Town of Orangetown

Drinking Water Source Protection Program (DWSP2) Plan

Veolia Water New York – Rockland

PWS ID: NY4303673

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2. Drinking Water Source Assessment

This section provides an overview of the development of the drinking water source protection maps for the Town of Orangetown. These maps were developed to better understand the system and assess potential contaminants of concern. The maps were created using ArcGIS with data sources from the New York State Clearinghouse, Multi-Resolution Land Characteristics Consortium, US EPA, USGS, NJDEP Bureau of GIS, and ESRI. All data citations can be found in Appendix XX.

2.1 Complete Drinking Water Source Protection Maps

The following maps are available in Appendix XX.

- Town of Orangetown Land Cover
- Town of Orangetown Potential Contaminant Sources
- Town of Orangetown Water Resources
- Town of Orangetown Nanuet & Pearl River Well Fields Potential Contaminant Sources
- Town of Orangetown Blauvelt Well Field Potential Contaminant Sources
- Town of Orangetown Sparkill and Tappan Well Fields Potential Contaminant Sources

2.1.1 Ownership and Control Area

New York State Sanitary Code, Part 5, Subpart 5-1, Public Water Systems – Appendix 5D states the following:

> *"Wells serving public water systems shall be located such that the owner of the water system possesses legal title to the lands within 100 ft of the well and the owner controls by ownership, lease, easement or other legally enforceable arrangement the land use activities within 200 ft of the well."*

According to these regulations, Veolia, as the owner of the public water system wells, should own a radius of 200 ft from each of the wells. The available information suggests that these conditions are met. However, without knowledge of exact well locations, parcel boundaries, or of any easements or agreements, it is not certain.

2.1.2 Critical Areas

The Critical Area includes the area above the aquifer where water is actively being drawn into the well and the upgradient areas where water will reach the well over a 5-year period. Critical Areas for groundwater protection can be delineated by various methodologies. The complexity of each delineation is based on the amount of information available. Available information is listed in the table below. Information was gathered from 2023 Annual Water Withdrawal Reports, Rockland County Comprehensive Plan: Rockland Tomorrow, and Heisig 2010.

2.1.1 Overview of Orangetown Wells				
Well Name	**Aquifer Type**	**Depth (ft)**	**Screen Length/ Open Interval (ft)**	**Pumping Rate (GPM)**
Sparkill 8	Bedrock	481	62	300
Sparkill 11	Bedrock	458	unknown	100
Sparkill 12	unknown	unknown	unknown	unknown
Nanuet 13	Bedrock	325	108	347
Nanuet 14	Bedrock	375	95	347
Blauvelt 15	Bedrock	395	60	332
Tappan 16	Bedrock	500	118	198
Tappan 20	Bedrock	555	99	115
Pearl River 22	Bedrock	655	54	150
Piermont 25	Sand and Gravel	72	unknown	100

Using the available information and an estimated porosity of the bedrock aquifer of 0.2 it was determined that the volumetric flow equation would be best suited to define the well critical areas in Orangetown.

The Volumetric Flow Equation is as follows:

$$r = \sqrt{\frac{Q * t}{n * h * \pi}}$$

r = radius of circle (ft)
Q = pumping rate (ft^3/day)
t = travel time (day)
n = porosity
h = length of well screen (ft)

The table below indicates the 5-year radii calculated for each well using the Volumetric Flow Equation and the above information. These radii were mapped as the critical areas on the maps in Appendix XX.

Well Name	Radius (ft)
Sparkill 8	1,645
Nanuet 13	1,341
Nanuet 14	1,429
Blauvelt 15	1,759
Tappan 16	969
Tappan 20	806

Pearl River 22	921

Since the screen length is unknown for Sparkill 11 and Piermont 25, and nothing is known about Sparkill 12, these three wells were not delineated. Sparkill 12 and Piermont 25 are currently out of service and will likely remain out of service. Sparkill 11 and 12 are in close proximity to Sparkill 8 and are included in the critical area around Sparkill 8.

2.1.3 Source Water Areas

The source water area represents the remaining land area that is beyond the critical area but still within a zone that contributes water to the well. This area represents areas where direct and/or indirect recharge occurs and will eventually reach the well head, but after a longer period of time. Since it will take longer for the water in these areas to reach the well head, it is easier to respond and remediate incidences to prevent contamination from reaching the well.

The source water areas for the wells were developed using the Newark Basin aquifer flow groundwater-flow-system map (Figure 32 in Heisig 2010) that was published in the *Water Resources of Rockland County, New York, 2025-07, with Emphasis on the Newark Basin Bedrock Aquifer*. These areas were defined using estimated flow direction, groundwater elevation, and groundwater divides. The maps in Appendix XX show the delineated source water areas for each well field.

2.2 Potential Contaminant Source Inventory

Assessing Orangetown's drinking water sources includes compiling a list of potential sources of contaminants to the groundwater called the Potential Contaminant Source Inventory. This Inventory is used to help focus future protection efforts. Information on the potential contaminant sources and their locations was gathered from NYSDEC, NJDEP, USEPA, USGS, and stakeholder knowledge. Potential contaminant sources were mapped to determine proximity to the source water and critical area.

2.2.1 Potential Contaminant Source

The draft Framework sorts potential contaminant sources fall into two broad categories: point source and nonpoint source pollution. Point source means any observable, distinct, and confined conveyance or discharge of pollution. This could be from a pipe, channel, fissure, container, or vehicle. Nonpoint source is when pollutants are not discharged or conveyed from a specific, identifiable point. This type of pollution can be caused by precipitation runoff, which can pick up and carry off pollutants, or any other method of conveying pollutants through a medium such as air or water.

Using potential contaminant sources suggested by the draft Framework and the industries and infrastructure present in Orangetown, a list of potential contaminant sources was identified for drinking water sources in this Plan. In Appendix XX, the Town of Orangetown Potential Contaminant Sources map shows the location of these sources in proximity to the well fields. The Nanuet and

Pearl River, Blauvelt, and Sparkill and Tappan maps zoom in on each of the source water areas for a more detailed view of the potential contaminant source locations.

2.2.2 Potential Contaminant Source Inventory

Below is the Potential Contaminant Source Inventory (PCSI) for this Plan.

Potential Contaminant Source Inventory		
Potential Source	**Contaminant(s) of Concern**	**Protection Area(s) Impacted**
Major and Minor Roadways / Impervious Surfaces	Petroleum products, pesticides, fertilizers, road salt (sodium chloride), other chemicals	All Areas
Industrial Facilities	Trichloroethylene (TCE), metals, other manufacturing and degreasing chemicals	Blauvelt Source Water & Critical Area Nanuet Source Water Area Sparkill Source Water Area
Wastewater Treatment Facilities	Sewage sludge, industrial wastes	Blauvelt Critical Area Sparkill Source Water Area
Petroleum Bulk Storage	Gasoline, diesel, methyl-tert-butyl ether (MTBE)	Blauvelt Source Water Area Nanuet Source Water & Critical Area Sparkill Source Water Area
Chemical Bulk Storage	Chlorine, other pool chemicals, other hazardous substances	Blauvelt Source Water Area Nanuet Critical Area Sparkill Source Water Area
Dry Cleaning Facilities	Perchloroethylene, also known as Tetrachloroethene, (PCE)	Blauvelt Source Water & Critical Area
Remediation Sites	Manufacturing chemicals: TCE, metals, degreasing agents, etc.	Blauvelt Source Water & Critical Area Nanuet Source Water Area
Landfills	PFAS, 1,4-dioxane, volatile organic compounds (VOCs), metals	Sparkill Source Water Area
Residential Land Use	Nitrogen, Phosphorus	All Areas
Septic Systems	Fecal Bacteria, nutrients	Blauvelt Source Water & Critical Area Pearl River Source Water Area Sparkill Source Water Area Tappan Critical Area
Spill Incidents	Fuel oil, Transformer oil, Petroleum products, TCE, PCE, PFAS, other materials	All Areas

2.2.2.1 Major and Minor Roadways / Impervious Surfaces

Runoff from both major and minor roadways and other impervious surfaces is a risk to nearby drinking water sources. These surfaces accumulate pollutants and no longer allow precipitation to soak into the ground. In turn, precipitation is directed over the impermeable surface to the nearest permeable surface, taking the pollutants with it. Common pollutants include petroleum products, chemicals, and metals from motor vehicles and motor vehicle accidents. It may also carry nutrients and pesticides and, during the winter months, salt and other deicing chemicals (NYSDEC draft Framework).

