Public Water Supply
Source Water Assessment
for

Artesian Water Company
(New Castle County Airport)

PWS ID: DE0000552

New Castle County, Delaware

Final Report: December 31, 2003

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Summary

The Delaware Department of Natural Resources and Environmental Control's (DNREC) Division of Water Resources has completed the Source Water Assessment for the public water supply wells for Artesian Water Company (New Castle County Airport) as required under the 1996 amendments to the Safe Drinking Water Act. This assessment has been performed using the methods specified in the State of Delaware Source Water Assessment Plan (DNREC, 1999).

Artesian Water Company (New Castle County Airport) uses three wells to provide drinking water to the system. All three wells withdraw water from the confined Potomac Group aquifer. These wells have a low vulnerability to contamination from surficial processes because significant clay layers exist between the ground surface and the well's screens. As confined aquifer wells, the wellhead protection areas were delineated using a fixed radius of 300 feet based on New Castle County code.

This public water supply system provides water to an average daily population of 200000 residential consumers from January 1 to December 31 through 66431 residential service connections.

There are three discrete sources of potential contamination in the wellhead protection areas. These sites have low contaminant potentials and it is unlikely that these pose a significant threat to the drinking water resources.

An analysis of land use activities in the area show over 62 percent of the total wellhead protection area for the system contains New Castle County Airport facilities. The next largest land use is highways and/ or parking lots covering approximately 20 percent of the wellfield.

Although water samples may have been taken from within the distribution system, no raw water (well tap) samples have been recorded for this Public Water Supply System.

Overall, Artesian Water Company (New Castle County Airport) has a very low susceptibility to nutrients, a very low susceptibility to pathogens, a low susceptibility to petroleum hydrocarbons, a very low susceptibility to pesticides, a very low susceptibility to PCBs, a low susceptibility to other organic compounds, a very low susceptibility to metals and, a very low susceptibility to other inorganic compounds.

Introduction

The 1996 amendments to the Safe Drinking Water Act (SDWA) require that source water assessments be performed for all sources of public drinking water in each state. Because of this, each state was required to develop a Source Water Assessment Plan (SWAP). The State of Delaware' s SWAP was developed by a committee of scientists, water industry professionals, conservation groups, government agencies, and interested citizens in 1998 and approved by the United States Environmental Protection Agency in October, 1999.

This assessment for Artesian Water Company (New Castle County Airport) has been performed using the methods specified in the State of Delaware Source Water Assessment Plan (DNREC, 1999)

The assessment consists of these four critical steps:

1) Delineation of source water areas;
2) Determination of the vulnerability of a well or intake to contamination;
3) Identification of existing and potential sources of contamination; and
4) Determination of the susceptibility of the source water area to contamination.

Step 1 consists of mapping the land surface area that contributes to the water supply. For ground water systems, this is called the wellhead protection area. Artesian Water Company (New Castle County Airport) uses three wells to provide drinking water to the system. All three wells withdraw water from the confined Potomac Group aquifer. These wells have a low vulnerability to contamination from surficial processes because significant clay layers exist between the ground surface and the well's screens. As confined aquifer wells, the wellhead protection areas were delineated using a fixed radius of 300 feet based on New Castle County code.

Step 2 uses a step-by-step decision making process by which each well or surface water intake for a particular system is examined to determine its vulnerability to contamination. Vulnerability is the relative ease with which contaminants, if released into a source water area, could move and enter a public water supply well or intake at concentrations of concern. Vulnerability includes consideration of such factors as aquifer characteristics, well or surface water intake integrity, and wellscreen depth. A series of questions about the type of system (surface water or ground water), hydrologic setting, and well construction are used in the decision-making process.

Step 3 consists of creating an inventory of all existing and potential sources of contamination within the delineated source water protection areas. This was done utilizing DNREC's contaminant site inventories, 1997 land use maps, analytical data compiled by the Office of Drinking Water and through visual examination during site visits.

Step 4 consists of determining the susceptibility of the source water area to contamination. This process combines steps 1, 2, 3, water quality reports, and other information.

This information must be summarized into a report and made available to the public. It is the goal of the Division of Water Resources that the summaries provided from the source water assessment and protection program will help drinking-water systems better understand the potential threats to their drinking water supply and to work to protect these drinking water resources.

Study Area

Artesian Water Company (New Castle County Airport) is located approximately one mile east of Interstate 95 at Churchman's Marsh. This location is shown on Map 1 Base Map for Artesian Water Company (New Castle County Airport). This public water supply system provides water to an average daily population of 200000 residential consumers from January 1 to December 31 through 66431 residential service connections.

