT

POTENTIAL CONTAMINATION SOURCES: QUANTITY:

USTS - GASOLINE
3x 10 000-GAL 30,000-GAL
INCIDENT 3453 LEAKING GAS UST (RUPTURED)
7/87, 610-GAL LEAKED RISK: 35/B; NATURAL
ATTENUATION/CORRECTIVE ACTION PLAN APPROVED BY DENR.
MONITOR WELLS SHOW GROUNDWATER CONTAMINATION

ADDITIONAL INFORMATION:
2013 - NO FURTHER ACTION LETTER FM NCDENR
19 NOV 03

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code 07

Closest Well _____

FACILITY NAME: MANN'S RED & WHITE
NO LONGER IN BUSINESS

ADDRESS:
2991 HWY 345 S.
WANCHESE, NC 27981

PHONE #: (252) 473-5664

OWNER/RP:
ORMAN L. MANN
381 OLD WHARF RD.
WANCHESE, NC 27981

PHONE #: (252) 473-2907

MUNICIPALITY: SKYCO

POTENTIAL CONTAMINATION SOURCES: QUANTITY:

USTS, GASOLINE
10,000, 6,000, 4000 GAL USTS 20,000 GAL
INCIDENT 13743, SOIL CONTAMINATION
NOTICED AFTER USTS REMOVED. RISK 105/B GAS
CONSTITUENTS IN GROUNDWATER, (1998). COMPRE-
HENSIVE SITE ASSESSMENT SUBMITTED

ADDITIONAL INFORMATION:
2 x 2000, 550-GAL REMOVED 5/94

2013 NO FURTHER ACTION LETTER FM NCDENR
6 JUL 05 GROUNDWATER CLEANED UP
TO 2L STANDARDS

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code 08

Closest Well _____

FACILITY NAME: NORTH BEACH CAMPGROUND

ADDRESS:
23781 NC 12
RODANTHE, NC 27968

PHONE #: (252) 987-2378

OWNER/RP:
JARVIS O'NEAL
PO BOX 40
RODANTHE, NC 27968

PHONE #: _____

MUNICIPALITY: RWS

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
USTS, GASOLINE	
8000, 2X 6000, 4000-GAL	18,000-GAL

ADDITIONAL INFORMATION:
6X 4000-GAL USTS REMOVED 12/92

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code 09

Closest Well _____

FACILITY NAME: LIBERTY ISLAND CONVENIENCE

ADDRESS:
23532 HWY 12
RODANTHE, NC 27968

PHONE #: (252) 987-2239

OWNER/RP:
ET FIVE, INC.
PO BOX 1386
AHOSKIE, NC 27910

PHONE #: (252) 332-2037

MUNICIPALITY: RWS

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
USTS, GASOLINE	
12000, 10000, 6000, 4000-GAL USTS	32,000-GAL
INCIDENT 13743, SOIL CONTAMINATION	
DISCOVERED AFTER UST REMOVAL. RISK: 105/B	
9 MONITOR WELLS ONSITE, GROUNDWATER CONTAM.	
PRESENT.	

ADDITIONAL INFORMATION:
3000, 4x 6000, 3x 4000-GAL USTS REMOVED <2/98

2013 - NO FURTHER ACTION LETTER FM NCDENR
8 MAY 02 GROUNDWATER CLEANED UP TO
2L STANDARDS

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Map Symbol O-10

FACILITY NAME: DUCK THRU 24

ADDRESS: 4201 S CROATAN HWY
NAGS HEAD, NC 27959

PHONE #: (252) 441-7213

OWNER/RP: JERNIGAN OIL CO
AHOSKIE, NC 27910

PHONE #: (252) 332-2131

MUNICIPALITY: _____ WHPA: _____

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
5 X 4000-GAL GAS UST	20,000
4000 KERO UST	4000
4000 DIESEL UST	4000

ADDITIONAL INFORMATION:

2013

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code P-1

Closest Well _____

FACILITY NAME: POINTER'S FIELD

ADDRESS:
BAYVIEW DRIVE
STUMPY POINT, NC 27978

PHONE #: _____

OWNER/RP:
COUNTY OF DARE
PO BOX 1000
MANTEO, NC 27954

PHONE #: (252) 473-1101

MUNICIPALITY: STUMPY PT

POTENTIAL CONTAMINATION SOURCES: QUANTITY:

BASEBALL DIAMOND
~ 3 AC FERTILIZER, PESTICIDE/HERBICIDE
APPLICATION: SMALL QTYS

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code Q1

Closest Well _____

FACILITY NAME: NORTH REVERSE OSMOSIS (NRO) WATER TREATMENT PLANT

ADDRESS:
600 MUSTIAN ST.
KILL DEVIL HILLS, NC 27948

PHONE #: (252) 441-7788

OWNER/RP:
COUNTY OF DARE
PO BOX 1000
MANTEO, NC 27954

PHONE #: (252) 473-1101

MUNICIPALITY: NRO PLANT

POTENTIAL CONTAMINATION SOURCES:		QUANTITY:
WATER CONDITIONING DISCHARGE		
	ZN ORTHOPHOSPHATE	55 gal
	23% HYDROFLUOSILICIC ACID	55 gal
AST	93% SULFURIC ACID	6000 gal
AST	25% NaOH	12000 gal
	Cl GAS STORAGE	
AST	DIESEL	2000 gal

ADDITIONAL INFORMATION:
SMALL WASTE GENERATOR NCR000004291

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code QZ

Closest Well _____

FACILITY NAME: KILL DEVIL HILLS WATER TREATMENT PLANT

ADDRESS:
500 W 5TH ST
KILL DEVIL HILLS, NC 27948

PHONE #: (252) 480-4090

OWNER/RP:
TOWN OF KILL DEVIL HILLS
PO BOX 1719
KILL DEVIL HILLS, NC 27948

PHONE #: (252) 480-4000

MUNICIPALITY: NRO PLANT

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
AST - DIESEL	500-GAL
WATER CONDITIONING DISCHARGE PERMIT NC 0070157	

ADDITIONAL INFORMATION:
1000-GAL UST REMOVED 6/93
PERMIT EXPIRES 12/31/07
2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code Q3

Closest Well _____

FACILITY NAME: TOWN OF NAGS HEAD WATER TREATMENT PLANT

ADDRESS:
2110 POND AVE
NAGS HEAD, NC 27959

PHONE #: (252) 441-1122

OWNER/RP:
TOWN OF NAGS HEAD
PO BOX 99
NAGS HEAD, NC 27959

PHONE #: _____

MUNICIPALITY: NRO PLANT

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
27 ACRES SURFACE WATER RESERVOIR "FRESH POND"	1.5 MG
CHEMICAL STORAGE	LARGE QTYS

ADDITIONAL INFORMATION:

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code Q4

Closest Well _____

FACILITY NAME: SKYCO WATER TREATMENT PLANT

ADDRESS:
359 WATER PLANT RD
MANTEO, NC 27954

PHONE #: (252) 473-1101

OWNER/RP:
COUNTY OF DARE
PO BOX 1000
MANTEO, NC 27954

PHONE #: (252) 473-1101

MUNICIPALITY: SKYCO

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
WATER CONDITIONING DISCHARGE	
PERMIT NC 0035670	FLOW = 192,000
AST - DIESEL	500 gal
SODIUM HYPOCHLORITE	
23% HF ACID	200 gal
ORTHOPHOSPHATE	500 gal

ADDITIONAL INFORMATION:
PERMIT EXPIRES 12/31/07

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code 05

Closest Well _____

FACILITY NAME: RWS WATER TREATMENT PLANT

ADDRESS:
23697 HWY 12
RODANTHE, NC 27968

PHONE #: (252) 987-1111

OWNER/RP:
COUNTY OF DARE
PO BOX 1000
MANTEO, NC 27954

PHONE #: (252) 473-1101

MUNICIPALITY: RWS

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
WATER CONDITIONING DISCHARGE	
PERMIT NC 0079409	FLOW = 1,420,000
	23% HF ACID 55 gal
	[illegible] 80 gal
	25% NaOH 2500 gal
	Cigas 1400 lbs

ADDITIONAL INFORMATION:
PERMIT EXPIRES 12/31/07

DIESEL AST 2000 gal

2004

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code Q6

Closest Well _____

FACILITY NAME: STUMPY POINT WTP

ADDRESS:

98 BAYVIEW DRIVE
STUMPY POINT, NC 27978

PHONE #: (252) 473-6609

OWNER/RP:

COUNTY OF DARE
PO BOX 1000
MANTEO, NC 27954

PHONE #: (252) 473-1101

MUNICIPALITY: STUMPY PT

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
WATER CONDITIONING DISCHARGE PERMIT NC 0086932	LARGE QTYS

ADDITIONAL INFORMATION:

PERMIT EXPIRES 12/31/07

2013 ✓

INVENTORY OF POTENTIAL CONTAMINATION SOURCES

Source Code Q7

Closest Well _____

FACILITY NAME: HATTERAS WATER TREATMENT PLANT

ADDRESS: 50225 WATER ASSOCIATION ROAD
FRISCO, NC

PHONE #: (877) 613-4005

OWNER/RP: COUNTY OF DARE
PO BOX 1000
MANTEO, NC 27954

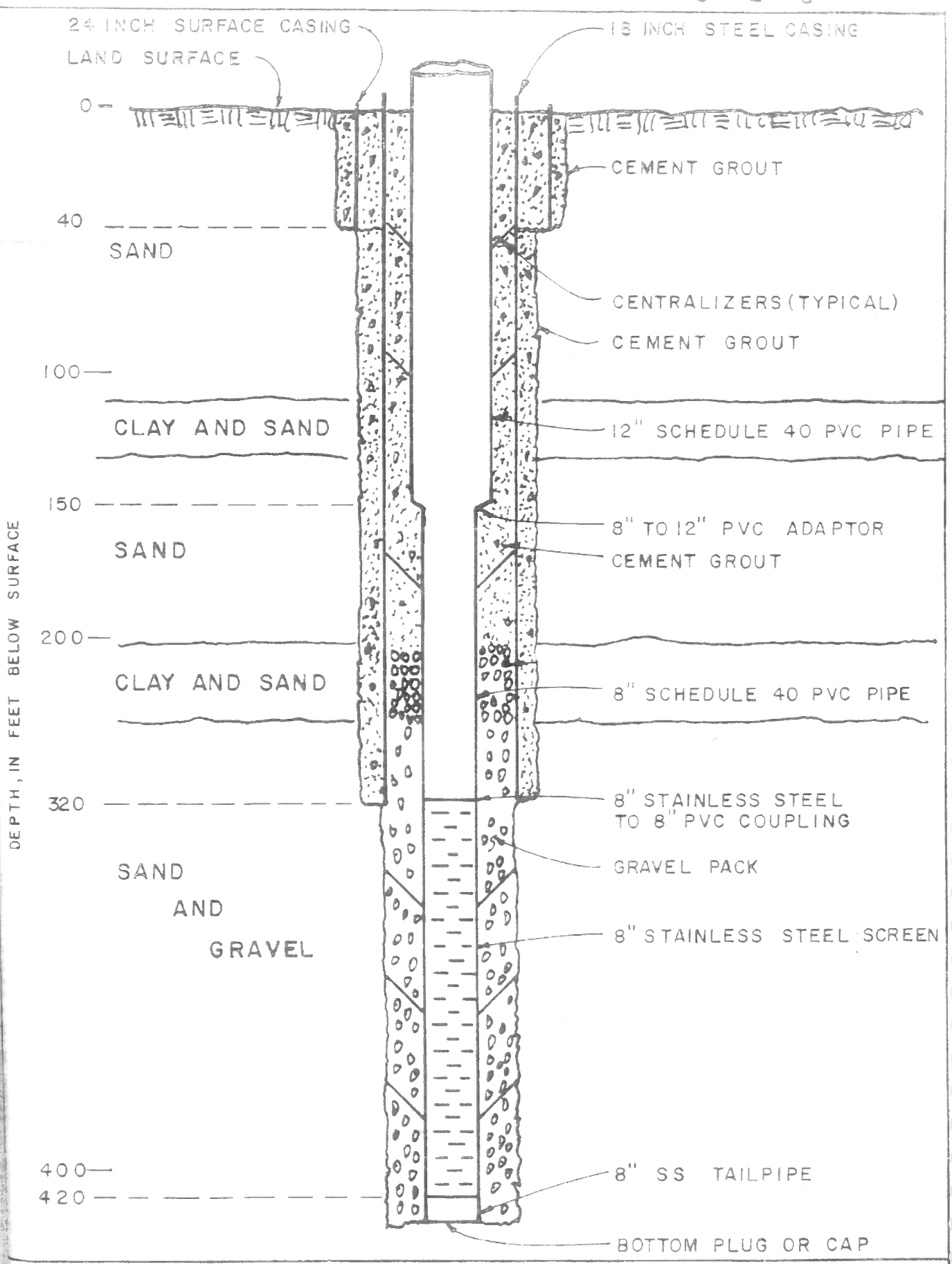
PHONE #: (252) 473-1101

MUNICIPALITY: HATTERAS

POTENTIAL CONTAMINATION SOURCES:	QUANTITY:
WATER CONDITIONING DISCHARGE PERMIT NC 0085707	FLOW = 1.8 MG
NaOH	
SULPHURIC ACID	
HF ACID	
DIESEL AST	1000-gal

ADDITIONAL INFORMATION:
PERMIT EXPIRES 12/31/07
2003 V

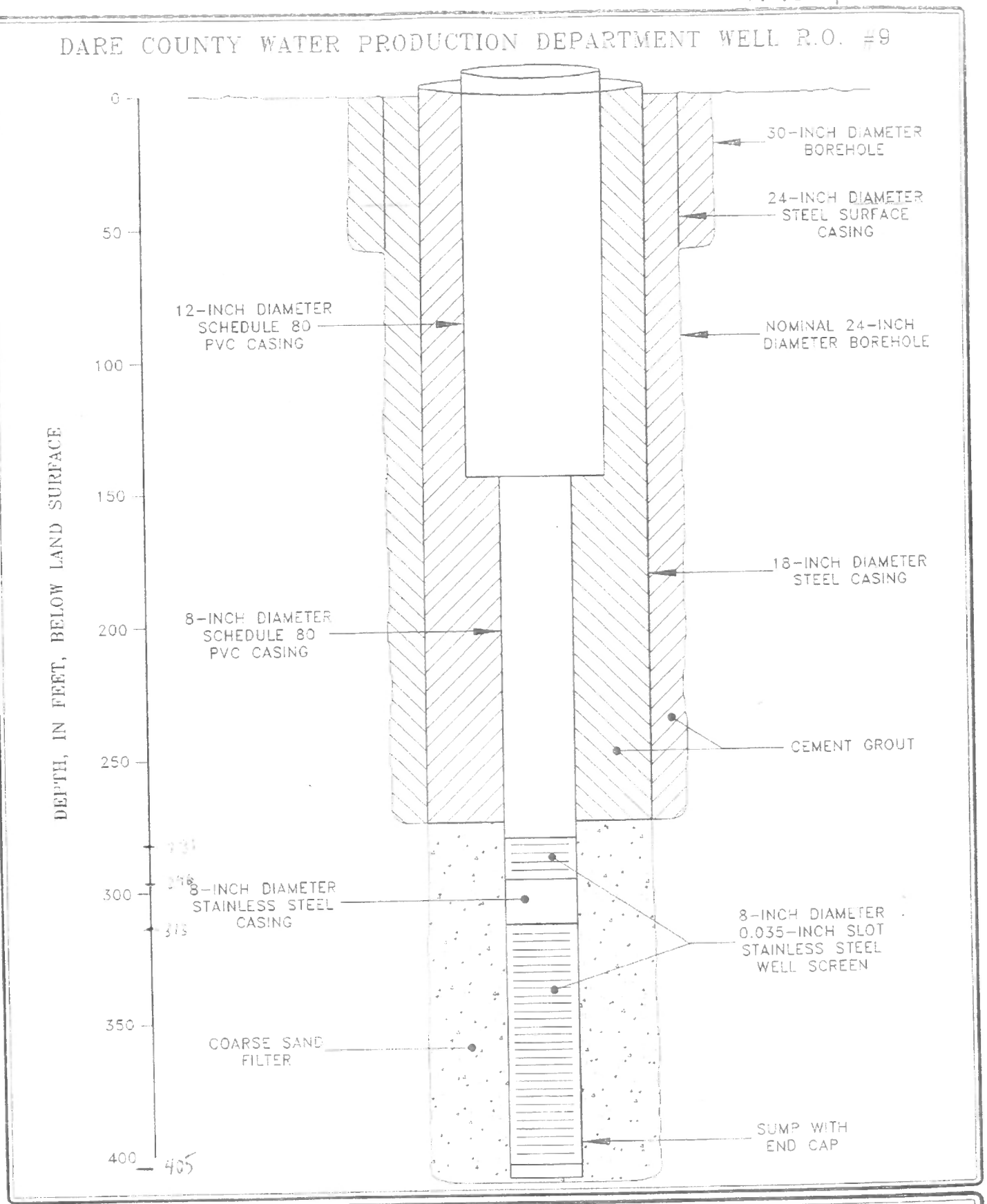
NRO WELLS 1 - 8



WELL DIAGRAM

BLACK & VEATCH ENGINEERS - ARCHITECTS ASHEBORO, NORTH CAROLINA	DARE COUNTY, NORTH CAROLINA DESALINATION PROJECT	FIGURE 1-13A

NRO 9



ViroGroup	AIR • WATER • SOIL TECHNOLOGY	MISSIMER DIVISION
	DRN. BY: CAM DWG NO. A-012737NB-2 DATE: 8/5/94	
	PROJECT NAME: DARE COUNTY R.O. NUMBER: 01-02737.00	

FIGURE IV-1. SCHEMATIC DIAGRAM SHOWING THE CONSTRUCTION DETAILS OF WELL R.O. #9.

