

1.0 TOWN OF BETHLEHEM DRINKING WATER SOURCE PROTECTION PROGRAM (DWSP2)

Executive Summary *March 2025*

In 2021, the Town of Bethlehem was accepted to participate in New York State's Drinking Water Source Protection Program (DWSP2). In June 2021, the Town of Bethlehem Stakeholder Group began the DWSP2 plan development process in conjunction with a free technical assistance (TA) provider from the New York State Department of Health (DOH).

The Town focused its DWSP2 planning on assessing current and future water quality concerns of Bethlehem's 13 wells, one reservoir: Vly Creek Reservoir, and its contributing watershed. The Stakeholder Group consisted of the Town's Water Operator, Commissioner of Public Works, Supervisor from both the towns of Bethlehem and New Scotland, members from Bethlehem's Town board and planning board, Bethlehem's open space coordinator and the Executive Director of the Mohawk Hudson Land Conservancy. These individuals provided local knowledge of current conditions of the water supply and emerging concerns in the watershed. Together, the stakeholders and their TA provider interpreted data, developed maps, identified potential sources of contamination, developed an actionable list of protection methods, and identified funding and partnership opportunities. All data is available in the Town's final DWSP2 plan. By working through plan development, the Town now has a comprehensive, step-by-step implementation plan that can be used to address priorities in maintaining the reliability of the 14 water sources. Implementing DWSP2 can promote public health and safety, avoid preventable drinking water treatment costs, increase community confidence in drinking water, and strengthen community partnerships.

Vision and Goals

Vision Statement: "Ensure clean and safe drinking water for the Bethlehem and New Scotland communities. The communities of Bethlehem and New Scotland recognize the importance of safeguarding their drinking water sources for their residents. Ensuring clean and safe drinking water is of the highest priority. The Towns will continue to explore source water protection actions that safeguard public health."

Goals:

1. Improve the public's awareness throughout the watershed by educating the community on their drinking water sources and how these sources are sustained through protection and treatment methods.
2. Increase stewardship of the lands surrounding our water supply sources.
3. Identify improvements or practices for the protection of our water source.
4. Execute strategies to continuously inform community members about DWSP2 and the longstanding efforts from the plan being implemented.

Potential Contaminant Sources

The Stakeholder Group, and their TA provider compiled a list of current and future concerns based on available data and updated mapping. The following list of concerns were identified as priorities for the Town to protect the quality and longevity of its sources:

1. Land use in the source water area(s)
2. Nutrient loading from agricultural activities, fertilizer, herbicide, pesticide application, and septic system leaks
3. Nutrient loading from landowner activities
4. Potential risk and erosion caused by trespassers around the reservoir
5. Regulated potential contaminant sources

Protection and Management Strategies

To address the identified concerns, the stakeholder group and their TA provider determined strategies that can be implemented to prevent future contamination of their sources. The list below summarizes these strategies and highlights overlap with the Towns' Comprehensive Plan goals.

Obtain land acquisitions and conservation easements around the source*

To maintain natural resource conservation, the Plan Management Team will work with the Town of Bethlehem to own and control the land around the water sources to mitigate the concerns of non-point source runoff.

Establish and support partnership efforts that promote agricultural best management practices and grant initiatives. *

The Plan Management Team will work closely with the Albany Soil Water Conservation District and their efforts to communicate with and foster connection with local farmers. These efforts will advocate for the use and the importance of best management practices and technical assistance in implementing these practices.

Outreach and education to landowners and farmers activities residing in sensitive areas. *

The plan management team will work to create and distribute educational materials for promoting best garden practices and homeowner maintenance to help reduce runoff.

Increase awareness of sensitive reservoir area and reduce trespassing activities.

Trespassers around the reservoir are causing unexpected rapid erosion into the source, along with additional water quality and security concerns, causing additional sediment to enter the water source. The Plan Management Team plans to increase signage, video surveillance, and monitoring to increase awareness of the area's sensitivity and limit trespassing impacts.

Manage regulated potential contaminant sources inside the Source Water Protection Areas.*

To limit future potential contamination to the source, the one gas pipeline located near the southern end of Vly Creek Reservoir, SPDES facilities, and PBS facilities around the source water areas will be monitored. The plan management team will review annual inspection reports and increase communication with regulatory entities.

Conclusion

Overall, the Town of Bethlehem drinking water sources are of the highest quality. To maintain the quality of the reservoir and the wells, the plan management team and the Town would like to move forward with the most important component of DWSP2: Plan Implementation. Because the Town is dependent on these sources for its drinking water, it is crucial to implement the identified strategies to protect water quality for current and future generations. Potential funding sources and partnerships are listed in the full DWSP2 plan to aid the Town with DWSP2 implementation. For more information, please see a copy of the final DWSP2 plan.

Footnotes

*Related to priority recommendations indicated in the Town of Bethlehem comprehensive plan, Town of Bethlehem 2022 Comprehensive Plan.

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DWSP2 Plan

Town of Bethlehem Drinking Water Source Protection Program (DWSP2)

Prepared for

Town of Bethlehem

445 Delaware Ave
Delmar, NY 12054

March 2025

Prepared by

New York State Department of Health
Bureau of Water Supply Protection
Corning Tower
Albany, NY 12237



**Department
of Health**



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ABBREVIATIONS

| | |
|--------|---|
| AEM | Agricultural Environmental Management |
| AWQR | Annual Water Quality Report |
| BMP | Best Management Practice |
| CBS | Chemical Bulk Storage |
| CSO | Combined Sewer Overflow |
| DPW | Department of Public Works |
| DWSP2 | Drinking Water Source Protection Program |
| EFC | Environmental Facilities Corporation |
| GIS | Geographical Information System |
| GWUDI | Ground Water Under Direct Influence |
| MCL | Maximum Contaminant Level |
| MGD | Million gallons per day |
| NEIWPC | New England Interstate Water Pollution Control Commission |
| NLCD | National Land Cover Database |
| NRCS | Natural Resources Conservation Service |
| NYS | New York State |
| NYSAGM | New York State Department of Agriculture and Markets |
| NYSDEC | New York State Department of Environmental Conservation |
| NYSDOH | New York State Department of Health |
| NYSDOS | New York State Department of State |
| NYSP2I | NY State Pollution Prevention Institute |
| PBS | Petroleum Bulk Storage |
| PEST | Parameter Estimation |
| PCS | Potential Contaminant Source |
| PFAS | Per- and Polyfluorinated Substances |
| PMT | Plan Management Team |
| SDWIS | State Drinking Water Information System |
| SPDES | State Pollutant Discharge Elimination System |

ABBREVIATIONS (CONTINUED)

| | |
|-----------|--|
| SWAP | Source Water Assessment Program |
| SWCC | Soil Water Conservation Committee |
| SWCD | Soil and Water Conservation District |
| TA | Technical Assistance |
| TTHM | Total Trihalomethanes |
| USDA NRCS | United States Department of Agriculture Natural Resources Conservation Service |
| USEPA | United States Environmental Protection Agency |
| USGS | United States Geological Survey |
| WQIP | Water Quality Improvement Project |
| WRR | Watershed Rules and Regulations |
| WTP | Water Treatment Plant |

INTRODUCTION

The purpose of this Drinking Water Source Protection Program (DWSP2) Plan for the Town of Bethlehem is to protect public health and safety by preventing pollutants from entering the Town’s drinking water supply. Source water refers to surface water (streams, rivers, lakes, and reservoirs) and groundwater (aquifers) from which water is taken by a public water system for drinking or food processing purposes. DWSP2 is designed to empower municipalities to take action to improve and protect public water sources and the surrounding environment.

The Town applied for free technical assistance to create a tailored, locally developed DWSP2 plan that builds off previous work, helps align priorities, and fills gaps within current and future source water protection efforts. The Town was paired with a Technical Assistance (TA) Provider from the New York State Department of Health (NYSDOH) to develop a DWSP2.

To help guide municipalities and their TA Providers in developing DWSP2 plans, representatives of key state agencies, including NYSDOH, New York State Department of Environmental Conservation (NYSDEC), New York State Department of State (NYSDOS), and New York State Department of Agriculture and Markets (NYSAGM), among other organizations, created a draft “Framework for Creating a Drinking Water Source Protection Program.” The framework sections are as follows (Table 0-1).

Table 0-1: Phases and Key Components

| |
|--|
| Phase 1. Stakeholder Group |
| 1.1 Form a Stakeholder Group |
| 1.2 Establish Goals and Formulate a Vision |
| Phase 2. Drinking Water Source Assessment |
| 2.1 Develop an Overview of the Water System |
| 2.2 Prepare a Drinking Water Source Protection Map |
| 2.3 Create a Potential Contaminant Source Inventory |
| Phase 3. Protection and Implementation Strategies |
| 3.1 Identify Protection and Management Methods |
| 3.2 Develop an Implementation Timeline |
| Phase 4. Progression and Maintenance |
| 4.1 Designate a Plan Management Team |
| Phase 5. Implementation |
| 5.1 Implement the Plan |
| 5.2 Progress Reports |

The Town DWSP2 plan was developed with a local stakeholder group using the series of steps noted above. The stakeholder group was able to provide knowledge of current conditions of the water supply and emerging concerns. In developing the DWSP2 plan, the stakeholder group and the DWSP2 TA Provider interpreted data, created maps, identified potential sources of contamination, prepared an

actionable list of source water protection methods, and researched funding and partnership opportunities.

This plan prepares the Town for the most important component of DWSP2: Implementation. The DWSP2 plan will guide the Town and its partners to readily apply source water protection methods. This will help the town promote public health, avoid preventable drinking water treatment costs, increase community confidence in their drinking water, and strengthen community partnerships.

This document outlines the Town's DWSP2 Plan that will be updated, maintained, and implemented by the community. It is comprehensive and tailored to the Town's unique needs and goals. Ultimately, this plan offers a detailed road map for long-term protection of their drinking water sources.

BACKGROUND

The Town's public water supply utilizes multiple surface water and groundwater sources. In this report, the water sources are sorted into two groups: the New Scotland system and the Selkirk system. For the New Scotland system, source water is received from the Vly Creek Reservoir, the Stage III Diversion and two wells, hereafter called the New Scotland wells. The Stage III Diversion is a surface water intake on a tributary of the Onesquethaw Creek, where water is collected at a dam on Wolf Hill Road and transported via pipe into the Vly Creek Reservoir. For the Selkirk system, eleven wells and three infiltration galleries are used and are located along the Hudson River on Schemerhorn Island located in the Town of Bethlehem's Hamlet of Selkirk. Both areas were assessed for DWSP2. As of 2024, the Town's water system serves approximately 31,000 people through 12,000 service connections. The average daily demand is about 7.39 million gallons per day. The Public Water System identification number is NY0100191.

The Town's water system owns the land on which the water sources are located. However, the Vly Creek Reservoir, Stage III Diversion and the New Scotland Wells are located within the Town of New Scotland and a portion of New Scotland receives water from the Town of Bethlehem (Figure 21). Therefore, the Town of New Scotland has an interest in the development and implementation of this DWSP2 Plan.

At the end of 2023, the Town of Bethlehem's contract with the City of Albany expired which had allowed for the purchase of water from the City of Albany since 2003. The interconnection was constructed at a time when the Town of Bethlehem was experiencing severe drought and needed more water to meet its system's demand. Since the contract expired, the City of Albany was not included in this DWSP2 plan. However, the interconnection between the City of Albany and the Town of Bethlehem will be maintained as an emergency interconnection.

Bethlehem's watershed Rules and Regulations (WRR) were first enacted in 1930 and updated in 1979. WRR require certain components, including application of regulations, definitions, and general provisions. Optional sections include inspections; enforcement and remedies; waiver or variance

procedures and/or a separability statement. As of 2025, the Town's WRR are applicable to the Vly Creek Reservoir and its tributaries that discharge into the Reservoir.

In 2004, a Source Water Assessment Program (SWAP) report was prepared for the Town's water system by NYSDOH. The SWAP report included a delineation of contributing land areas, watershed and aquifer recharge areas, inventory of potential contaminant sources, and analysis of the susceptibility of the water supply to contamination. This assessment was referenced and enhanced for the DWSP2. The Town and DWSP2 TA Provider compiled and reviewed additional information, including but not limited to annual water quality reports (AWQR), local laws, and the Town's Comprehensive Plan.

Due to unusually high temperatures and a drought in September through October 2024, a late season algal bloom occurred in the Vly Creek Reservoir potentially causing an odor to residents' water. Bethlehem Water District No. 1 effectively removed the algae through its water treatment protocols and stopped the odor after the system was flushed. An evaluation and monitoring plan for the Vlyproject profile 3 Creek Reservoir was developed as well as improvements at the plant to address any future algal blooms.

In February 2025, the Town of Bethlehem discovered that biosolid fertilizers had been applied for agricultural use 2/3 miles from the reservoir. Upon learning about the use of biosolids, the Town increased the frequency of Bethlehem's water testing to ensure that our water remains safe to drink. All test results from the reservoir and New Scotland wellfield during this time remain in full compliance with federal and state safety standards.