Public Water Supply Well Data

Information about the construction and operation of these wells is summarized in Table1. This information was gathered from various sources (DNREC, Delaware Geological Survey, Department of Health and Social Services), and a letter requesting confirmation from the system.

Table 1: Well Construction Data

Well #	Permit #	Allocation #	Year Constructed	Well Capacity (gpm)	Diameter (inches)	Screen Interval (fbgs)	Aquifer
New Castle County Airport 1	10029	94-0014	1942	200	8	187-197	Potomac Group
New Castle County Airport 2	10030	94-0014	1942	200	8	211-221	Potomac Group
New Castle County Airport 3	108453	94-0014	1996	200	12	135-154	Potomac Group

* fbgs = feet below ground surface

Geology and Hydrogeology

Confined Aquifer(s)

Potomac Aquifer

The Potomac Formation is the oldest unconsolidated formation in Delaware and directly overlies crystalline basement rocks. It is an alluvial, flood plain, Cretaceous-aged deposit which thickens from 0 feet at its subcrop at the Fall Line to 1,700 feet in southern New Castle County. The top of the Potomac Formation is encountered from -100 MSL in the

northeastern part of the area to -550 in the southern part of the area. It is estimated to be approximately 900 feet thick in the north of the area to 1600 in the south near Blackbird Creek. Sands of the Potomac aquifer are major aquifers from Middletown to the Fall Line. In the Middletown area, the Potomac Formation is entirely overlain by the Cretaceous-aged Magothy Formation.

The Potomac Formation consists of variegated red, gray, purple, yellow, and white, frequently lignitic silts and clays containing interbedded white, gray, and rust-brown quartz sands and some gravel. The individual sand beds are laterally restricted and elongated and separated by silt and clay. Because of their depositional history, these sand beds are elongated and tabular rather than sheet like (Sundstrom and others, 1967; Phillips, 1987). Because of the thickness of the Potomac Formation and the nature of distribution of the sand bodies within this thick formation, correlation between aquifers is difficult. Various authors have designated aquifer groupings such as an upper and lower; an upper, middle, and lower; and others. The ability to designate these groupings also varies in different areas of New Castle County (Sundstrom and others, 1967; Phillips, 1987). In this study area, Sundstrom and others (1967) have designated an upper and a lower hydrologic (aquifer) zone within the Potomac Formation. The more productive sands appear to be in the lower hydrologic zone which is 75% sand and up to 200 feet thick (Sundstrom and others, 1967).

Source Water Protection Area Delineation

The State of Delaware' s Source Water Assessment Plan describes the methods to be used for the delineation of the areas that contribute water to public drinking water supplies. These source water areas are delineated by applying the methodology described in section 3.5 of the Delaware SWAP to an understanding of the geologic and hydrologic setting of the area coupled with a review of well logs and well construction information. The wellhead areas for this system were delineated using a fixed radius of 300 feet based on New Castle County code. The modeling methods are summarized in Table 2a.

New Castle County has had wellhead protection and water resource protection ordinances in place since the early 1990’s. These ordinances recognized environmental quality problems that occurred due to land use decisions made up to many decades before. As part of these ordinances the zones of contribution to the water supply wells have been mapped and land use management practices have been put into place. The well(s) used by this system have been delineated using the Class A (300-foot radius) Water Resource Protection Areas (WRPAs).

Class A wellhead WRPAs have been delineated by the DGS and DNREC through the interpretation of geologic and hydrologic reports and maps, water table maps, and professional judgment. Class A wellhead WRPAs are the area within a 300 foot radius circle around all public water supply wells that are classified as community, non-transient non-community, or transient non-community wells. The New Castle County Class A WRPA map delineations are more conservative (larger) than the basic fixed radius delineations provided for under the Delaware SWAP and the State of Delaware Wellhead

Protection Program (1990), and therefore the DNREC will adhere to the more protective delineation.

Table 2a : Aquifer type and Delineation Method

Well #	Permit #	Aquifer	Aquifer Type	Delineation Method
New Castle County Airport 1	10029	Potomac Group	confined	Class A WRPA (300-foot Fixed Radius)
New Castle County Airport 2	10030	Potomac Group	confined	Class A WRPA (300-foot Fixed Radius)
New Castle County Airport 3	108453	Potomac Group	confined	Class A WRPA (300-foot Fixed Radius)

The areas delineated by this process are shown on Map 2 Delineation Map for Artesian Water Company (New Castle County Airport). The 10029 wellfield contains one well (New Castle County Airport 1 – DNREC ID:10029). The 10030 wellfield contains one well (New Castle County Airport 2 - DNREC ID: 10030). The 108453 wellfield contains one well (New Castle County Airport 3 - DNREC ID: 108453). Table 2b below list any wellfields and their associated wells and acreages.