In 2003, at the request of Jim Dean, the Orangetown's Town Board approved the purchase of brine-manufacturing equipment. The equipment came online in 2004, and Orangetown began using salt brine as part of their anti-icing practices. Orangetown's roadways are now pretreated with a 23% brine mixture and, once snow begins to accumulate, brine is also used to wet down rock salt. The brine helps activate the salt and adheres it to the snow pack so that less salt is used and less is lost to the roadside (Hellauer, 2017, Orangetown).

Major roadways in Orangetown include the Palisades Interstate Parkway, NY Route 303, NY Route 304, and the New York State Thruway. The Palisades Interstate Parkway intersects the source water area of the Blauvelt and Sparkill well fields. It also intersects the Sparkill well field critical area. NY Route 303 intersects both thee Blauveltt source water and critical areas. NY Route 304 intersects both the Nanuet source water and critical areas. The New York State Thruway does not pass through any of the source water or critical areas.

Land cover data gives a sense of how much of an area is developed with structures and impervious surfaces. In high density developed areas, much of the land is covered with structures and impervious surfaces. In low density developed areas, the land is covered with a mix of vegetation and structures (USGS). The table below shows the percentage of each of the source water and critical areas that are developed, including high- and low-density areas. Orangetown, as a whole, is 51% developed.

Well Field	Source Water Area	Critical Area
Blauvelt	83%	88%
Nanuet	95%	95%
Pearl River	77%	66%
Sparkill	67%	91%
Tappan	80%	81%

2.2.2.2 Industrial Facilities

Industrial land use consists of uses such as manufacturing and processing, mining and quarrying, and oil and gas production (NYSDTF). Industrial land use can introduce pollution into the environment through industrial wastewater discharges, leakage from storage of hazardous materials, and stormwater runoff of contaminated surfaces.

In Orangetown, industrial land use is located primarily along Route 303 but also includes the Pfizer campus and areas along the New York-New Jersey border, east of Lake Tappan (Orangetown Comprehensive Plan, 2023). The Route 303 corridor is encompassed by the Blauvelt and Sparkill

source water areas. The Pfizer campus just clips the Nanuet source water area. The table below indicates the percentage of industrial land use in the source water and critical areas.

Well Field	Source Water Area	Critical Area
Blauvelt	3%	8%
Nanuet	2%	0%
Pearl River	0%	0%
Sparkill	5%	0%
Tappan	0%	0%

2.2.2.3 Wastewater Treatment Facilities

Article 17 (Water Pollution Control) of the New York State Environmental Conservation Law was enacted so that New York could protect and maintain its water resources through the State Pollutant Discharge Elimination System (SPDES). A permit is required for constructing or using an outlet or discharge pipe that discharges wastewater into the surface waters or ground waters of the State, and/or constructing or operating a disposal system such as a sewage treatment plant (NYSDEC).

Facilities whose treatment system has a total discharge to groundwater of less than 1,000 gpd of sewage-wastewater containing no industrial or other non-sewage wastes are exempt from the SPEDES permit. Facilities with discharges to groundwater of less than 10,000 gpd of sewage effluent, without the admixture of industrial wastes or other wastes are considered minor SPEDES projects and may qualify for the P/C/I SPEDES General Permit. All other facilities are considered major and are regulated under the standard SPEDES permit (NYSDEC).

Wastewater treatment facilities can introduce biological contaminants such as bacteria, chemical contaminants from industrial wastes, sediments and floatable such as garbage (NYSDEC draft Framework).

Information and a map of all wastewater facilities regulated under the SPDES permit can be found online through the DECinfo Locator and the NYS Clearinghouse.

There are five wastewater facilities regulated in Orangetown. Two facilities, U & A Construction Corp. and Linde Advanced Material Technologies, are located in the Blauvelt critical area. Two additional facilities, the Rockland County Sewer District No. 1 and Orangetown Sewer District No. 2 Sewage Treatment Plant, are located in the Sparkill source water area.

2.2.2.4 Petroleum Bulk Storage

New York State's Petroleum Bulk Storage (PBS) Program defines a PBS Facility as a property that has one or more tank systems that are designated to store a combined capacity of more than 1,100 gallons of petroleum in aboveground (AST) and/or underground (UST) storage tanks or one or more USTs that are designated to store 110 or more gallons of petroleum. If a property meets the above criteria, it must be registered with the DEC (NYSDEC). Information about registered facilities can be found online through the NYS DEC's Bulk Storage Database Search, and a map of all locations is available through the DECinfo Locator and NYS Clearinghouse.

Leaks from storage tanks and fill ports introduce petroleum products such as gasoline and diesel, and gasoline compounds such as benzene, toluene, ethyl benzene, MTBE, and xylene into the environment (NYSDEC). These compounds are common volatile organic compounds (VOCs). VOCs are organic chemical compounds that are resistant to degradation and are easily transported in the environment. This makes them difficult to remediate (David and Niculescu, 2021).

PBS facilities are present in the Blauvelt and Nanuet well fields' source water areas and the Sparkill well field's critical area. Any spills associated with these PBS facilities are listed in section 2.2.2.11 Spill Incidents.

Site No.	Site Location	Status / Expiration Date	Tank Capacity	Material Stored	Tank Status
3-990205 3-601818	552 North Middletown Rd (Nanuet Source Water Area)	Active 8/29/2027 Unregulated or Closed 6/21/2011	300 gal AST	Used oil (heating, on-site consumption)	In Service
			500 gal AST	Lube oil	Closed - Removed
			10,000 gal UST	Gasoline/ethanol	In Service
			10,000 gal UST	Diesel	In Service
			10,000 gal UST	Gasoline/ethanol	In Service
			1,000 gal AST	#2 fuel oil (on-site consumption)	Closed - Removed
			55 gal drum	Waste oil/used oil	In Service
3-991095	230 North Middletown Rd (Nanuet Source Water Area)	Active 1/1/2023	2,000 gal UST	#2 fuel oil (on-site consumption)	In Service
3-601817	592 Route 303 (Blauvelt Source Water Area)	Unregulated or Closed 6/21/2011	500 gal UST	Gasoline	In Service
3-602437	Palisades Interstate Parkway (Sparkill Critical Area)	Active 10/1/2027	10,000 gal UST	Gasoline/ethanol	In Service
			10,000 gal UST	Gasoline/ethanol	In Service
			10,000 gal UST	Gasoline/ethanol	In Service
			10,000 gal UST	Diesel	In Service

Source: NYSDEC Bulk Storage Database

2.2.2.5 Chemical Bulk Storage

New York State's Chemical Bulk Storage (CBS) Program regulates facilities that store hazardous substances (as listed in 6 NYCRR Part 597) in ASTs larger than 185 gallons, any size UST, or in a container than can store 1,000 kg or more for a period of 90 consecutive days or more (NYSDEC). Information about registered facilities can be found online through the NYS DEC's Bulk Storage Database Search, and a map of all locations is available through the DECinfo Locator and NYS Clearinghouse.