NRO 9

TABLE A-1

DARE COUNTY R.O. - TEST WELL #9
STEP DRAWDOWN TEST
- CONTINUED -

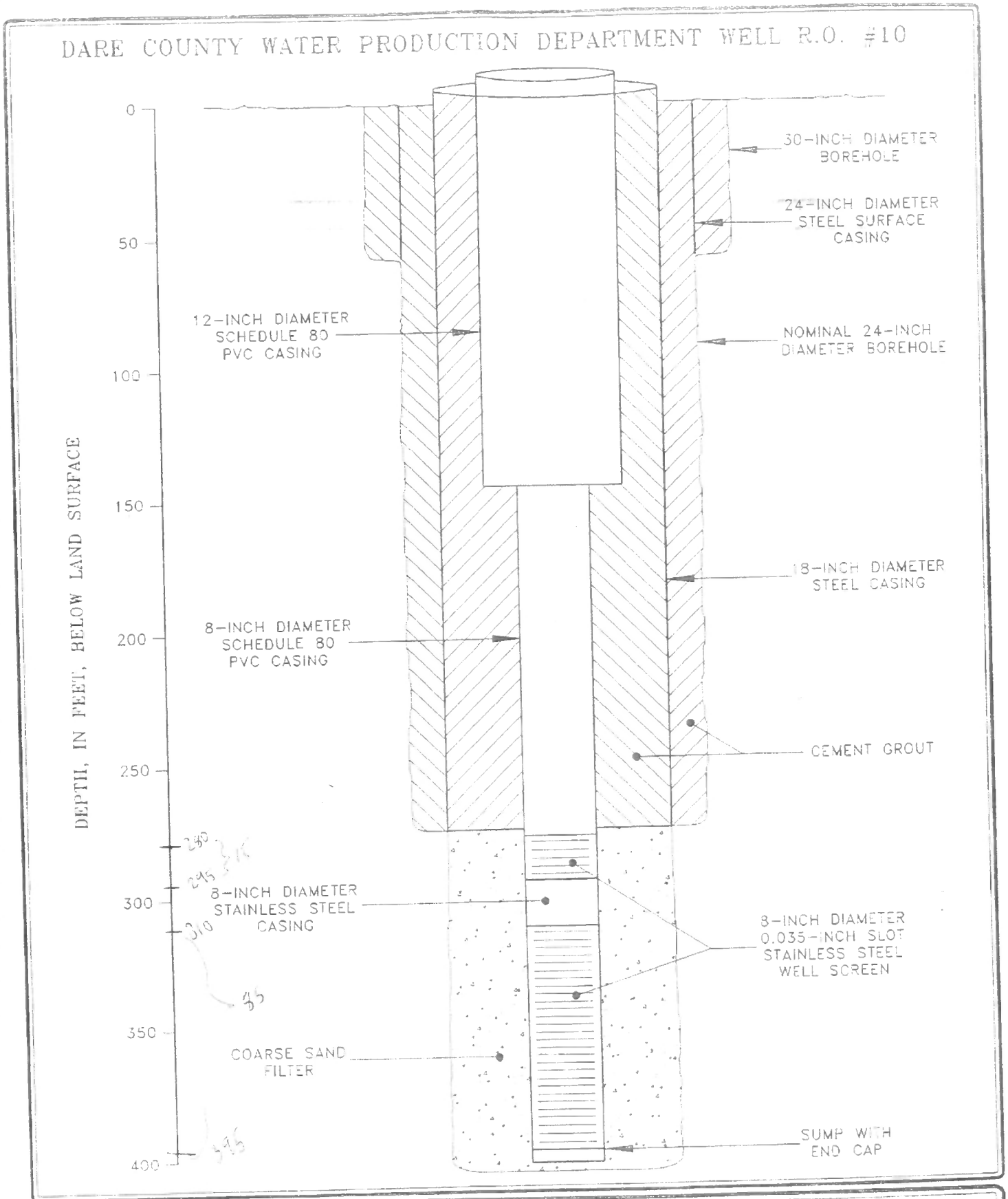
Test Date: 4/27/94
Recorded by: Jack Breland
Static Water Level: 30.39 feet below measuring point (ft. BMP)

PUMPING RATE (GPM)	TIME (MIN.)	PUMPING WATER LEVEL (BMP)	DRAWDOWN (FT. BMP)	SPECIFIC CAPACITY (GPM/FT)
480	5	59.63	29.24	
	10	59.75	29.36	
	20	59.87	29.48	
	30	59.94	29.55	
	40	61.07	30.68	
	50	61.24	30.85	
	60	61.43	31.04	
	70	61.50	31.11	
	80	61.60	31.21	
	90	61.70	31.31	
	100	61.74	31.35	
	110	61.77	31.38	
	120	61.82	31.43	
	140	61.89	31.50	
	160	61.96	31.57	
	180	62.07	31.68	
	200	62.16	31.77	
	220	62.19	31.80	
	240	62.22	31.83	15.1

Measuring point is approximately three feet above land surface.

BMP = Below Measuring Point
TOC = Below Top of Casing
GPM = Gallons Per Minute
MIN = Minutes
FT = Feet

NRO 10



ViroGroup	AIR • WATER • SOIL TECHNOLOGY	MISSIMER DIVISION
	DRN. BY: CAM DWG NO. A-012737NC-2 DATE: 8/5/94	
	PROJECT NAME: DARE COUNTY R.O. NUMBER: 01-02737.00	

FIGURE IV-2. SCHEMATIC DIAGRAM SHOWING THE CONSTRUCTION DETAILS OF WELL R.O. #10.

NRO 10

TABLE A-4. DARE COUNTY R.O. - PRODUCTION WELL #10
STEP DRAWDOWN TEST

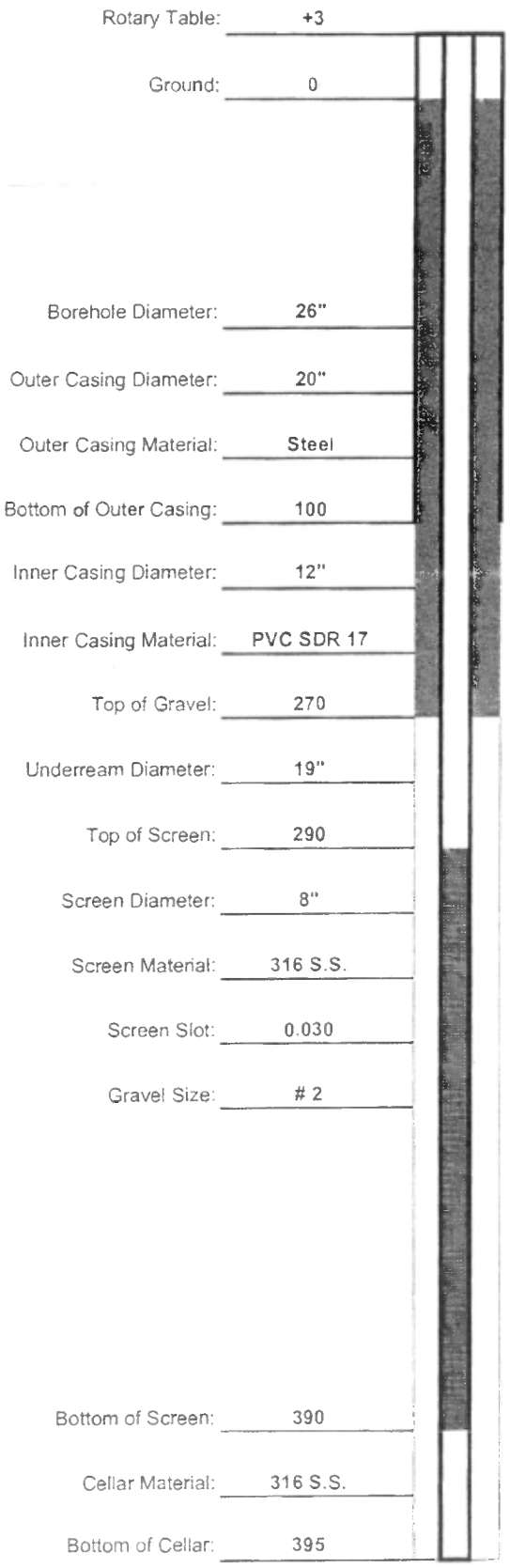
Test Date: 6/24/94
Recorded by: Jack Breland
Static Water Level: 26.15 feet below measuring point (ft. BMP)

PUMPING RATE (GPM)	TIME (MIN.)	PUMPING WATER LEVEL (BMP)	DRAWDOWN (FT. BMP)	SPECIFIC CAPACITY (GPM/FT)
200	5	34.23	8.08	
	10	34.22	8.07	
	20	34.23	8.08	
	30	34.26	8.11	
	40	34.28	8.13	
	50	34.29	8.14	
	60	34.30	8.15	
	70	34.31	8.16	
	80	34.33	8.18	
	90	34.34	8.19	
	100	34.35	8.20	
	110	34.36	8.21	
	120	34.37	8.22	24.3
400	5	44.11	17.96	
	10	43.95	17.80	
	20	44.00	17.85	
	30	44.03	17.88	
	40	44.05	17.90	
	50	44.07	17.92	
	60	44.09	17.94	
	70	44.12	17.97	
	80	44.14	17.99	
	90	44.16	17.91	
	100	44.17	17.92	
	110	44.18	17.93	
	120	44.19	17.94	22.3
485	5	48.01	21.86	
	10	47.92	21.77	
	20	48.09	21.94	
	30	48.21	22.06	
	40	48.33	22.18	
	50	48.42	22.27	
	60	48.56	22.41	
	70	48.68	22.53	
	80	48.75	22.60	
	90	48.77	22.62	
	100	48.79	22.64	
	110	48.81	22.66	
	120	48.82	22.67	
	130	48.83	22.68	
	140	48.84	22.69	
	150	48.84	22.69	
	160	48.85	22.70	
	170	48.86	22.71	
	180	48.86	22.71	21.4

A.C. Schultes of Carolina
INFLUENT TO EFFLUENT

NRO 15

Double Cased Well As-Built



Rotary Table:	+3
Ground:	0
Borehole Diameter:	26"
Outer Casing Diameter:	20"
Outer Casing Material:	Steel
Bottom of Outer Casing:	100
Inner Casing Diameter:	12"
Inner Casing Material:	PVC SDR 17
Top of Gravel:	270
Underream Diameter:	19"
Top of Screen:	290
Screen Diameter:	8"
Screen Material:	316 S.S.
Screen Slot:	0.030
Gravel Size:	# 2
Bottom of Screen:	390
Cellar Material:	316 S.S.
Bottom of Cellar:	395

JOB DATA	
Owner:	Dare County
Job Name:	North Reverse Osmosis
Job No:	C-0087
Well Number:	# 15
Location:	Kill Devil Hills
Screen Mfg.:	Johnson
Grout Material:	Neat Cement

Datum:
All Measurements
Are Taken From Ground

Inner Casing manufactured by Certainteed Corporation
Inner Casing Joints are Certa-Lok
Well Screens manufactured w/ Certa-Lok Joint at top
Pilot hole drilled to 400 FT.
Ream pilot hole to 405 FT.
Installed gravel from 395 FT. to 270 FT.
Inner Casing Cement Grouted in Lifts from 0-270 feet
Well gravel is from Southern Products

A.C. SCHULTES OF CAROLINA, INC. NRO 15

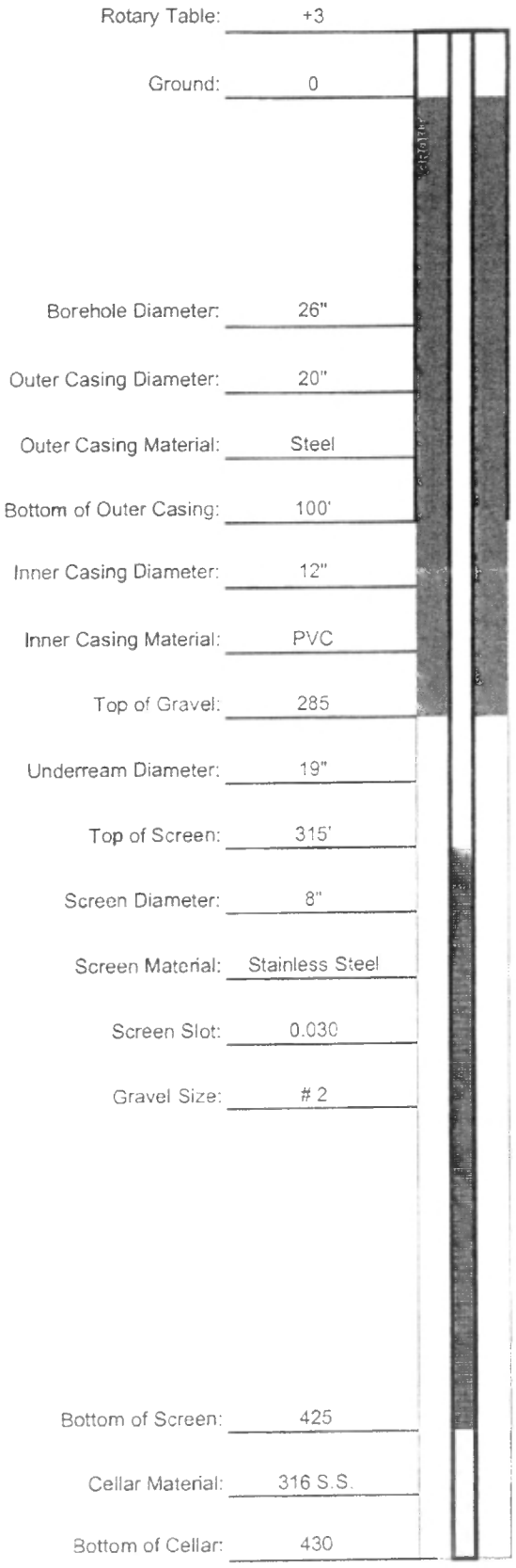
PUMP TEST DATA

Customer:	Dare County			Job Number:		C-0087	
Location:	Jockeys Ridge State Park			Well Number:		15	
Date:	12/20/04			Diameter:		20 X 12	
Static Water Level:	17			Depth:		395'	
Capacity Measured By:	Flow Meter			Datum:		Ground	
Time Test Started:	7:22 AM			Duration of Test:		24 Hours	
Time	Capacity	Disch. Pressure	Pumping Level	Draw Down	Specific Capacity Gal./Ft.	Volts	Amps	Remarks
1 Min	600		46.416	29.416	20.3971			
2 Min	600		40.668	23.668	25.3507			
3 Min	600		38.32	21.32	28.1426			
4 Min	600		38.594	21.594	27.7855			
5 Min	600		38.796	21.796	27.528			
6 Min	600		39.631	22.631	26.5123			
7 Min	600		39.732	22.732	26.3945			
8 Min	600		39.934	22.934	26.162			
9 Min	600		39.574	22.574	26.5793			
10 Min	600		39.545	22.545	26.6134			
12 Min	600		39.905	22.905	26.1952			
14 Min	600		40.582	23.582	25.4431			
16 Min	600		40.294	23.294	25.7577			
18 Min	600		40.222	23.222	25.8376			
20 Min	600		40.928	23.928	25.0752			
22 Min	600		41.014	24.014	24.9854			
24 Min	600		42.383	25.383	23.6379			
26 Min	600		42.786	25.786	23.2684			
28 Min	600		43.967	26.967	22.2494			
30 Min	600		43.448	26.448	22.686			
35 Min	600		43.304	26.304	22.8102			
40 Min	600		44.125	27.125	22.1198			
45 Min	600		44.097	27.097	22.1427			
50 Min	600		44.413	27.413	21.8874			
55 Min	600		44.802	27.802	21.5812			
60 Min	600		45.105	28.105	21.3485			1 Hour

A.C. Schultes of Carolina
INFLUENT TO EFFLUENT

DOUBLE CASED WELL AS-BUILT

NRO 17



Rotary Table:	+3
Ground:	0
Borehole Diameter:	26"
Outer Casing Diameter:	20"
Outer Casing Material:	Steel
Bottom of Outer Casing:	100'
Inner Casing Diameter:	12"
Inner Casing Material:	PVC
Top of Gravel:	285
Underream Diameter:	19"
Top of Screen:	315'
Screen Diameter:	8"
Screen Material:	Stainless Steel
Screen Slot:	0.030
Gravel Size:	# 2
Bottom of Screen:	425
Cellar Material:	316 S.S.
Bottom of Cellar:	430

JOB DATA	
Owner:	DARE COUNTY
Job Name:	NORTH REVERSE OSMOSIS
Job No:	C-0087
Well Number:	# 17
Location:	RT 158 Mp 13-14 Nags Head
Screen Mfg.:	JOHNSON SCREENS
Grout Material:	CEMENT

Datum:
All Measurements
Are Taken From • Ground

Inner Casing manufactured by Certainteed Corporation
Inner Casing Joints are Certa-Lok
Well Screens manufactured w/ Certa-Lok Joint at top
Pilot hole drilled to 430 FT.
Ream pilot hole to 435 FT.
Install gravel from 435 FT. to 285 FT.
Inner Casing Cement Grouted in Lifts from 0-285 feet
Well gravel from is from Southern Products

A.C. SCHULTES OF CAROLINA, INC.
PUMP TEST DATA

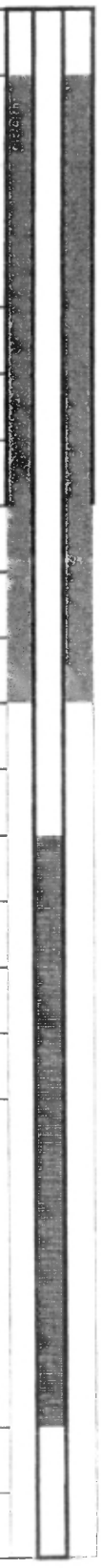
NR0 17

Customer:	Dare County				Job Number:		C-0087	
Location:	Nags Head, NC				Well Number:		Well #17	
Date:	9/9/04				Diameter:		20 X 12	
Static Water Level:	29				Depth:		430'	
Capacity Measured By:	Flow Meter				Datum:		Ground	
Time Test Started:	5:00 PM				Duration of Test:		24 Hours	
Time	Capacity	Disch. Pressure	Pumping Level	Draw Down	Specific Capacity Gal./Ft.	Volts	Amps	Remarks
1 Min	600		41.513	12.513	47.9501			
2 Min	600		42.954	13.954	42.9984			
3 Min	600		43.3	14.3	41.958			
4 Min	600		43.444	14.444	41.5397			
5 Min	600		43.66	14.66	40.9277			
6 Min	600		43.919	14.919	40.2172			
7 Min	600		43.746	14.746	40.689			
8 Min	600		43.991	14.991	40.024			
9 Min	600		44.106	15.106	39.7193			
10 Min	600		44.193	15.193	39.4919			
12 Min	600		44.265	15.265	39.3056			
14 Min	600		44.366	15.366	39.0472			
16 Min	600		44.553	15.553	38.5778			
18 Min	600		44.495	15.495	38.7222			
20 Min	600		44.51	15.51	38.6847			
22 Min	600		44.683	15.683	38.258			
24 Min	600		44.755	15.755	38.0831			
26 Min	600		44.841	15.841	37.8764			
28 Min	600		44.913	15.913	37.705			
30 Min	600		44.927	15.927	37.6719			
35 Min	600		45.071	16.071	37.3343			
40 Min	600		45.23	16.23	36.9686			
45 Min	600		45.172	16.172	37.1012			
50 Min	600		45.345	16.345	36.7085			
55 Min	600		45.475	16.475	36.4188			
60 Min	600		45.633	16.633	36.0729			1 Hour

A.C.Schultes of Carolina
INFLUENT TO EFFLUENT

Double Cased Well As-Built

NRO ORVILLE



Rotary Table:	
Ground:	0
Borehole Diameter:	26"
Outer Casing Diameter:	20"
Outer Casing Material:	Steel
Bottom of Outer Casing:	105'
Inner Casing Diameter:	12"
Inner Casing Material:	PVC SDR 17
Top of Gravel:	275'
Underream Diameter:	19"
Top of Screen:	295'
Screen Diameter:	8"
Screen Material:	316 S.S.
Screen Slot:	0.030
Gravel Size:	# 2
Bottom of Screen:	405'
Cellar Material:	316 S.S.
Bottom of Cellar:	410

JOB DATA	
Owner:	Dare County
Job Name:	North Reverse Osmosis
Job No:	C-0087
Well Number:	Orville
Location:	Kill Devil Hills
Screen Mfg.:	Johnson
Grout Material:	Neat Cement

Datum:
All Measurements
Are Taken From Ground

Inner Casing manufactured by Certainteed Corporation
Inner Casing Joints are Certa-Lok
Well Screens manufactured w/ Certa-Lok Joint at top
Pilot hole drilled to 430 FT.
Ream pilot hole to 420 FT.
Install gravel from 420 FT. to 285 FT.
Inner Casing Cement Grouted In Lifts from 0-285 feet
Well gravel from is from Southern Products

A.C. SCHULTES OF CAROLINA, INC. NRO ORVILLE

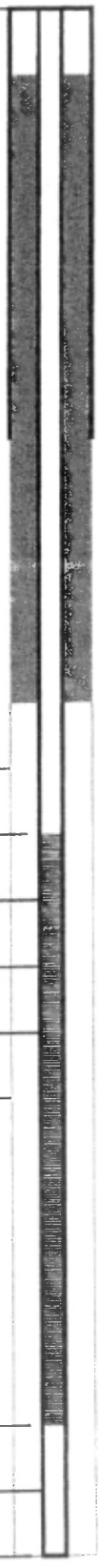
PUMP TEST DATA

Customer:		Dare County			Job Number:		C-0087	
Location:		Orville Well			Well Number:		Orville	
Date:		10/26/04			Diameter:		12"	
Static Water Level:		18.9			Depth:		410'	
Capacity Measured By:			Flow Meter		Datum:		Ground	
Time Test Started:		11:59 AM			Duration of Test:		24 Hours	
Time	Capacity	Disch. Pressure	Pumping Level	Draw Down	Specific Capacity Gal./Ft.	Volts	Amps	Remarks
1 Min	600		33.32	14.42	41.6089			
2 Min	600		34.18	15.28	39.267			
3 Min	600		35.01	16.11	37.2439			
4 Min	600		34.5	15.6	38.4615			
5 Min	600		35.01	16.11	37.2439			
6 Min	600		35.47	16.57	36.21			
7 Min	600		35.08	16.18	37.0828			
8 Min	600		35.7	16.8	35.7143			
9 Min	600		35.11	16.21	37.0142			
10 Min	600		35.49	16.59	36.1664			
12 Min	600		35.21	16.31	36.7872			
14 Min	600		35.16	16.26	36.9004			
16 Min	600		35.87	16.97	35.3565			
18 Min	600		36.06	17.16	34.965			
20 Min	600		35.8	16.9	35.503			
22 Min	600		35.85	16.95	35.3982			
24 Min	600		36.21	17.31	34.662			
26 Min	600		36.62	17.72	33.86			
28 Min	600		36.49	17.59	34.1103			
30 Min	600		35.97	17.07	35.1494			
35 Min	600		36.08	17.18	34.9243			
40 Min	600		35.94	17.04	35.2113			
45 Min	600		36.5	17.6	34.0909			
50 Min	600		36.47	17.57	34.1491			
55 Min	600		36.26	17.36	34.5622			
60 Min	600		36.62	17.72	33.86			1 Hour

A.C. Schultes of Carolina
INFLUENT TO EFFLUENT

DOUBLE CASED WELL AS-BUILT

NRO WILBUR



Rotary Table:	
Ground:	0
Borehole Diameter:	26"
Outer Casing Diameter:	20"
Outer Casing Material:	STEEL
Bottom of Outer Casing	100 FT.
Inner Casing Diameter:	12"
Inner Casing Material:	PVC SDR 17
Top of Gravel:	280 FT.
Underream Diameter:	19"
Top of Screen:	310 FT.
Screen Diameter:	8" P.S.
Screen Material:	316 S.S.
Screen Slot:	0.025
Gravel Size:	# 1A
Bottom of Screen:	430 FT.
Cellar Material:	316 L S.S.
Bottom of Cellar:	435 FT.