Table 2b: Delineated Source Water Areas

Wellfield	Wells	Acreage	Vulnerability
10029	AWC New Castle County Airport 10029	6.47	Low
10030	AWC New Castle County Airport 10030	6.47	Low
108453	AWC New Castle County Airport 108453	6.47	Low

New Castle County has had wellhead protection and water resource protection ordinances in place since the early 1990's. These ordinances recognized environmental quality problems that occurred due to land use decisions made up to many decades before. As part of these ordinances the zones of contribution to the water supply wells have been mapped and land use management practices have been put into place. The well(s) used by this system have been delineated using the Class A (Reduced 150-foot radius) Water Resource Protection Areas (WRPAs).

Class A wellhead WRPAs have been delineated by the DGS and DNREC through the interpretation of geologic and hydrologic reports and maps, water table maps, and professional judgment. Class A wellhead WRPAs are the area within a 300 foot radius circle around all public water supply wells that are classified as community, non-transient non-community, or transient non-community wells. The New Castle County Class A WRPA map delineations are more conservative (larger) than the basic fixed radius delineations provided for under the Delaware SWAP and the State of Delaware Wellhead Protection Program (1990), and therefore the DNREC will adhere to the more protective delineation.

Vulnerability Determination

The vulnerability is the relative ease with which contaminants, if released into a source water area, could move and enter a public water supply well or surface water intake at

concentrations of concern. Individual intakes or wells are ranked as having high, medium, or low vulnerability according to the process described in section 5.1 of the Delaware SWAP. The determination of this vulnerability is conducted through a series of questions about the type of intake (surface or ground water), hydrogeologic setting, and construction.

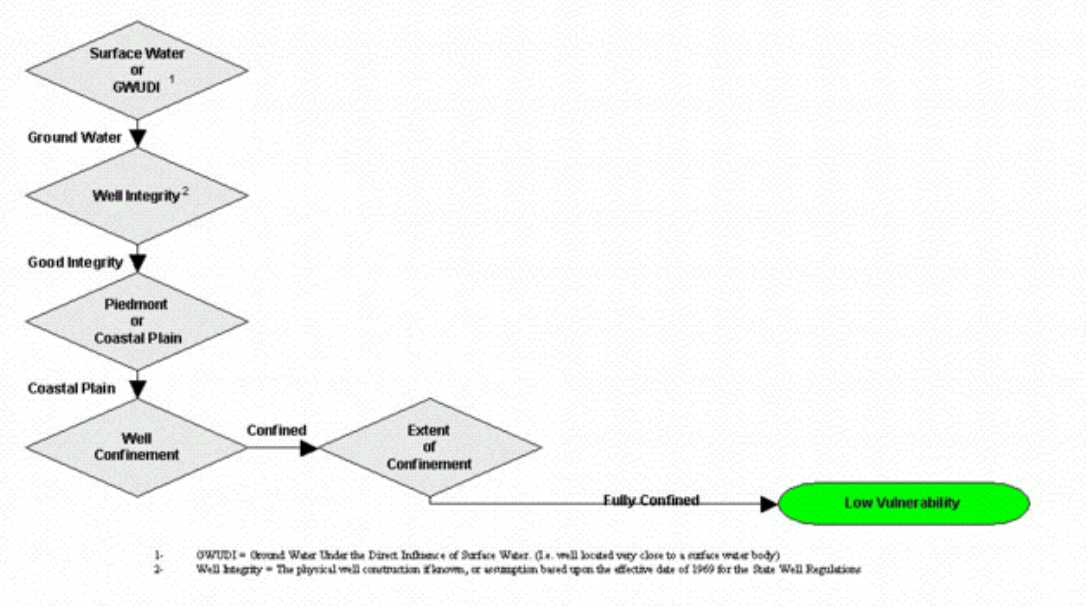

Figure 1: Vulnerability Determination process

Artesian Water Company (New Castle County Airport) uses three wells to provide drinking water to the system. All three wells withdraw water from the confined Potomac Group aquifer. These wells have a low vulnerability to contamination from surficial processes because significant clay layers exist between the ground surface and the well's screens. As confined aquifer wells, the wellhead protection areas were delineated using a fixed radius of 300 feet based on New Castle County code.

Existing and Potential Sources of Contamination

There are a multitude of potential contaminant sources that, if present, could degrade drinking water quality. Most of these sources are anthropogenic, however, natural 'contaminants' such as salt water or iron deposits can also impact water supplies. Most human impacts occur at or just below the ground surface and therefore are much more of a concern for shallow water supplies that lack a protective confining layer.