CBS facilities are present in the Nanuet source water and critical areas and the Blauvelt and Sparkill source water areas. The following information is available on these facilities:

Site No.	Site Name	Facility Type	Status / Expiration Date	Location
3-000109	Lake Nanuet Pool Complex	Municipality	Active 6/20/2025	27 Lake Nanuet Dr (Nanuet Critical Area) [Clarkstown]
3-000125	Wyeth-Ayerst (now Pfizer)	Other	Unregulated or Closed 7/5/2003	North Middletown Rd (Nanuet Source Water Area)
3-000231	Materials Research Corp.	Manufacturing (other than chemical) / Processing	Unregulated or Closed 11/10/1993	Route 303 & Glenshaw St (Blauvelt Source Water Area)
3-000101	Avery Dennison, Information & Brand Management	Manufacturing (other than chemical) / Processing	Unregulated or Closed 9/18/2019	524 Route 303 (Blauvelt Source Water Area)
3-000348	Rockland County Sewer District No. 1	Municipality	Active 7/23/2027	4 Route 340 (Sparkill Source Water Area)
3-000466	Orangetown Sewage Treatment Plant SD No. 2	Municipality	Active 9/8/2024	127 Route 303 (Sparkill Source Water Area)

Source: NYSDEC Bulk Storage Database

Wyeth-Ayerst (CBS # 3-000125) lists 53 ASTs, of which 27 are closed and removed, 16 are closed in place, and 10 have been converted to non-regulated use. Tanks range in capacity from 150,000 gals to 200 gals, however the majority of the tanks ranging from 1,000 gals to 10,000 gals.

Avery Dennison, Information & Brand Management (CBS # 3-000101) lists 10 ASTs and 6 USTs. All have been closed and removed except for one AST (2,000 gals) that has been converted to non-regulated use and one UST (5,000 gals) that has been closed in place. All tanks had a capacity between 2,500 gals and 10,000 gals.

Materials Research Corp. (3-000231) lists one AST. The tank has a capacity of 700 gals and has been converted to non-regulated use.

No tanks were listed for the Lake Nanuet Pool Complex, Rockland Sewer District No. 1, or Orangetown Sewage Treatment Plant SD No. 2.

2.2.2.6 Dry Cleaning Facilities

Dry cleaning facilities have historically used perchloroethylene (PCE), another common VOC, as a dry cleaning solvent, but many now use a New York State approved alternative solvent. These facilities are regulated under 6 NYCRR Part 232, but exemptions are made for facilities using only water-based cleaning processes and liquid carbon dioxide dry cleaning machines. Dry cleaning facilities must have a New York State Air Facility Registration (NYSDEC). A map of all air facility registrations can be found online through the DECinfo Locator and the NYS Clearinghouse. For the purpose of this Plan, the data from NYS Clearinghouse was scrubbed to include only dry cleaning facilities.

The information provided by the NYS Clearinghouse only includes active dry cleaning facilities. Three historic facilities with known groundwater contamination were added to the dataset by HVRC. These include Blauvelt Laundry, Sparkle Cleaners, and the former Rockland Psychiatric Center laundry facility.

There are nine dry cleaning facilities in Orangetown, six of which are currently active. The Blauvelt well field is most impacted by these facilities. There are two facilities within the critical area, and two within the source water area. One facility in each designation is currently active. The facility names are as follows:

- Blauvelt Critical Area:
  - Alexander's Quality Cleaners Inc. [Active]
  - Blauvelt Laundry [Historic]
- Blauvelt Source Water Area:
  - La French Cleaners [Active]
  - Sparkle Cleaners [Historic]

2.2.2.7 Remediation Sites

The NYSDEC keeps record of sites in need of remediation.

The State Superfund Program is an enforcement program that identifies sites with suspected inactive onsite hazardous waste disposal and ensures that the contamination is addressed. Each site in this program goes through investigation, evaluation, cleanup, and monitoring (NYSDEC).

The Brownfield Cleanup Program encourages the cleanup and redevelopment of certain sites. These sites contain contamination above cleanup levels or environmental standards (NYSDEC).

The Resource Conservation and Recovery Act (RCRA) gives the EPA the authority to control hazardous waste. The NYSDEC is authorized to implement this program for New York State. Sites identified under this program treat, store, or dispose of hazardous waste. Under the RCRA corrective action program, these Sites must comply with regulatory requirements for hazardous waste management and must investigate and clean up all known or likely releases of hazardous waste or materials (NYSDEC).

Details regarding remediation sites can be found in the Environmental Remediation Database. A map of remediation sites found online through the DECinfo Locator and the NYS Clearinghouse.

The following remediation sites are located within the source water or critical areas of the well fields:

Blauvelt Critical Area

- Blauvelt Laundry (State Superfund Program)
- Materials Research Corporation (Brownfield and Voluntary Cleanup Programs)

Blauvelt Source Water Area

- Avery Dennison – Information and Brand Management (Resource Conservation and Recovery Program)
- Orangeburg Shopping Center (Brownfield Cleanup Program)
- Xerox Corporation (State Superfund Site)
- Camp Blauvelt (State Superfund Site)

Nanuet Source Water Area

- Lederle Lab (Resource Conservation and Recovery Program)

Blauvelt Laundry

Blauvelt Laundry is listed in the State Superfund Program as Class 2. Class 2 is assigned when a site has confirmed hazardous waste disposal, and that this disposal represents a significant threat to public health or the environment. It can also be assigned to sites listed on the Federal National Priorities List. Blauvelt Laundry operated as a dry-cleaning facility since the late 1960s. The primary contaminant of concern at the site is tetrachloroethene (PCE). Soils, groundwater, and indoor air are impacted by PCE. PCE in groundwater on the site was found to be between non-detect and 10 ppb. In August 2014, the DEC proposed an Interim Remedial Measure for the site, which is performed when a source of contamination can be effectively addressed without extensive investigation and evaluation.

The Blauvelt well field is listed in the State Superfund Program under Class N. In 1978, the Blauvelt 15 was found to have concentrations of 40 ppb of PCE. The site was assessed to have contaminated groundwater from Blauvelt Laundry, an upgradient, off site source.

Materials Research Corporation

Materials Research Corporation is listed in the Brownfield Cleanup Program as Class A. Class A (Active) is for non-registry sites where remedial work is underway and not yet complete. Since 1961, the facility on the site purified metals and formed metal targets used in machines that manufacture electronic chips. Degreasing agents were involved in these processes. Primary contaminants of concern are trichloroethene (TCE), tetrachloroethene (PCEP), carbon tetrachloride, cis-1,2 dichloroethene (DCE), 1,1 dichloroethane, and 1,1,1 trichloroethane (TCA). The following amounts of these contaminants were found in the groundwater:

- TCE: up to 18,000 ppb
- TCA: up to 2,900 ppb

- DCE: up to 150 ppb
- Carbon tetrachloride: up to 7,700 ppb
- 1,1 dichloroethane: up to 150 ppb
- PCE: up to 26 ppb

In May 2016, proposed a remedy to address the contaminants of concern at the site. Groundwater would be treated through use of in-situ chemical oxidation (ISCO).