JOB DATA	
Owner:	DARE COUNTY
Job Name:	NORTH REVERSE OSMOSIS
Job No:	C-0087
Well Number:	WILBUR WELL
Location:	HWY 158 KILL DEVIL HILLS
Screen Mfg.:	JOHNSON SCREENS
Grout Material:	CEMENT

Datum:
All Measurements
Are Taken From Ground

Inner Casing manufactured by Certainteed Corporation
Inner Casing Joints are Certa-Lok
Well Screens manufactured w/ Certa-Lok Joint at top
Pilot hole drilled to 430 FT.
Ream pilot hole to 435 FT.
Installed gravel from 435 FT. to 280 FT.
Inner Casing Cement Grouted in Lifts from 0-280 feet
Well gravel from is from Southern Products

A.C. SCHULTES OF CAROLINA, INC.
PUMP TEST DATA

NRO WILBUR

Customer:		Dare County			Job Number:		C-0087	
Location:		Kill Devil Hills			Well Number:		Wilbur Well Site	
Date:		6/25/04			Diameter:		20 X 12	
Static Water Level:		25.593			Depth:		435'	
Capacity Measured By:		Flow Meter			Datum:		Ground	
Time Test Started:		6:07 AM			Duration of Test:		24 Hour	
Time	Capacity	Disch. Pressure	Pumping Level	Draw Down	Specific Capacity Gal./Ft.	Volts	Amps	Remarks
1 Min	600		40.895	15.302	39.2106			
2 Min	600		41.151	15.558	38.5654			
3 Min	600		41.738	16.145	37.1632			
4 Min	600		42.099	16.506	36.3504			
5 Min	600		41.902	16.309	36.7895			
6 Min	600		42.22	16.627	36.0859			
7 Min	600		42.384	16.791	35.7334			
8 Min	600		41.994	16.401	36.5831			
9 Min	600		43.017	17.424	34.4353			
10 Min	600		42.715	17.122	35.0426			
12 Min	600		42.958	17.365	34.5523			
14 Min	600		42.565	16.972	35.3523			
16 Min	600		42.791	17.198	34.8878			
18 Min	600		43.273	17.68	33.9367			
20 Min	600		43.26	17.667	33.9616			
22 Min	600		43.604	18.011	33.313			
24 Min	600		42.82	17.227	34.829			
26 Min	600		43.152	17.559	34.1705			
28 Min	600		43.44	17.847	33.6191			
30 Min	600		42.791	17.198	34.8878			
35 Min	600		43.319	17.726	33.8486			
40 Min	600		43.26	17.667	33.9616			
45 Min	600		43.575	17.982	33.3667			
50 Min	600		43.44	17.847	33.6191			
55 Min	600		43.303	17.71	33.8792			
60 Min	600		43.877	18.284	32.8156			1 Hour

A.C. Schultes of Carolina
INFLUENT TO EFFLUENT

SKYCO 2

Double Cased Well As-Built

Rotary Table:	
Ground:	0
Borehole Diameter:	26"
Outer Casing Diameter:	20"
Outer Casing Material:	STEEL
Bottom of Outer Casing	20 FT.
Inner Casing Diameter:	10"
Inner Casing Material:	PVC SDR 17
Top of Gravel:	147 FT.
Underream Diameter:	19"
Top of Screen:	167 FT.
Screen Diameter:	8" P.S.
Screen Material:	304 S.S.
Screen Slot:	0.030
Gravel Size:	# 2
Bottom of Screen:	217 FT.
Cellar Material:	316 L S.S.
Bottom of Cellar:	222 FT.

JOB DATA	
Owner:	DARE COUNTY
Job Name:	REPLACEMENT OF SKYCO #1
Job No:	C-0087
Well Number:	#2
Location:	BAUMTOWN RD., WANCHESE, NC
Screen Mfg.:	JOHNSON SCREENS
Grout Material:	CEMENT

Datum:
All Measurements
Are Taken From Ground

Inner Casing manufactured by Certainteed Corporation
Inner Casing Joints are Certa-Lok
Well Screens manufactured w/ Certa-Lok Joint at top
Pilot hole drilled to 239 FT.
Ream pilot hole to 230 FT.
Install gravel from 230 FT. to 147 FT.
Inner Casing Cement Grouted in Lifts from 0-147 feet

SKYCO 2

A.C. SCHULTES OF CAROLINA, INC.
PUMP TEST DATA

Customer:	Dare County			Job Number:	C-0087		
Location:	Wanchese, NC			Well Number:	Skyco #2		
Date:	5/10/04			Diameter:	20 X 10		
Static Water Level:	18			Depth:	222'		
Capacity Measured By:	Flow Meter			Datum:	Ground		
Time Test Started:	2:00 PM			Duration of Test:	24 Hour		

Time	Capacity	Disch. Pressure	Pumping Level	Draw Down	Specific Capacity Gal./Ft.	Volts	Amps	Remarks
1 Min	600		40.501	22.501	26.6655			
2 Min	600		42.761	24.761	24.2317			
3 Min	600		43.476	25.476	23.5516			
4 Min	600		43.198	25.198	23.8114			
5 Min	600		42.889	24.889	24.107			
6 Min	600		44.906	26.906	22.2999			
7 Min	600		44.024	26.024	23.0556			
8 Min	600		43.408	25.408	23.6146			
9 Min	600		45.215	27.215	22.0467			
10 Min	600		43.972	25.972	23.1018			
12 Min	600		45.215	27.215	22.0467			
14 Min	600		46.117	28.117	21.3394			
16 Min	600		45.441	27.441	21.8651			
18 Min	600		45.73	27.73	21.6372			
20 Min	600		45.864	27.864	21.5332			
22 Min	600		45.421	27.421	21.881			
24 Min	600		46.684	28.684	20.9176			
26 Min	600		46.632	28.632	20.9556			
28 Min	600		46.914	28.914	20.7512			
30 Min	600		47.265	29.265	20.5023			
35 Min	600		46.668	28.668	20.9293			
40 Min	600		47.163	29.163	20.574			
45 Min	600		48.095	30.095	19.9369			
50 Min	600		48.288	30.288	19.8098			
55 Min	600		47.967	29.967	20.022			
60 Min	600		49.072	31.072	19.31			1 Hour

WELLSITE EVALUATION FORM
CALCULATED FIXED RADIUS METHOD
ONE FOR EACH WELL

SKYCO 4

SKYCO WELL #4

General Information

*1) Well Owner: Dare County 2)Date Drilled: 6/22/78

*3) Well Location:(St./Road & Town): Hwy 345S. Wanchese

*4) Water Supplied to: Dare County Regional Water System

5) Source Aquifer(If known): Yorktown

6) Well Depth: 250 ft.

7) Diameter: 8"&10 in.

8) Depth cased: 228 ft.

9) Open Hole/Screen from 170 to 220 ft.

Information from the Well Acceptance Test

10)Date: 6/21/78 11)Length: 24 hours

12)Pumping Rate: 503 gpm 13)Depth to Static Water Level: 6'9" ft.

Pumping Level: 69.7 ft 15)Drawdown: 62'10" ft.

Well Operation

*16)Pumping Rate: 500 gpm *17)Pump Period: 1440 min/day

Well Location

*18)Latitude: 35°51'14.75959"N *19)Longitude: 75°38'24.61237"W

*20)A 1:24,000 scale 7.5 minute topographic map showing the well location must also be submitted.

*Minimum data required for Wellhead Protection Area delineation. Additional information will improve the accuracy of the delineation.

WELLSITE EVALUATION FORM
CALCULATED FIXED RADIUS METHOD
ONE FOR EACH WELL

SKYCO 5

SKYCO WELL #5

General Information

*1) Well Owner: Dare County 2)Date Drilled: 7/26/77

*3) Well Location:(St./Road & Town): Hwy 345S Wanchese

*4) Water Supplied to: Dare County Regional Water System

5) Source Aquifer(If known): Yorktown

6) Well Depth: 235 ft.

7) Diameter: 8 & 10 in.

8) Depth cased: 228 ft.

9) Open Hole/Screen from 168 to 218 ft.

Information from the Well Acceptance Test

)Date: 7/27/77 11)Length: 24 hours

12)Pumping Rate: 503 gpm 13)Depth to Static Water Level: 5.8 ft.

Pumping Level: 57.9 ft 15)Drawdown: 52.1 ft.

Well Operation

*16)Pumping Rate: 500 gpm *17)Pump Period: 1440 min/day

Well Location

*18)Latitude: 35°51'37.26020"N *19)Longitude: 75°36'55.18621"W

*20)A 1:24,000 scale 7.5 minute topographic map showing the well location must also be submitted.

*Minimum data required for Wellhead Protection Area delineation. Additional information will improve the accuracy of the delineation.

SKYCO #6

WELL CONSTRUCTION RECORD

North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Samuel L. Wiggins CERTIFICATION # 2300

WELL CONTRACTOR COMPANY NAME Magette Well & Pump Co., Inc. PHONE # (252) 332-2265

STATE WELL CONSTRUCTION PERMIT# (if applicable) _____ ASSOCIATED WQ PERMIT# (if applicable) _____

1. WELL USE (Check Applicable Box): Residential ☐ Municipal/Public ☒ Industrial ☐ Agricultural ☐ Monitoring ☐ Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use _____

2. WELL LOCATION:
Nearest Town: Wanchese County Dare
NC 345
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐Ridge ☐Slope ☐Valley ☐Flat
(check appropriate box)
Latitude/longitude of well location
_____
(degrees/minutes/seconds)
Latitude/longitude source: ☐GPS ☐Topographic map
(check box)

3. OWNER: Dare County
Address PO Box 1000
(Street or Route No.)
Manteo NC 27594
City or Town State Zip Code
(252) - 475-2935
Area code - Phone number

4. DATE DRILLED October 2004
5. TOTAL DEPTH: 225'
6. DOES WELL REPLACE EXISTING WELL? YES ☒ NO ☐
7. STATIC WATER LEVEL Below Top of Casing: 33.07 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 1.5 FT. Above Land Surface*
***Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118.**
9. YIELD (gpm): 605 METHOD OF TEST 48 hour test
10. WATER ZONES (depth): 150 - 220
11. DISINFECTION: Type HTH Amount 10 lbs.
12. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From +1.5	To 30	Ft.	20"	.50	steel
From +1.5	To 150	Ft.	10"	SDR 17	PVC
From 220	To 225	Ft.	10"	SCH 10	stainless

13. GROUT:

	Depth		Material	Method
From 0	To 110	Ft.	neat cement	pump
From 110	To 130	Ft.	bentonite grout	pump

14. SCREEN:

	Depth		Diameter	Slot Size	Material
From 150	To 220	Ft.	10 in.	.050 in.	stainless
From _____	To _____	Ft.	_____ in.	_____ in.	_____

15. SAND/GRAVEL PACK:

	Depth		Size	Material
From 130	To 225	Ft.	3	Ricci Brothers
From _____	To _____	Ft.	_____	_____

DEPTH

From	To
0	25
25	35
35	48
48	75
75	104
104	138
138	144
144	233
233	250

DRILLING LOG

Formation Description
fine sand
same with grey clay
sand with shells
clay with fine sand
same with less clay
sand and shells
sand with clay traces
medium to coarse sand
clay with fine sand

LOCATION SKETCH

Show direction and distance in miles from at least two State Roads or County Roads. Include the road numbers and common road names.

16. REMARKS: specific capacity 12.61 gpm per foot of drawdown after 48 hours at 805 gpm

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER

Sam L Wiggins 12/23/04

SIGNATURE OF PERSON CONSTRUCTING THE WELL DATE

Submit the original to the Division of Water Quality, Groundwater Section, 1636 Mail Service Center - Raleigh, NC 27699-1636 Phone No. (919) 733-3221, within 30 days.

GW-1 REV. 07/2001

WELLSITE EVALUATION FORM
CALCULATED FIXED RADIUS METHOD
ONE FOR EACH WELL

SKYCO 7

SKYCO WELL #7

General Information

*1) Well Owner: Dare County 2)Date Drilled: 3/1/78

*3) Well Location:(St./Road & Town): Hwy 345s. Wanchese

*4) Water Supplied to: Dare County Regional Water System

5) Source Aquifer(If known): Yorktown

6) Well Depth: 250 ft.

7) Diameter: 8 & 10 in.

8) Depth cased: 223 ft.

9) Open Hole/Screen from 165 to 215 ft.

Information from the Well Acceptance Test

)Date: 2-28-78 11)Length: 24 hours

12)Pumping Rate: 703 gpm 13)Depth to Static Water Level: 4'10" ft.

Pumping Level: 77'2" ft 15)Drawdown: 72'4" ft.

Well Operation

*16)Pumping Rate: 500 gpm *17)Pump Period: 1440 min/day

Well Location

*18)Latitude: 35°52'53.39670"N *19)Longitude: 75°39'00.68116"W

*20)A 1:24,000 scale 7.5 minute topographic map showing the well location must also be submitted.

*Minimum data required for Wellhead Protection Area delineation. Additional information will improve the accuracy of the delineation.

WELLSITE EVALUATION FORM
CALCULATED FIXED RADIUS METHOD
ONE FOR EACH WELL

SKYCO 8

SKYCO WELL #8

General Information

*1) Well Owner: Dare County 2)Date Drilled: 5-1-78

*3) Well Location:(St./Road & Town): Hwy 345S. Wanchese

*4) Water Supplied to: Dare County Regional Water System

5) Source Aquifer(If known): Yorktown

6) Well Depth: 250 ft.

7) Diameter: 8 & 10 in.

8) Depth cased: 222 ft.

9) Open Hole/Screen from 162 to 212 ft.

Information from the Well Acceptance Test

)Date: 5-2-78 11)Length: 24 hours

12)Pumping Rate: 503 gpm 13)Depth to Static Water Level: 3.9 ft.

, Pumping Level: 90.9 ft 15)Drawdown: 87 ft.

Well Operation

*16)Pumping Rate: 500 gpm *17)Pump Period: 1440 min/day

Well Location

*18)Latitude: 35°52'16.16437"N *19)Longitude: 75°39'06.52349"W

*20)A 1:24,000 scale 7.5 minute topographic map showing the well location must also be submitted.

*Minimum data required for Wellhead Protection Area delineation. Additional information will improve the accuracy of the delineation.

WELLSITE EVALUATION FORM
CALCULATED FIXED RADIUS METHOD
ONE FOR EACH WELL

SKYCO 10

SKYCO WELL # 10

General Information

*1) Well Owner: Dare County 2)Date Drilled: 3/30/78

*3) Well Location:(St./Road & Town): Hwy 345S Skyco

*4) Water Supplied to: Dare County Regional Water System

5) Source Aquifer(If known): Yorktown

6) Well Depth: 250 ft.

7) Diameter: 8 & 10 in.

8) Depth cased: 202 ft.

9) Open Hole/Screen from 142 to 192 ft.

Information from the Well Acceptance Test

)Date: 3/30/78 11)Length: 11 hours

12)Pumping Rate: 620 gpm 13)Depth to Static Water Level: 6.1 ft.

14)Pumping Level: 86.3 ft 15)Drawdown: 80.2 ft.

Well Operation

*16)Pumping Rate: 500 gpm *17)Pump Period: 1440 min/day

Well Location

*18)Latitude: 35°52'52.18447"N *19)Longitude: 75°40'03.15688"W

*20)A 1:24,000 scale 7.5 minute topographic map showing the well location must also be submitted.

*Minimum data required for Wellhead Protection Area delineation. Additional information will improve the accuracy of the delineation.

WELLSITE EVALUATION FORM
CALCULATED FIXED RADIUS METHOD
ONE FOR EACH WELL

SKYCO WELL #11

Skyco 11

General Information

*1) Well Owner: Dare County 2)Date Drilled: 3/28/83

*3) Well Location:(St./Road & Town): Hwy 345S Skyco

*4) Water Supplied to: Dare County Regional Water System

5) Source Aquifer(If known): Yorktown

6) Well Depth: 223 ft.

7) Diameter: 8 in.

8) Depth cased: 187 ft.

9) Open Hole/Screen from 196 to 218 ft.

Information from the Well Acceptance Test

)Date: 4/11/83 11)Length: 12 hours

12)Pumping Rate: 430 gpm 13)Depth to Static Water Level: 18.1 ft.

Pumping Level: 41.51 ft 15)Drawdown: 23.36 ft.

Well Operation

*16)Pumping Rate: 500 gpm *17)Pump Period: 1440 min/day

Well Location

*18)Latitude: 35°53'01.29865"N *19)Longitude: 75°39'48.65859"W

*20)A 1:24,000 scale 7.5 minute topographic map showing the well location must also be submitted.

*Minimum data required for Wellhead Protection Area delineation. Additional information will improve the accuracy of the delineation.

WELLSITE EVALUATION FORM
CALCULATED FIXED RADIUS METHOD
ONE FOR EACH WELL

SKYCO 13

Skyco WEll #13

General Information

*1) Well Owner: Dare County 2)Date Drilled: 3/21/83

*3) Well Location:(St./Road & Town): Hwy 345S

*4) Water Supplied to: Dare County Regional Water System

5) Source Aquifer(If known): Yorktown

6) Well Depth: 225 ft.

7) Diameter: 8 in.

8) Depth cased: 216 ft.

9) Open Hole/Screen from 176 to 216 ft.

Information from the Well Acceptance Test

)Date: 3/28/83 11)Length: 12 hours

.2)Pumping Rate: 410 gpm 13)Depth to Static Water Level: 17.25 ft.

Pumping Level: 51.37 ft 15)Drawdown: 34.12 ft.

Well Operation

*16)Pumping Rate: 500 gpm *17)Pump Period: 1440 min/day

Well Location

*18)Latitude: 35°52'30.09691"N *19)Longitude: 75°39'03.28388"W

*20)A 1:24,000 scale 7.5 minute topographic map showing the well location must also be submitted.