Discrete Sources

Discrete sources are defined as existing or potential sources of pollution to surface or ground water supplies at well defined, usually manufactured 'points' or locations. The Source Water Program has divided the discrete sources into the following categories:

Underground Storage Tanks
Landfills / Dumps
National Pollutant Discharge Elimination Sys.
Tire Piles
Hazardous Waste Generators
Toxic Release Inventory
Salvage Yards
Pesticide Loading, Mixing, & Storage Facility
State and Federal Superfund Sites
Large On-Site Septic
Wastewater Spray Irrigation
Waste Sludge Application
Animal Feedlot Operations
Combined Sewer Overflows
Dredge Spoils
Golf Courses
Domestic Septic Systems

These discrete sources can contaminate source waters depending upon their location, the severity of a release, and other factors. For example, golf courses may contribute both pesticides and nutrients to the surface and ground waters by means of surface application for landscaping purposes, whereas tire piles generally do not pose a threat to the waters of the state unless they begin to burn. There are three discrete sources of potential contamination in the wellhead protection areas. These sites have low contaminant potentials and it is unlikely that these pose a significant threat to the drinking water resources. A brief description of each of these sites and their associated contaminant potentials follows.

AWC New Castle County Airport 10029
Artesian Water Substation (MAPID: UT4840)
This is an underground storage tank facility. This site has a low contaminant potential for petroleum hydrocarbons, and a negligible contaminant potential for nutrients, pathogens, pesticides, PCBs, other organic compounds, metals, and other inorganic compounds.

DANG Air National Guard (MAPID: UT5013)
This is an underground storage tank facility. This site has a low contaminant potential for petroleum hydrocarbons, and a negligible contaminant potential for nutrients, pathogens, pesticides, PCBs, other organic compounds, metals, and other inorganic compounds.

DANG Air National Guard (MAPID: UT5014)
This is an underground storage tank facility. This site has a low contaminant potential for petroleum hydrocarbons, and a negligible contaminant potential for nutrients, pathogens, pesticides, PCBs, other organic compounds, metals, and other inorganic compounds.

Additional information for other contaminant sources can be found on the state web site (www.dnrec.state.de.us) using the Environmental Navigator. The inventory contains categorized data for multiple forms of media (surface water, ground water, etc).

Land Use / Land Cover

Anthropogenic activities associated with various land uses have the potential to contribute to ground-water quality problems, particularly when examining potential 'non-point' source contamination. There is, however, some overlap between discrete sources of contamination and some land use categories. For instance, individual domestic septic systems may be considered discrete sources, however, the regional impact of a number of systems in a large development might also be considered as 'non-point'.

Map 4 Land Use Map for Artesian Water Company (New Castle County Airport) shows the land use within the delineated area. The table on Map 4 summarizes the system-wide land use that is the percent of the entire system's source water area overlain by that particular land use. Based upon the SWAP, the contaminant potential could be adjusted depending on the percentage of land use within the WHPA, with land uses occupying the greatest portion of the wellhead areas having a more significant potential impact.

Using the most recent GIS information, over 62 percent of the total wellhead protection area for the system contains New Castle County Airport facilities. The next largest land use is highways and/ or parking lots covering approximately 20 percent of the wellfield.

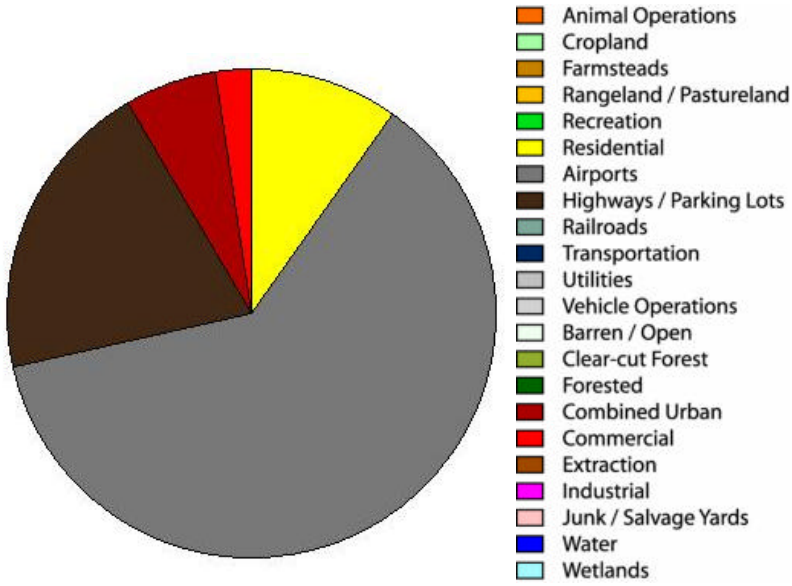

Figure 2: System-Wide Land Use

Roads and Railroads

Roads and railroads represent potential conduits for the entry of contaminants into soils and ground water. The possibility exists that an accident, such as a spill, could impact water quality. Furthermore, certain upkeep and maintenance practices such as road salting, or pesticides applications could also introduce contaminants along these transportation pathways. Table 3 summarizes the lengths and types of conduits that run through the various wellhead areas. These are the highlighted roads and railroads shown

on Map 3 Discrete Sources Map for Artesian Water Company (New Castle County Airport) and Map 4 Land Use Map for Artesian Water Company (New Castle County Airport) . Smaller (tertiary), or private roads are not included in the assessment because of the lack of consistent data across the State.