Avery Dennison

Avery Dennison (formally Paxar Corporation) coated fabric and non-woven goods. The facility generated water- and solvent-based wastes, solvent-contaminated solids and rags, and spent solvents. This site is listed in the remediation parcel database since it once held RCRA status. The DEC is evaluating whether there is need for additional environmental investigation.

Orangeburg Shopping Center

The Orangeburg Shopping Center is listed in the Brownfield Cleanup Program and classified as Code C (Complete). This is given to sites where remediation has been determined to be satisfactory under the remediation program. Dry cleaning solvents and their degradation products, such as PCE, TCE, DEC, and vinyl chloride (VC), were the primary contaminants of concern. After remediation, residual contamination exists in the soil and groundwater, which is managed by a Site Management Plan.

Xerox Corporation

Xerox Corporation is listed in the State Superfund Program as Class 4. Class 4 is assigned when a site has been properly closed but still requires continued site management to meet regulator compliance. The facility refurbished copiers and copier parts using chlorinated solvents. The site had two USTs, where there were documented releases in the 1970s. Primary contaminants of concern at the site are PCE, TCE, 1,1-dichloroethene, and 1,2-dichloloethane. Remedial activities are complete, but residual contamination remains. The groundwater contamination plume is managed by pumping and treating of groundwater in the area of contamination.

Camp Blauvelt

Camp Blauvelt is listed in the State Superfund Program as Class P. Class P signifies a site where there is indication that contamination might be present. Further information is necessary to determine if action is needed. Camp Blauvelt was a small arms range between 1910 and 1913. Copper and lead are the contaminants of concern at the site and were detected in soil above background levels. Therefore, the site was recommended for future evaluation.

Lederle Lab

Lederle Lab or Pfizer (now Pearl River Campus), operates as a pharmaceutical manufacture, research, and development facility. It has operated as such since 1930. The site is listed under the RCRA program as Class A (Active). TCE is the primary contaminant of concern in the groundwater. This is being monitored through natural attenuation.

2.2.2.8 Inactive Solid Waste Landfills

There are approximately 1,900 inactive solid waste landfills across New York State, many of which operated during a time when regulations required soil covers without any type of investigation for impacts to groundwater. Since then, increased knowledge of emerging contaminants has lead the DEC to develop the Inactive Landfill Initiative to assess and mitigate the known inactive landfill sites. The DEC prepares an annual report for this program, with focus on emerging contaminants such as PFAS and 1,4-dioxane. Inactive landfills can also leach other chemicals such as volatile organic compounds and metals into the groundwater (NYSDEC).

A map of all inactive solid waste landfills can be found online through the DECinfo Locator and the NYS Clearinghouse.

There are five inactive landfill sites in Orangetown. Two of these landfills are located within the well field source water areas. One in the Blauvelt source water area (Parseghian) and the other in the Sparkill source water area (Camp Shanks SLF). Parseghian is set to be investigated by the DEC in 2028, so current groundwater impacts are unknown. Camp Shanks has been investigated and was found to have PFAS or 1,4-dioxane in exceedance in onsite groundwater samples. However, the contamination is contained on the site. The DEC recommended periodic source monitoring and/or mitigation.

2.2.2.9 Residential Land Use

Residential properties are the most common use of land in Orangetown, claiming approximately 39% of land use (Orangetown Comprehensive Plan, 2023). Residential properties use of lawn and garden chemicals, including fertilizers or pesticides, can run off or infiltrate the ground and contaminate source water with excess nitrogen or phosphorus (NYSDEC draft Framework).

Residential properties were mapped from information provided through the NYS Clearinghouse. The NYS Tax Parcels shapefile complies information on each parcel through the 2022 assessors rolls, including the properties land use code. New York State Department of Taxation and Finance (NYSDFT) designates any property type classification in the 200s as residential.

Residential land use makes up 50% or more of all but the Blauvelt critical area and the Sparkill source water area. The following table lists the acres of residential land use in each of the source water and critical areas:

Well Field	Source Water Area	Critical Area
Blauvelt	51%	43%
Nanuet	70%	75%
Pearl River	57%	92%
Sparkill	35%	68%
Tappan	68%	70%

2.2.2.10 Septic Systems

Septic systems typically serve residential or commercial properties and receive less than 1,000 gallons of sewage per day. They do not require a permit from the NYSDEC and maintenance is the responsibility of the property owner. While a benefit of septic systems is allowing direct recharge to

the aquifer, if they are not properly maintained, they can introduce contaminants such as bacteria and nutrients into the source water (NYSDEC draft Framework).

Properties served by private septic systems were mapped utilizing information provided through the NYS Clearinghouse. The NYS Tax Parcels shapefile complies information on each parcel through the 2022 assessors rolls, including whether the parcel is served by a private or public sewer. The data indicates there are 273 properties in Orangetown that are currently served by septic systems. Of those 273 properties, only 59 are located within the source water or critical areas with the following breakdown:

Well Field	Source Water Area	Critical Area
Blauvelt	31	2
Nanuet	0	0
Pearl River	18	0
Sparkill	7	0
Tappan	0	1

In 2010, the lower segment of the Sparkill Creek was listed on the NYS Section 303(d) List of Impaired Waterbodies for fecal coliforms and dissolved oxygen (NYSDEC).

2.2.2.11 Spill Incident Reports

Every year, accidental releases of petroleum, toxic chemicals, gases, and other hazardous materials occur in New York State. According to the NYSDEC, approximately 90 percent of all reported spills involve petroleum products, and the rest involve other hazardous substances, unknown materials, and materials such as raw sewage and cooking grease (NYSDEC).

The NYS DEC, through the Spill Response Program, responds to reported releases to investigate and take action. Many reports are small quantity releases that are contained and cleaned up quickly. These inflict little damage on the environment. However, larger, uncontained spills can seep through soil and enter storm drains which impact water sources (NYSDEC).

Information on all reported spills can be found through the Spill Incidents Database. The address listed on these spill reports were mapped to determine if spills had occurred within the source water and critical areas. Spill incident reports in and near Orangetown were reviewed from January 2019 through December 2024. The table below lists the number of spill incidents reviewed and the number in each of the well field source water areas. Spill incidents are sorted by material spilled. Transformer oil was the most common material spilled. These occurred after storm events, and the amount spilled was typically small. Fuel oil is the next most common material spilled. This is likely from leaks in fuel oil USTs, which are used to heat buildings and homes.