This DWSP2 focuses on all of Bethlehem's water sources and contributing watersheds (see Figure 1). The watersheds have minimal development and few potential sources of contamination. The Town recognizes the importance of maintaining a high quality and reliable drinking water source for the long-term benefit of its residents. This plan will build off previous work and assess current and future water quality concerns. By working internally and in cooperation with the Town of New Scotland, the Town will implement the identified protection and management methods to maintain the long-term quality of their drinking water.

1.0 STAKEHOLDER GROUP

1.1 Form a Stakeholder Group

The first step in developing the Town DWSP2 Plan was forming a stakeholder group. Stakeholders with different backgrounds, knowledge, and work assignments assisted with the development of the plan. They include representatives from the Bethlehem Department of Public Works (DPW), Bethlehem Town and Planning Boards, the Town Open Space Coordinator and Chamber of Commerce, the Town GIS Coordinator, Mohawk Hudson Land Conservancy, Town of New Scotland, and the Albany County Health Department. The Hamlet of Selkirk is one of Bethlehem's Hamlets and is frequently mentioned in this plan as the location for the Selkirk well system. As a Hamlet, its

governing body and representation in this plan, comes solely from the Town of Bethlehem’s municipal members. All individuals who were a part of the stakeholder group at any point during plan development are listed with their affiliation in Table 1-1. The stakeholder group participated in regular meetings with the DWSP2 TA Provider to progress through the Framework and develop the DWSP2 Plan. A list of the scheduled meetings and summaries of the discussions is included in Appendix A.2. The stakeholder group assisted in creating a vision statement and goals. They also provided local knowledge and feedback during the drinking water source assessment phase and protection and implementation strategies phase. Finally, they assisted in making important decisions about the current stakeholder group members' roles and job positions that will lead future DWSP2 efforts as the Plan Management Team. For more information on this plan contact the Town of Bethlehem’s Department of Public Works at 518-439-4955.

Table 1-1: Town of Bethlehem Stakeholder Group

| Member Name | Relevant Affiliation(s) |
|--|--|
| George Kansas, P.E. ¹ | Town of Bethlehem Commissioner of Public Works |
| Dave Blenis ⁴ | Town of Bethlehem Chief Water Treatment Plant Operator |
| David VanLuven | Bethlehem Town Supervisor |
| Maureen Cunningham | Bethlehem Town Board Member |
| Rad Anderson | Town of Bethlehem Planning Board Member |
| Mark King | Executive Director, Mohawk Hudson Land Conservancy |
| Maureen McGuiness ² | President, Bethlehem Chamber of Commerce |
| Max Ferris | Albany County Department of Health |
| Doug LaGrange | New Scotland Town Supervisor |
| Lauren Axford | Town of Bethlehem Open Space Coordinator |
| Keith Menia ³ | Town of Bethlehem GIS Coordinator |
| 1 Left the stakeholder group in October 2023, former Point of Contact 2 Left the stakeholder group June 2022 3 Left the stakeholder group in August 2022 4 Secondary Point of Contact | |

1.2 Vision Statement and Goals

The Town stakeholder group created specific goals and a vision statement to guide future efforts. The goals are:

1. Improve and maintain the public's awareness throughout the watershed by educating the community on their drinking water sources and how these sources are sustained through protection and treatment methods.
2. Increase and maintain stewardship of the lands surrounding our water supply sources.
3. Identify improvements or practices for the protection of our water source.
4. Execute strategies to continuously inform community members about DWSP2 and the longstanding efforts from the plan being implemented.

After consideration of the community's goals, the vision statement was created and followed during the project:

Ensure clean and safe drinking water for the Bethlehem and New Scotland communities. The communities of Bethlehem and New Scotland recognize the importance of safeguarding their drinking water sources for their residents. Ensuring clean and safe drinking water is of the highest priority. The Towns will continue to explore source water protection actions that safeguard public health.

2.0 DRINKING WATER SOURCE ASSESSMENT

2.1 Water System Overview

The Town of Bethlehem serves drinking water to approximately 35,000 people through about 12,000 service connections. The Town currently draws public drinking water from a total of three main sources: one surface water system and two different groundwater well systems, listed below.

- Surface water drawn from the Vly Creek Reservoir located in the Town of New Scotland
- Groundwater from two wells located in the Town of New Scotland
- Groundwater from eleven wells and three infiltration galleries located along the Hudson River in the Town of Bethlehem

The 165-acre Vly Creek Reservoir has a dam on both ends and has a storage capacity of approximately 1.2 billion gallons. It was constructed in 1958 through a dike construction that utilized a natural bedrock depression as a holding basin. The reservoir is fed both by (1) rain, (2) water diverted by pipe from the nearby Onesquethaw Creek watershed, and (3) below-ground seepage from upslope regions.

The Town has two surface water intakes associated with the reservoir, both of which are located in the Town of New Scotland. One intake is situated in a tributary of the Onesquethaw Creek, referred to as the Stage III Diversion. Water is collected from this tributary at a dam on Wolf Hill Road and transported via pipe into the Vly Creek Reservoir. The Town's main surface water intake is located at

the northern end of the reservoir, from which water is collected for treatment and distribution at the New Salem Water Treatment Plant (WTP) on New South Salem Road. The Stage III Diversion and Vly Creek Reservoir are considered one surface water source, and this plan assesses all associated watersheds.

The treatment processes for the Town's surface water system consist of chlorination for disinfection purposes; coagulation with aluminum sulfate to facilitate removal of organic matter and other suspended and colloidal solids; rapid sand filtration; and corrosion control. Activated carbon systems are employed for taste and odor control as needed. Algal growth within the reservoir is managed through application of copper sulfate during summer months. From the New Salem WTP in New Scotland, water is pumped into a 5.7-million-gallon steel storage tank before water is delivered by gravity to Town of Bethlehem residents from North Bethlehem to Selkirk.

One groundwater area with two deep wells is located just north of the Vly Creek Reservoir in New Scotland, south of New Salem South Road. These wells, referred to as the New Scotland Wells, supplement the capacity at the New Salem WTP. Several water districts in the Town of New Scotland purchase water from the Town of Bethlehem New Salem WTP, including Font Grove Water District, Heldervale Water District, Swift Road Water District, and Feura Bush Water District. Additionally, residents within 150 feet of Route 85 nearby the New Salem WTP receive water from the Town.

The eleven wells along the Hudson, referred to as the Selkirk Wells, are a combination of traditional vertical wells and angled wells. There are six vertical wells, all with depths of screens ranging from 25 to 45 feet below mean sea level. The other five wells are angled wells, with screens that are 47 to 66 feet long that are under the Hudson River, with the shallow ends beginning 20 to 25 feet below mean sea level. Three of the vertical wells are located on the north bank of the Vloman Kill, within the Henry Hudson Park. The remainder of the wells are located south of the Vloman Kill.

Water from the Selkirk Wells are treated at the Clapper Road WTP. This facility was constructed in the 1990s and its raw water source was intended to be an infiltration gallery located along the Hudson River, immediately south of the confluence of the Vloman Kill and Hudson River. When the infiltration gallery was found to not produce the 6 million gallons per day (MGD) per the intended design, the eleven Selkirk Wells were drilled in the vicinity of the infiltration gallery to meet the raw water needs of the facility. These 11 wells deliver water to the infiltration galleries. From there, the original infiltration gallery pumps deliver up to 6 MGD to the Clapper Road WTP. The Town uses sodium permanganate and oxygen to oxidize iron and manganese found in the raw water, dissolved air flotation for the removal of organic materials, polyaluminum chloride (PCH-180) and a non-ionic polymer for coagulation, (4) Trident filter units for water purification, sodium hydroxide and carbon dioxide for pH adjustment, corrosion control and chlorine for disinfection.

All eleven Selkirk Wells are treated in a manner consistent with water from sources considered as "ground water under direct influence," or GWUDI, since they are located close enough to nearby

surface water that they receive direct surface water recharge. GWUDI sources for drinking water are subjected to additional treatment requirements like filtration prior to consumption by the public. Since the raw water undergoes clarification and filtration at the Clapper Road WTP, the GWUDI requirements are satisfied.

While the wells are treated under the GWUDI guidelines, it should be noted that the raw water source is still considered to be groundwater. This was determined because levels of dissolved iron and manganese in the raw water from the Towns wells are not consistent with the levels found in the Hudson River.

The ambient and raw water quality information described in this section was obtained through the Town of Bethlehem’s 2022 Annual Water Quality Report (AWQR), Water Withdrawal Report, and information provided by the stakeholder group. Information from this section can also be viewed on appendix A.4 Overview of Water System. Refer to Table 2-1 for the Town’s water quantity summary, which was calculated based on the combination of Bethlehem’s surface and groundwater sources.

Table 2-1: Town Water Quantity Summary

| | |
|---|-----------|
| Current Water Withdrawal Permit Expiration Date | 2/20/2029 |
| Total Permitted Water Withdrawal Capacity | 12.63 MGD |
| Average Daily Water Demand | 4.54 MGD |
| Maximum Daily Water Demand (Unofficial 3-day average in peak month – e.g., July) | 7.39 MGD |
| Daily Water Losses | 0.3 MGD |

In 2022, the Town exceeded the maximum contaminant level (MCL) for Total Trihalomethanes (TTHM) (Bethlehem Annual Water Quality Report 2022). TTHMs are a by-product of disinfection when chlorine reacts with organic matter (e.g., decomposing vegetation such as tree leaves, algae, or other aquatic plants). The Town has taken several corrective measures to address TTHM exceedances.

Per State regulations, the Town of Bethlehem sampled and reported on certain perfluoroalkyl substances, commonly referred to as PFAS. The three contaminants that were regulated in 2022 were PFOA, PFOS, and 1,4-dioxane. In 2022, the Town completed additional sampling for unregulated perfluoroalkyl substances at each of the wells that provide raw water to the Clapper Road WTP. It was found that two wells had concentrations that were high enough that the Town decided to take them off-line and not use them as drinking water sources. The Town will continue to

monitor these wells for PFAS compounds and will adjust operations as needed to comply with all applicable drinking water standards (Bethlehem Annual Water Quality Report 2022 Supplement).

2.2 Drinking Water Source Protection Mapping

2.2.1 Hydrogeological Setting

The Town and its water sources are in the Hudson Valley (Northeastern Coastal Zone) and Catskills Transition (Northern Allegheny Plateau) [ecoregions of New York State](#). The underlying bedrock is comprised largely of Ordovician-period sedimentary formations that are approximately 450 million years old (Reading Prong\Hudson Highlands).

Glaciers and receding flood waters that occurred about 15-20,000 years ago helped shape the landscapes by carving out softer stones and eroding peaks. Rivers, stream beds and basins were established with melt waters. This influenced much of the current terrain of the region, including deposited surficial geological beds of coarse-grained sands and gravels, silt, clay, and till, as well as steeply sloped bedrock regions. Karst topographic formations, or eroded carbonate rocks, are found throughout the watershed. Karst topography can lead to an unpredictable transportation of contaminants, which can be a concern for groundwater quality.

2.2.2 Drinking Water Source Protection Areas

Drinking water source protection areas were delineated to identify locations in the watershed that could potentially impact the source water. For surface waters serving public water systems, various protection areas can be identified. These include: (1) the Critical Area, or a protection area within a certain distance of a waterbody, and (2) the Extended Source Water Area, typically the broader contributing watershed. The Town stakeholder group decided that all areas within the watershed are a high priority, and a defined critical area was not needed. The group recommended that concerns are prioritized from the source outward. For example, potential land acquisitions would be prioritized closer to the water's edge compared to acquiring land further upland.

The Surface Source Water Protection Areas were derived using the USGS online spatial analysis tool: StreamStats. StreamStats is a United States Geological Survey Web-based Geographic Information Systems (GIS) application that provides users with tools for water resources planning and management purposes, and engineering and design purposes. The location of the surface water intakes was used in StreamStats to generate the drainage area in which water flows from the surrounding land into each intake. The DWSP2 Framework provides a step-by-step guide on how this was performed.

The stakeholder group initially focused on the watershed for the Vly Creek Reservoir, located in the Town of New Scotland. The Stage III Diversion watershed, which overlaps with the Town of New Scotland and the Town of Berne, was later incorporated into the DWSP2 Plan. An effort was made to collaborate with the Town of Berne regarding DWSP2 efforts, although there was no response.

Advanced modeling software (MODFLOW-2005 Groundwater Vistas) was used to create a three-dimensional model to determine which land areas contribute to each of the groundwater systems (See Appendix D for methodology). The models were used to produce a protective contribution area, referred to as the Wellhead Contribution Areas, which will act as Bethlehem’s groundwater Source Water Protection Areas.

The naming conventions and delineation methods for Bethlehem’s various source waters are summarized in Table 2-2.