*Minimum data required for Wellhead Protection Area delineation. Additional information will improve the accuracy of the delineation.

North Carolina Department of Environment and Natural Resources
Division of Water Quality
943 Washington Square Mall, Washington, NC 27889

Pumping Test Record

Skyco #14

Constant Rate Test

Site: Skyco #14, Roanoke Is. , Dare Co.

Test Conducted By: GMA

Well Construction Permit No. WS07-00862

1. WELL LOCATION: Nearest Tn. Manteo County: Dare
Quadrangle: Manteo

2. OWNER: Dare County Water, 600 Mustian Street, Kill Devil Hills, NC 27948
Name Address

3. USE OF WELL: ( ) Domestic (X) Public ( ) Industry ( ) Other

4. WELL DEPTH: 200 ft. Casing Diameter: 10 in. Casing type: 0.365-in Steel

5. DRILL.CONTRACTOR: Skipper's Well Drilling Was casing grouted? Yes

6. STATIC WATER LEVEL 17.29 feet below top of casing
Date measured 4/12/2007 Casing is: 3 ft. above land surface.

7. WELL YIELD 495 gpm Specific capacity 10.95 gpm/ft-dd

8. PUMPING WATER LEVEL: 62.52 After 24 hrs 495 gpm

9. CHLORINATION: Type HTH Amount 10 lbs.

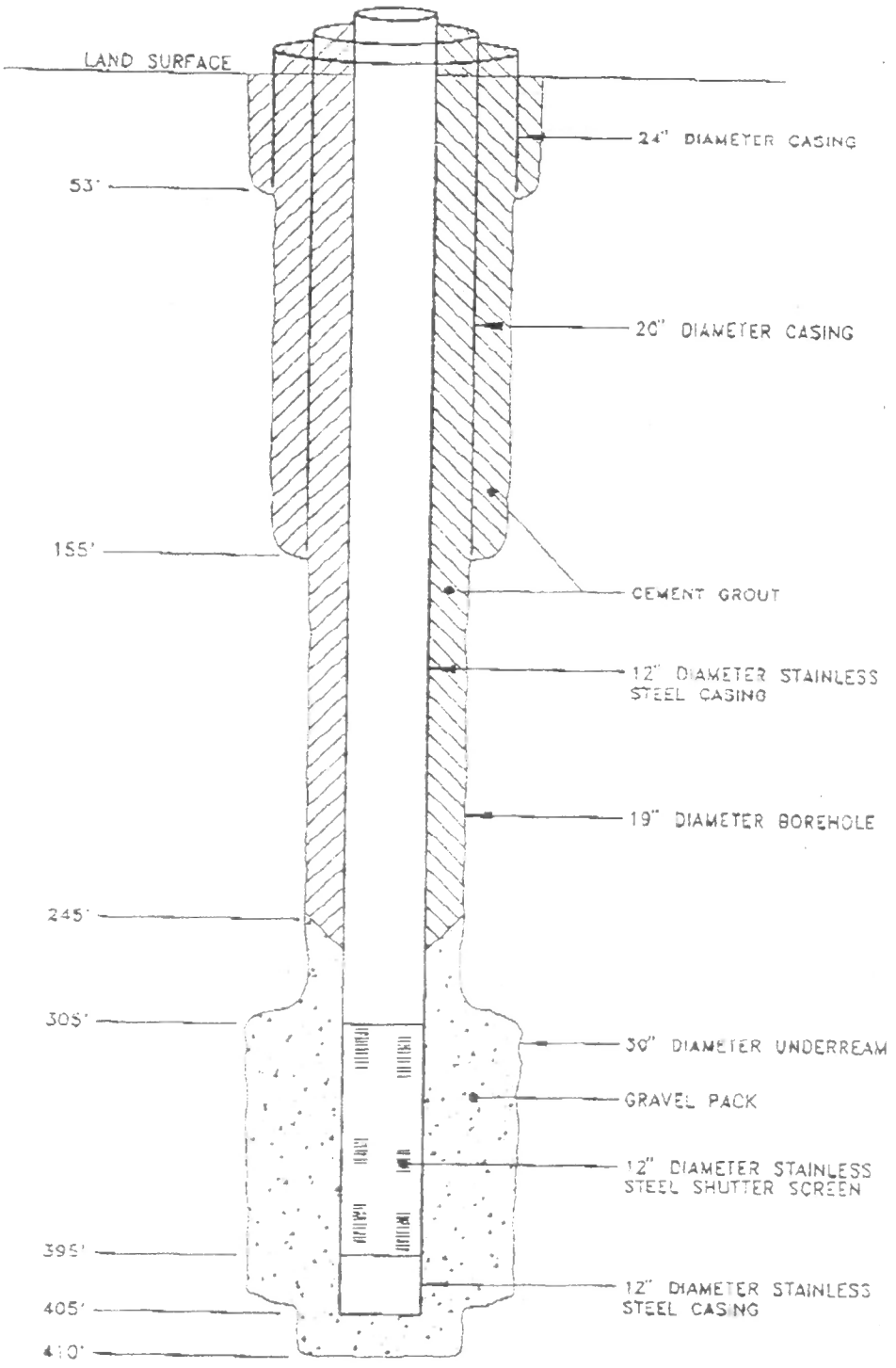
10. TIME AND DATE PUMP STARTED: 4/12/07 9:08 AM PUMP STOPPED: 4/13/07 9:10 AM

11. WATER LEVEL MEAS. DEVICE: Electric Tape and Press. Trans. FLOW MEAS. DEVICE: inline flow meter

12. TEST PUMP: Type: Submersible Make: Ga. Pacific Horsepower 30
Capacity: 400 gpm at 200 ft. TDH Intake Depth 126'

13. SIGNATURE OF PERSON PERFORMING TEST Kelly A. Hall

RWS 1



ViroGroup

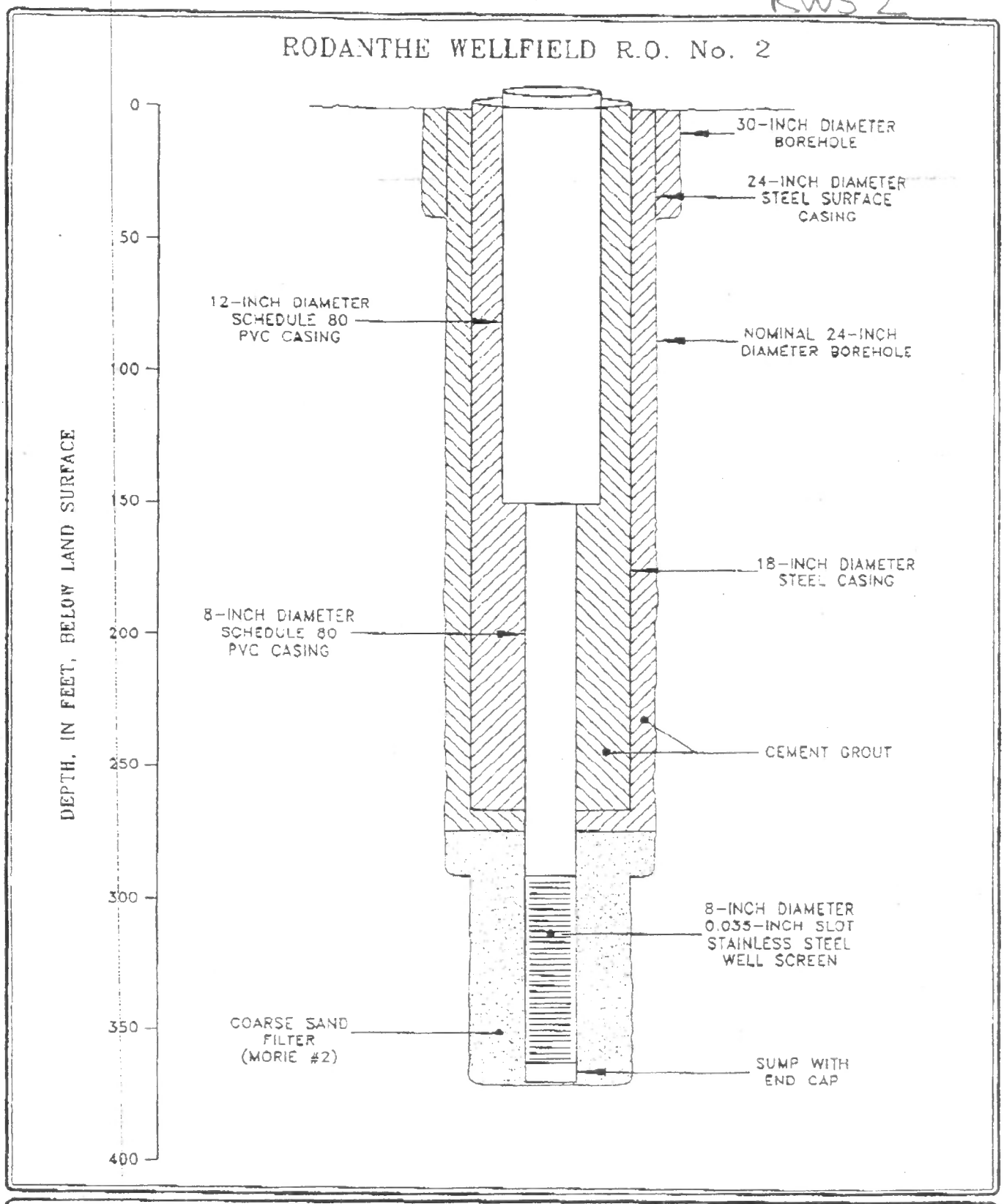
AIR • WATER • SOIL TECHNOLOGY

DRN BY: CAM DWG. NO. A-013159NB-2 DATE: 5/9/95

PROJECT NAME: RODANTHE R.O. NUMBER: 01-03159.00

FIGURE V-1. SCHEMATIC DIAGRAM SHOWING THE CONSTRUCTION DETAILS OF R.O. No. 1.

RWS 2



ViroGroup

AIR • WATER • SOIL TECHNOLOGY

DRN. BY: CAM DWG NO. A-013159NA-Z DATE: 5/9/95

PROJECT NAME: RODANTHE R.O. NUMBER: 01-03159.00

FIGURE V-2. CONSTRUCTION DETAILS OF R.O. No. 2.

STUMPY PT 1

WELL CONSTRUCTION RECORD

North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) Bobby L Harrell CERTIFICATION # 2936

WELL CONTRACTOR COMPANY NAME Magette Well & Pump Co., Inc. PHONE # (252) 332-2265

STATE WELL CONSTRUCTION PERMIT# (if applicable) _____ ASSOCIATED WQ PERMIT# (if applicable) _____

1. WELL USE (Check Applicable Box): Residential ☐ Municipal/Public ☒ Industrial ☐ Agricultural ☐
   Monitoring ☐ Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use _____

2. WELL LOCATION:
   Nearest Town: Stumpy Point County Dare
   Well #1 beside ball field
   (Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

   Topographic/Land setting
   ☐Ridge ☐Slope ☐Valley ☐Flat
   (check appropriate box)
   Latitude/longitude of well location
   _____ _____
   (degrees/minutes/seconds)
   Latitude/longitude source: ☐GPS ☐Topographic map
   (check box)

3. OWNER: Stumpy Point Water & Sewer District
   Address PO Drawer 1000
   (Street or Route No.)
   Manteo NC 27954
   City or Town State Zip Code
   (____)-_____
   Area code Phone number

DEPTH From	DEPTH To	DRILLING LOG Formation Description

4. DATE DRILLED May 2002
5. TOTAL DEPTH: 197'
6. DOES WELL REPLACE EXISTING WELL? YES ☒ NO ☐
7. STATIC WATER LEVEL Below Top of Casing: 9.53 FT.
   (Use "+" if Above Top of Casing)
8. TOP OF CASING IS 2 FT. Above Land Surface*
   *Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118.
9. YIELD (gpm): 125 METHOD OF TEST 24 hour test
10. WATER ZONES (depth): 172-192
11. DISINFECTION: Type HTH Amount 3 lb.
12. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From 0	To 50	Ft.	16"	SDR 21	PVC
From +2	To 172	Ft.	6"	SDR 21	PVC
From 192	To 197	Ft.	6"	SCH 10	Stainless

13. GROUT:

	Depth		Material	Method
From 0	To 50	Ft.	neat cement	pump
From 50	To 155	Ft.	bentonite	pump

14. SCREEN:

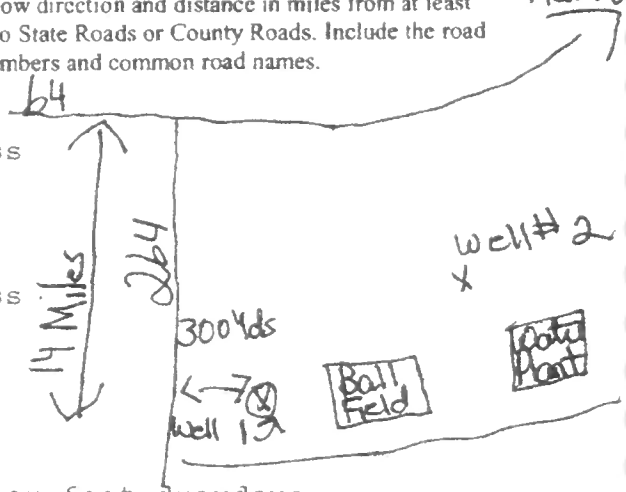
	Depth		Diameter	Slot Size	Material
From 172	To 192	Ft.	6 ? in.	.025 in.	stainless
From _____	To _____	Ft.	_____ in.	_____ in.	_____

15. SAND/GRAVEL PACK:

	Depth		Size	Material
From 155	To 197	Ft.	2	Ricci
From _____	To _____	Ft.	_____	_____

LOCATION SKETCH

Show direction and distance in miles from at least two State Roads or County Roads. Include the road numbers and common road names.



16. REMARKS: Specific capacity 4.19 gpm per foot drawdown

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER

Bobby L Harrell 5/10/02

SIGNATURE OF PERSON CONSTRUCTING THE WELL DATE

Submit the original to the Division of Water Quality, Groundwater Section, 1636 Mail Service Center - Raleigh, NC 27699-1636 Phone No. (919) 733-3221, within 30 days.

GW-1 REV. 07/2001

NORTH CAROLINA DEPARTMENT OF NATURAL AND ECONOMIC RESOURCES
OFFICE OF WATER AND AIR RESOURCES
GROUND WATER DIVISION
P. O. Box 27687 - Raleigh, N. C. 27611

STUMPY PT 1

PUMPING TEST RECORD

Tes. Conducted by: Chris Foldesi Well Construction Permit No.

1. WELL LOCATION: Nearest Town: Stumpy Point County: Dare
Beside Ball Field Well #1 Quadrangle No.
(Road No., Community, or Subdivision and Lot No.)

2. OWNER: Stumpy Point Water & Sewer District PO Drawer 1000 Manteo NC 27954
Name Address

3. USE OF WELL: ( ) Domestic (X) Public ( ) Industrial ( ) Irrigation ( ) _____
Other

4. WELL DEPTH: 197' ft. Casing Diameter 6" in. Casing Type: PVC

5. DRILLING CONTRACTOR: Magette Well & Pump Co., Inc. Was casing grouted? YES

6. STATIC WATER LEVEL: 9.53 ft. (above / below) top of casing. Casing is 2.5 ft. above land surface. Date Measured: May 6, 2002

7. WELL YIELD: 125 gpm. Specific Capacity: 4.19 gpm/ft.-dd.

8. PUMPING WATER LEVEL: 39.42 ft. after 24 hours at 125 gpm.

9. CHLORINATION: Type HTH Amount 3 pounds

10. TIME AND DATE PUMP STARTED: _____ TIME AND DATE PUMP STOPPED: _____

11. WATER LEVEL MEASURING DEVICE: _____ FLOW MEASURING DEVICE: _____

12. TEST PUMP: Type _____ Make _____ Horse Power _____
Capacity _____ gpm at _____ T D H. Intake Depth _____ ft.

Time	Water Level	Pumping Rate			Remarks
STATIC	9.53'				
30 sec.	28.90	125			
6 min.	29.20	125			
8 min.	30.22	125			
10 min.	30.74	125			
12 min.	31.13	125			
14 min.	31.50	125			
16 min.	31.78	125			
18 min.	32.02	125			
20 min.	32.27	125			
[illegible] min.	32.82	125			
30 min.	33.21	125			
35 min.	33.58	125			

STUMPY PT 2

WELL CONSTRUCTION RECORD

North Carolina - Department of Environment and Natural Resources - Division of Water Quality - Groundwater Section

WELL CONTRACTOR (INDIVIDUAL) NAME (print) LARRY SKIPPER CERTIFICATION # 2483

WELL CONTRACTOR COMPANY NAME SKIPPER'S WELL DRILLING PHONE # (910) 3212220

STATE WELL CONSTRUCTION PERMIT# (if applicable) _____ ASSOCIATED WQ PERMIT# (if applicable) _____

1. WELL USE (Check Applicable Box): Residential ☐ Municipal/Public ☒ Industrial ☐ Agricultural ☐
Monitoring ☐ Recovery ☐ Heat Pump Water Injection ☐ Other ☐ If Other, List Use _____

2. WELL LOCATION:
Nearest Town: STUMPY POINT County DARE
(Street Name, Numbers, Community, Subdivision, Lot No., Zip Code)

Topographic/Land setting
☐Ridge ☐Slope ☐Valley ☐Flat
(check appropriate box)
Latitude/longitude of well location
(degrees/minutes/seconds)
Latitude/longitude source: ☐GPS ☐Topographic map
(check box)

3. OWNER: DARE COUNTY
Address _____
(Street or Route No.)
City or Town State Zip Code
( ) _____
Area code- Phone number

4. DATE DRILLED 11-14-00
5. TOTAL DEPTH: 230
6. DOES WELL REPLACE EXISTING WELL? YES ☐ NO ☒
7. STATIC WATER LEVEL Below Top of Casing: _____ FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3 FT. Above Land Surface*
*Top of casing terminated at/or below land surface requires a variance in accordance with 15A NCAC 2C .0118.
9. YIELD (gpm): 97 METHOD OF TEST PUMP
10. WATER ZONES (depth): 170 - 190
11. DISINFECTION: Type 70% HTH Amount 1 LB

DEPTH From	To	DRILLING LOG Formation Description

LOCATION SKETCH
Show direction and distance in miles from at least two State Roads or County Roads. Include the road numbers and common road names.

12. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	+3 To	250 Ft.	4"	SCH 40	PVC
From	To	Ft.			
From	To	Ft.			

13. GROUT:

	Depth		Material	Method
From	0 To	150 Ft.	CEMENT	PUMP
From	To	Ft.		

14. SCREEN:

	Depth		Diameter	Slot Size	Material
From	170 To	190 Ft.	4 in.	.25 in.	PVC
From	To	Ft.	in.	in.	

15. SAND/GRAVEL PACK:

	Depth		Size	Material
From	152 To	230 Ft.	NO 2	MARIE
From	To	Ft.		

16. REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER

Larry Skipper 11-15-00
SIGNATURE OF PERSON CONSTRUCTING THE WELL DATE

Submit the original to the Division of Water Quality, Groundwater Section, 1636 Mail Service Center - Raleigh, NC 27699-1636 Phone No. (919) 733-3221, within 30 days.

GW-1 REV. 07/2001

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat _____ Long. _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: GLENN ENDERSON

DRILLER REGISTRATION NUMBER: 1328

STATE WELL CONSTRUCTION PERMIT NUMBER: W1507003 75

WELL #3D

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: FRISCO County: DARE
WATER PLANT ROAD
(Road, Community, or Subdivision and Lot No.)