Spilled Material	No. Incidents	Source Water Area				
		Blauvelt	Nanuet	Pearl River	Sparkill	Tappan
Fuel Oil	85	2	3	1	7	
Diesel	34				1	
Gasoline	24	1	1		2	
Unknown Petroleum	19				1	
TCE; PCE	2					

PFOA	1	1				
Benzo(k)fluoranthene	1					
Hydraulic Oil	23					
Transformer Oil	222	5	4		4	1
Motor Vehicle Fluid	15		1		1	
Waste Oil/Used Oil	5					
Raw Sewage	10				2	
Unknown	33	1	2		2	
Other	19	1			2	
Source: NYSDEC Spill Incident Database						

The following spills were reported in the well field critical areas:

Spill Date	Spill No.	Material Spilled	Resource Affected	Spill Location	Spill Status
1/4/1990	8909584	Gasoline and MTBE (Unknown Amount)	Groundwater	Palisades Parkway (Sparkill Critical Area)	Not Closed
6/4/2020	2001594	Other (Unknown Amount)	Soil, Sewer	23 Rolfe Road (Nanuet Critical Area)	Closed (6/4/2020)
7/1/2021	2103050	Transformer Oil (Unknown Amount)	Soil	20 Pine Tree Lane (Sparkill Critical Area)	Closed (7/2/2021)
12/2/2021	2107973	#2 Fuel Oil (Unknown Amount)	Unknown	114 Campbell Road (Sparkill Critical Area)	Closed (2/1/2022)
4/20/2022	2200563	Cooking Grease (Unknown Amount)	Unknown (Drain)	580 Route 303 (Blauvelt Critical Area)	Closed (4/20/2022)
5/16/2022	2201361	Perfluorooctanoic Acid (Unknown Amount)	Groundwater	Route 303 at Spruce Street (Blauvelt Critical Area)	Not Closed
5/31/2022	2201886	#2 Fuel Oil (Unknown Amount)	Soil	163 Austin Avenue (Sparkill Critial Area)	Closed (9/1/2022)
6/10/2022	2202207	Other (Unknown Amount)	Air	2 Glenshaw Street (Blauvelt Critical Area)	Closed (6/10/2022)
6/2/2023	2301777	Odor Complaint (Unknown Material)	Air, Indoor Air	Piermont Street at Sparkill Avenue (Sparkill Critical Area)	Closed (6/2/2023)

6/18/2024	2402451	Transformer Oil (25 Gal)	Soil	2 April Court (Nanuet Critical Area)	Closed (6/26/2024)

Source: NYSDEC Spill Incident Database

The 1990 spill in the Sparkill critical area (Spill No. 8909584) was included in this list even though it occurred outside the 5-year period reviewed, because of its known impacts to drinking water. In December 2022, Precision Environmental Services, Inc. mapped the VOCs groundwater plume from the spill. The plume extended onto the property where Sparkill 8 and 11 are located at concentrations of 10 µg/l or less.

2.2.3 References

Information on the potential contaminant sources and their locations was gathered from NYSDEC, NJDEP, USEPA, USGS, and stakeholder knowledge. Links to appropriate sites are listed throughout the section. Water system data and information was collected from the Annual Water Withdrawal Reports, Rockland County Comprehensive Plan: Rockland Tomorrow, and Heisig (2010). Information on land use in Orangetown was gathered from the 2023 Orangetown Comprehensive Plan. Orangetown's brine practices was provided by the Orangetown website, and a 2017 article in the Nyack News & View titled "Earth Matters: Worth His Salt" by Susan Hellauer. A publication titled *Volatile Organic Compounds (VOCs) as Environmental Pollutants: Occurrence and Mitigation Using Nanomaterials* by David and Niculescu (2021) was used as reference for information on VOCs. Lastly, information on the Palisades Parkway gas station spill in 1990 was provided by Orangetown DWSP2 Committee Member, Larry Vail.

Citations

David, E.; Niculescu, V.-C. Volatile Organic Compounds (VOCs) as Environmental Pollutants: Occurrence and Mitigation Using Nanomaterials. Int. J. Environ. Res. Public Health 2021, 18, 13147. https://doi.org/10.3390/ijerph182413147

3. Protection and Management

Using information gathered during the Drinking Water Source Assessment phase and Stakeholder concerns, the Stakeholder Committee identified five priority issues to address with this Plan. These five issues were chosen as they were deemed to be the most effective way to meet the needs of Orangetown and the Stakeholder group while also protecting against future contamination from multiple different sources. Specific protection and management methods were developed to address these issues.

3.1 Identify Protection and Management Methods

After reviewing the Potential Contaminant Source Inventory, the Stakeholder Committee identified the following priority issues:

Priority Issue 1: Septic Systems

There is limited data available on fecal coliform in the groundwater and surface waters of Orangetown. However, it is known that the lower reach of the Sparkill Creek is impaired with fecal coliform, so it is likely entering the environment in some capacity. The locations of septic systems in Orangetown were identified using information from the Assessor's Office. However, the accuracy of this data is unverified. In order to understand and protect against further and future contamination from septic systems, it was determined that a comprehensive inventory should be undertaken by Orangetown to confirm which parcels have active septic systems. This issue is addressed in Project Profile 1: Private Septic System Database.

Priority Issue 2: Extensive Water System

Orangetown is just one town that receives water from the Veolia system, and the wells in Orangetown are only a small portion of the source water system. In order to develop a robust and comprehensive source water protection program, intermunicipal collaboration between the other Rockland County towns and villages needs to begin. This issue is addressed in Project Profile 2: Countywide Coordinated Municipal Outreach.

Priority Issue 3: Residential Awareness

A significant portion of the source water and critical areas surrounding the well fields are residential properties. Ensuring that residents are made aware of ways that they may be inadvertently introducing hazardous substances to the groundwater is important to limiting the amount of non-point source pollution coming from residential land use. This issue is addressed in Project Profile 3: Public Awareness Leading to Drinking Water Source Protection.

Priority Issue 4: Extensive Development

Many of the critical areas surrounding the well fields in Orangetown are developed. It is important to limit future development or redevelopment that may pose a risk to the source water by introducing hazardous chemicals into the groundwater. This issue is addressed in Project Profile 4: Update Town Code with Water Protection Methods.

Priority Issue 5: Continuing Monitoring of PCSI

In order for Orangetown to continue to monitor potential contaminant sources and respond to new and emerging threats, there should be a practice in place to host and update the data in the inventory. This issue is addressed in Project Profile 5: Host and Maintain Source Water Mapping.

3.2 Project Profiles

The project profiles address each of the contaminants of concern outlined in the Potential Contaminant Source Inventory and are meant to be a guide for protection and management methods and implementation timeline and steps. Each project profile outlines the issue and includes the implementation timeline and steps, potential contaminant source, goals and priorities, costs of the project, and potential funding sources and partners.

The priority level of the Profile is listed as either high, medium, or low. Costs are broken down into low, medium, and high. Low-cost projects are generally under $10,000. Medium (above $10,000 but under $30,000) and High-cost projects (above $30,000) might be best suited for a capital project or grant. The timelines are broken down into short, medium, and long-term projects. Short term projects can be done immediately, medium is within 5 years, and long-term are more than 5 years from now. Some projects are ongoing and listed as such.

Project Profile 1: Private Septic System Database

TARGETED POTENTIAL CONTAMINANT SOURCE: Fecal bacteria entering the groundwater due to improperly managed septic systems and out of date septic system records.

While many of Orangetown's homes and businesses are served by a public sewer system, some remain on private septic systems. Currently available septic system records rely on assessor information by parcel, but this data may be outdated or incomplete. Missing data may include information on historic septic system, recently updated systems, or permanently closed systems.

Septic systems located within the critical areas may introduce fecal bacteria into the water supply if they are not properly maintained. This plan recommends Orangetown compiles up-to-date information on parcels with private septic systems and develops targeted informational outreach that informs the public on proper septic system maintenance to avoid groundwater contamination and who to contact for more information. It will also enable outreach for financial assistance.