Table 2-2: Drinking Water Source Protection Areas and Delineation Methods

| SYSTEM TYPE | PROTECTION AREA | DESCRIPTION | DELINEATION METHOD |
|--------------------|--------------------------------------|---|---|
| Surface Water | Surface Source Water Protection Area | Watershed or drainage basin of the Vly Creek Reservoir (2,100 acres) and Stage III Diversion (3,000 acres). These two watershed basins, functioning as a single system, are each considered <i>Surface Source Water Protection Areas</i> , due to their collective contribution to Bethlehem’s drinking water resources. | Calculated via USGS StreamStats |
| Groundwater Wells | Wellhead Contribution Area | Source Water Protection Areas for New Scotland Wells and Selkirk Wells. | MODFLOW-2005 Groundwater Vistas modeling software |
| Groundwater Wells | Ownership Area | Required under the NYS Sanitary Code to help reduce direct contamination to the wellhead(s) (Part 5, Subpart 5-1, Public Water Systems- Appendix 5-D.2 of New York State Sanitary Code). Wells serving public water systems shall be located such that the owner of the water system possesses ownership of 100 feet around the well. | 100-foot fixed radius around the wellhead locations in ArcGIS |

| | | | |
|-------------------|--------------|--|---|
| Groundwater Wells | Control Area | Required under the NYS Sanitary Code to help reduce direct contamination to the wellhead(s). Wells serving public water systems shall be located such that the owner of the water system controls land activities within 200 feet of the well. | 200-foot fixed radius around the wellhead locations in ArcGIS |
|-------------------|--------------|--|---|

2.2.3 Drinking Water Source Protection Maps

ESRI ArcGIS ArcMap Desktop v.10.8.2 was used to generate and analyze the drinking water source protection maps (Figures 1 through 21). Figures 22 through 24 were downloaded from the Town websites of Bethlehem, New Scotland, and Berne due to overlap with the Source Water Protection Areas. The remaining maps provide an overview of the conditions within the Source Water Protection Areas. Collectively, the maps provide an overview of the conditions within the Source Water Protection Areas.

- Figure 1. Overview
- Figure 2. Principal Aquifers
- Figure 3. Bedrock Geology
- Figure 4. Surficial Geology
- Figure 5. Hydrologic Soil Group
- Figure 6. Steep Slopes (New Scotland Area)
- Figure 7. NLCD Land Cover 2019 (New Scotland Area)
- Figure 8. Land Use (New Scotland Area)
- Figure 9. Protected Areas (New Scotland Area)
- Figure 10. New Scotland Wellhead Protection and Contribution Areas (New Scotland Area)
- Figure 11. Potential Contaminant Sources (New Scotland Area)
- Figure 12. Previous Spill Incidents (New Scotland Area)
- Figure 13. Private Septic Systems (New Scotland Area)
- Figure 14. Steep slopes (Selkirk Wellfield)
- Figure 15. NLCD Land Cover 2019 (Selkirk Wellfield)
- Figure 16. Land Use (Selkirk Wellfield)
- Figure 17. Protected Areas (Selkirk Wellfield)
- Figure 18. Potential Contaminant Sources (Selkirk Wellfield)
- Figure 19. Private Septic Systems (Selkirk Wellfield)
- Figure 20. Bethlehem Water Service Areas
- Figure 21. Zoning – Town of Bethlehem
- Figure 22. Zoning – Town of New Scotland
- Figure 23. Zoning – Town of Berne

Figures 2 through 5 display the regional context of Bethlehem’s various sources of water. Figure 2 shows the topography of the watersheds as well as the underlying principal aquifers. [Principal Aquifers](#) are defined in New York State as “aquifers known to be highly productive or whose geology suggests abundant potential water supply, but which are not intensively used as sources of water supply by major municipal systems at the present time.” The unconfined units found within the Bethlehem region are expected to produce water yields in the range of 10-100 gallons per minute. Figure 10 shows a detailed topographic view of the New Scotland Wellfield. The northeastern portion of the Selkirk Wellhead Contribution Area goes east of the Hudson River into the Village of Castleton-on-Hudson called the “low-risk area”, and this area is represented by a dashed line. The low-risk area does not need to be a primary focus of this plan, but the groundwater modeling shows that this area east of the Hudson has a low, but feasible, probability of contributing to the Selkirk wells under certain conditions (primarily when the Hudson River is at or approaching baseflow). Bethlehem must remain aware of this eastern floodplain in case there is an incident involving a contaminant of concern. If there is a spill in this floodplain, water operators should be aware that the contaminant could have been introduced to their aquifer while acknowledging that the risk is low. See Figures 1 through 5 and 15 through 20.

Geology at the surface and below ground can influence how water moves through the watershed. The Vly Creek Reservoir watershed is primarily composed of graywacke and limestone, with areas of karst topography (Figure 3). The Stage III Diversion watershed is primarily black shale. The New Scotland Wellhead Contribution Area and the Selkirk Wellhead Contribution Area is primarily graywacke (Figure 3). At the surface, all Source Water Protection Areas display a combination of bedrock, sand and gravel, and till (Figure 4).

Soils were also assessed in the Source Water Protection Areas. Soil types can play a role in runoff potential during significant storm events. The United States Department of Agriculture Natural Resources Conservation Service (USDA NRCS) groups soils that share similar runoff potentials. Soil group classifications consider runoff, infiltration rates, and how land activities can affect dynamics such as erosion and sedimentation of waterways. They are ranked by rate of infiltration with group A having the highest infiltration and group D having the lowest infiltration and highest runoff as described below.

- **Group A** soils have a high infiltration rate and low runoff. These soils consist of deep, well drained sands or gravelly sands and have a high rate of water transmission.
- **Group B** soils have a moderate infiltration rate. This group consists chiefly of deep well drained soils with a moderately fine to moderately coarse texture and a moderate rate of water transmission.
- **Group C** soils have a slow infiltration rate. This group consists of soils with a layer that impedes the downward movement of water or fine textured soils and a slow rate of water transmission.

- **Group D** soils have a very slow infiltration rate and high runoff potential. This group is composed of clays that have a high shrink-swell potential, soils with a high-water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission. If a soil is placed in Group **D** because of a high-water table, it may be assigned to a dual hydrologic group: **A/D**, **B/D**, or **C/D**. The first letter of the pair represents the soil’s group if drained and the **D** represents the natural condition.

The area nearest the Vly Creek Reservoir intakes are soil groups B, B/D, and C (Figure 5). The Selkirk Wellfield is primarily surrounded by soil groups A, B, and B/D. The Stage III diversion intake is mainly surrounded by group C soils. The Selkirk Wellhead Contribution Area has soil groups A and B.

Terrain slopes can affect land cover, land use, soil development, and runoff. Steep slopes are areas where hillsides with a 15-foot or greater vertical rise over a 100-foot horizontal run (or 15% slope) are found. While these areas can present obstacles to development, they also represent areas where there is less water infiltrating the ground and increased runoff, which would carry sediments and pollutants more quickly towards the water sources. Figure 6 shows that there are steep slopes northeast and to the west of the reservoir. Figure 15 suggests that the Selkirk Wellfield Contribution Area is mainly flat.

Land cover is the mixture of natural and human-influenced systems that cover a region. The National Land Cover Data (2019) shows that the Surface Source Water Protection Areas and New Scotland Wellfield are largely forested (i.e. 65%), which helps maintain water quality (Figure 7). About 19% of that area is a combination of pasture/hay, shrub/scrub, grassland/herbaceous, and cultivated crops. The Selkirk Wellfield displays mainly cultivated crops, deciduous forest, and low-medium intensity development (Figure 16).

Land cover and land use are important factors in identifying potential contaminant sources (Figures 11 and 18). Land use was analyzed by property type classification codes based on Albany County tax parcels. These maps (Figures 8, 14, and 17) provide context as to how each tax parcel in the Source Water Protection Area is intended to be used in the future (i.e., agricultural, residential, commercial, industrial). According to the DWSP2 Framework, areas zoned as low-density residential use (with limited or no septic system use) and open space are considered low risk. The general distribution of private, on-site septic systems is noted in Figures 13 and 20 based on “point centroids,” or the central location of each tax parcel.

Table 2-3: Land Cover in Source Water Areas

| Land Cover Classification | Percentage |
|---------------------------|------------|
| Open Water | 3.50% |
| Developed, Open Space | 6.00% |

| | |
|------------------------------|--------|
| Developed, Low Intensity | 2.34% |
| Developed, Medium Intensity | 0.53% |
| Developed, High Intensity | 0.04% |
| Barren Land | 0.15% |
| Deciduous Forest | 15.92% |
| Evergreen Forest | 13.37% |
| Mixed Forest | 37.32% |
| Shrub/Scrub | 1.40% |
| Herbaceous | 2.04% |
| Hay/Pasture | 12.69% |
| Cultivated Crops | 1.65% |
| Woody Wetlands | 2.39% |
| Emergent Herbaceous Wetlands | 0.65% |

The Town has been proactive about seeking opportunities to acquire lands that are critical for source water protection. Therefore, parcels that the Town is in the process of acquiring are highlighted in Figures 8 and 9. Another component of land use is whether parcels are protected from future development and water quality impacts beyond land use classifications or zoning. Figure 9 highlights (1) parcels that are owned by the Town or NYS (i.e., protected “in fee”) and (2) parcels that are protected by conservation easement according to the NYS Protected Area Database. These maps can be used as a reference for implementation strategy planning.

Historically, few spill incidents have occurred within all Source Water Protection Areas based on NYSDEC’s Spill Incident Database (Figure 12). The spills database contains records of chemical and petroleum spill incidents. Data records may not be complete. Recorded spills only occurred in the Surface Source Water Protection Area, and none were detected in the Selkirk Wellhead Contribution Area. Most recorded spills involved drinking water treatment plant chemicals at the New Salem Water Treatment Plant, which is designed to contain and address these issues. Therefore, these spills did not endanger the drinking water sources or public health. The Town will continue to monitor the spills database in the future to maintain awareness of any possible future spills within the Source Water Protection Areas.

2.3 Potential Contaminant Source Inventory

A potential contaminant source inventory was assembled for the Town (Appendix A.6) and includes a list of potential contaminant sources (PCS) that may impact the quality of drinking water sources, if improperly managed.

The estimated PCS locations identified by publicly available data sets for a wide range of potential point sources of contamination. It is important to recognize that these are not sources of contamination, but rather representative areas with potential risk based on the history of surface water contaminants associated with certain land uses. Their mapped presence in the Source Water Protection Areas provided the Town with guidance on categories of land uses warranting attention.

Figures 11 and 18 show the location of all potential contaminant sources mapped within the Source Water Protection Areas. It should be noted that the gas pipeline layer on these maps is a generalized layer due to security concerns with sharing shapefiles. More accurate pipeline locations can be found on the NPMS (National Pipeline Mapping System) [Public Viewer](#).

Overall, there are few potential sources of contamination near Bethlehem’s drinking water sources, but all identified potential contaminant sources should be monitored in the future. The Town has identified strategies to help maintain these low levels of concern.

The data provided lists the facility, address, and information source in addition to key attributes associated with proximity to the Source Water Protection Areas. The data is classified by overall general category as defined in the Framework. Some PCS are categorized as “other”, which means that they did not fall into the general categories. Potential future sources of contamination are also listed in the PCS inventory. These sources could emerge in the near or far future, and keeping track of these sources is critical to be able to protect drinking water. The PCS categories assessed and identified within the Town’s Source Water Protection Areas are listed in Table 2-3.

Table 2-4: Potential Contaminant Sources in the Town Source Water Protection Areas

| Potential Contaminant Source Category | Source | Identified |
|---|---|------------|
| Bulk Storage | Chemical Bulk Storage | Yes |
| | Major Oil Storage Facilities | No |
| | Petroleum Bulk Storage Facilities | Yes |
| Waste Management and Disposal | Active Landfills | No |
| | Inactive Landfills (Title 12) | No |
| | Hazardous Waste Management Facilities | No |
| | Land Application Sites | No |
| | Vehicle Dismantling Facilities | No |
| Contamination Sites or Incidents | Remediation Sites | No |
| | Spill Incidents | No |
| | Orphan Oil and Gas Wells | No |
| | Mines | No |
| | Historical Abandoned Mines | No |
| Discharge to Water | State Pollutant Discharge Elimination System Permitted (SPDES) Facilities | Yes |
| | Combined Sewer Overflows (CSOs) and Sanitary Sewer Overflows (SSOs) | No |
| Transportation | Airports | No |
| | Transportation Corridors | No |

| | | |
|----------------------------------|--|-----|
| | Road and Maintenance Facilities | No |
| | Salt and Deicers Storage | No |
| Agriculture | Agricultural Activities | Yes |
| Residential Sources | On-Site Septic Systems | Yes |
| | Lawn and Garden Chemicals | Yes |
| | Waterfront Property Management | No |
| Conveyances and Pipelines | Oil and Gas Pipelines | Yes |
| Other | Golf Courses | No |
| | Marinas and Boat Launches | No |
| | Stormwater | No |
| | Toxic Release Inventory Facilities | No |
| | Fire Training and Dedicated Fire Training Facilities | No |
| | Nutrient Loading (Lakes Only) | No |
| | Saltwater Intrusion | No |
| | Road Salt Application | No |

3.0 PROTECTION AND IMPLEMENTATION STRATEGIES

Since the Town is dependent on multiple water sources, it is crucial to implement effective strategies for current and future protection. Overall, the Town’s wells and reservoir provide quality and adequate sources of water for residents. Implementation of the identified strategies will allow the Town to maintain the current condition of the source water and meet the vision and goals outlined by the Town’s stakeholder group.