Table 3: Roads and Railways found within WHPA

Wellfield	Conduit	Mileage	Type
10029	Road	0.11	Major
10030	Road	0.11	Major
108453	Road	0.11	Major

Water Quality Data

This portion of the source water assessment evaluates the water quality of raw water *before* it enters into any treatment process (i.e. filtration, disinfection, fluoridation, softening, etc.) and/or the distribution system. However, it should be noted that many water supply systems utilize certain treatment methods that remove contaminants or impurities from the drinking water before it is delivered to the public.

The Delaware SWAP classifies contaminants into eight (8) categories. Examples of contaminants within each of the eight categories are as follows:

Other Inorganic:	Fluoride, Chloride, pH, Sulfate, Radon, Radium, Strontium,
Metals:	Copper, Arsenic, Iron, Manganese
Nutrients:	Nitrate, Nitrite
Other Organics:	Vinyl Chloride, PCE, TCE
Pathogens:	Coliform Bacteria, Cryptosporidium, Giardia lambia
Pesticides:	Alachlor, Atrazine, Glyphosate
Petroleum Hydrocarbons:	Gasoline, Heating Oil, Benzene, Toluene
Polychlorinated Biphenyls:	PCB

The Source Water Assessment and Protection Program has reviewed the available analytical data for this system for the previous five years. While this report may show that a drinking water standard was exceeded for a particular contaminant at one instance, the Department of Health and Social Services, Division of Public Health, Office of Drinking Water, which regulates drinking water quality, may not consider it a violation based upon more detailed procedures detailed within their regulations (DHSS, 2002). In the event that a contaminant, which is not naturally found in the source water, has been detected as a result of maintenance to the water distribution system, its results will be noted and explained within the text. These results may not be considered when determining the final susceptibility for a well and/or public water system.

Naturally Occurring Contaminants

There are several naturally occurring potential contaminants that will be identified as part of the assessments of public water supplies. These include iron, chloride, sodium, radon, radium, manganese, sulfate and others. These will be identified as part of the susceptibility determination for each well and listed as being naturally occurring if detected.

Analytical Data

Data from the Department of Health and Social Services' Division of Public Health's Office of Drinking Water's (DPH-ODW) analytical database was reviewed for raw/untreated water quality data for the past five years.

Although water samples may have been taken from within the distribution system, no raw water (well tap) samples have been recorded for this Public Water Supply System.

Due to a database conversion by DPH-ODW during the timeframe of this report process, historical data on water quality may not be available at this time for inclusion within the report. Please call DPH-ODW for more information regarding the water quality for this water system at (302) 739-5410.

Water Treatment Methods

Raw water from three wells is pumped to the New Castle County Airport Station where a series of treatment processes are employed to meet state and federal drinking water standards. Aeration is used for oxidation and pH adjustment. Pressure filters are used for the removal of iron and manganese. Chlorine is used for oxidation and disinfection. Fluoride and a phosphate-based corrosion inhibitor are added after the treatment process.

For more information about the water treatment used please contact Artesian Water Company (New Castle County Airport) or the Division of Public Health's Office of Drinking Water at (302) 739-5410.

Susceptibility Determination

The key part of a source water assessment is the determination of the likelihood that a particular public water supply system will capture contaminants at concentrations of concern. This analysis, termed susceptibility determination, combines the source water protection area delineation, the vulnerability determination for the wells, the contaminant source inventory, and the water quality information to yield a relative susceptibility for the public water system. Each individual water source is rated for each of the eight-contaminant categories on a scale ranging from no susceptibility to having been documented as having exceeded drinking-water standards.

Vulnerability

Artesian Water Company (New Castle County Airport) uses three wells to provide drinking water to the system. All three wells withdraw water from the confined Potomac Group aquifer. These wells have a low vulnerability to contamination from surficial processes because significant clay layers exist between the ground surface and the well's screens. As confined aquifer wells, the wellhead protection areas were delineated using a fixed radius of 300 feet based on New Castle County code.