2. OWNER DARE COUNTY
ADDRESS 600 MUSTIAN ST
(Street or Route No.)
KILL DEVIL HILLS N.C. 27948
City or Town State Zip Code

3. DATE DRILLED 2-26-98 USE OF WELL WITHDRAWAL
4. TOTAL DEPTH 80'
5. CUTTINGS COLLECTED YES ☐ NO ☒
6. DOES WELL REPLACE EXISTING WELL? YES ☒ NO ☐
7. STATIC WATER LEVEL Below Top of Casing: 6 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3 FT. Above Land Surface*
*Casing Terminated at or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118
9. YIELD (gpm): 25 METHOD OF TEST AIR COMPRESSOR
10. WATER ZONES (depth): 60' - 80'
11. CHLORINATION: Type HTH Amount 6 OZ.

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0'	10'	FINE SAND
10'	15'	COARSE SAND & SHELLS
15'	35'	MED. FINE SAND
35'	45'	FINE SAND
45'	50'	MED. SAND
50'	60'	MED. SAND & SHELLS
60'	75'	MED. to COARSE SAND & SH
75'	82'	MED. to COARSE SAND
82'	90'	FINE CLEAN SAND - NO S

If additional space is needed use back of form

12. CASING:

Depth From	To	Ft.	Diameter	Wall Thickness or Weight Ft.	Material
0'	60		6	#40	PVC

13. GROUT:

Depth From	To	Ft.	Material	Method
0'	60		BENTONITE	GRAVITY

14. SCREEN:

Depth From	To	Ft.	Diameter	Slot Size	Material
60	80		6 in.	12 in.	STAINLESS STEEL
			in.	in.	
			in.	in.	

15. SAND/GRAVEL PACK:

Depth From	To	Ft.	Size	Material
60	90		#2	GRAVEL

16. REMARKS: SPEC. CAP. 4.2

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 3-19-98
SIGNATURE OF CONTRACTOR OR AGENT DATE

Submit original to Division of Environmental Management and copy to well owner.

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

4L

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat. _____ Long. _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent.

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: GLENN ENGLESON

DRILLER REGISTRATION NUMBER: 1328

STATE WELL CONSTRUCTION PERMIT NUMBER: CHWA WELL 4 WS700192

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: FRISCO County: DARE
WATER Plant Road
(Road, Community, or Subdivision and Lot No.)

2. OWNER CHWA
ADDRESS PO Box 578
(Street or Route No.)
BUXTON N.C. 27920
City or Town State Zip Code

3. DATE DRILLED 12-14-95 USE OF WELL WITHDRAWAL
4. TOTAL DEPTH 75'
5. CUTTINGS COLLECTED YES ☐ NO ☑
6. DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐
7. STATIC WATER LEVEL Below Top of Casing: 4' FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3 FT. Above Land Surface*
* Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118
9. YIELD (gpm): 100 METHOD OF TEST AIR COMP.
10. WATER ZONES (depth): 62'
72'
11. CHLORINATION: Type HTH Amount 1 oz
12. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	0	62		6"	#40	PVC

13. GROUT:

	Depth From	To	Ft.	Material	Method
	0	50		PORTLAND CEMENT	PRESSURE GROUT

14. SCREEN:

	Depth From	To	Ft.	Diameter	in.	Slot Size	in.	Material
	62	72		6		14		STAINLESS

15. SAND/GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	60	73		#2	GRAVEL

16. REMARKS: _____

DEPTH From	To	DRILLING LOG Formation Description
0	12'	FINE SAND
12'	22'	COARSE SAND
12'	37'	FINE TO MED. SAND
37'	42'	COARSE SAND
42'	52'	FINE SAND & CLAY
52'	60'	COARSE SAND & SHELLS
60'	72'	COARSE TO MED. SAND
72'	75'	SHELLS, CLAY FINE SAND

if additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

12-16-95

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat. _____ Long. _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

52

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: GLENN ENDERSON

STATE WELL CONSTRUCTION PERMIT NUMBER: WS700197 CHWA WELL #5

DRILLER REGISTRATION NUMBER: 1328

1. WELL LOCATION: (Show sketch of the location below)
   Nearest Town: Frisco County: DARE
   WATER plant Road
   (Road, Community, or Subdivision and Lot No.)
2. OWNER CHWA
   ADDRESS P.O. Box 578
   (Street or Route No.)
   Buxton N.C. 27920
   City or Town State Zip Code
3. DATE DRILLED 12-13-95 USE OF WELL WITHDRAWAL
4. TOTAL DEPTH 75'
5. CUTTINGS COLLECTED YES ☐ NO ☑
6. DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐
7. STATIC WATER LEVEL Below Top of Casing: 4 FT.
   (Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3 FT. Above Land Surface*
   * Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118
9. YIELD (gpm): 100 METHOD OF TEST AIR Comp.
10. WATER ZONES (depth): 60'
    70'
11. CHLORINATION: Type HTH Amount 10 oz
12. CASING:

	Depth From	Depth To	Diameter	Wall Thickness or Weight/Ft.	Material
	0	60' Ft.	6"	#40	PVC
		Ft.			
		Ft.			

13. GROUT:

	Depth From	Depth To	Material	Method
	0	50 Ft.	PORTLAND CEMENT	PRESSURE GROUT
		Ft.		

14. SCREEN:

	Depth From	Depth To	Diameter	Slot Size	Material
	60	70 Ft.	6 in.	14 in.	STAINLESS
		Ft.	in.	in.	
		Ft.	in.	in.	

15. SAND/GRAVEL PACK:

	Depth From	Depth To	Size	Material
	60	72 Ft.	#2	GRAVEL
		Ft.		

16. REMARKS: _____

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0	14'	FINE SAND
14'	24'	COARSE SAND
24'	52'	MED. to FINE SAND
52'	58'	COARSE SAND & SHELLS
58'	72'	COARSE SAND - LIMESTONE
72'	75	COARSE SAND, SHELLS, CLAY-FINE

If additional space is needed use back of form

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 12-16-95

SIGNATURE OF CONTRACTOR OR AGENT DATE

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

6L

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat. _____ Long. _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR: Glen Emerson
STATE WELL CONSTRUCTION PERMIT NUMBER: WS7900192 CHWA - WELL 6
DRILLER REGISTRATION NUMBER: 1328

1. WELL LOCATION: (Show sketch of the location below)
   Nearest Town: Frisco County: Dare
   Water Plant Road
   (Road, Community, or Subdivision and Lot No.)
2. OWNER CHWA
   ADDRESS PO Box 578
   (Street or Route No.)
   Buxton N.C. 27920
   City or Town State Zip Code
3. DATE DRILLED 12-1-95 USE OF WELL Withdrawal
4. TOTAL DEPTH 75
5. CUTTINGS COLLECTED YES ☐ NO ☑
6. DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐
7. STATIC WATER LEVEL Below Top of Casing: 4 FT.
   (Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3 FT. Above Land Surface*

* Casing Terminated alter below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118

9. YIELD (gpm): 100 METHOD OF TEST Air Comp.
10. WATER ZONES (depth): 63'
    73'
11. CHLORINATION: Type HTH Amount 10 oz.
12. CASING:

	Depth From	To	Diameter	Wall Thickness or Weight/Ft.	Material
	0	63 Ft.	6"	#40	PVC
		Ft.			
		Ft.			

13. GROUT:

	Depth From	To	Material	Method
	0	50' Ft.	portland	pressure
		Ft.	Cement	Grout

14. SCREEN:

	Depth From	To	Diameter	Slot Size	Material
	63	73 Ft.	6 in.	14 in.	stainless
		Ft.	in.	in.	
		Ft.	in.	in.	

15. SAND/GRAVEL PACK:

	Depth From	To	Size	Material
	60	74 Ft.	#2	Gravel
		Ft.		

16. REMARKS: _____

DEPTH From	To	DRILLING LOG Formation Description
0	14'	Fine Sand
14'	28'	Coarse Sand
28'	46'	Med Sand
40'	52'	Fine Gray Sand
52'	60'	Coarse Sand & Shell
60'	65'	Med. Sand & Shell
65'	73'	Coarse Sand & Shell
73'	75	Shells, Gray Clay-F

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

12-5-95
DATE

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

7L

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat. _____ Long. _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR: Glenn Emerson
STATE WELL CONSTRUCTION PERMIT NUMBER: WS0200197 CHWA WELL 7
DRILLER REGISTRATION NUMBER: 1328

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Frisco County: Dare
Water Plant Road
(Road, Community, or Subdivision and Lot No.)

2. OWNER CHWA
ADDRESS P.O. Box 578
(Street or Route No.)
Buxton N.C. 27920
City or Town State Zip Code

3. DATE DRILLED 12-11-95 USE OF WELL Withdrawal
4. TOTAL DEPTH 75
5. CUTTINGS COLLECTED YES ☐ NO ☑
6. DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐
7. STATIC WATER LEVEL Below Top of Casing: 4' FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3 FT. Above Land Surface*
* Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118
9. YIELD (gpm): 100 METHOD OF TEST Air Comp.
10. WATER ZONES (depth): 62
72
11. CHLORINATION: Type HTH Amount 100z
12. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	0	62		6"	#40	PVC

13. GROUT:

	Depth From	To	Ft.	Material	Method
	0	50		Portland Cement	Pressure Cent

14. SCREEN:

	Depth From	To	Ft.	Diameter		Slot Size		Material
	62	72	Ft	6	in.	14	in.	Stainless
			Ft.		in.		in.	
			Ft.		in.		in.	

15. SAND/GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	60	74	Ft.	#2	Gravel

16. REMARKS _____

DEPTH From	To	DRILLING LOG Formation Description
0'	10'	Fine Sand
10'	26'	Coarse Sand
26'	43'	med. Sand - Fine Sand
43'	50'	med. Sand
50'	58'	med. Sand
58'	63'	med. to Coarse Sand
63'	72'	Coarse Sand & Shells
72'	75'	Shells, Fine Sand & Clay

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 12-15-95
SIGNATURE OF AGENT DATE

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

8L

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat _____ Long. _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: GLENN ENDERSON

DRILLER REGISTRATION NUMBER: 1328

STATE WELL CONSTRUCTION PERMIT NUMBER: WS0700192

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: FRISCO County: CHWA WELL 8 DARE
WATER PLANT ROAD
(Road, Community, or Subdivision and Lot No.)

2. OWNER CHWA - DARE County Water Dept.
ADDRESS P.O. Box 528
(Street or Route No.)
BUXTON, City or Town — N.C. State — 279 Zip Code

3. DATE DRILLED 12-7-95 USE OF WELL Withdrawal
4. TOTAL DEPTH 72
5. CUTTINGS COLLECTED YES ☐ NO ☑
6. DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐
7. STATIC WATER LEVEL Below Top of Casing: 3 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 4 FT. Above Land Surface*
* Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118
9. YIELD (gpm): 100 METHOD OF TEST Air Compressor
10. WATER ZONES (depth): 62
72
11. CHLORINATION: Type HTH Amount 10 oz
12. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	0	62		6"	#40	PVC

13. GROUT:

	Depth From	To	Ft.	Material	Method
	0	50		Portland Cement	Pressure Grout

14. SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size	Material
	62	72		6 in.	14 in.	Stainless
				in.	in.	
				in.	in.	

15. SAND/GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	60	74		#2	Gravel

16. REMARKS:

DEPTH From	To	DRILLING LOG Formation Description
0'	12'	FINE SAND
12'	23'	COARSE SAND (GREY)
23'	41'	MED. SAND
41'	45'	" "
45'	55'	" "
55'	62'	COARSE SAND
62'	72	COARSE TO MED SAND
72'	75	SHELLS, CLAY, SAND (MIXTURE)

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 12-7-95

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

9L

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat. _____ Long. _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent.

DRILLING CONTRACTOR: Glenn Enderson

DRILLER REGISTRATION NUMBER: 1328

STATE WELL CONSTRUCTION PERMIT NUMBER: W5020092

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Frisco County: Dare
Water Assoc. Road
(Road, Community, or Subdivision and Lot No.)

2. OWNER Cape Hatteras Water Assoc
ADDRESS P.O. Box 528
(Street or Route No.)
Buxton N.C. 27920
City or Town State Zip Code

3. DATE DRILLED 4-24-96 USE OF WELL Supply
4. TOTAL DEPTH 75'
5. CUTTINGS COLLECTED YES ☐ NO ☑
6. DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐
7. STATIC WATER LEVEL Below Top of Casing: 5 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3 FT. Above Land Surface*
* Casing Terminated at or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118
9. YIELD (gpm): 100 METHOD OF TEST Compressor
10. WATER ZONES (depth): 60
70
11. CHLORINATION: Type HT. H Amount 6 oz.
12. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	Surface	60		6"	#40	PVC

13. GROUT:

	Depth From	To	Ft.	Material	Method
	Surface	50		Portland Cement	Pressure Grout

14. SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size	Material
	60	70		6 in.	20 in.	Stainless
				in.	in.	
				in.	in.	

15. SAND/GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	55	70		#2	Gravel

16. REMARKS: _____

DEPTH From	To	DRILLING LOG Formation Description
0'	14'	Medium Fine Brown Sa
14'	26'	Coarse Gray Sand
26'	29'	Gray Clay
29'	38'	Shells & Coarse Sand
38'	45'	med. Coarse Gray Sand
45'	50	Coarse Sand
50'	55'	Shells & Coarse Sand
55'	60'	Medium Coarse San
60'	70'	Coarse Sand - Lithe Sh
70'	75'	Fine Sand - Clay - Limestone

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Glenn Enderson 5-20-96
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 REV. 9/91

Submit original to Division of Environmental Management and copy to well owner

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

10 L

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat _____ Long. _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: GLENN ENDERSON

DRILLER REGISTRATION NUMBER: 1328

STATE WELL CONSTRUCTION PERMIT NUMBER: WS0200192

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: FRISCO County: DARE
WATER ASSOC. ROAD
(Road, Community, or Subdivision and Lot No.)

2. OWNER CAPE HATTERAS WATER ASSOC.
ADDRESS P.O. BOX 578
(Street or Route No.)
BUXTON N.C. 27920
City or Town State Zip Code

3. DATE DRILLED 4-26-96 USE OF WELLS Supply
4. TOTAL DEPTH 75'
5. CUTTINGS COLLECTED YES ☐ NO ☑
6. DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐
7. STATIC WATER LEVEL Below Top of Casing: 5 FT.
8. TOP OF CASING IS 3 FT. Above Land Surface* (Use "+" if Above Top of Casing)
* Casing Terminated at or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118
9. YIELD (gpm): 100 METHOD OF TEST COMPRESSOR
10. WATER ZONES (depth): 60'
70'
11. CHLORINATION: Type H.T.H. Amount: 6 oz
12. CASING:

From	To	Depth Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
SURFACE	60		6"	#40	PVC

13. GROUT:

From	To	Depth Ft.	Material	Method
SURFACE	50		PORTLAND	PRESSURE
			CEMENT	GROUT

14. SCREEN:

From	To	Depth Ft.	Diameter	Slot Size	Material
60	70		6 in.	20 in.	STAINLESS
			in.	in.	
			in.	in.	

15. SAND/GRAVEL PACK:

From	To	Depth Ft.	Size	Material
55	70		#2	GRAVEL

16. REMARKS:

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0	14'	MEDIUM FINE SAND
14'	28'	COARSE GRAY SAND
28'	34'	SHELLS - COARSE SAND
34'	37'	COARSE SAND
37'	42'	GRAY CLAY
42'	50	GRAY SAND & SHELLS
50'	56	GRAY CLAY
56'	61'	SHELLS
61'	72'	COARSE SAND - SOME SH
72	75	FINE SAND & CLAY

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Glenn Enderson 5-20-96
SIGNATURE OF CONTRACTOR OR AGENT DATE

Submit original to Division of Environmental Management and copy to well owner.

W-1 REV. 9.91

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

FOR OFFICE USE ONLY
QUAD. NO. ______ SERIAL NO. ______
Lat. ______ Long. ______ RO ______
Minor Basin ______
Basin Code ______
Header Ent. ______ GW-1 Ent. ______

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: Glenn Endreson

DRILLER REGISTRATION NUMBER: 1328

STATE WELL CONSTRUCTION PERMIT NUMBER: WSO700375

Well #11 D

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: Frisco County: Dare
Water Plant Road
(Road, Community, or Subdivision and Lot No.)
2. OWNER Dare County
ADDRESS 600 Mustian St
(Street or Route No.)
Kill Devil Hills N.C. 27948
City or Town State Zip Code
3. DATE DRILLED 3-3-98 USE OF WELL Withdrawal
4. TOTAL DEPTH 95'
5. CUTTINGS COLLECTED YES [ ] NO [✓]
6. DOES WELL REPLACE EXISTING WELL? YES [✓] NO [ ]
7. STATIC WATER LEVEL Below Top of Casing: 6 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3 FT. Above Land Surface*
*Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118
9. YIELD (gpm): 75 METHOD OF TEST Air Compressor
10. WATER ZONES (depth): 75' - 95'

11. CHLORINATION: Type H.T.H. Amount 6 oz.

DEPTH From – To	DRILLING LOG Formation Description
0' - 10'	Fine Sand
10' - 22'	Coarse Sand
22' - 26'	Fine Sand
26' - 40'	Coarse Sand
40' - 50'	Coarse Sand & Shells
50' - 55'	Shells
55' - 70'	Coarse Sand & Shells
70' - 75'	Shells - Clay mixture
75' - 80'	Shells
80' - 90' -	Sand Shells - mix
90' - 100' -	Shells - Sand - silts (mix)

If additional space is needed use back of form

12. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From 0	To 75'	Ft.	6	SCH 40	PVC
From	To	Ft.			
From	To	Ft.			

13. GROUT:

	Depth		Material	Method
From 0	To 70	Ft.	Bentonite	pressure
From	To	Ft.		

14. SCREEN:

	Depth		Diameter		Slot Size		Material
From 75	To 95	Ft.	6	in.	12	in.	Stainless Steel
From	To	Ft.		in.		in.	
From	To	Ft.		in.		in.	

15. SAND/GRAVEL PACK:

	Depth		Size	Material
From 75	To 95	Ft.	#2	Gravel
From	To	Ft.		

16. REMARKS: Spec. Cas. 4.2

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 5-19-98
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 REV. 3/91

Submit original to Division of Environmental Management and copy to well owner.

North Carolina - Department of Environme[illegible]ealth, and Natural Resources
Division of Environmental Managem[illegible] - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

FOR OFFICE USE ONLY
QUAD. NO.: _____ SERIAL NO.: _____
Lat. _____ Long. _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: Glenn Enderson

DRILLER REGISTRATION NUMBER: 1328

STATE WELL CONSTRUCTION PERMIT NUMBER: WI5070375

WELL # 12D

WELL LOCATION: (Show sketch of the location below)
Nearest Town: Frisco County: Dare
Water Plant Road
(Road, Community, or Subdivision and Lot No.)

OWNER: Dare County
ADDRESS: 600 Mustian St.
(Street or Route No.)
Kill Devil Hills N.C. 27948
City or Town State Zip Code

DATE DRILLED 5-13-98 USE OF WELL Withdrawal
TOTAL DEPTH 95'
CUTTINGS COLLECTED YES ☐ NO ☑
DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐
STATIC WATER LEVEL Below Top of Casing: 7 FT.
(Use "-" if Above Top of Casing)
TOP OF CASING IS 3 FT. Above Land Surface*
*Casing Terminated at or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0113
YIELD (gpm): 25 METHOD OF TEST Air Compressor
WATER ZONES (depth): 25'
95'
CHLORINATION: Type H.T.H. Amount: 6 oz

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0	11'	Fine Sand
11'	18'	Coarse Sand
18'	32'	Coarse Sand & Shells
32'	36'	Clay - Gray
36'	46'	Med Coarse Sand
46'	56'	Sand, Clay, - Shells mix
56'	66'	Clay - Sand & Shells
66'	76'	Coarse Sand Shells
76'	76'	Sand - clay - Silts
76'	86'	Shells
86'	96'	Shells, Sand, Silts
96'	101	Shells, Sand Silts

If additional space is needed use back of form

CASING:

	Depth From	Depth To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	0	75		6	Sch 40	PVC

GROUT:

	Depth From	Depth To	Ft.	Material	Method
	0	70		Portland	Pressure Grout

SCREEN:

	Depth From	Depth To	Ft.	Diameter	In.	Slot Size	In.	Material
	75	95		6		10		Stainless Steel

SAND/GRAVEL PACK:

	Depth From	Depth To	Ft.	Size	Material
	95	95		#2	Gravel

REMARKS: Sch. Cap 6

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I/WE HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

3-19-98
SIGNATURE OF CONTRACTOR OR AGENT DATE

Submit original to Division of Environmental Management and copy to well owner

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat: _____ Long: _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: GLENN ENDERSON

DRILLER REGISTRATION NUMBER: 1328

STATE WELL CONSTRUCTION PERMIT NUMBER: WS 0700395

WELL # 13D

WELL LOCATION: (Show sketch of the location below)
Nearest Town: FRISCO County: DARE

WATER PLANT ROAD
(Road, Community, or Subdivision and Lot No.)