3.1 Protection and Management Methods

A variety of protection and management methods can help address the Town of Bethlehem’s priority issues and potential contaminant sources to protect the source water. Summarized below are several regulatory and non-regulatory methods recommended as options in the DWSP2 Framework. Section 3.1.4 highlights the priority issues and associated protection and management methods identified by the stakeholder group.

3.1.1 Land Use Tools and Methods

The broad category of land use tools and methods includes both regulatory and non-regulatory methods for mitigating potential contaminant sources. Regulatory methods include zoning ordinances, updating Watershed Rules and Regulations to address current and emerging concerns, designation of critical environmental areas (CEAs) that require additional reviews and oversight, inter-municipal agreements, etc.

Non-regulatory methods include land purchase or voluntary conservation easements, encouraging or incentivizing the best management practices (BMPs), and intermunicipal

organizations. Other examples include improved roadway maintenance, enhanced staffing for inspections and enforcement, and planned maintenance of stormwater and wastewater infrastructure. Certain actions can minimize adverse impacts of climate change, including tree planting, vegetated buffers, wetland restoration, and floodplain management to help reduce flood flows and erosion of the stream bed and banks.

3.1.2 Monitoring and Reporting

Additional water quality monitoring throughout the source water area may help locate specific areas where contamination is entering the source water. Identifying and addressing sources of contamination before they reach the water intake could eliminate or reduce the need for additional treatment. A detailed review of current monitoring plans and findings can identify gaps and highlight potential areas of vulnerability. Additionally, expanded monitoring could provide early warning of the presence of emerging contaminants.

3.1.2 Public Education and Outreach

Informing the public and providing educational tools to teach them about source water protection can reduce the risk of contamination from residential sources. Public involvement in monitoring programs (community science) can be a highly effective means of building understanding of source water area issues and a commitment to stewardship.

The following questions should be considered when identifying potential outreach approaches:

1. Who are your target audience(s) and what do you want them to do in response to your project (e.g., what behaviors you seek to change, or actions you want them to take in because of the information provided)?
2. What are your key messages and where do you want to direct people to get more information on the topic?
3. Are messages short, long, require graphics, etc.?
4. How do you plan to get the information out? (in person, email, digitally, direct mail)?
5. Who are the partners who can help you get the information out?
6. What is your budget? Example strategies for education and outreach include digital/social media, paid advertising, press releases, newsletters, factsheets and flyers, email blasts, signage, tabling/presenting, community events, and training.

3.1.4 Priority Issues

Discussions were held with the stakeholder group to understand the Town's priority issues. These issues were ranked on a high, medium, or low scale in order of importance based on several factors, including the Town's existing concerns, observed issues, gaps in protection efforts, and proximity of potential contaminant sources to the water sources. Issues with existing concerns and gaps in current efforts were prioritized first. With each priority issue, a targeted potential contaminant source was identified along with goals to reduce or mitigate the issue. Refer to Appendix B for a complete list of project profiles with implementation steps and protection and management methods for each priority issue.

PRIORITY 1

The first priority for the Town is to remain proactive about land use around the Surface Source Water Protection Area and the Wellhead Contribution Areas. New development associated with potential contaminant sources could occur in sensitive areas around the sources. Potential contaminants may include nutrients, sediments, lawn and garden management, salt/chlorides, and unregulated/newly regulated contaminants, among others that can negatively impact water quality. Eleven wells are in the Town of Bethlehem's jurisdiction. Two wells and the Vly Creek Reservoir are located in the Town of New Scotland's jurisdiction. While the Town of Bethlehem Water District owns the land in which each source is located, the Town is proactively seeking opportunities to acquire additional land and easements around both surface and groundwater sources for source water protection. Bethlehem plans to continue prioritizing this protection strategy and will consider incorporating designated Source Water Protection Areas into upcoming Bethlehem zoning updates. Bethlehem will collaborate with the Town of New Scotland in future zoning updates regarding drinking water sources. A cooperative agreement between the Towns of Bethlehem and New Scotland will also be explored.

PRIORITY 2

The second priority for the Town of Bethlehem is to consider current and future agricultural activities. Runoff that occurs within the Source Water Protection Areas, particularly around the Vly Creek Reservoir, may impact water quality by adding nutrients to the reservoir. Secondary issues may arise if not addressed (e.g. algal blooms). To reduce nutrient loading, Bethlehem will enhance communication with and support the work of the Albany County Soil and Water Conservation District and other community partners as needed to promote BMP and Agricultural Environmental Management (AEM).

PRIORITY 3

The third priority for the Town is outreach and education for residents and private landowners in the Source Water Protection Areas. The Town will address three topics through outreach and education: lawn and garden management, private on-site septic system maintenance, and general awareness of the water system and surrounding area. To reduce runoff from lawn and garden activities, the Town will share best management practices such as utilizing native plants, riparian buffers, and proper fertilizer and pesticide application. Pesticides include herbicides, insecticides, and fungicides. To reduce the impact of biological leaks and other potential contaminants from entering water sources via failing septic systems, Bethlehem will improve communications and informational resources regarding on-site septic system maintenance. At the time of this report, municipalities in Albany County are not eligible for NYS Environmental Facilities Corporation (EFC) Septic System Replacement Fund. The Town would benefit from the EFC Septic System Replacement Fund should it become available in the future. Lastly, the Town will increase awareness of the drinking water system and sources to build public confidence and

awareness for current or future potential contaminant source concerns. The Town plans to be proactive in outreach efforts and open lines of communication with residents within the Source Water Protection Areas as well as residents served by Bethlehem Water District. This priority will help the Town meet several of the overarching DWSP2 goals, including the creation of an informational website and hosting multiple public outreach meetings each year.

PRIORITY 4

The fourth Priority is to enhance reservoir security. The Town has observed trespassing activity in sensitive areas near the Vly Creek Reservoir. Trespassing activity, such as foot traffic and ATV use, has caused erosion of the shoreline, among other concerns. Bethlehem plans to improve signage, video surveillance, and monitoring to increase awareness of the area’s sensitivity and limit trespassing impacts. It is suggested to add more vegetation around the reservoir to decrease erosion.

PRIORITY 5

A fifth priority is to manage regulated potential contaminant sources inside the Source Water Protection Areas. There is one gas pipeline located near the southern end of Vly Creek Reservoir that should be monitored in the future. Pipeline crossings pose risks of spills and leaks that could impact water quality. There are also SPDES facilities and PBS facilities that are not owned by the Town. Bethlehem plans to monitor the area and review annual inspection reports, increasing communication with the regulatory entity.

3.2 Implementation Timeline

For each protection and management method identified, the stakeholder group has established a step-by-step process for implementation. Refer to Appendix B for the project profiles, which identify project partnerships needed, potential funding sources, costs estimates, project timing, and step-by-step implementation processes. Refer to Appendix A.7 for a table summary of the implementation timeline for each protection and management method. Please note that potential funding sources are not guaranteed. It is the responsibility of the Town to determine eligibility and apply for any potential funding source listed in this report.

4.0 PLAN PROGRESSION AND MAINTENANCE

This DWSP2 plan was developed to provide the Town of Bethlehem with the tools and information, including the potential contaminant source list and implementation timeline, needed to protect the drinking water sources. A Plan Management Team (PMT) is recommended to oversee the implementation of the plan. The PMT is also responsible for generating and sharing progress reports with the community.

The Town’s stakeholder group created a PMT based on job titles that will hold responsibilities in DWSP2 implementation long term. To continue implementation and plan progression of DWSP2, the stakeholder group chose to designate job titles rather than specific individuals. PMT duties will be the responsibility of any incumbent of the job titles specified in Table 4-0 and Appendix A.8. Members were

selected based on their knowledge of the water system, position, and potential to lead or contribute to implementation of the recommended actions. The PMT is encouraged to include two members from each organization to enable transfer of institutional knowledge and succession planning. The Town of Bethlehem Commissioner of Public Works can designate liaisons to represent PMT members.

The PMT review progress towards implementation and review any issues or emerging concerns during their regularly scheduled meetings. Meetings may be held quarterly to start than determined based on the PMT decision on follow ups. Members are expected to coordinate with one another to share the ideas and methods contained within the plan. Annual progress reports should be produced and shared with NYSDEC, NYSDOH and the community. The PMT is expected to update the DWSP2, reflect on progress and emerging issues annually. For more information about this DWSP2 plan and the PMT, contact the Town of Bethlehem’s Public Works Commissioner from the contact provided in table 4-0.

Table 4-0: Plan Management Team

| Title | Contact Information* | | |
|--|----------------------|--|----------------------------|
| | Current Incumbent | Current Incumbent Email | Point of Contact Telephone |
| T. Bethlehem Public Works Commissioner ¹ | Paul Penman | ppenman@townofbethlehem.org | (518) 439-4955 |
| T. Bethlehem Chief Water Treatment Plant Operator ² | Dave Blenis | dblenis@townofbethlehem.org | (518) 765-4433 |
| T. Bethlehem Open Space Coordinator | Lauren Axford | laxford@townofbethlehem.org | |
| T. Bethlehem Planning Board Member | Rad Anderson | randerson@townofbethlehem.org | |
| New Scotland Town Representative | Doug LaGrange | dlagrange@townofnewscotland.com | |
| Albany County Health Department – Short term/as needed | Max Ferris | maxwell.ferris@albanycountyny.gov | |
| *Emails and names may be subject to change as members of the plan management team change | | | |
| 1 Primary point of contact | | | |
| 2 Secondary point of contact | | | |

5.0 IMPLEMENTATION

5.1 Implement the Plan

The PMT is tasked with overseeing the implementation of the DWSP2 Plan. Steps for implementing the plan below will aid in ensuring its usefulness for the Town of Bethlehem.

Steps to implementing the plan.

1. Start with priority action from the implementation timeline table.
2. Review the project profile for the action including steps.
3. Assign how work will be divided for the project.
 - a. For example, if one of the earlier steps is to contact a local partner, who will conduct that outreach? Once that individual/group is on board, designate individuals for the remaining tasks.
4. Identify the lead for the project.
5. Implement project. Note that certain projects may be recurring. Therefore, certain steps for the project will become routine over time and allow for projects to be implemented simultaneously. If this is not the case, review the project with the team before considering it completed/closed out and moving on to the next action.
6. The team may decide to complete a retrospective review of how the implementation action went, to enhance the process moving forward.

Items for the plan management team to consider:

- The team may decide to implement one action at a time or have certain actions concurrently.
- The team should frequent the state DWSP2 webpage for any new templates or resources that will aid with plan implementation.
- The team may decide to incorporate the DWSP2 plan into future Comprehensive Plan updates.

5.2 Progress Reports

An additional responsibility that the PMT is tasked with is to generate and share progress reports with the community to build support for implementation strategies.