Contaminant Inventory

There are three discrete sources of potential contamination in the wellhead protection areas. These sites have low contaminant potentials and it is unlikely that these pose a significant threat to the drinking water resources.

The contaminant potential from all discrete sources is as follows:

Negligible Contaminant Potential for Nutrients
Negligible Contaminant Potential for Pathogens
Low Contaminant Potential for Petroleum
Negligible Contaminant Potential for Pesticides
Negligible Contaminant Potential for PCBs
Negligible Contaminant Potential for Other Organic
Negligible Contaminant Potential for Metals
Negligible Contaminant Potential for Other Inorganic

As stated previously, over 62 percent of the total wellhead protection area for the system contains New Castle County Airport facilities. The next largest land use is highways and/ or parking lots covering approximately 20 percent of the wellfield.

The contaminant potential from all land uses is as follows:

Low Contaminant Potential for Nutrients
Low Contaminant Potential for Pathogens
Medium Contaminant Potential for Petroleum
Low Contaminant Potential for Pesticides
Low Contaminant Potential for PCBs
Medium Contaminant Potential for Other Organic
Low Contaminant Potential for Metals
Low Contaminant Potential for Other Inorganic

Water Quality

No analytical data were available to be used to adjust the susceptibility ratings for this system.

Individual Source Susceptibility

All of the wells for Artesian Water Company (New Castle County Airport) have unique properties, such as depth, location, date drilled, and pumping rate. These influence the delineated area, the vulnerability determination, and the contaminant inventory. This water system has three unique wellhead areas for the entire system . A Susceptibility Assessment must be performed for each individual wellhead area/wellfield. A brief discussion for each wellfield follows and the results are further summarized in Appendix B Table 7: Well Specific Susceptibility.

The AWC New Castle County Airport 10029 wellfield has a very low susceptibility to nutrients due to land use activities, a very low susceptibility to pathogens due to land use activities, a low susceptibility to petroleum hydrocarbons due to land use activities, a very low susceptibility to pesticides due to land use activities, no susceptibility to PCBs due to both discrete sources and land use activities, a low susceptibility to other organic compounds due to land use activities, a very low susceptibility to metals due to land use activities and, a very low susceptibility to other inorganic compounds due to land use activities.

The AWC New Castle County Airport 10030 wellfield has a very low susceptibility to nutrients due to land use activities, a very low susceptibility to pathogens due to land use activities, a low susceptibility to petroleum hydrocarbons due to land use activities, a very low susceptibility to pesticides due to land use activities, a very low susceptibility to PCBs due to land use activities, a low susceptibility to other organic compounds due to land use activities, a very low susceptibility to metals due to land use activities and, a very low susceptibility to other inorganic compounds due to land use activities.

The AWC New Castle County Airport 108453 wellfield has a very low susceptibility to nutrients due to land use activities, a very low susceptibility to pathogens due to land use activities, a low susceptibility to petroleum hydrocarbons due to land use activities, a very low susceptibility to pesticides due to land use activities, no susceptibility to PCBs due to land use activities, a low susceptibility to other organic compounds due to land use activities, a very low susceptibility to metals due to land use activities and, a very low susceptibility to other inorganic compounds due to land use activities.

System Wide Susceptibility

The individual susceptibilities of each of this system's wells are detailed in the previous section. On a source-by-source basis these wells could have very different susceptibility ratings. When looked at as a group for the entire system some generalized, conservative statements can be made. For instance, if one assumes that the system is only as protected as it's weakest link, then the system-wide susceptibility to any given contaminant category is determined by the most susceptible water source. Using this methodology, a drinking water system with five wells that have a low susceptibility to metals, and one well that is highly susceptible to metals would be rated as having a high susceptibility to that contaminant category. In many instances this could mean that a particular land use overlying an unconfined well could drive the system-wide susceptibility higher.

However, it is also possible that a confined-aquifer well that withdraws iron-rich water could dramatically raise this system's susceptibility rating for metals.

As stated, this system-wide susceptibility is a conservative rating that summarizes the most susceptible portions of any system. This susceptibility is the relative likelihood that a public water supply might draw water contaminated at concentrations of concern to public health. This Susceptibility Assessment is a summary of the vulnerability and contaminant potential to raw water supplies. The actual water quality delivered to the consumer is monitored by Public Health's Office of Drinking Water (and for community systems is reported in the Consumer Confidence Reports) and is not part of this assessment.

Overall, Artesian Water Company (New Castle County Airport) has a very low susceptibility to nutrients, a very low susceptibility to pathogens, a low susceptibility to petroleum hydrocarbons, a very low susceptibility to pesticides, a very low susceptibility to PCBs, a low susceptibility to other organic compounds, a very low susceptibility to metals and, a very low susceptibility to other inorganic compounds. The individual well contributions to the system-wide susceptibility are explained below with a further summary provided in Appendix B Table 8: Overall System Susceptibility.