OWNER: DARE COUNTY

ADDRESS: 600 MUSTIAN ST.
(Street or Route No.)

KILL DEVIL HILLS N.C. 27948
City or Town State Zip Code

DATE DRILLED 3-5-98 USE OF WELL WITHDRAWAL

TOTAL DEPTH 95'

CUTTINGS COLLECTED YES ☐ NO ☑

DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐

STATIC WATER LEVEL Below Top of Casing: 8 FT.
(Use "+" If Above Top of Casing)

TOP OF CASING IS 3 FT. Above Land Surface*

*Casing Terminated after below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118

5. YIELD (gpm): 75 METHOD OF TEST AIR COMPRESSOR

6. WATER ZONES (depth): 75'
95'

7. CHLORINATION: Type H.T.H Amount: 6 OZ

8. CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From 0	To 75	Ft.	6	#40	PVC
From ____	To ____	Ft.			
From ____	To ____	Ft.			

9. GROUT:

	Depth		Material	Method
From 0	To 70	Ft.	BENTONITE	GRAVITY
From ____	To ____	Ft.		

10. SCREEN:

	Depth		Diameter	Slot Size	Material
From 75'	To 95	Ft.	6 In.	12 In.	STAINLESS STEEL
From ____	To ____	Ft.	In.	In.	
From ____	To ____	Ft.	In.	In.	

11. SAND/GRAVEL PACK:

	Depth		Size	Material
From 75	To 95	Ft.	#2	GRAVEL
From ____	To ____	Ft.		

REMARKS: SAND CLAY 9.4

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0'	15'	FINE SAND
15'	30'	COARSE SAND & SHELLS
30'	40'	GRAY CLAY - SHELL - INTERBED
40'	55'	COARSE SAND & SHELLS
55'	60'	SHELLS
60'	72'	COARSE SAND & SHELLS
72'	75'	COARSE SAND & CLAY
75'	80'	SHELLS - LIME CLAY MIX
80'	100'	SHELLS WITH FINE SAND MIX

If additional space is needed use back of form

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT

3-19-98
DATE

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

14L

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat. _____ Long. _____ RO ____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

DRILLING CONTRACTOR: GLENN ENDRESON

DRILLER REGISTRATION NUMBER: 1328

STATE WELL CONSTRUCTION PERMIT NUMBER: WS0220142

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: FRISCO County: DARE
WATER ASSOC. ROAD
(Road, Community, or Subdivision and Lot No.)

2. OWNER CAPE HATTERAS WATER ASSOC -
ADDRESS P.O. BOX 578
(Street or Route No.)
BUXTON (City or Town) NC. (State) 27920 (Zip Code)

3. DATE DRILLED 5-3-96 USE OF WELL Supply
4. TOTAL DEPTH 70
5. CUTTINGS COLLECTED YES ☐ NO ☑
6. DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐
7. STATIC WATER LEVEL Below Top of Casing: 5 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3 FT. Above Land Surface*
* Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118
9. YIELD (gpm): 100 METHOD OF TEST COMPRESSOR
10. WATER ZONES (depth): 60'
70'
11. CHLORINATION: Type HTH Amount: 6 OZ
12. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	SURFACE	60		6"	#40	PVC

13. GROUT:

	Depth From	To	Ft.	Material	Method
	SURFACE	50		PORTLAND	PRESSURE
				CEMENT	GROUT

14. SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size	Material
	60	70		6" in.	20 in.	STAINLESS
				in.	in.	
				in.	in.	

15. SAND/GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	55	70		#2	GRAVEL

16. REMARKS:

DEPTH From	To	DRILLING LOG Formation Description
0'	12'	BROWN SAND ME
12'	25'	COARSE & MEDIUM SAND
25'	32'	COARSE GRAY SAND
32'	36'	MEDIUM SAND GR
36'	42'	MEDIUM & FINE SA
42'	55'	MEDIUM SAND GR
55'	61'	COARSE SAND
61'	72'	COARSE SAND & SH
72	75	SHELLS COARSE SAN

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

Glenn Endreson 5-20-96
SIGNATURE OF CONTRACTOR OR AGENT DATE

GW-1 REV. 9/91
Submit original to Division of Environmental Management

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat: _____ Long: _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: GLENN ENDERSON

DRILLER REGISTRATION NUMBER: 1328

STATE WELL CONSTRUCTION PERMIT NUMBER: NSC700325

WELL #15D

WELL LOCATION: (Show sketch of the location below)
Nearest Town: Frisco County: Dare

Water Plant Road
(Road, Community, or Subdivision and Lot No.)

OWNER: Dare County

ADDRESS: 600 Mustian St.
(Street or Route No.)

Kill Devil Hills N.C. 27948
City or Town State Zip Code

DATE DRILLED 3-4-98 USE OF WELL Withdrawal

TOTAL DEPTH 95'

CUTTINGS COLLECTED YES ☐ NO ☑

DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐

STATIC WATER LEVEL Below Top of Casing: 8 FT.
(Use "+" if Above Top of Casing)

TOP OF CASING IS 3 FT. Above Land Surface*

*Casing Terminated at or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118

YIELD (gpm): 75 METHOD OF TEST Air Compressor

WATER ZONES (depth): 75'
95'

CHLORINATION: Type HTH Amount: 6oz

CASING:

	Depth		Diameter	Wall Thickness or Weight Ft.	Material
From	0	To 75 Ft.	6"	#40	PVC
From		To Ft.			
From		To Ft.			

GROUT:

	Depth		Material	Method
From	0	To 70 Ft.	Bentonite	Pressure
From		To Ft.		

SCREEN:

	Depth		Diameter	Slot Size	Material
From	75	To 95 Ft.	6	.2	Stainless Steel
From		To Ft.			
From		To Ft.			

SAND/GRAVEL PACK:

	Depth		Size	Material
From	75	To 95 Ft.	#2	Gravel
From		To Ft.		

REMARKS: Spec. Cap. 35

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0	12'	Fine yellow Sand
12'	28'	Coarse Sand
28'	36'	Coarse Sand & Shells
36'	40'	Grey Clay
40'	65'	Coarse Sand & Shells
65'	72'	Clay, Shells & Sand mix
72'	80	Shells
80'	100	Shells - Sand - Silt (Mix)

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

REMARKS: _____

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT — DATE 3-19-98

Submission to Division of Environmental Management and copy to well owner

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat _____ Long _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: Glenn Emerson

DRILLER REGISTRATION NUMBER: 1328

STATE WELL CONSTRUCTION PERMIT NUMBER: WI0700595

WELL LOCATION: (Show sketch of the location below) Well # 1B

Nearest Town: Frisco County: Dare

Water Plant Road
(Road, Community, or Subdivision and Lot No.)

OWNER: Dare County

ADDRESS: 100 Mustian St.
(Street or Route No.)

Kill Devil Hills N.C. 27948
City or Town State Zip Code

DATE DRILLED 5-12-98 USE OF WELL Withdrawal

TOTAL DEPTH 95'

CUTTINGS COLLECTED YES ☐ NO ☑

DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐

STATIC WATER LEVEL Below Top of Casing: 7 FT.
(Use "+" If Above Top of Casing)

TOP OF CASING IS 3 FT. Above Land Surface*

*Casing Terminated ever below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118

YIELD (gpm): 25 METHOD OF TEST Air Compressor

WATER ZONES (depth): 25'
95'

CHLORINATION: Type H.T.H. Amount: 100#

CASING:

Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
0	75		6"	Sch 40	PVC

GROUT:

Depth From	To	Ft.	Material	Method
0	76		Bentonite	Pressure Grout

SCREEN:

Depth From	To	Ft.	Diameter	Slot Size	Material
75	95		6 In.	10 In.	Stainless Steel
			In.	In.	
			In.	In.	

SAND/GRAVEL PACK:

Depth From	To	Ft.	Size	Material
75	95		#2	Gravel

REMARKS: Spec. Cap. 3.5

DEPTH From	To	DRILLING LOG Formation Description
0	10'	Fine Sand
10'	21'	Coarse Sand
21'	36'	Coarse Sand & Shells
36'	40'	Med. to Fine Sand
40'	50'	Coarse Sand
50'	60'	Coarse Sand - Some Shells
60'	70'	Coarse Sand - Shells - Clay
70'	80'	Shells - Some Fine Sand
80'	95'	Shells, Silts - Sand

If additional space is needed use back of form.

LOCATION SKETCH

(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

3-19-98
SIGNATURE OF CONTRACTOR OR AGENT DATE

Submission of this form to the Division of Environmental Management does not constitute approval

North Carolina - Department of Environme[illegible]ealth, and Natural Resources
Division of Environmental Managemen[illegible] - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat. _____ Long. _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: Glenn Ensgeson

DRILLER REGISTRATION NUMBER: 1328

STATE WELL CONSTRUCTION PERMIT NUMBER: W50000325

WELL # 17D

WELL LOCATION: (Show sketch of the location below)
Nearest Town: Frisco County: Dare

Water Plant Road
(Road, Community, or Subdivision and Lot No.)

OWNER: Dare County

ADDRESS: 600 Mustian St.
(Street or Route No.)

Kill Devil Hills N.C. 27948
City or Town State Zip Code

DATE DRILLED 3-11-98 USE OF WELL Withdrawal

TOTAL DEPTH 95'

CUTTINGS COLLECTED YES ☐ NO ☑

DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐

STATIC WATER LEVEL Below Top of Casing: 8 FT.
(Use "+" if Above Top of Casing)

TOP OF CASING IS 3 FT. Above Land Surface*

*Casing Terminated abov[illegible] below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118

YIELD (gpm): 75 METHOD OF TEST Air Compressor

WATER ZONES (depth): 75'
95'

CHLORINATION: Type Liq. Amount: 6 oz

DEPTH From	To	DRILLING LOG Formation Description
0	12'	Fine Sand
12'	25'	Med Coarse Sand
25'	32'	Coarse Sand & Shells
32'	37'	Gray Clay
37'	40'	Med. Sand - Fines
40'	50'	Coarse Sand & Shells
50'	65'	Coarse Sand & Shells
65'	70'	Coarse Sand & Shells
70'	78'	Sand Clay Shells - limy
78'	82'	Shells - Sand - Limestone
82'	91'	Shells - Sand - Clay, lm
95	100'	Shells

If additional space is needed use back of form

CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	0	75		6	Sch 40	PVC

GROUT:

	Depth From	To	Ft.	Material	Method
	0	70		Bentonite	Pressure

SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size	Material
	75	95		6	10	Stainless Steel

SAND/GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	75	95		#2	Gravel

REMARKS: Spec. Cap. 3

LOCATION SKETCH
(Show direction and distance from at least two State Roads or other map reference points)

I DO HEREBY CERTIFY THAT THE WELL HAS BEEN CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature]
SIGNATURE OF CONTRACTOR OR AGENT

3-19-98
DATE

Submission of this form to Division of Environmental Management does not constitute approval

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat. _____ Long. _____ FO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ SWH Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: Glenn Earlesco

DRILLER REGISTRATION NUMBER: 1328

STATE WELL CONSTRUCTION PERMIT NUMBER: WI0000395

WELL LOCATION: (Show sketch of the location below) Well # 19D

Nearest Town: Frisco County: Dare

Water Plant Road
(Road, Community, or Subdivision and Lot No.)

OWNER: Dare County

ADDRESS: 600 Mustian St.
(Street or Route No.)

Kill Devil Hills N.C. 27948
City or Town State Zip Code

DATE DRILLED 5-14-98 USE OF WELL Withdrawal

TOTAL DEPTH: 95'

CUTTINGS COLLECTED YES ☐ NO ☑

DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐

STATIC WATER LEVEL Below Top of Casing: 8 FT.
(Use "+" If Above Top of Casing)

TOP OF CASING IS 3 FT. Above Land Surface*

*Casing Terminated at or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118

YIELD (gpm): 25 METHOD OF TEST Air Compressor

WATER ZONES (depth): 75'
95'

CHLORINATION: Type HTH Amount: 6 oz

CASING:

	Depth		Diameter	Wall Thickness or Weight/Ft.	Material
From	0	To 75 Ft.	6"	#40	PVC
From		To Ft.			
From		To Ft.			

GROUT:

	Depth		Material	Method
From	0	To 70 Ft.	Bentonite	pressure
From		To Ft.		

SCREEN:

	Depth		Diameter	Slot Size	Material
From	75	To 95 Ft.	6 In.	12 In.	Stainless Steel
From		To Ft.	In.	In.	
From		To Ft.	In.	In.	

SAND/GRAVEL PACK:

	Depth		Size	Material
From	75	To 95 Ft.	#2	Gravel
From		To Ft.		

REMARKS: Sand Cap 4.3

DEPTH From	DEPTH To	DRILLING LOG Formation Description
0	10'	Fine Sand
10'	22'	Coarse Sand
22'	41'	Coarse Sand & Shell
41'	50'	Grey Clay
50'	62'	Fine Sand
62'	70'	Coarse Sand
70'	80'	Shells
80'	90	Shells & Sand
90	95	Shell - Sand Gravel

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT — DATE 3-19-99

Submit original to Division of Environmental Management and copy to well owner

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

20L

WELL CONSTRUCTION RECORD

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat _____ Long. _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent.

DRILLING CONTRACTOR: GLENN ENDERSON
STATE WELL CONSTRUCTION PERMIT NUMBER: CHWA WELL 20 US0700197
DRILLER REGISTRATION NUMBER: 1328

1. WELL LOCATION: (Show sketch of the location below)
Nearest Town: FRISCO County: DARE
WATER Plant Road
(Road, Community, or Subdivision and Lot No.)
2. OWNER C HWA
ADDRESS P.O. Box 728
(Street or Route No.)
Buxton N.C. 27920
City or Town State Zip Code
3. DATE DRILLED 11-20-95 USE OF WELL Withdrawal
4. TOTAL DEPTH 74'
5. CUTTINGS COLLECTED YES ☐ NO ☑
6. DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐
7. STATIC WATER LEVEL Below Top of Casing: 4 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3 FT. Above Land Surface*
* Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118
9. YIELD (gpm): 100 METHOD OF TEST Air Comp.
10. WATER ZONES (depth): 62'
72'
11. CHLORINATION: Type HTH Amount 10 oz
12. CASING:

	Depth From	Depth To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	0	62		6"	#40	PVC

13. GROUT:

	Depth From	Depth To	Ft.	Material	Method
	0	50		Portland	Pressure
				Cement	Grout

14. SCREEN:

	Depth From	Depth To	Ft.	Diameter	Slot Size	Material
	62	72		6 in.	14 in.	Stainless
				in.	in.	
				in.	in.	

15. SAND/GRAVEL PACK:

	Depth From	Depth To	Ft.	Size	Material
	60	73		# 2	Gravel

16. REMARKS:

DRILLING LOG

Depth From	Depth To	Formation Description
0'	14'	FINE Gray Sand
14'	48'	Coarse Gray Sand
48'	56'	FINE Gray Sand
56'	60'	FINE Gray Sand Little Cla
60'	74'	Coarse Sand & Shells

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

[signature] 12-18-95
SIGNATURE OF AGENT DATE

North Carolina - Department of Environment, Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

21 L

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat. _____ Long. _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: GLENN ENGLESON

STATE WELL CONSTRUCTION PERMIT NUMBER: W SO700193 CHWA WELL #21

DRILLER REGISTRATION NUMBER: 1328

1. WELL LOCATION: (Show sketch of the location below)
   Nearest Town: FRISCO County: DARE
   P.O. Box WATER PLANT ROAD
   (Road, Community, or Subdivision and Lot No.)
2. OWNER CHWA
   ADDRESS P.O. Box 798
   (Street or Route No.)
   Buxton N.C. 27920
   City or Town State Zip Code
3. DATE DRILLED 9-2-95 USE OF WELL Withdrawal
4. TOTAL DEPTH 74'
5. CUTTINGS COLLECTED YES ☐ NO ☑
6. DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐
7. STATIC WATER LEVEL Below Top of Casing: 5' FT.
   (Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3 FT. Above Land Surface*
   * Casing Terminated at/or below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118
9. YIELD (gpm): 100 METHOD OF TEST Air Comp.
10. WATER ZONES (depth): 63
    73
11. CHLORINATION: Type HTH Amount 16 oz
12. CASING:

	Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
	0	63		6"	#40	PVC

13. GROUT:

	Depth From	To	Ft.	Material	Method
	0	50		PORTLAND	PRESSURE
				CEMENT	Grout

14. SCREEN:

	Depth From	To	Ft.	Diameter	Slot Size	Material
	63	73		6" in.	#14 in.	STAINLESS
				in.	in.	
				in.	in.	

15. SAND/GRAVEL PACK:

	Depth From	To	Ft.	Size	Material
	60	73		#2	GRAVEL

16. REMARKS:

DEPTH From	To	DRILLING LOG Formation Description
0'- 30'		COARSE SAND
30'- 45'		SAND & SHELLS COARSE
45'- 68'		MED-COARSE SAND GR
68'- 73		SHELLS & COARSE SAND
73'- 74		GRAY CLAY

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C, WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

SIGNATURE OF CONTRACTOR OR AGENT

12-18-95
DATE

North Carolina - Department of Environm Health, and Natural Resources
Division of Environmental Management - Groundwater Section
P.O. Box 29535 - Raleigh, N.C. 27626-0535
Phone (919) 733-3221

FOR OFFICE USE ONLY
QUAD. NO. _____ SERIAL NO. _____
Lat _____ Long. _____ RO _____
Minor Basin _____
Basin Code _____
Header Ent. _____ GW-1 Ent. _____

WELL CONSTRUCTION RECORD

DRILLING CONTRACTOR: GLENN ENGLISH

RILLER REGISTRATION NUMBER: 1328

STATE WELL CONSTRUCTION PERMIT NUMBER: W5020325

WEL # 22

WELL LOCATION: (Show sketch of the location below)
Nearest Town: EDISTO County: DARE

WATER PLANT ROAD
(Road, Community, or Subdivision and Lot No.)

OWNER DARE COUNTY
ADDRESS 600 MUSTIAN ST.
(Street or Route No.)
KILL DEVIL HILLS N.C. 27948
City or Town State Zip Code

3. DATE DRILLED 3-16-98 USE OF WELL MUNICIPAL
4. TOTAL DEPTH 90'
5. CUTTINGS COLLECTED YES ☐ NO ☑
6. DOES WELL REPLACE EXISTING WELL? YES ☑ NO ☐
7. STATIC WATER LEVEL Below Top of Casing: 2 FT.
(Use "+" if Above Top of Casing)
8. TOP OF CASING IS 3 FT. Above Land Surface*
*Casing Terminated ever below land surface is illegal unless a variance is issued in accordance with 15A NCAC 2C .0118
9. YIELD (gpm): 75 METHOD OF TEST AIR COMPRESSOR
10. WATER ZONES (depth): 70'
90'
11. CHLORINATION: Type HTH Amount 6 OZ
12. CASING:

Depth From	To	Ft.	Diameter	Wall Thickness or Weight/Ft.	Material
0	70		6"	SCH 40	PVC

13. GROUT:

Depth From	To	Ft.	Material	Method
0	70		BENTONITE	PRESSURE

14. SCREEN:

Depth From	To	Ft.	Diameter	Slot Size	Material
70	90		6 in.	.02 in.	STAINLESS STEEL
			in.	in.	
			in.	in.	