Landowners with active septic systems may be eligible for financial assistance for septic system upgrades through NYS EFC Septic System Replacement Fund. Those identified through this database will be encouraged to contact Liz Mello at the Rockland County Department of Health (RC DOH) to determine eligibility.

To build this database, Orangetown, in collaboration with the RC DOH, will review historic septic systems records and cross check them with sanitary sewer system connection records. Historic septic system records are housed at the RC DOH. Orangetown maintains records of sewer connections.

Two challenges with this data arose during stakeholder discussion. First, sewer connection information is stored in paper files at the Town of Orangetown, making cross-checking parcels time consuming. Second, it is possible that some parcels may still have an active septic system even though they have been connected to the sanitary sewer system. These active septic systems may only receive waste from certain sections of the building plumbing, such as a washing machine, while the rest of the plumbing is on sewer. There are likely very few instances where this is occurring, but it is something to consider when building the database.

One recommendation on how to account for this potential source of inaccuracy is to require parcels with historic septic systems that have been converted to sewer be inspected at the point of sale. At this time, information in this database on the parcel can be assessed and updated.

GOALS AND PRIORITIES:

- Update Orangetown's records regarding the number of parcels on private septic systems.
- Ensure proper maintenance and contact information is provided for the public
- Manage the influence of septic systems present or proposed in proximity to the municipal wellfields and throughout the upstream source watershed.

Priority Level: High

SUMMARY OF PROTECTION AND MANAGEMENT METHODS:

Methods to reduce the risk and mitigate the threat include:

- Update records regarding parcels served by a private septic system.
    - Work with RC DOH to obtain historic septic system data
    - Review Orangetown's records of sewer connections, and
    - Overlay data to determine which parcels are still on septic
- Developed targeted outreach materials on septic system maintenance to property owners on septic
    - Work with RC DOH for a shared messaging campaign
    - Determine an outreach schedule (ex. quarterly, biannually, etc.)
- Upgrade or conversion of septic systems that do not meet current design requirements.
    - Work with RC DOH to address upgrades for existing septic systems in the watershed
    - Determine if residents are able to apply for the NYS EFC Septic System Replacement Fund
    - Determine if parcel is able to be converted to Orangetown's sewer
- Set up procedure for interacting/collaborating with partners and sharing information and materials.

POTENTIAL COSTS:
Estimated cost: $15,000
Potential costs include staff time to develop, distribute, and analyze survey results; staff time to review records and determine if there are any gaps; staff time to update and/create a septic system database; staff time to develop and distribute informational pieces.

Cost Classification: Medium

POTENTIAL FUNDING SOURCES:

- **Town of Orangetown Budget**
- **Rockland County Department of Health Budget**

POTENTIAL PARTNERSHIPS - PEOPLE AND AGENCIES INVOLVED:

- Plan Management Team
- Town of Orangetown
- Rockland County Department of Health, primary contact:
    - Liz Mello, Senior Public Health Engineer; melloe@co.rockland.ny.us; 845-364-2616

SUGGESTED TIMELINE:
Short Term: 1 year for planning
Medium Term: 1 to 3 years for database completion
Ongoing: Annually assess database and update as necessary. Annually distribute informational pieces

POTENTIAL BARRIERS:

- Communication with landowners
- Availability of Historic information
- Older homes that might have both a septic system and a sewer connection

IMPLEMENTATION STEPS:

1. Plan Management Team, Town of Orangetown, and RC DOH determine what information to include in the septic system database and where to obtain this information.
2. Determine data format and method to compare the historic septic system data, housed at RC DOH, and the sewer connections data, hosed at Orangetown.
3. Identify data collection methods, options may include historic record searches or field surveys and inspections.
4. Identify which platform to use in recording the data (ex. Excel, Access)
5. Identify the point person to gather and input the data into the database.
6. Create database.
7. Create materials needed to assist in data collection (ex. spreadsheets, worksheets, checklists).
8. Begin gathering and inputting information into the database
9. Once the database is complete, create a list of contact information for parcels still served by septic systems.
10. Develop and distribute outreach material on septic system maintenance, funding sources, and information on who to contact for assistance.
11. Annually, assess and update the database, contact list, and outreach material, as needed.

Project Profile 2: Countywide Coordinated Municipal Outreach (Intermunicipal Coordination)

TARGETED POTENTIAL CONTAMINANT SOURCE: Any Unwanted Contamination of Source Water in Source Water and Critical Areas

Veolia sources, treats, and distributes the public drinking water supply in Orangetown. This water is sourced from and distributed throughout much of Rockland County. Therefore, all five of the Towns and 15 of the 18 Villages in Rockland County also receive water from the Veolia's system.

Due to the scale of the system, this DWSP2 plan is only able to cover the portion of the water supply sourced from Orangetown. So, educational materials and land use protections implemented as part of this plan will offer protection to the portion of the water system in Orangetown, leaving the remainder of the water supply to the protections in place by neighboring municipalities.

It is recommended that a coordinated Countywide meeting with Rockland municipalities and Veolia is established to create a designated space to work towards municipal water quality protection goals across the system. This unified group would enable pooling of ideas and resources towards addressing drinking water quality concerns.

One goal of this coordination would be to encourage other municipalities in Rockland County to develop a DWSP2 plan of their own. Another goal would be to engage with Veolia, Rockland County, and other local and regional organizations working on water quality concerns.

Coordinated outreach to other Rockland municipalities can be facilitated by the Rockland Water Task Force through their Communications Subcommittee, with this venue as the location for convening this countywide meeting once established. Additional outreach can be facilitated at events such as the Rockland County Supervisors and Mayors meeting and through email communications.

GOALS AND PRIORITIES:

- Connect with other municipalities served by the Veolia water system in Rockland County
- Establish shared goals and priorities related to water quality
- Develop shared actions and messaging regarding water quality protection for the Veolia system

Priority Level: High

SUMMARY OF PROTECTION AND MANAGEMENT METHODS:
Methods to reduce the risk and mitigate the threat include:

- Maintain a good working relationship with neighboring municipalities
- Maintain a good working relationship with Veolia
- Periodic coordination with neighboring municipalities
- Establish a shared messaging campaign

POTENTIAL COSTS:

Estimated Cost: $10,000
Potential costs include staff time [including time for other Organizations such as Rockland County DOH and HVRC] to meet with municipal staff, discuss the benefits of establishing this collaborative meeting, coordinate a meeting time and place, gather information, set an agenda and host the meeting. Additional costs will include time and resources to develop a shared messaging campaign.

Cost Classification: Low

POTENTIAL FUNDING SOURCES:

- **Hudson River Greenway Community Grant** (for educational material development)
    - Funds natural resource protection, regional planning, and environmental education

POTENTIAL PARTNERSHIPS - PEOPLE AND AGENCIES INVOLVED:

- Rockland County Towns and Villages served by Veolia
    - Towns of Clarkstown, Haverstraw, Ramapo, and Stony Point
    - Villages of Airmont, Chestnut Ridge, Grand View-on-Hudson, Haverstraw, Kaser, Montebello, New Hempstead, New Square, Piermont, Pomona, Sloatsburg, Spring Valley, Upper Nyack, Wesley Hills, and West Haverstraw
- Veolia
- Rockland Water Task Force

SUGGESTED TIMELINE:
Short Term: approximately 1 year for planning and initial communication with municipalities
Medium Term: approximately another 1-2 years to set up regular meetings
Ongoing: Meetings to discuss specific topics, messaging, and frequency of messaging

POTENTIAL BARRIERS:

- Communication across various municipalities and organizations
- Finding a meeting time and frequency that works for everyone
- Establishing a messaging campaign that meets all municipal needs
- Potential efficiency issues in intermunicipal collaboration

IMPLEMENTATION STEPS:

1. Plan Management Team in coordination with Rockland County Water Taskforce, establish and maintain relationships with municipalities served by the Veolia water system. Emphasize the importance of communication to protect drinking water quality.
2. Coordinate with Rockland County Water Taskforce to host a drinking water coordination meeting with other Rockland municipalities.
3. Attend regular meetings to develop a shared messaging campaign around drinking water quality protection.
4. Communicate the importance of the use of best management practices near well fields to avoid/mitigate contamination of groundwater.
5. Identify other topics for discussion at these meetings based on discussions with all participating municipalities.
6. Determine messaging information and schedule.
7. Develop and distribute messaging materials.