Table 4: Overall Susceptibility Rating

Susceptibility	Contaminant Category
Low	Other Organic Compounds Petroleum Hydrocarbons
Very Low	Metals Nutrients Other Inorganic Compounds Pathogens Pesticides PCBs

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Appendix A: Maps

Map1: Base Map for Wellhead Areas

Map 1: Base Map

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Please contact the Source Water Assessment and Protection Program at Phone: (302) 739-4793 or Fax: (302) 739-2296 to request more information regarding this map.

Map 2: Delineation Map for Wellhead Areas

Map 2: Delineation Map

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Please contact the Source Water Assessment and Protection Program at Phone: (302) 739-4793 or Fax: (302) 739-2296 to request more information regarding this map.

Map 3: Discrete Sources Within Wellhead Areas

Map 3: Discrete Source Map

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Please contact the Source Water Assessment and Protection Program at Phone: (302) 739-4793 or Fax: (302) 739-2296 to request more information regarding this map.

Map 4: Land Use Within Wellhead Areas

Map 4: Land Use Map

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Please contact the Source Water Assessment and Protection Program at Phone: (302) 739-4793 or Fax: (302) 739-2296 to request more information regarding this map.

Appendix B: Tables

Table 5: Discrete Sources Within Wellhead Areas

Wellfield	SiteType	SiteID	Nutrients	Pathogens	Petroleum	Pesticides	PCBs	Other Organic	Metals	Other Inorganic
AWC New Castle County Airport 10029	Underground Storage Tanks	3001381	N	N	N	N	N	N	N	N
AWC New Castle County Airport 10029	Underground Storage Tanks	3001584	N	N	N	N	N	N	N	N
AWC New Castle County Airport 10029	Underground Storage Tanks	3001585	N	N	N	N	N	N	N	N

Wellfield Summary	SiteType	SiteID	Nutrients	Pathogens	Petroleum	Pesticides	PCBs	Other Organic	Metals	Other Inorganic
AWC New Castle County Airport 10029	All Site Types	All Sites	N	N	L	N	N	N	N	N

System Summary	Nutrients	Pathogens	Petroleum	Pesticides	PCBs	Other Organic	Metals	Other Inorganic
Overall	N	N	L	N	N	N	N	N

Table 6: Land Use Within Wellhead Area

Wellfield	Land Use	Area(acres)	Percent	Nutrients	Pathogens	Petroleum	Pesticides	PCBs	Other Organic	Metals	Other Inorganic
New Castle County Airport 10029	New Castle County Airports	3.63	56.14	N	N	N	N	N	M	N	N
New Castle County Airport 10029	Residential	1.52	23.6	L	L	L	L	N	N	N	N
New Castle County Airport 10029	Highways / Parking Lots	1.31	20.27	N	N	N	N	N	L	L	L
New Castle County Airport 10030	New Castle County Airports	4.45	68.79	N	N	N	N	N	M	N	N
New Castle County Airport 10030	Highways / Parking Lots	1.2	18.58	N	N	N	N	N	L	L	L
New Castle County Airport 10030	Commercial	0.46	7.23	L	N	L	L	L	L	L	L
New Castle County Airport 10030	Residential	0.35	5.41	L	L	L	L	N	N	N	N
New Castle County Airport 108453	New Castle County Airports	3.87	59.95	N	N	N	N	N	M	N	N
New Castle County Airport 108453	Highways / Parking Lots	1.38	21.35	N	N	N	N	N	L	L	L
New Castle County Airport 108453	Combined Urban	1.18	18.24	N	N	N	L	N	L	N	L
New Castle County Airport 108453	Residential	0.03	0.47	L	L	L	L	N	N	N	N

Wellfield Summary	Land Use	Area(acres)	Nutrients	Pathogens	Petroleum	Pesticides	PCBs	Other Organic	Metals	Other Inorganic
AWC New Castle County Airport 10029	All Land Uses	19.41	L	L	M	L	N	M	L	L
AWC New Castle County Airport 10030	All Land Uses	25.88	L	L	M	L	L	M	L	L
AWC New Castle County Airport 108453	All Land Uses	25.88	L	L	M	L	N	M	L	L

System Summary	Nutrients	Pathogens	Petroleum	Pesticides	PCBs	Other Organic	Metals	Other Inorganic
Overall	L	L	M	L	L	M	L	L