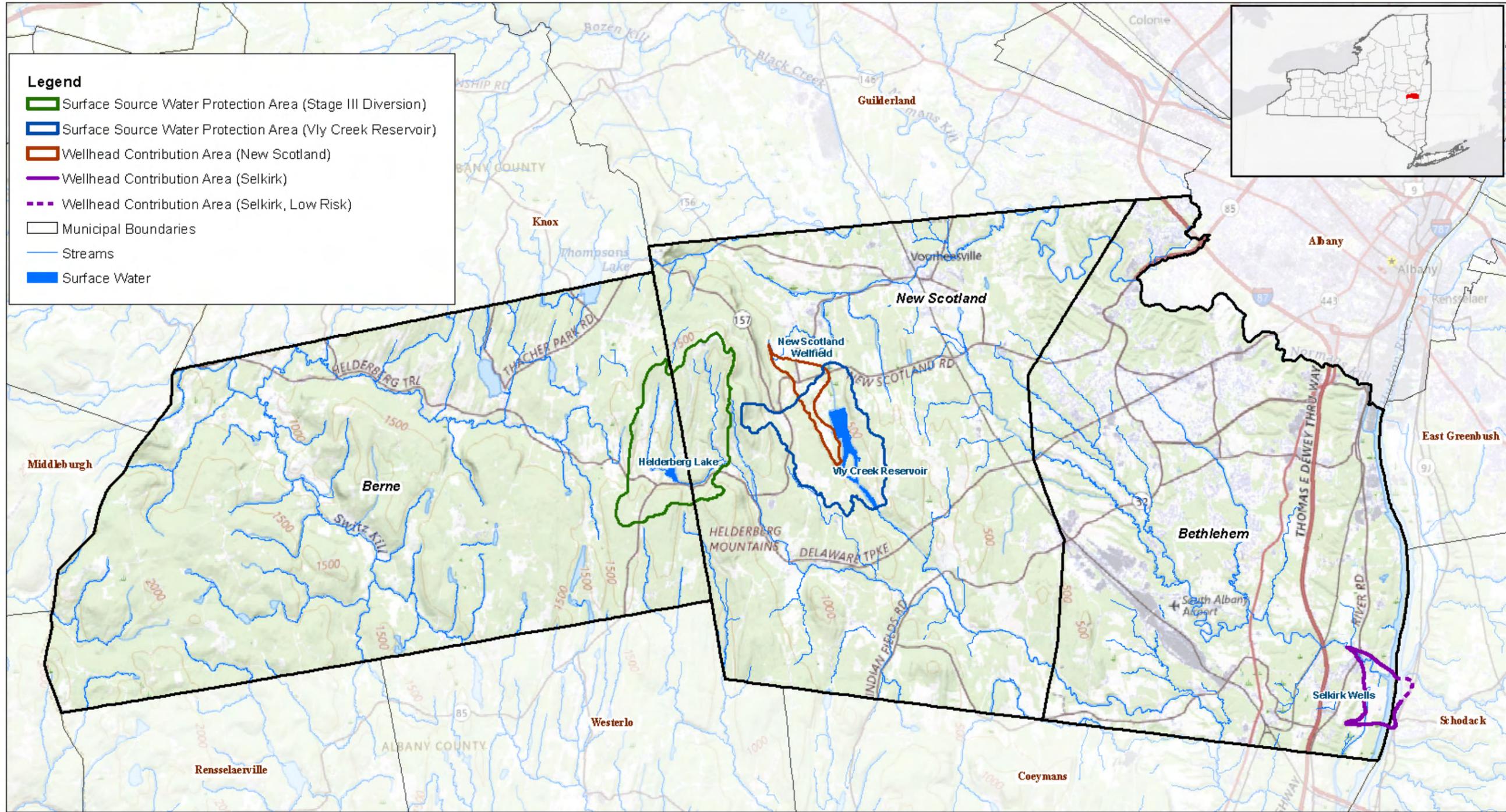
6.0 CONCLUSION

This DWSP2 plan serves to guide the Town toward the implementation of various methods designed to protect the Town's drinking water sources: Vly Creek Reservoir and Stage III Diversion, Selkirk Wellfield, and New Scotland Wellfield. The drinking water maps outline the Source Water Protection Areas that are a priority for protection, and the potential contaminant source inventory within these priority areas identifies potential sources of contamination within the watershed. The project profiles included in Appendix B of this plan outline specific goals, partnerships, funding opportunities, and implementation steps to complete a variety of projects that align with the Town's goals and vision. The Town's PMT will use this plan to progress forward with drinking water source protection activities.

Figures

Figure 1
Regional Overview

Town of Bethlehem DWSP2 - Overview



0 1.25 2.5 5 7.5 10 Miles



Data Sources: ESRI, USGS, NYS GIS Clearinghouse, CEH BWSP GIS

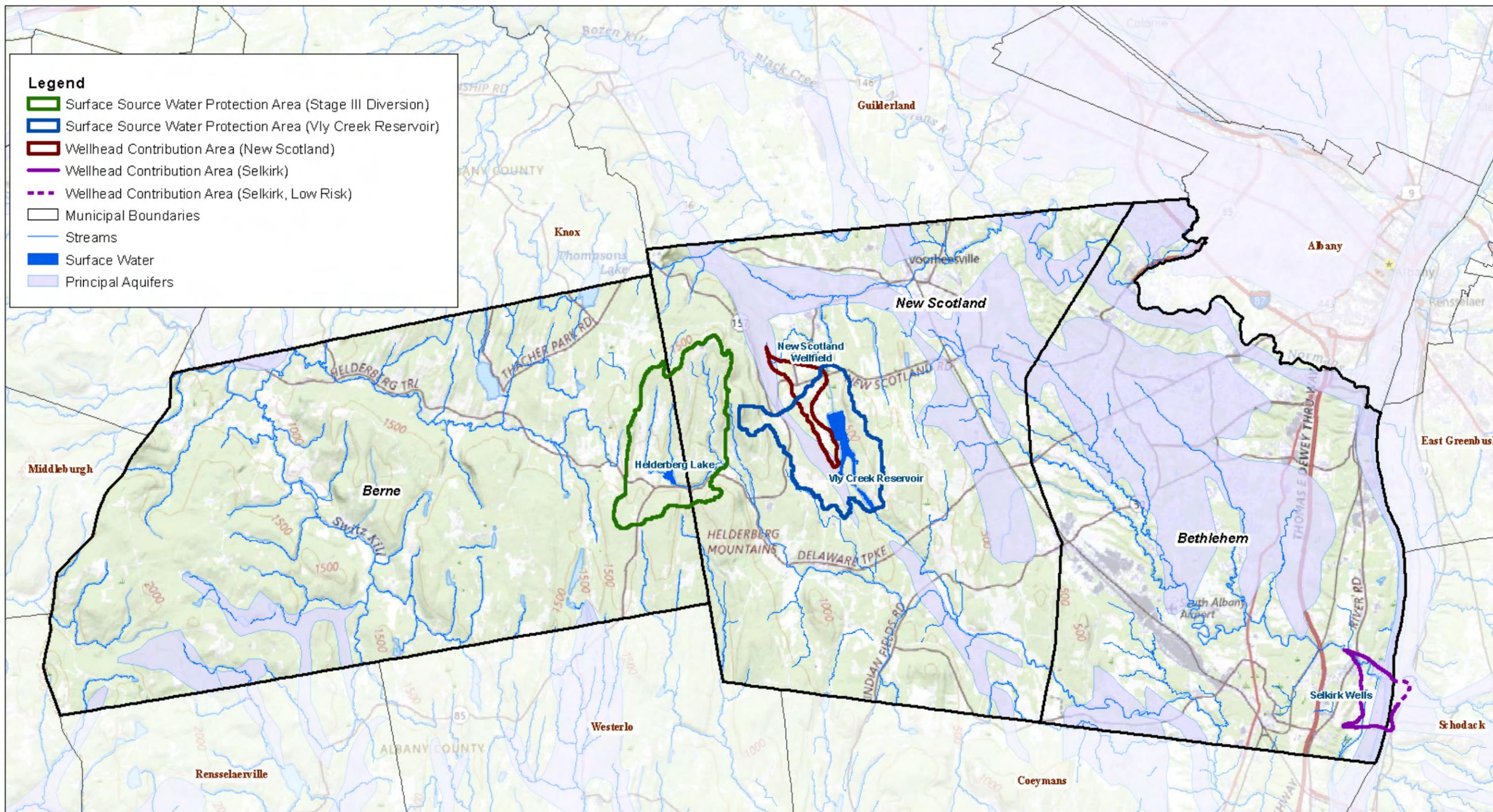


Disclosure: Geographic data represented on this map are based on entries to the Safe Drinking Water Information System (SDWIS), Department of Health, and/or other government agencies. As such, the map may contain errors or inaccuracies, and represents a generalized description of the area. Basemap provided by the Environmental Systems Research Institute (ESRI).

Center for Environmental Health,
Bureau of Water Supply Protection GIS
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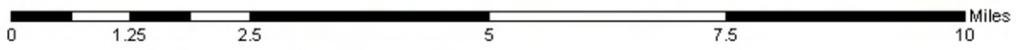
Figure 2
Regional Aquifers

Town of Bethlehem DWSP2 - Principal Aquifers



Legend

- Surface Source Water Protection Area (Stage III Diversion)
- Surface Source Water Protection Area (Vly Creek Reservoir)
- Wellhead Contribution Area (New Scotland)
- Wellhead Contribution Area (Selkirk)
- Wellhead Contribution Area (Selkirk, Low Risk)
- Municipal Boundaries
- Streams
- Surface Water
- Principal Aquifers



Data Sources: ESRI, USGS, NYS GIS Clearinghouse, CEH BWSP GIS

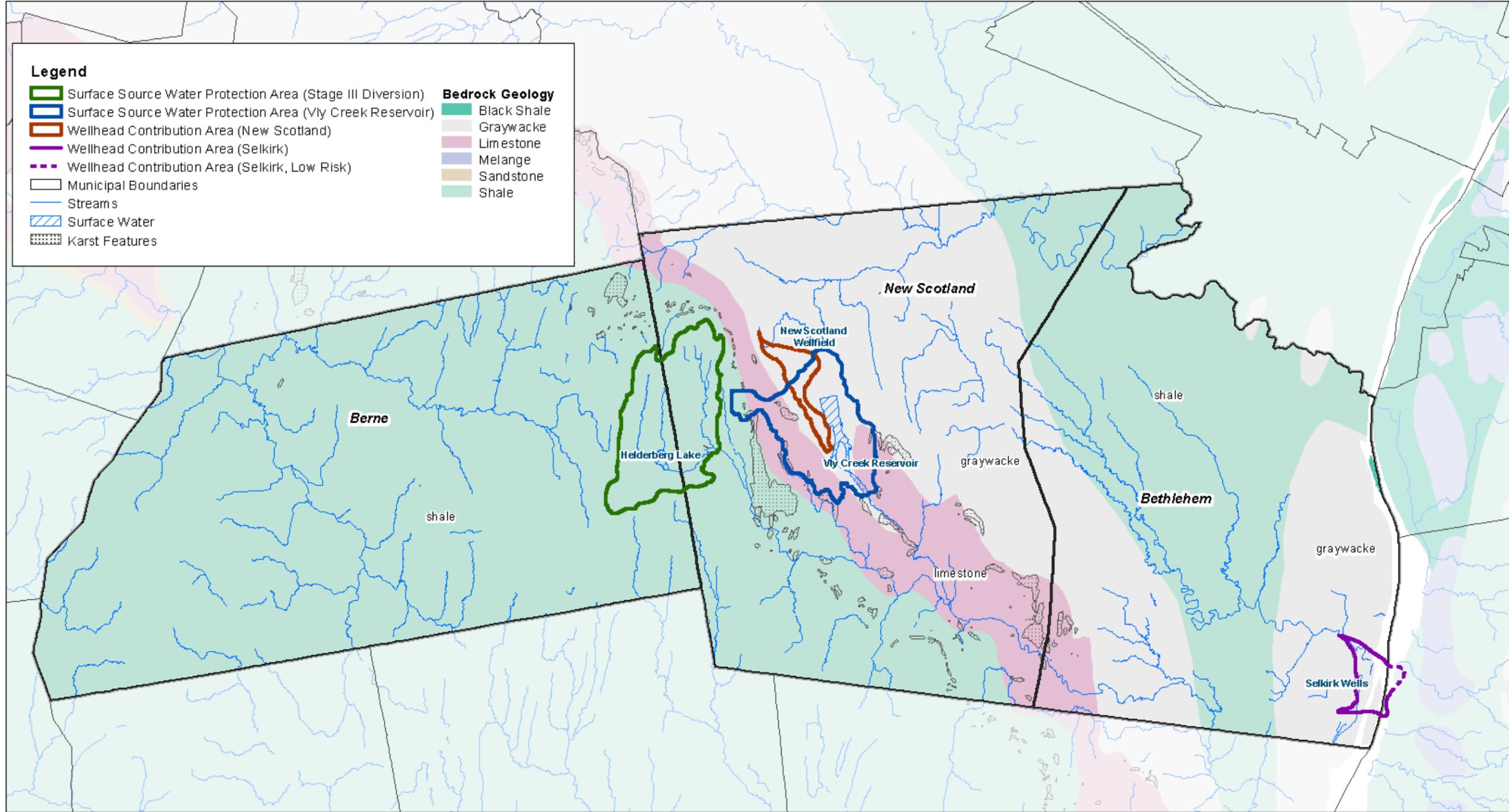


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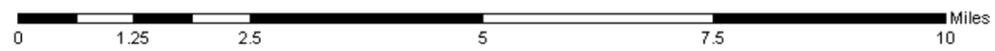
Figure 3
Regional Bedrock Geology

Town of Bethlehem DWSP2 - Bedrock Geology



Legend

| | |
|--|------------------------|
| Surface Source Water Protection Area (Stage III Diversion) | Bedrock Geology |
| Surface Source Water Protection Area (Vly Creek Reservoir) | Black Shale |
| Wellhead Contribution Area (New Scotland) | Graywacke |
| Wellhead Contribution Area (Selkirk) | Limestone |
| Wellhead Contribution Area (Selkirk, Low Risk) | Melange |
| Municipal Boundaries | Sandstone |
| Streams | Shale |
| Surface Water | |
| Karst Features | |