15. SAND/GRAVEL PACK:

Depth From	To	Ft.	Size	Material
70	90		#2	GRAVEL

REMARKS: SPEC CAP #2

DEPTH From	To	DRILLING LOG Formation Description
0	12'	FINE SAND
12'	21'	COARSE SAND
21'	33'	COARSE SAND & SHELL
33'	37'	GREY CLAY
37'	44'	FINE SAND & CLAY
44'	60'	MED. TO FINE SAND & CLAY
60'	72'	MED SAND
72'	80'	SHELL, SAND MIX
80'	90'	SHELLS, SILTS - SAND
90'	95'	SILTS & CLAY

If additional space is needed use back of form

LOCATION SKETCH
(Show direction and distance from at least two State Roads, or other map reference points)

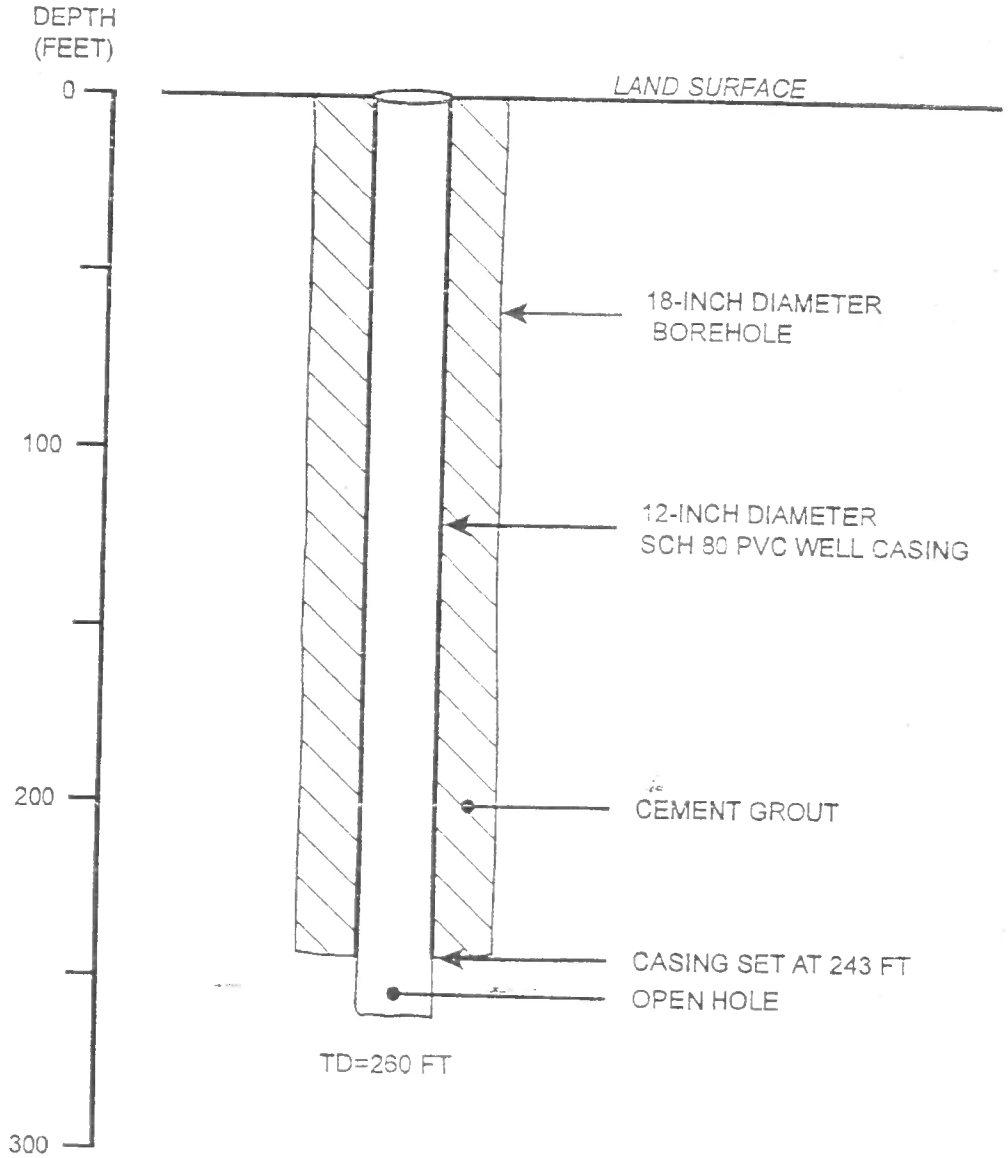
I DO HEREBY CERTIFY THAT THIS WELL WAS CONSTRUCTED IN ACCORDANCE WITH 15A NCAC 2C WELL CONSTRUCTION STANDARDS, AND THAT A COPY OF THIS RECORD HAS BEEN PROVIDED TO THE WELL OWNER.

3-19-98
SIGNATURE OF CONTRACTOR OR AGENT DATE

Submit original to Division of Environmental Management and copy to well owner.

CONSTRUCTION DETAILS
DARE COUNTY HATTERAS WATER SYSTEM
REVERSE OSMOSIS PRODUCTION WELL

PW-1



MISSIMER INTERNATIONAL, INC.

Pr. Name: DARE CO. HATTERAS R.O. WELLFIELD	
Pr. No. FH7-574	Date: 11/25/98
DWG No. DAREPW1.CDR	Rev. No.

GROUNDWATER
AND
ENVIRONMENTAL SERVICES

FIGURE III-1. SCHEMATIC DIAGRAM SHOWING CONSTRUCTION DETAILS OF REVERSE OSMOSIS PRODUCTION WELL PW-1.

TABLE III-2.

HATTERAS REVERSE OSMOSIS WELLFIELD
STEP DRAWDOWN TEST - WELL PW-1

Test Date: 11/18/98
Recorded By: Scott Manahan
Static Water Level: 2.81 ft. Below Measuring Point (BMP)*

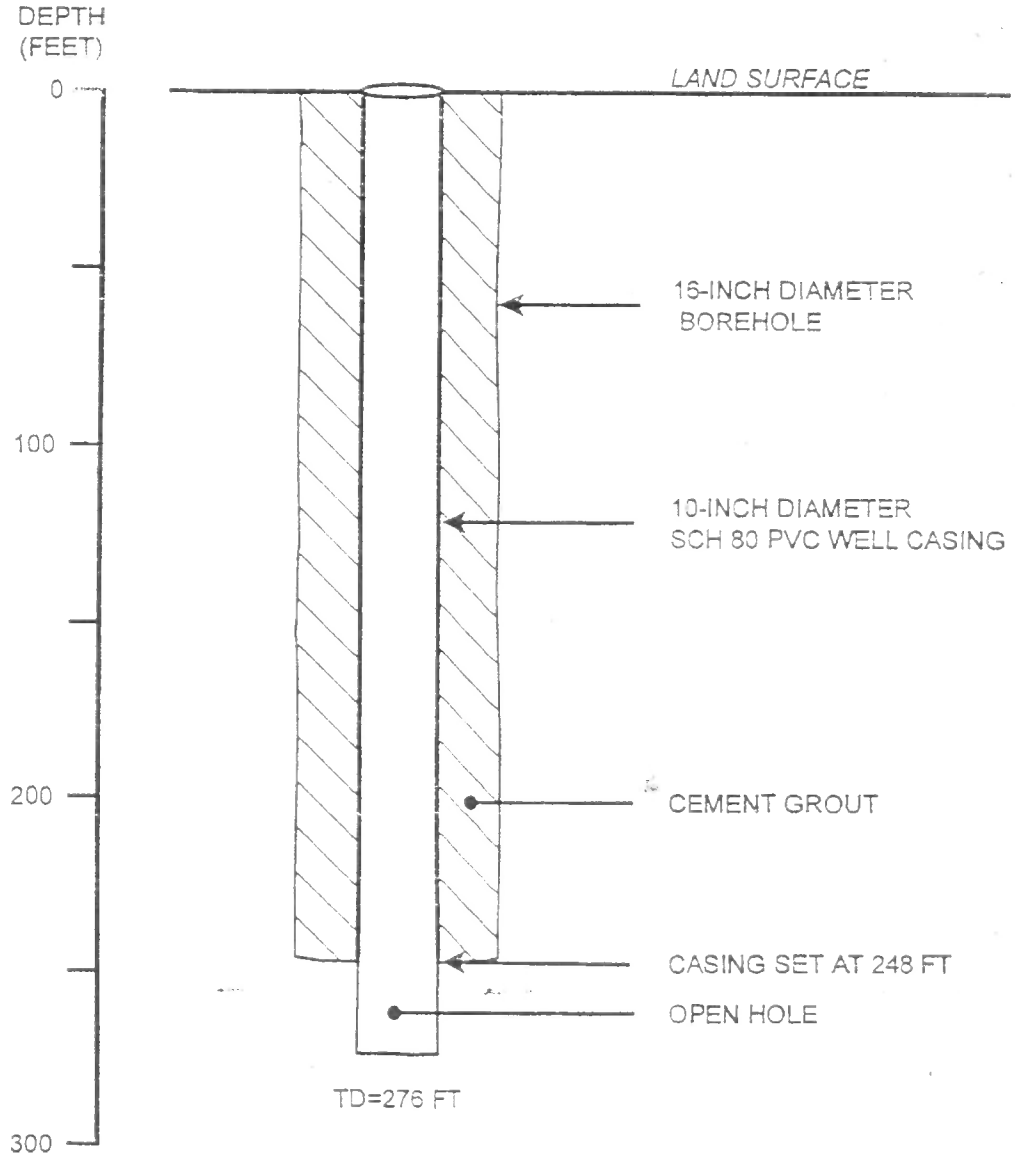
Pumping Rate (GPM)	Time (Minutes)	Pumping Water Level (Ft. BMP)	Drawdown (Feet)	Specific Capacity (GPM/Ft)
600	5	11.94	9.13	
	10	11.98	9.17	
	20	12.08	9.27	
	30	12.10	9.29	
	40	12.21	9.40	
	50	12.28	9.47	
	60	12.30	9.49	
	80	12.35	9.54	62.9
700	5	15.08	12.27	
	10	14.83	12.02	
	20	15.15	12.34	
	30	15.17	12.36	
	40	15.25	12.44	
	50	15.28	12.47	
	60	15.30	12.49	
	70	15.31	12.50	
	80	15.32	12.51	56.0
770	5	17.30	14.49	
	10	17.28	14.47	
	20	17.22	14.41	
	30	17.38	14.57	
	40	17.41	14.60	
	50	17.42	14.61	
	60	17.42	14.61	
	70	17.44	14.63	
	80	17.46	14.65	
	140	17.57	14.76	
	380	17.63	14.82	
	430	17.68	14.87	
	460	17.69	14.88	
	1440	17.67	14.86	51.7

*Measuring point is top of casing approximately 2.8 feet above land surface.

FH7-574.TA2

CONSTRUCTION DETAILS
DARE COUNTY HATTERAS WATER SYSTEM
REVERSE OSMOSIS PRODUCTION WELL

PW-2



MISSIMER INTERNATIONAL, INC.

Pr. Name:	DARE CO. HATTERAS R.O. WELLFIELD
Pr. No.	FH7-574
Date:	11/25/98
DWG No.	DAREPW2.CDR
Rev. No.	

GROUNDWATER
AND
ENVIRONMENTAL SERVICES

FIGURE III-2. SCHEMATIC DIAGRAM SHOWING CONSTRUCTION DETAILS OF REVERSE OSMOSIS PRODUCTION WELL PW-2.

TABLE III-3. HATTERAS REVERSE OSMOSIS WELLFIELD
STEP DRAWDOWN TEST - WELL PW-2

Test Date: 8/04/95
Recorded By: Mike Romero
Static Water Level: 4.62 ft. Below Measuring Point (BMP)*

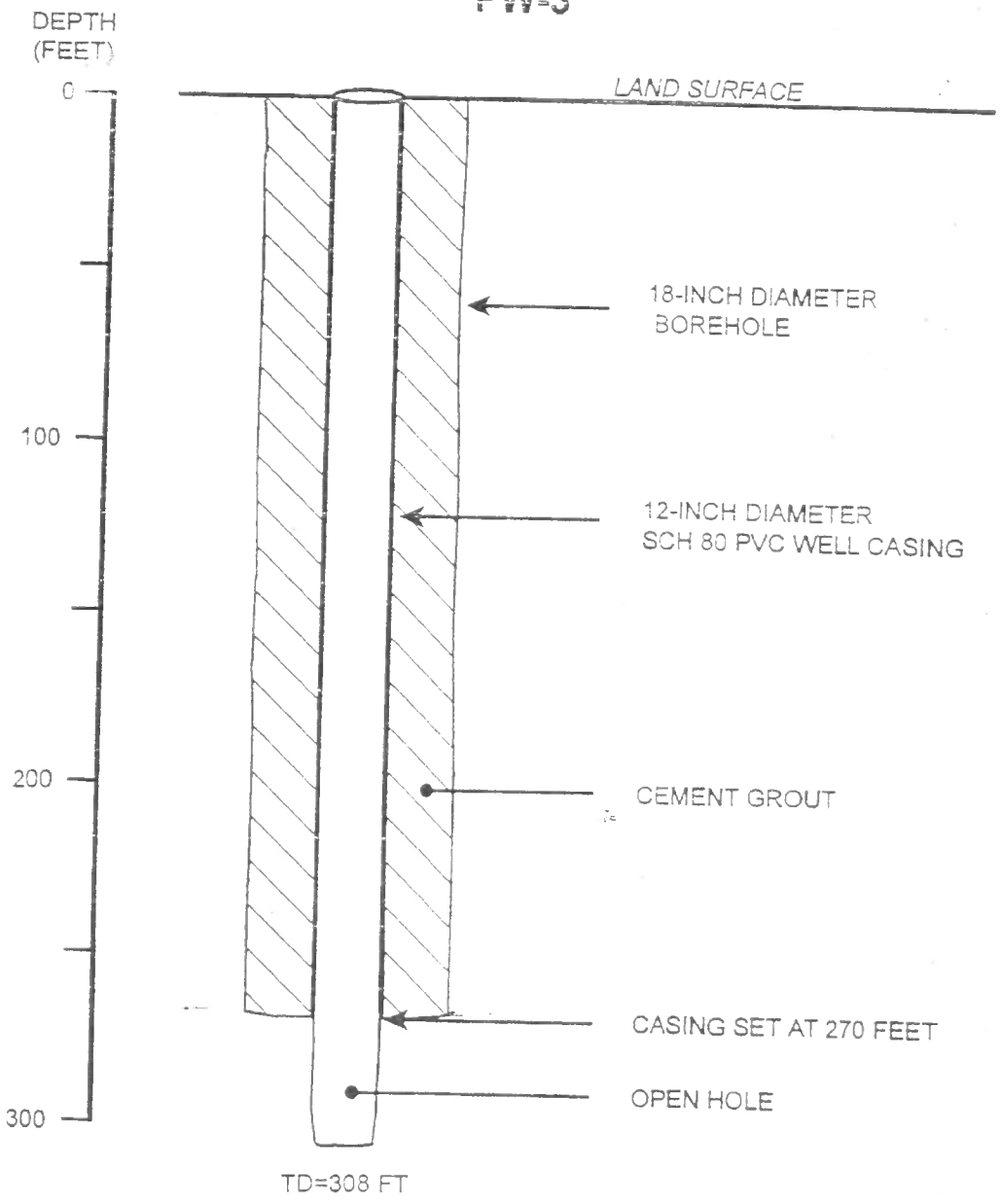
Pumping Rate (GPM)	Time (Minutes)	Pumping Water Level (Ft. BMP)	Drawdown (Feet)	Specific Capacity (GPM/Ft)
700	5	7.55	2.93	
	10	7.73	3.11	
	20	7.69	3.07	
	30	8.07	3.45	
	40	8.25	3.63	
	50	8.15	3.53	
	60	8.05	3.43	
	1380	8.44	3.87	
	2040	8.97	4.35	
	3120	8.87	4.25	
	4140	8.90	4.28	
	4440	9.20	4.58	
	4800	8.94	4.32	152.8
1000	5	9.53	4.95	
	10	10.04	5.46	
	20	10.31	5.73	
	30	10.34	5.76	
	40	10.35	5.77	
	50	10.23	5.65	
	60	10.27	5.64	
	300	10.43	5.85	
	630	10.30	5.72	
	1380	10.37	5.75	170.9
1375	5	12.25	7.67	
	10	12.43	7.85	
	20	12.07	7.49	
	30	12.06	7.48	
	40	12.57	7.99	
	50	11.69	7.11	
	60	12.36	7.78	
	300	12.58	8.00	
	480	12.50	7.92	171.9

*Measuring point is top of PVC casing approximately 3.1 feet above land surface.

FH7-574 TA2

CONSTRUCTION DETAILS
DARE COUNTY HATTERAS WATER SYSTEM
REVERSE OSMOSIS PRODUCTION WELL

PW-3



MISSIMER INTERNATIONAL, INC.

Pr. Name:	DARE CO. HATTERAS R.O. WELLFIELD
Pr. No.	FH7-574
Date:	11/25/98
DWG No.	DAREPW3.CDR
Rev. No.	

GROUNDWATER
AND
ENVIRONMENTAL SERVICES

FIGURE III-3. SCHEMATIC DIAGRAM SHOWING CONSTRUCTION DETAILS OF REVERSE OSMOSIS PRODUCTION WELL PW-3.