Table 7: Individual Well Susceptibility

Wellfield	DNREC ID	Based On	Vulnerability	Nutrients	Pathogens	Petroleum	Pesticides	PCBs	Other Organic	Metals	Other Inorganic
New Castle County Airport	10029	Discrete Sources	Low	Not Susceptible	Not Susceptible	Very Low Susceptibility	Not Susceptible	Not Susceptible	Not Susceptible	Not Susceptible	Not Susceptible
New Castle County Airport	10029	Land Use	Low	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Not Susceptible	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility
New Castle County Airport	10029	Overall	Low	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Not Susceptible	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility
New Castle County Airport	10030	Land Use	Low	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility
New Castle County Airport	10030	Overall	Low	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility
New Castle County Airport	108453	Land Use	Low	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Not Susceptible	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility
New Castle County Airport	108453	Overall	Low	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Not Susceptible	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility

Wellfield	Based On	Vulnerability	Nutrients	Pathogens	Petroleum	Pesticides	PCBs	Other Organic	Metals	Other Inorganic
Airport 10029	Discrete Sources	Low	Not Susceptible	Not Susceptible	Very Low Susceptibility	Not Susceptible	Not Susceptible	Not Susceptible	Not Susceptible	Not Susceptible
Airport 10029	Land Use	Low	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Not Susceptible	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility
Airport 10029	Overall	Low	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Not Susceptible	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility
Airport 10030	Land Use	Low	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility
Airport 10030	Overall	Low	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility
Airport 108453	Land Use	Low	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Not Susceptible	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility
Airport 108453	Overall	Low	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Not Susceptible	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility

Table 8: Overall System Susceptibility

Based On	Vulnerability	Nutrients	Pathogens	Petroleum	Pesticides	PCBs	Other Organic	Metals	Other Inorganic
Discrete Sources	Low	Not Susceptible	Not Susceptible	Very Low Susceptibility	Not Susceptible	Not Susceptible	Not Susceptible	Not Susceptible	Not Susceptible
Land Use	Low	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility
Overall	Low	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility	Low Susceptibility	Very Low Susceptibility	Very Low Susceptibility

Appendix C: Analytical Data

No Available Analytical Data

Appendix D: Data Sources

Data Sources Used in Source Water Assessments

Type	Organization	Section	Phone Number
Public Water Supply Well Data	Department of Natural Resources and Environmental Control	Water Supply Section	(302) 739-4793
Public Water Supply Well Data	Delaware Geological Survey		(302) 831-2833
Water Quality Data	Department of Health and Social Services	Division of Public Health Office of Drinking Water	(302) 739-5410
Land Use / Land Cover GIS Coverage	Delaware Office of State Planning Coordination		(302) 739-3090
Animal Feedlot Operations	County Conservation Districts	Kent	(302) 697-2600
Animal Feedlot Operations	County Conservation Districts	New Castle	(302) 832-3100
Animal Feedlot Operations	County Conservation Districts	Sussex	(302) 856-3990
Combined Sewer Overflows (CSOs)	Department of Natural Resources and Environmental Control	Surface Water Discharges Section	(302) 739-5731
Dredge Spoil Disposal Areas	Department of Natural Resources and Environmental Control	Soil and Water Conservation	(302) 739-4411
Hazardous Waste Generator Sites	Department of Natural Resources and Environmental Control	Solid and Hazardous Waste Management Branch	(302) 739-3689
Landfills and Dumps	Department of Natural Resources and Environmental Control	Solid and Hazardous Waste Management Branch	(302) 739-3689
Large On-site Septic Systems	Department of Natural Resources and Environmental Control	Ground Water Discharges Section	(302) 739-4762
NPDES Wastewater Outfalls	Department of Natural Resources and Environmental Control	Surface Water Discharges Section	(302) 739-5731
Pesticide Loading, Mixing, and Storage Facilities	Delaware Department of Agriculture	Pesticide Management Section	(302) 739-4811
Salvage Yards	Department of Natural Resources and Environmental Control	Solid and Hazardous Waste Management Branch	(302) 739-3689
Site Investigation and Restoration Branch (SIRB) [Superfund] Sites	Department of Natural Resources and Environmental Control	Site Investigation and Restoration Branch	(302) 395-2600
Sludge Application Sites	Department of Natural Resources and Environmental Control	Surface Water Discharges Section	(302) 739-5731
Spray Irrigation Sites	Department of Natural Resources and Environmental Control	Ground Water Discharges Section	(302) 739-4762
Tire Piles	Department of Natural Resources and Environmental Control	Solid and Hazardous Waste Management Branch	(302) 739-3820
Toxic Release Inventory Sites	Department of Natural Resources and Environmental Control	Air Quality Management Section	(302) 739-4791
Underground Storage Tanks	Department of Natural Resources and Environmental Control	Underground Storage Tank Branch	(302) 395-2500