Data Sources: ESRI, USGS, NYS GIS Clearinghouse, NYS DEC, CEH BWSP GIS

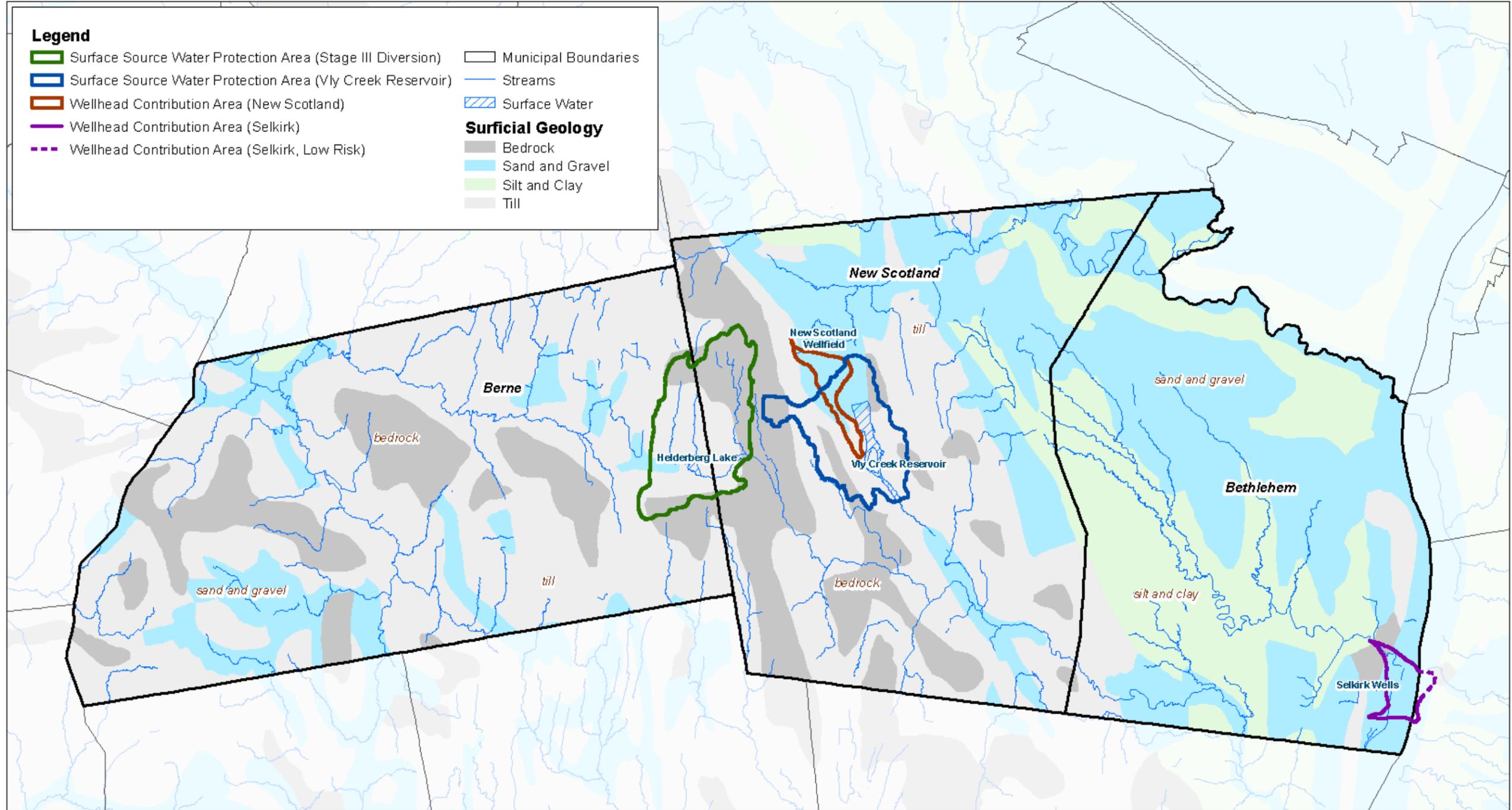


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Bureau of Water Supply Protection GIS
Data Downloaded: 4/3/2023

Disclosure: Geographic data represented on this map are based on entries to the Safe Drinking Water Information System (SDWIS), Department of Health, and/or other government agencies. As such, the map may contain errors or inaccuracies, and represents a generalized description of the area. Basemap provided by the Environmental Systems Research Institute (ESRI).

Figure 4
Regional Surficial Geology

Town of Bethlehem DWSP2 - Surficial Geology

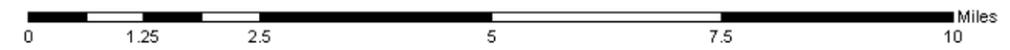


Legend

- Surface Source Water Protection Area (Stage III Diversion)
- Surface Source Water Protection Area (Vly Creek Reservoir)
- Wellhead Contribution Area (New Scotland)
- Wellhead Contribution Area (Selkirk)
- Wellhead Contribution Area (Selkirk, Low Risk)
- Municipal Boundaries
- Streams
- Surface Water

Surficial Geology

- Bedrock
- Sand and Gravel
- Silt and Clay
- Till



Data Sources: ESRI, USGS, NYS GIS Clearinghouse, CEH BWSP GIS

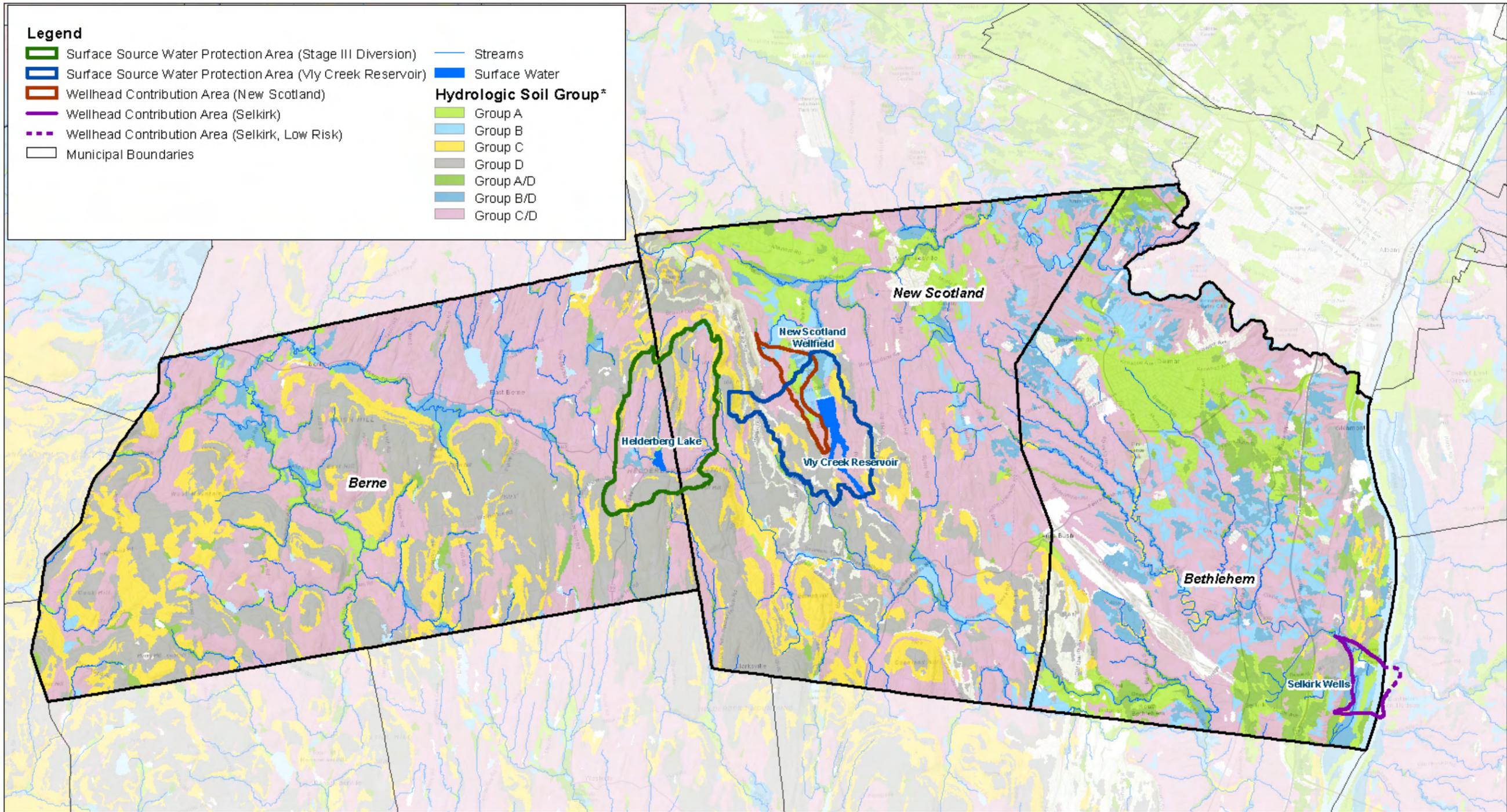


Disclosure: Geographic data represented on this map are based on entries to the Safe Drinking Water Information System (SDWIS), Department of Health, and/or other government agencies. As such, the map may contain errors or inaccuracies, and represents a generalized description of the area. Basemap provided by the Environmental Systems Research Institute (ESRI).

Center for Environmental Health,
Bureau of Water Supply Protection GIS
Data Downloaded: 4/3/2023

Figure 5
Regional Hydrologic Soil Group

Town of Bethlehem DWSP2 - Hydrologic Soil Group



Data Sources: ESRI, USGS, NYS GIS Clearinghouse, CEH BWSP GIS



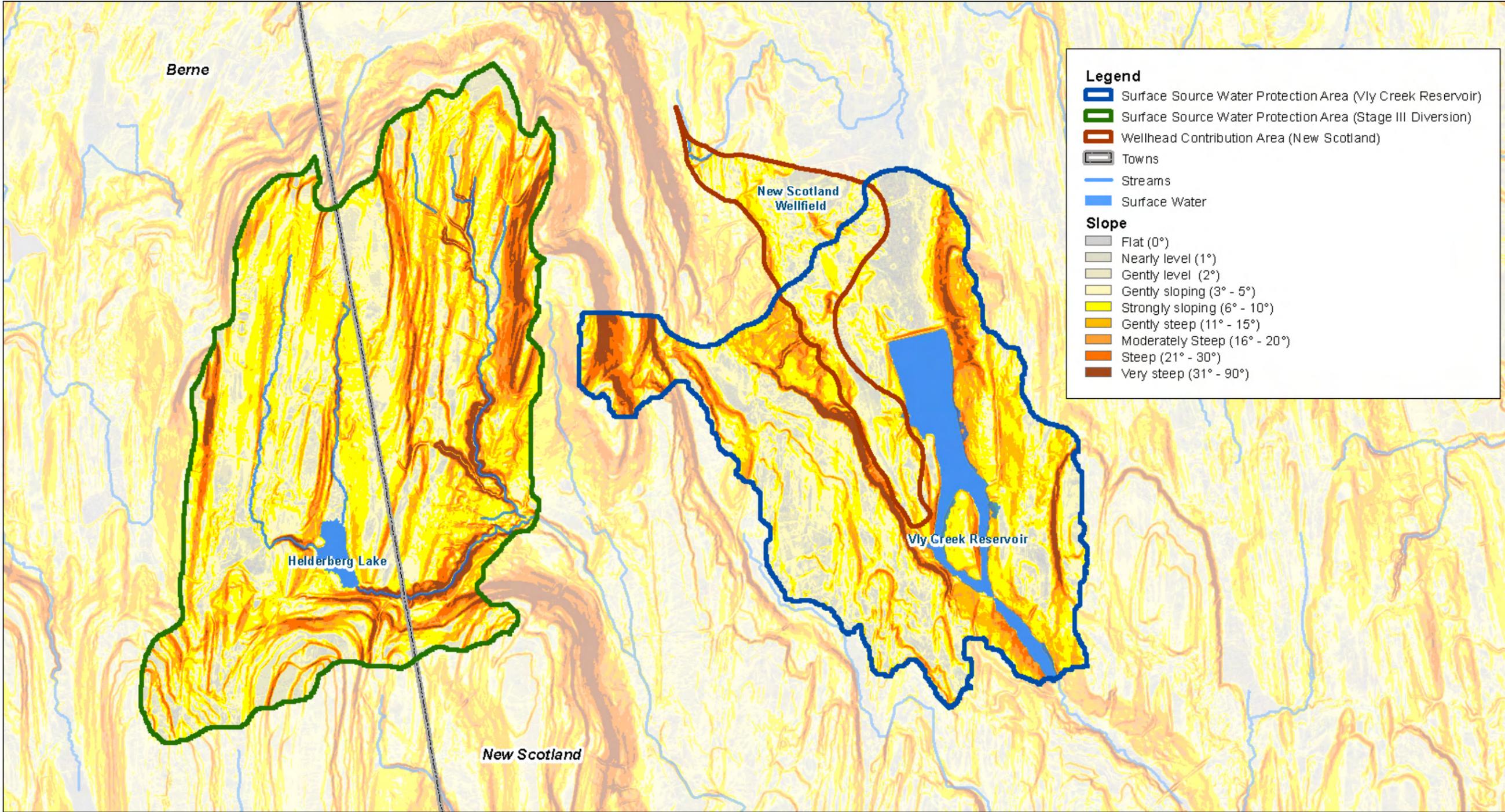
*Refer to Report Section 2.2.4 for Hydrologic Soil Group Classification Descriptions.