Project Profile 3: Public Awareness Leading to Drinking Water Source Protection

TARGETED POTENTIAL CONTAMINANT SOURCE: Pesticides, Herbicides, Other Lawn and Garden Chemicals, and Any Unwanted Contamination of Source Water in Source Water and Critical Areas

Practices on private properties can lead to impairment of nearby waterbodies by introducing chemicals into the environment through infiltration and runoff. The application of pesticides, herbicides, and other lawn and garden chemicals and the improper disposal of lawn clippings and leaves on properties introduce pollutants such as nitrogen and phosphorus to the environment. Residential properties may contain unknown or unlisted chemical storage. Any spill or usage of these chemicals, known or unknown, could enter the groundwater or nearby waterbodies. An example includes residents washing their cars in their front yards.

In order to increase awareness surrounding potentially harmful chemicals, informational materials on various chemical pollutants and their sources are recommended to be produced, compiled, and distributed to landowners, businessowners, and landscapers across Orangetown. Topics may include information on the potentially harmful chemicals, the importance of chemical maintenance and disposal, alternative, environmentally friendly options, and actions the target audience can take to reduce the introduction of these chemicals to water bodies. All informational materials should include benefits of protecting water sources from a water quality and water quantity perspective and inform the target audience of any federal, state, county, and local codes.

Local and regional organizations and departments within Orangetown have already created outreach and educational materials on some of these topics. In collaboration with these organizations and departments, it is recommended an inventory of all the available informational materials be created and assessed for relevance and gaps.

After the inventory of already available resources is established, additional informational materials can be developed to fill identified gaps. It is recommended that a webpage be created as a central location to house the inventory with links to important information. This will help the target audience easily access all relevant information.

For distribution, the inventory can be assessed to determine the schedule and distribution method on each piece. A welcome packet is recommended to be sent to new homeowners when a property is sold to inform them of these resources. Road signs and other signage can be installed to inform the public.

Currently available campaigns and informational pieces:

- Orangetown Highway Department “only rain down the drain”
- Cornell Cooperative Extension Rockland County circulars
- Orangetown, Piermont, and Nyack leaflets on leaf pick up and yard waste pick up
- Rockland County Task Force

GOALS AND PRIORITIES:

- Increased public awareness for watershed protection

- Increased community action towards water quality protection

Priority Level: Medium

SUMMARY OF PROTECTION AND MANAGEMENT METHODS:
Methods to reduce the risk and mitigate the threat include:

- Collaborate with other organizations working in Orangetown/Rockland County on water quality protection
- Develop informational materials (i.e. road signage, mailings, etc.) that fill informational gaps
- Increase education for Town residents and businessowners

POTENTIAL COSTS:
Estimated Costs: $15,000
Potential costs include staff time collaborating with printing costs, signage, mailings and postage, and staff time spent planning and developing informational pieces. This would also be staff time spent developing, hosting, and updating an informational website and collaborating with other organizations.

Cost Classification: Medium

POTENTIAL FUNDING SOURCES:

- **Town of Orangetown Budget**
- **NYS DEC Hudson River Estuary Local Stewardship Planning Grant**
    - Funds Implement source water protection strategies or management methods identified in a DEC accepted DWSP2 source water protection plan. Activities that enhance protections for drinking water sources are eligible, tailored to local needs, with priority given to surface drinking water sources and watershed areas supplying community water systems.
- **Hudson River Greenway Community Grant**
    - Funds natural resource protection, regional planning, and environmental education.

POTENTIAL PARTNERSHIPS - PEOPLE AND AGENCIES INVOLVED:

- Town of Orangetown
- Plan Management Team
- Local Environmental Groups or Organizations (i.e. Sparkill Creek Watershed Alliance, Cornell Cooperative Extension Rockland County)
- Rockland County Water Task Force

SUGGESTED TIMELINE:
Short-term: Approximately 1 year for initial planning and idea identification for educational outreach; and an additional 1 year for inventory development and grant applications as needed
Medium term: Approximately 1 year for additional material development and distribution
Ongoing: Continued engagement with the community on the importance of source water protection through informational sessions and outreach events.

POTENTIAL BARRIERS:

- Public understanding of the materials presented and their connection to the need to protect water quality in the watershed.
- Balancing this privacy with need to prevent unwanted contamination of the water system.

IMPLEMENTATION STEPS:

1. Plan Management Team meet to identify methods to educate the public on potential contaminant threats (e.g. informational newsletter, public outreach events, etc.).
2. Identify potential collaborators (e.g. local environmental groups or organizations).
3. Plan Management Team to meet with potential collaborators to discuss already available informational materials.
4. Compile all resources on one webpage, with links to sources
5. Plan distribution methods and schedules
6. Identify if there are any gaps that need to be filled with additional materials
7. Apply for funding, if necessary
8. Develop new informational materials and distribute to the public via social media, informational mailings, web postings, newspaper postings, public meetings, or workshops.

Project Profile 4: Update Town Code with Water Protection Methods

TARGETED POTENTIAL CONTAMINANT SOURCE: Any Unwanted Contamination of Source Water in Critical Areas

Orangetown relies on groundwater for approximately 70% of its water supply. An important tool to protect this groundwater from contamination is the creation of special overlay zones in the Town's code. The purpose of an aquifer overlay zone is to protect the health and welfare of residents of the Town. It is recommended that Orangetown develop an overlay district over the well critical areas as defined by the 2.1.2 Critical Areas section of this plan.

Overlay zones identify areas on the surface that can affect the underlying groundwater and offer water quality protection by setting additional standards for development in the identified areas. The underlying zoning remains in effect unless the overlay zone provisions specifically modify it. Any development, improvements, redevelopment, or subdivisions on a parcel within the well critical areas will be subject to planning board review for the new overlay requirements.

The first step in developing an overlay zone is to map the zone's boundaries. Orangetown's overlay zone will cover the source water critical areas defined by this plan, however it is recommended that these boundaries be reviewed and approved by a qualified hydrogeologist working for the Town before they are adopted to ensure accuracy.

It is recommended that the Plan Management Team along with other important stakeholders from the Town of Orangetown convene to discuss the specific provisions to be included in the overlay zone. If desired, the Town may apply for a grant to hire a consultant to assist with this step. Standards should reduce or mitigate the adverse impacts that development or other activities have on the aquifer. When discussing which rules/limits to include in the overlay district, questions such as below should be considered:

- What are we limiting? How should we define those limits?
- What are the rules for new vs. existing businesses?
- What are the rules for if a business is sold?
- Are retrofits needed? What should the retrofits be based off?