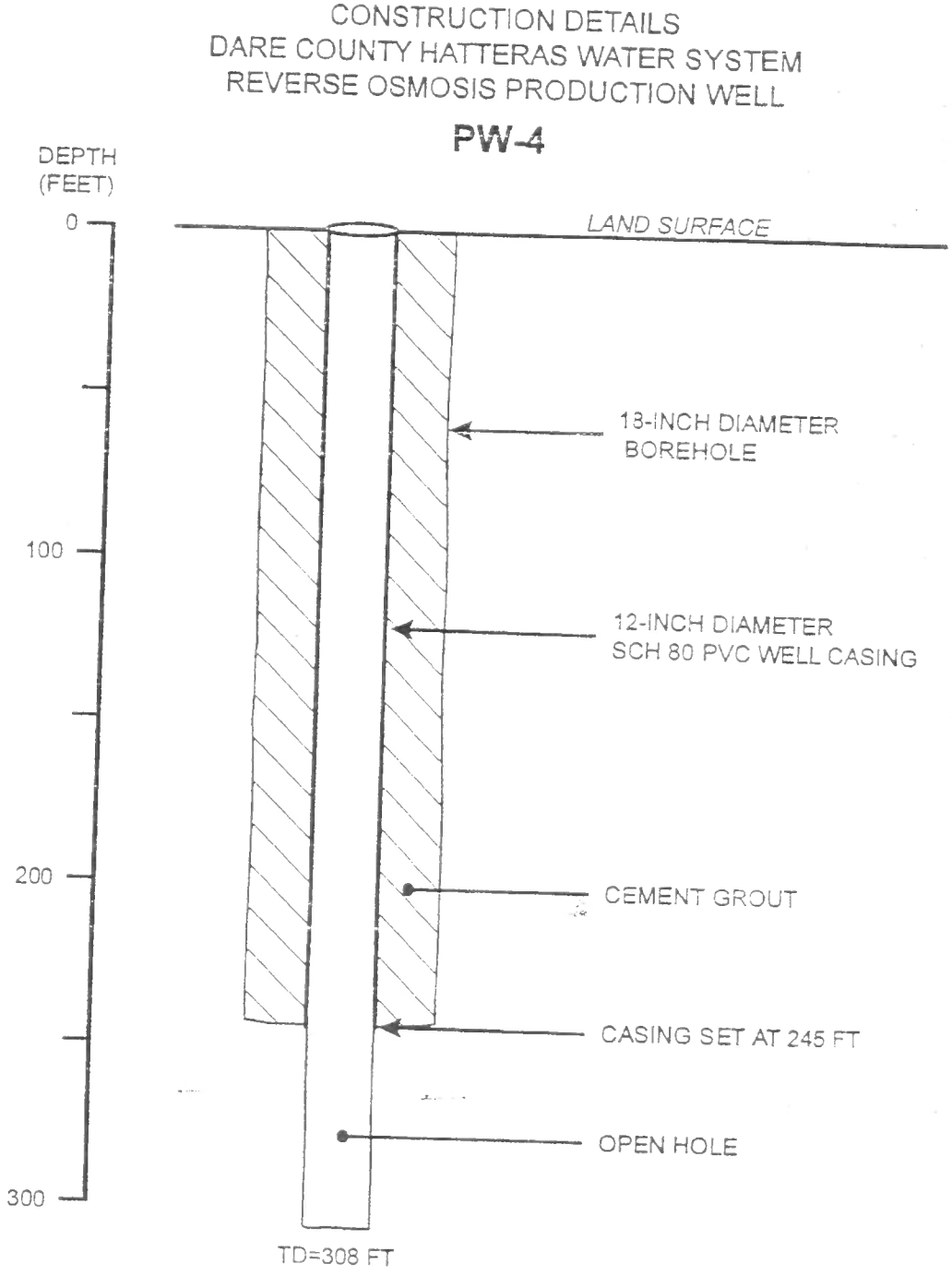
TABLE III-4. HATTERAS REVERSE OSMOSIS WELLFIELD
STEP DRAWDOWN TEST - WELL PW-3

Test Date: 11/11/98
Recorded By: Scott Manahan
Static Water Level: 2.25 ft. Below Measuring Point (BMP)*

Pumping Rate (GPM)	Time (Minutes)	Pumping Water Level (Ft. BMP)	Drawdown (Feet)	Specific Capacity (GPM/Ft)
400	5	45.10	42.85	
	10	48.34	46.09	
	15	49.18	46.93	
	20	49.75	47.50	
	30	49.80	47.55	
	40	50.39	48.14	
	50	50.63	48.38	
	60	50.66	48.41	8.3
500	5	60.02	57.77	
	10	60.35	58.10	
	20	63.10	60.85	
	30	65.36	63.11	
	40	65.60	63.35	
	50	65.78	63.53	
	60	65.86	63.61	7.9
600	5	75.07	72.82	
	10	76.19	73.94	
	15	77.36	75.11	
	20	78.43	76.18	
	30	77.75	75.50	
	40	78.26	76.01	
	50	78.23	75.98	
	60	77.98	75.73	
	70	79.29	77.04	
	80	79.14	76.89	
	90	79.73	77.48	
	1440	78.47	76.22	7.7

*Measuring point is top of casing approximately 2.3 feet above land surface.

FH7-574.TA2



MISSIMER INTERNATIONAL, INC

Pr. Name: DARE CO. HATTERAS R.O. WELLFIELD	
Pr. No. FH7-574	Date: 11/25/98
DWG No. DAREPW4.CDR	Rev. No.

GROUNDWATER
AND
ENVIRONMENTAL SERVICES

FIGURE III-4. SCHEMATIC DIAGRAM SHOWING CONSTRUCTION DETAILS OF REVERSE OSMOSIS PRODUCTION WELL PW-4.

TABLE III-5. HATTERAS REVERSE OSMOSIS WELLFIELD
STEP DRAWDOWN TEST - WELL PW-4

Test Date: 11/16/98
Recorded By: Scott Manahan
Static Water Level: 2.40 ft. Below Measuring Point (BMP)*

Pumping Rate (GPM)	Time (Minutes)	Pumping Water Level (Ft. BMP)	Drawdown (Feet)	Specific Capacity (GPM/Ft)
500	5	37.19	34.79	
	10	41.26	38.86	
	20	41.64	39.24	
	30	42.33	39.93	
	40	42.81	40.41	
	50	42.86	40.46	
	60	42.82	40.42	12.4
600	5	47.16	44.76	
	10	47.87	45.47	
	20	50.15	47.75	
	30	50.53	48.13	
	40	50.58	48.18	
	50	50.76	48.36	
	60	50.83	48.34	12.4
720	5	60.45	58.05	
	10	60.53	58.13	
	20	60.67	58.27	
	30	60.98	58.58	
	40	61.10	58.70	
	50	61.27	58.87	
	60	61.36	58.96	
	70	61.43	59.03	
	80	61.55	59.15	
	90	61.61	59.21	
	320	62.03	59.63	
	390	62.13	59.73	
	490	62.35	59.95	
	1440	58.22	55.82	12.0

*Measuring point is top of casing approximately 2.4 feet above land surface.

FH7-574.TA2

file

NCDENR

North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

John E. Skvarla, III
Secretary

August 21, 2014

Ken Flatt, Public Utilities Director
Dare County Water Department
600 Mustain Street
Kill Devil Hills, NC 27948

Re: Wellhead Protection Plan (dated 03/24/2014)
Dare County Water Department
Approved WHP Plan No. 110-R1

Dear Mr. Flatt:

We are pleased to inform you that the above referenced Wellhead Protection (WHP) Plan has been approved. The effective date of this approval is July 8, 2014 and applies to the following water systems.

Public Water Supply System	Water Supply No.
Cape Hatteras	NC0428025
Dare County Regional (NRO and Skyco)	NC0428030
Joseph "Mac" Midgett (Rodanthe, Waves, Salvo)	NC0428035
Stumpy Point	NC0628002

State WHP Programs are intended to be a key part of a national groundwater protection strategy to prevent contamination of groundwaters used as public drinking water supplies. Based upon our review, the subject WHP Plan meets the requirements for approval established under North Carolina's WHP Program.

In North Carolina, development of a WHP Plan is not mandatory, but rather, is viewed as a valuable supplement to existing State groundwater protection programs. North Carolina's WHP Program is intended for city and county governments and water supply operators interested in providing added protection to their local groundwater supplies. Once implemented, the WHP Plan reduces (but does not eliminate) the susceptibility of wells to contaminants. Proper implementation, maintenance, and periodic updating are essential for the local WHP Plan to be successful. Additionally, documentation of such is necessary to maintain the Plan's status as "active" and is required in order to obtain WHP priority rating points for future loan and grant applications.

Enclosed with this letter are maps of the approved wellhead protection areas for the Dare County Water System's wells. Should you find these maps to be in error, please contact this office within 14 days of receipt of this letter.

1634 Mail Service Center, Raleigh, North Carolina 27699-1634
Phone: 919-707-9100 \ FAX: 919-715-4374 \ Lab Form FAX: 919-715-6637 \ Internet: www.ncwater.org/pws

I would like to take this opportunity to thank Dare County and the Dare County Water Department for this effort to provide safe drinking water for its residents and visitors. I would also like to commend you for the priority that you and your staff have placed on Wellhead Protection. If you have any questions, please don't hesitate to contact me at (919) 707-9083.

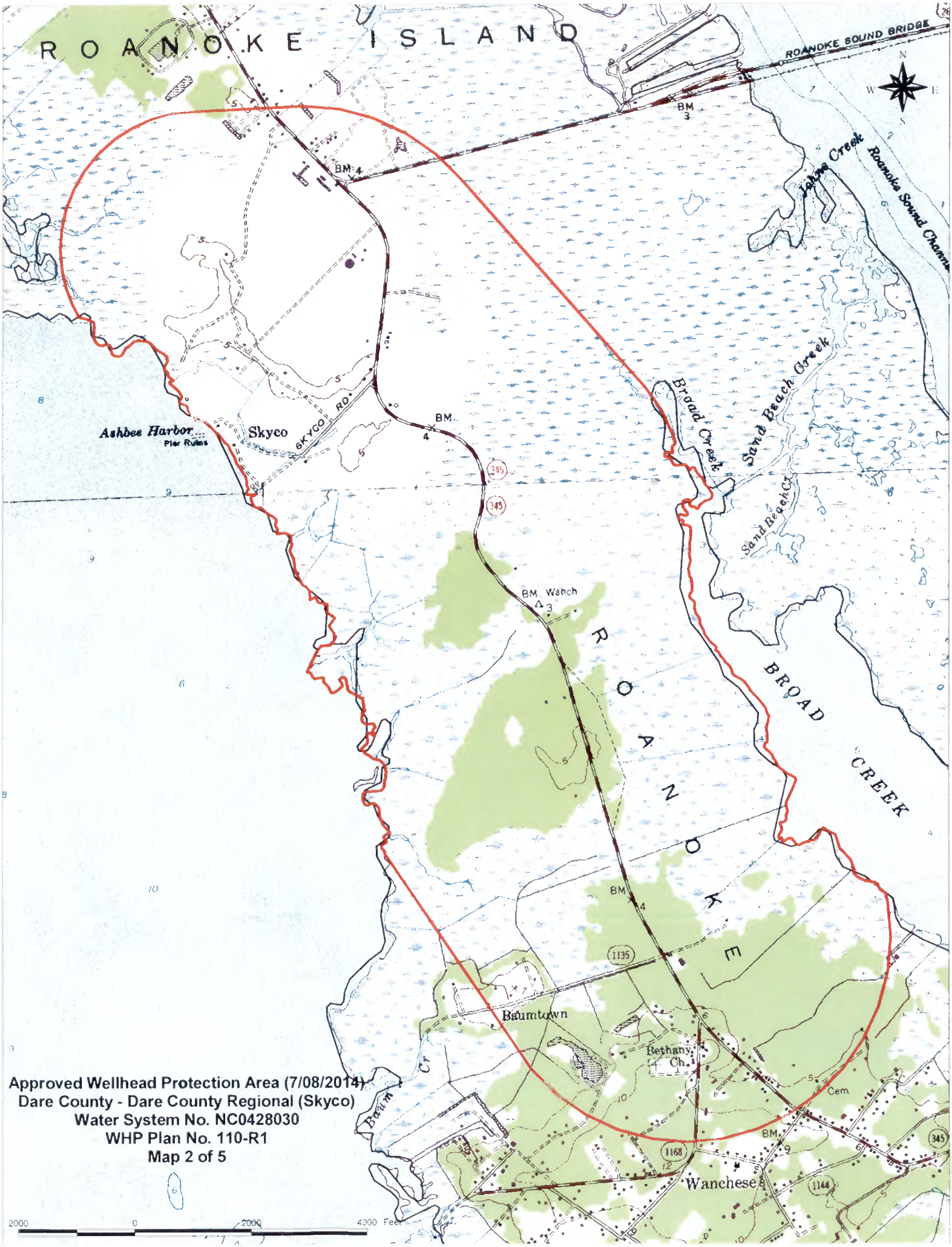
Sincerely,

M. Gale Johnson, P.G., P.HG.
Wellhead Protection Program Manager

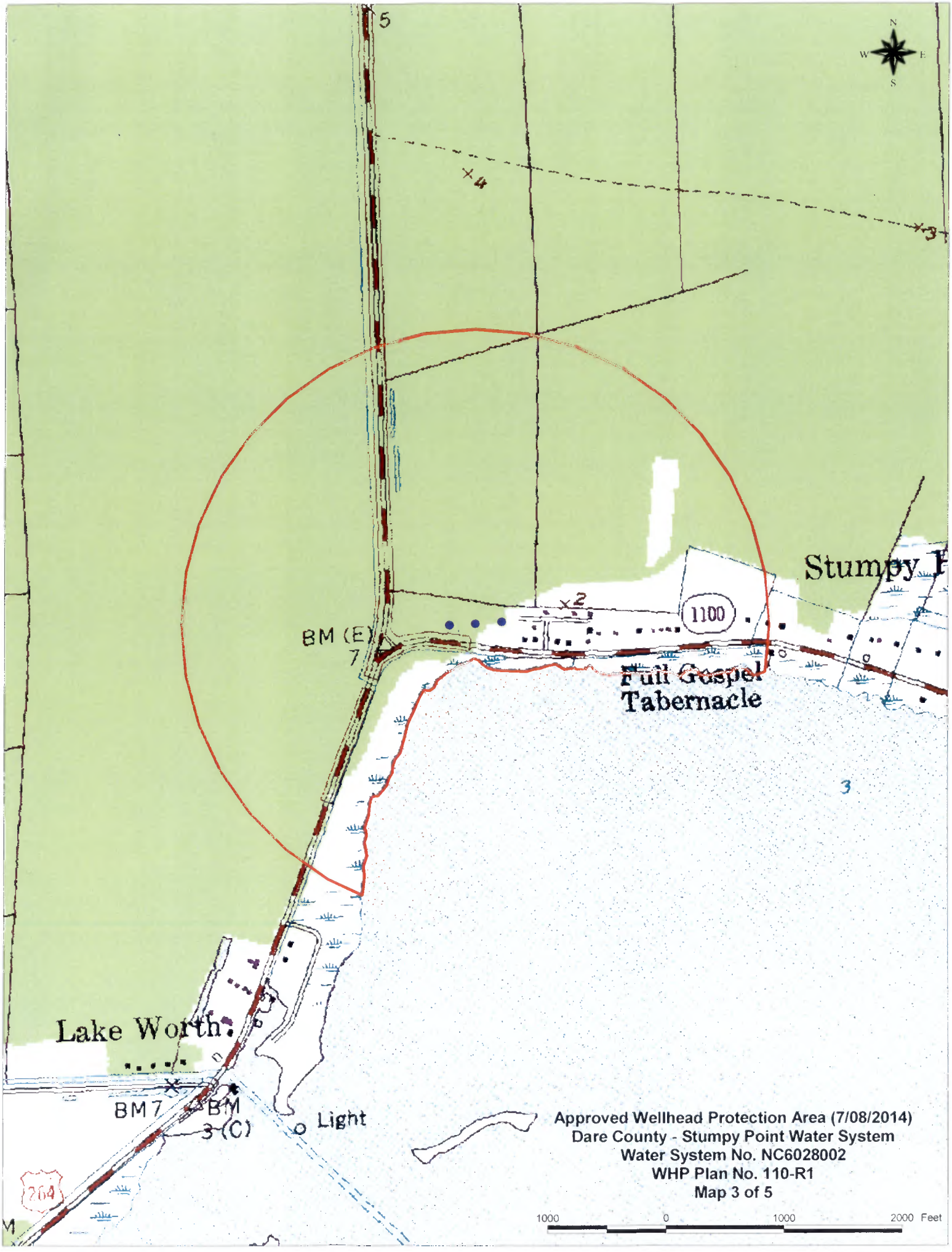
enclosures

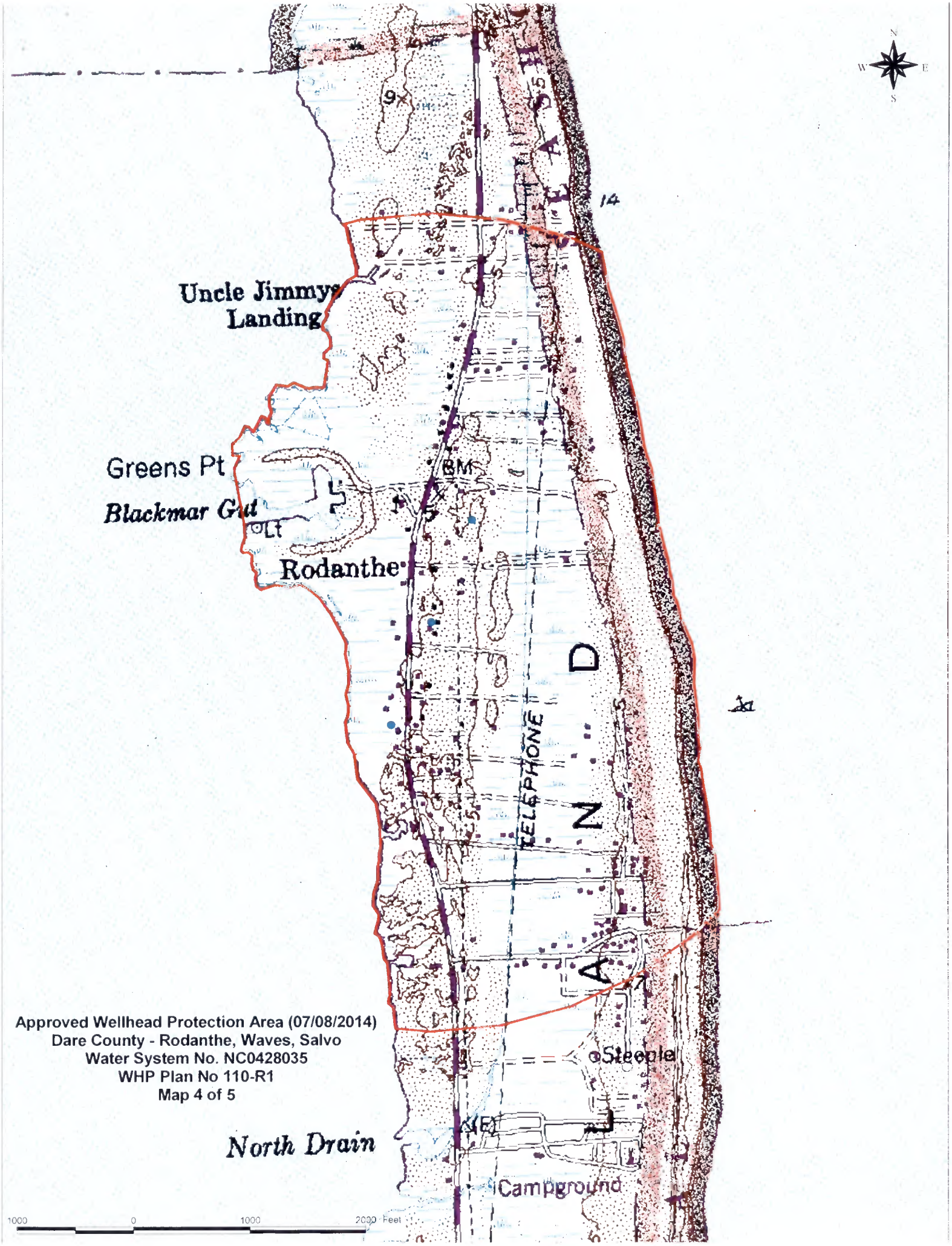
cc: Washington Regional Engineer
Linda Smith, DWM
Keith Starner, NCRWA


KILL DEVIL HILLS
Holy Redeemer Ch
Radio Tower
WTNM
BM 2.4
WRIGHT BROTHERS NAT MEM
West Hill
BM 2.7
First Flight Airport
Wright
Kill Devil Hill
Bay
Shifting Sand Dunes
Nags Head Woods
Mann Point
Manns Point
BODIE ISLAND
ATLANTIC OCEAN
Landing Strip
Shifting Sand Dunes
Ridge
Engagement Hill
JOCKEYS RIDGE
Shifting Sand Dunes
STATE PARK
Nags Head
Nags Head
SOUND SIDE
Sound Side
Seven Sisters
Shifting Sand Dunes
Pier
Pond Area
ROANOAN
Approved Wellhead Protection Areas (7/08/2014)
Dare County - Dare County Regional (NRO)
Water System No. NC0428030
WHP Plan No. 110-R1
Map 1 of 5
2000 0 2000 4000 6000 Feet



Approved Wellhead Protection Area (7/08/2014)
Dare County - Dare County Regional (Skyco)
Water System No. NC0428030
WHP Plan No. 110-R1
Map 2 of 5


N
W
E
S
5
4
3
2
1100
BM (E)
7
Full Gospel
Tabernacle
Lake Worth
BM 7
BM
3 (C)
Light
264
Approved Wellhead Protection Area (7/08/2014)
Dare County - Stumpy Point Water System
Water System No. NC6028002
WHP Plan No. 110-R1
Map 3 of 5
1000
0
1000
2000 Feet



Approved Wellhead Protection Area (07/08/2014)
Dare County - Rodanthe, Waves, Salvo
Water System No. NC0428035
WHP Plan No 110-R1
Map 4 of 5

Approved Wellhead Protection Area (7/08/2014)
Dare County - Cape Hatteras
Water System No. NC0428025
WHP Plan No 110-R1
Map 5 of 5