Disclosure: Geographic data represented on this map are based on entries to the Safe Drinking Water Information System (SDWIS), Department of Health, and/or other government agencies. As such, the map may contain errors or inaccuracies, and represents a generalized description of the area. Basemap provided by the Environmental Systems Research Institute (ESRI).

Center for Environmental Health,
Bureau of Water Supply Protection GIS
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Figure 6
Steep Slopes (New Scotland Area)

Town of Bethlehem DWSP2 - Steep Slopes (New Scotland)



Legend

- ▬ Surface Source Water Protection Area (Vly Creek Reservoir)
- ▬ Surface Source Water Protection Area (Stage III Diversion)
- ▬ Wellhead Contribution Area (New Scotland)
- Towns
- ▬ Streams
- ▬ Surface Water

Slope

- Flat (0°)
- Nearly level (1°)
- Gently level (2°)
- Gently sloping (3° - 5°)
- Strongly sloping (6° - 10°)
- Gently steep (11° - 15°)
- Moderately Steep (16° - 20°)
- Steep (21° - 30°)
- Very steep (31° - 90°)

0 0.25 0.5 1 1.5 2 Miles



Data Sources: ESRI, USGS, NYS GIS Clearinghouse, CEH BWSP GIS

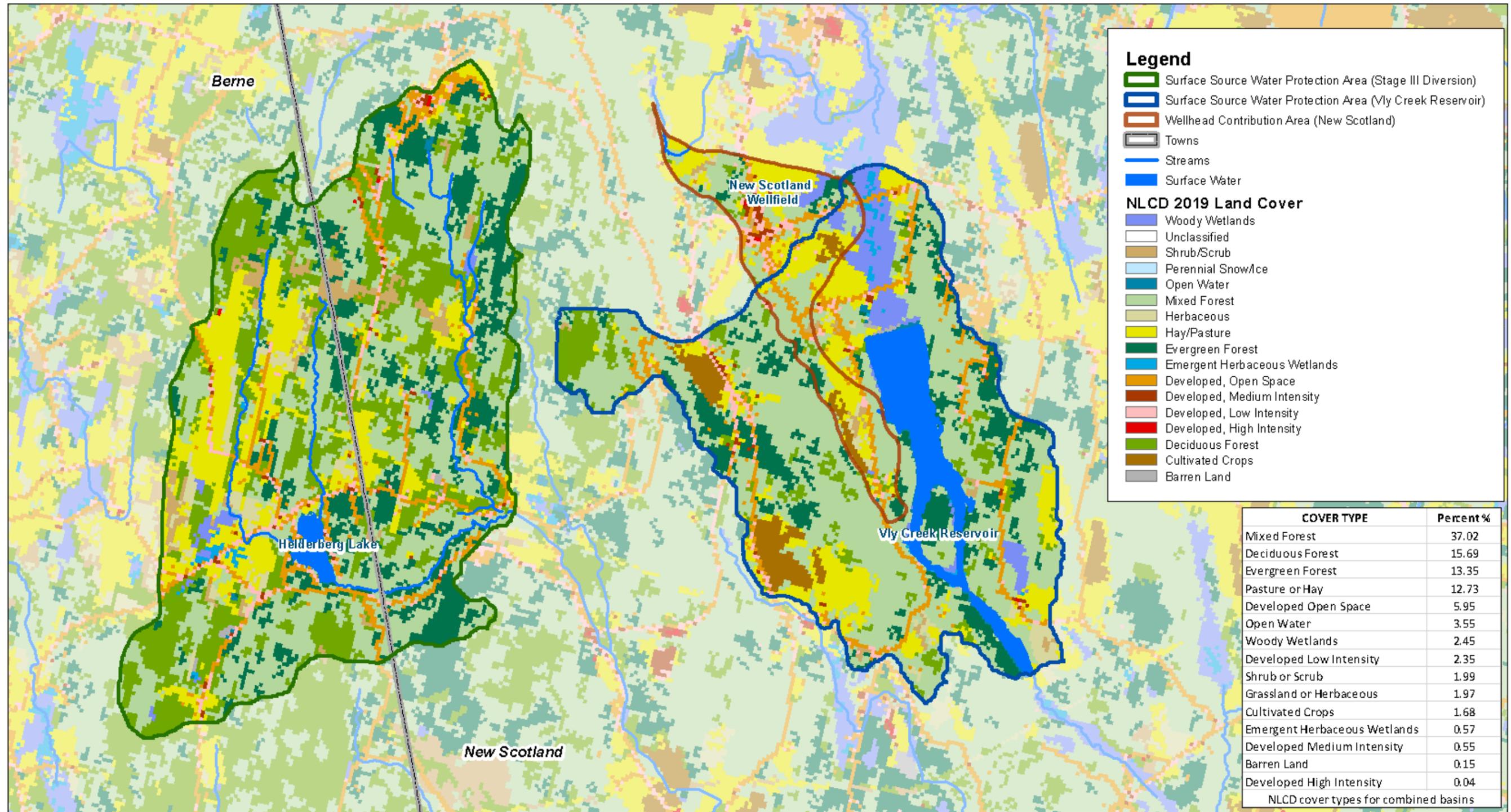
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Center for Environmental Health,
Bureau of Water Supply Protection GIS
Data Downloaded: 2/15/2023

Figure 7
Land Cover (New Scotland Area)

Town of Bethlehem DWSP2 - NLCD Land Cover 2019 (New Scotland)



Legend

- Surface Source Water Protection Area (Stage III Diversion)
- Surface Source Water Protection Area (Vly Creek Reservoir)
- Wellhead Contribution Area (New Scotland)
- Towns
- Streams
- Surface Water

NLCD 2019 Land Cover

- Woody Wetlands
- Unclassified
- Shrub/Scrub
- Perennial Snow/Ice
- Open Water
- Mixed Forest
- Herbaceous
- Hay/Pasture
- Evergreen Forest
- Emergent Herbaceous Wetlands
- Developed, Open Space
- Developed, Medium Intensity
- Developed, Low Intensity
- Developed, High Intensity
- Deciduous Forest
- Cultivated Crops
- Barren Land

| COVER TYPE | Percent % |
|------------------------------|-----------|
| Mixed Forest | 37.02 |
| Deciduous Forest | 15.69 |
| Evergreen Forest | 13.35 |
| Pasture or Hay | 12.73 |
| Developed Open Space | 5.95 |
| Open Water | 3.55 |
| Woody Wetlands | 2.45 |
| Developed Low Intensity | 2.35 |
| Shrub or Scrub | 1.99 |
| Grassland or Herbaceous | 1.97 |
| Cultivated Crops | 1.68 |
| Emergent Herbaceous Wetlands | 0.57 |
| Developed Medium Intensity | 0.55 |
| Barren Land | 0.15 |
| Developed High Intensity | 0.04 |

NLCD cover types for combined basins



Data Sources: ESRI, USGS, NYS GIS Clearinghouse, CEH BWSP GIS

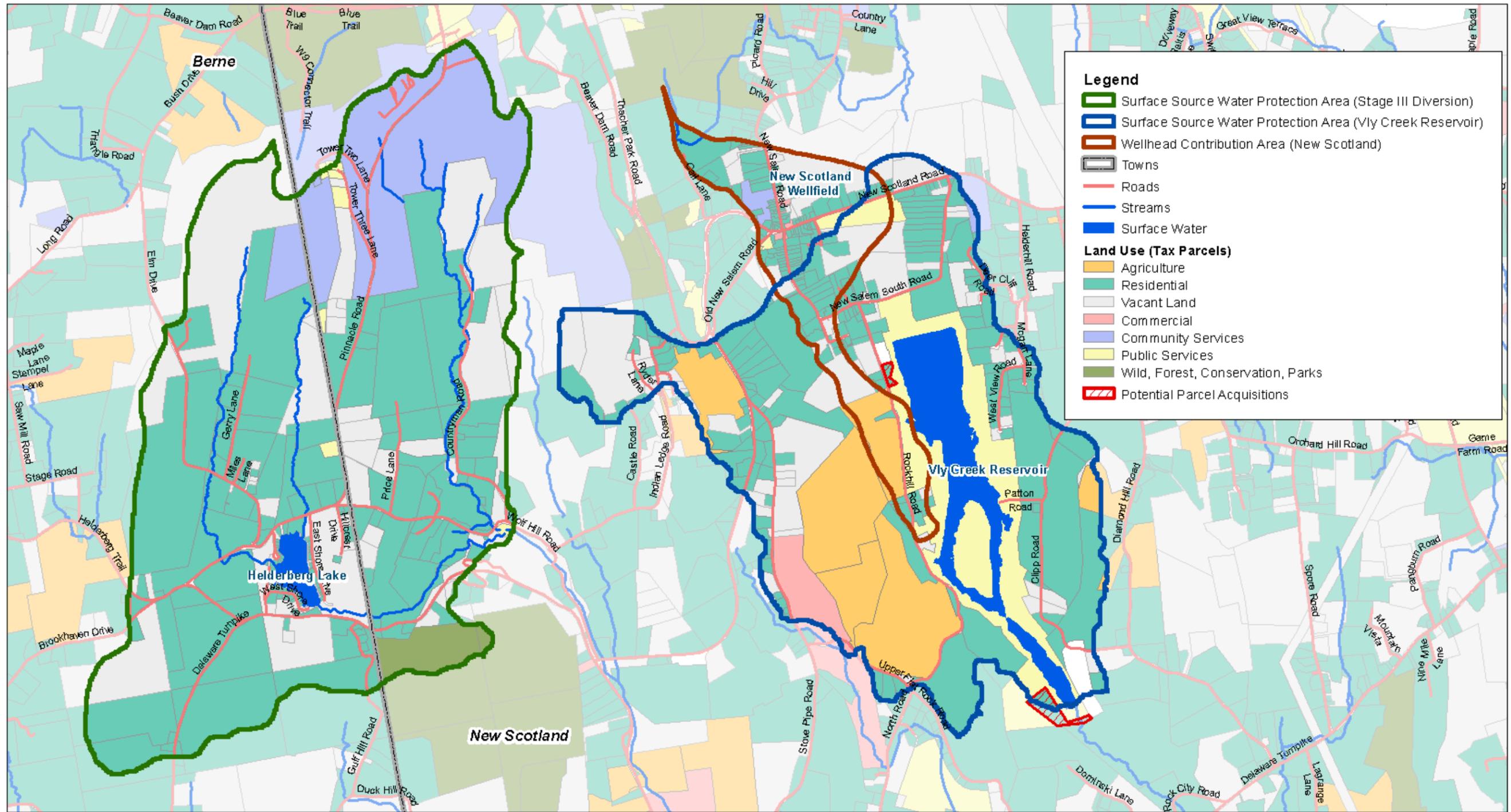


Center for Environmental Health,
Bureau of Water Supply Protection GIS
Data Downloaded: 6/13/2022

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Figure 8
Land Use (New Scotland Area)

Town of Bethlehem DWSP2 - Land Use (New Scotland)



Legend

- Surface Source Water Protection Area (Stage III Diversion)
- Surface Source Water Protection Area (Vly Creek Reservoir)
- Wellhead Contribution Area (New Scotland)
- Towns
- Roads
- Streams
- Surface Water

Land Use (Tax Parcels)

- Agriculture
- Residential
- Vacant Land
- Commercial
- Community Services
- Public Services
- Wild, Forest, Conservation, Parks
- Potential Parcel Acquisitions