Based on conversation with the DWSP2 Committee, recommendations to consider as part of the overlay are as follows:

- Include a Non-Degradation Standard similar to the one included in the Village of Allegany's local law:
    - "No use shall be allowed which can be calculated, shown, or anticipated to degrade the quality of groundwater in a manner that poses a potential danger to public health or safety and no permits or approvals shall be issued for any use which violates this standard. Compliance in with applicable standards, requirements, and permit conditions imposed by federal, state, or county agencies shall be deemed to constitute compliance with this standard. Based on reasonable

cause or concern, the Village may require a property owner or potentially responsible party to collect data clarifying whether the non-degradation standard has been breached or has the potential to be breached."

- Regulations should be on the manufacture, use, storage, or discharge of any products, materials, or by-products deemed to cause environmental harm
- Consider whether any of the regulations should extend beyond the critical areas to cover surface waterbodies as well as groundwater.
- Expanding stormwater management requirements on new construction in the critical area
    - Requiring a zero-runoff ordinance on newly developed properties
    - Lower requirements for stormwater management from 1 acre for specific land uses
- Creating buffer zones around waterbodies and well heads
- Additional regulations on the installation or replacement of underground storage tanks that are not regulated by NYS
- Requiring specific types of landscaping on residential properties to include plantings good for water filtration and water absorption.
- Require residents to use biodegradable soaps and/or other environmentally friendly detergents when outside (ex. washing their cars)

GOALS AND PRIORITIES:

- Regulate zoning in well field critical areas
- Promote cleaner drinking water by limiting potential future releases of contaminants

Priority Level: High

SUMMARY OF PROTECTION AND MANAGEMENT METHODS:

Methods to reduce the risk and mitigate the threat include:

- Develop new aquifer zoning overlay district for the well field critical areas
- Develop and distribute information to the community on new zoning and regulations

POTENTIAL COSTS:

Estimated Costs: $75,000

Potential costs include staff time to plan for the overly district, apply for potential grants, develop the overlay, staff time to update town code, hiring of a consultant to field test the critical area boundaries, hiring of a consultant to assist in defining appropriate standards and limits to employ in the overlay district. Additional funding for staff time to develop and distribute materials to the community regarding the zoning and regulation changes

Cost Classification: High

POTENTIAL FUNDING SOURCES:

- **Town of Orangetown Budget**
- **Hudson River Estuary Program Local Stewards Planning Grant**
    - Provides funding for planning a conservation overlay zone or natural resource protection regulations for priority lands and waters identified as important in a municipal or inter-municipal plan.
- **NYS DOS Smart Growth Program Community Planning and Zoning Grant Program**

- Provides funding for preparation and local adoption of new or updated community wide zoning regulations or the amendment of existing zoning regulations for part of town, village, or city. Zoning must integrate smart growth principals.

POTENTIAL PARTNERSHIPS - PEOPLE AND AGENCIES INVOLVED:

- Town of Orangetown
- Plan Management Team
- Rockland County Task Force

SUGGESTED TIMELINE:

Short-term: Approximately 1-2 years for initial planning and grant application
Medium-term: Approximately another 2-3 years for development and finalization

POTENTIAL BARRIERS:

- Balancing well location privacy with need to prevent unwanted contamination of the water system.
- Additional funding is needed to assist with verifying the overlay district boundaries and identifying standards to implement.
- Effort to enforce the new zoning district regulations

IMPLEMENTATION STEPS:

1. Plan Management Team meet to confirm the areas to include in the new zoning overlay district
2. Plan Management Team discuss update with Orangetown Planning and Zoning Boards
3. Develop a committee to work on the creation of the new overlay district
4. Apply for grant funding
5. Hire a consultant to field test the critical area boundaries and assist with determining which standards to include in the overlay district
6. Discuss and determine which standards to include with consultant and committee
7. Update the Town Code with the new overlay district
8. Develop informational materials on the update that can be distributed to the public via social media, informational mailings, web postings, newspaper postings, public meetings, or workshops.
9. Distribute materials to the Town

ADDITIONAL RESOURCES:

- Resource Guide: Creating Conservation Overlay Zoning: A Guide for Communities in the Hudson River Estuary Watershed 2022
- Village of Allegany DWSP2 Plan
  - Town of Allegany Zoning Map Draft
  - Town of Allegany Local Law
  - Village of Allegany Aquifer Protection Overlay District Map
  - Village of Allegany Zoning Law Amendment
- Indian Brook-Croton Gorge Watershed Protection Overlay
  - Town of Ossining Draft Local Law
  - Town of New Castle Local Law
  - Town of Cortlandt e code

- Water conservation codes
  - Town of Yorktown, NY
  - Livingston, NJ
  - Nassau County, NY
- Historic District Codes (with landscaping/vegetation requirements)
  - City of Schenectady, NY
  - Village of Rhinebeck, NY
  - City of Beacon, NY
- Other codes:
  - Town of Warwick, NY (Ridgeline Overlay District with vegetation and landscaping requirements)
  - Town of Warwick, NY (Aquifer Overlay District)
  - Village of Woodbury, NY (Water Quality Protection Overlay District)

Project Profile 5: Host and Maintain Source Water Mapping

TARGETED POTENTIAL CONTAMINANT SOURCE: Any Unwanted Contamination of Source Water in Critical Areas

Source water maps are recommended to be converted to an online format so that the maps can be easily viewed and digested by all audiences. These maps will be hosted and maintained by Orangetown and/or Rockland County Planning Department moving forward, allowing for ease of access to the potential contaminant source database and the ability to update maps as needed.

Future updates to the maps will enable Orangetown to adjust and respond to any emerging contaminant sources. These maps will also include the updated zoning and regulations discussed in Project Profile 4 once they are finalized.

GOALS AND PRIORITIES:

- Manage source water and critical area potential contaminant sources
- Continue to adapt to a changing landscape

Priority Level: Low

SUMMARY OF PROTECTION AND MANAGEMENT METHODS:
Methods to reduce the risk and mitigate the threat include:

- Continue to keep track of identified and emerging contaminant sources
- Host source water maps in a format that is accessible to the community

POTENTIAL COSTS:
Estimated Costs: $20,000
Potential costs include staff time to set up the source water maps in the mapping platform, staff time to maintain the database and answer any inquiries, staff time to update the source water maps as needed with additional contaminant sources. Costs also include annual fees to use and maintain the software where the data is housed.

Cost Classification: Medium

POTENTIAL FUNDING SOURCES:

- Town of Orangetown

POTENTIAL PARTNERSHIPS - PEOPLE AND AGENCIES INVOLVED:

- Town of Orangetown
- Plan Management Team
- Rockland County Department of Planning

SUGGESTED TIMELINE:
Short-term: Approximately 1 year for planning and data transfer
Ongoing: Continuous hosting and updating of the database

POTENTIAL BARRIERS:

- Identifying which platform to host the maps on
- Managing the cost of hosting the data
- Identifying staff member(s) to maintain and update the database

IMPLEMENTATION STEPS:

1. Plan Management Team and Town of Orangetown obtain source water map data from HVRC
2. Plan Management Team and Town of Orangetown identify the platform in which to host the maps
3. Determine where the hosted maps and database will be listed (either with the Town of Orangetown or with Rockland County Department of Planning)
4. Plan Management Team and/or Town of Orangetown staff member upload data into the mapping platform and develop maps
5. Determine who will be responsible for maintaining the database and what access will be given to the public
6. Determine a schedule for updating the database and maps
7. Publish the maps