0 0.25 0.5 1 1.5 2 Miles



Data Sources: ESRI, USGS, NYS GIS Clearinghouse, CEH BWSP GIS

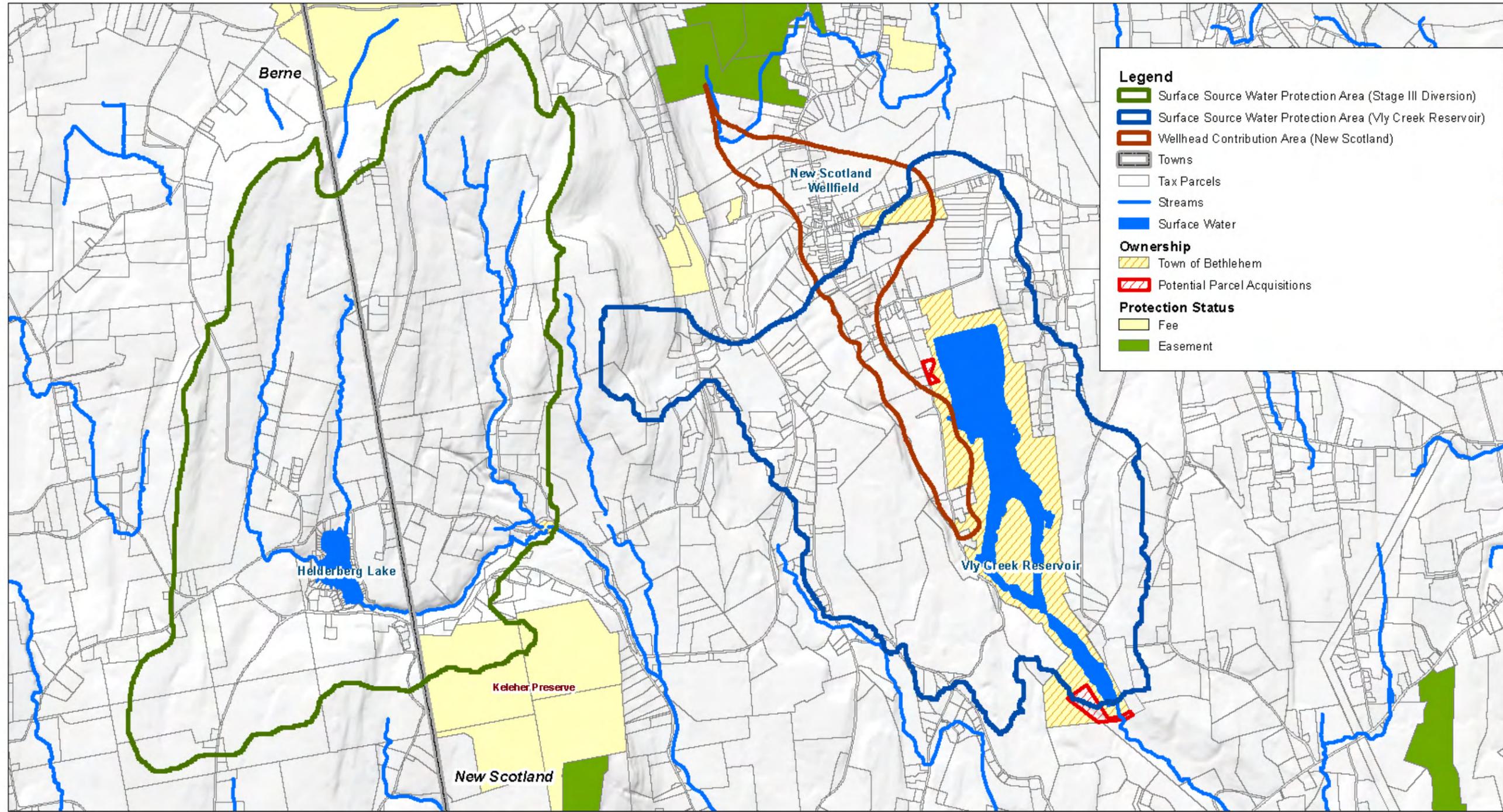


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Figure 9
Protected Areas (New Scotland Area)

Town of Bethlehem DWSP2 - Protected Areas (New Scotland)



Legend

- ▬ Surface Source Water Protection Area (Stage III Diversion)
- ▬ Surface Source Water Protection Area (Vly Creek Reservoir)
- ▬ Wellhead Contribution Area (New Scotland)
- Towns
- Tax Parcels
- Streams
- Surface Water

Ownership

- Town of Bethlehem
- Potential Parcel Acquisitions

Protection Status

- Fee
- Easement

0 0.25 0.5 1 1.5 2 Miles



Data Sources: ESRI, USGS, NYS GIS Clearinghouse, CEH BWSP GIS, NYPAD

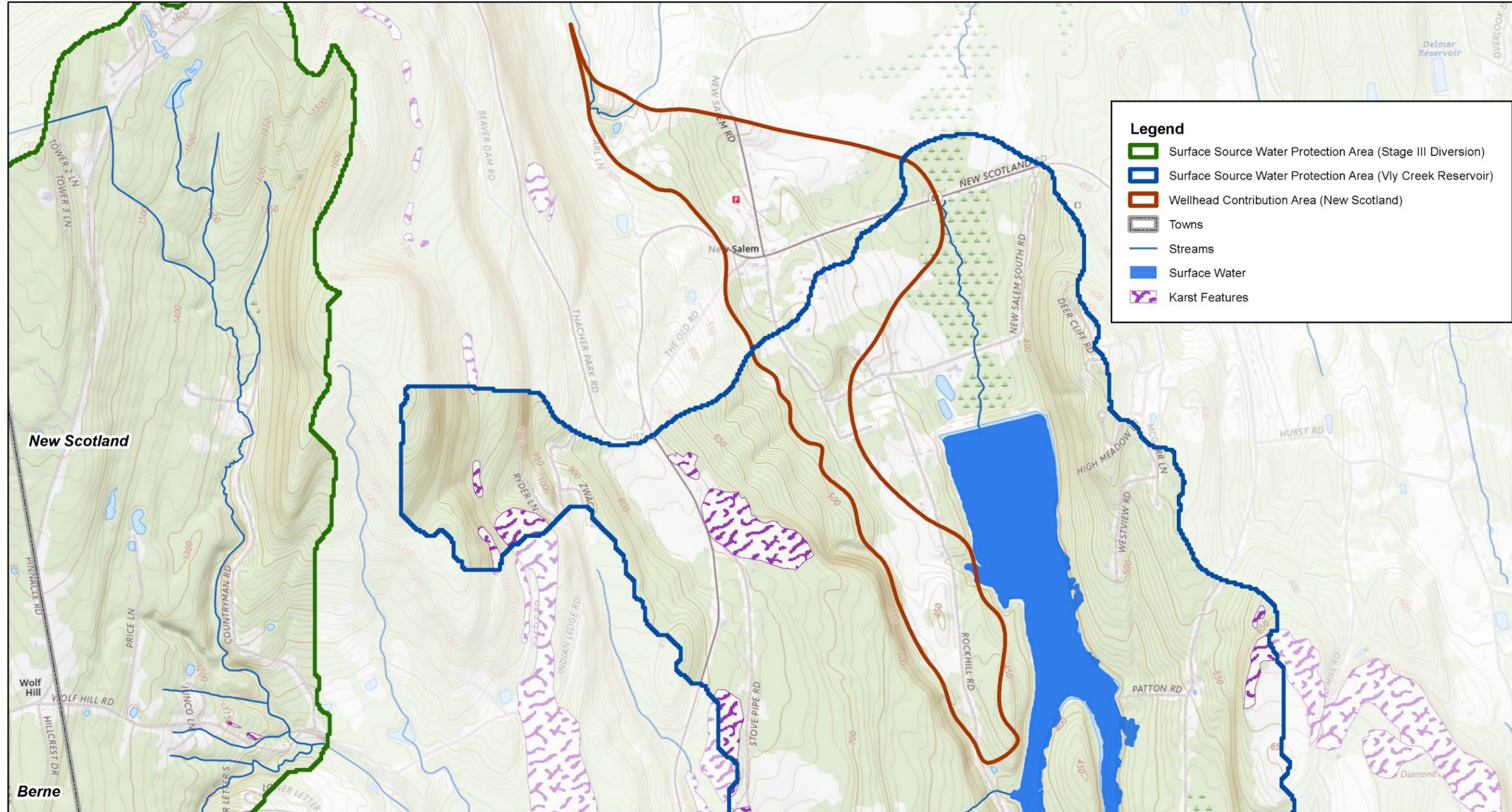


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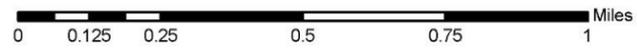
Figure 10
New Scotland Wellhead Protection and Contribution Areas

Town of Bethlehem DWSP2 - New Scotland Wellhead Protection and Contribution Areas



Legend

- █ Surface Source Water Protection Area (Stage III Diversion)
- █ Surface Source Water Protection Area (Vly Creek Reservoir)
- █ Wellhead Contribution Area (New Scotland)
- Towns
- Streams
- █ Surface Water
- █ Karst Features



Data Sources: ESRI, USGS, NYS GIS Clearinghouse, CEH BWSP GIS

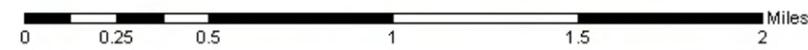
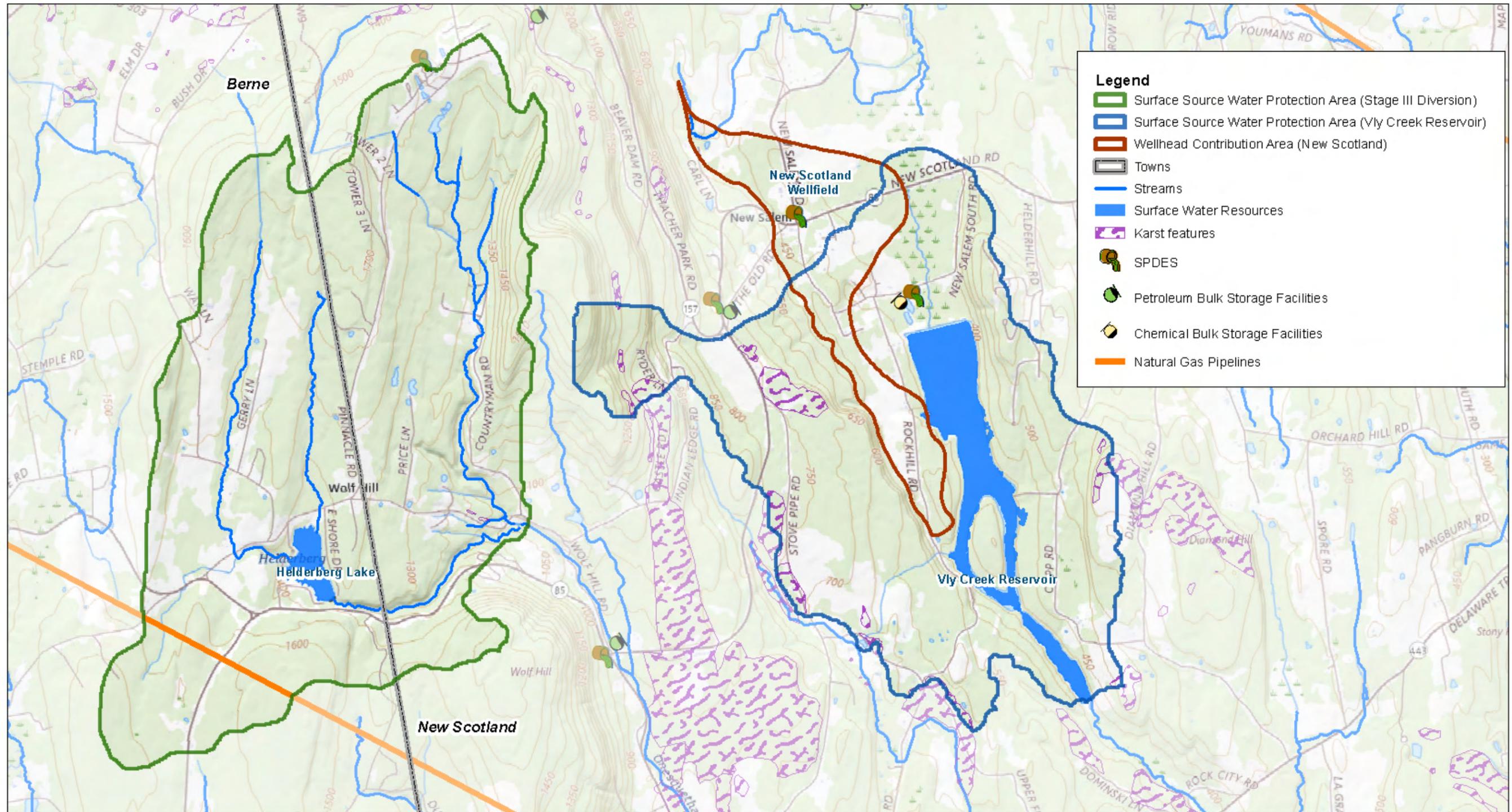


Center for Environmental Health,
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Data Downloaded: 1/17/2023

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Figure 11
Potential Contaminant Sources (New Scotland Area)

Town of Bethlehem DWSP2 - Potential Contaminant Sources (New Scotland)



Data Sources: ESRI, USGS, EIA.GOV, NYS GIS Clearinghouse, CEH BWSP GIS

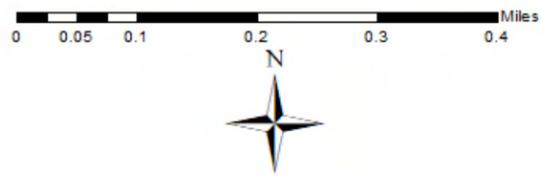
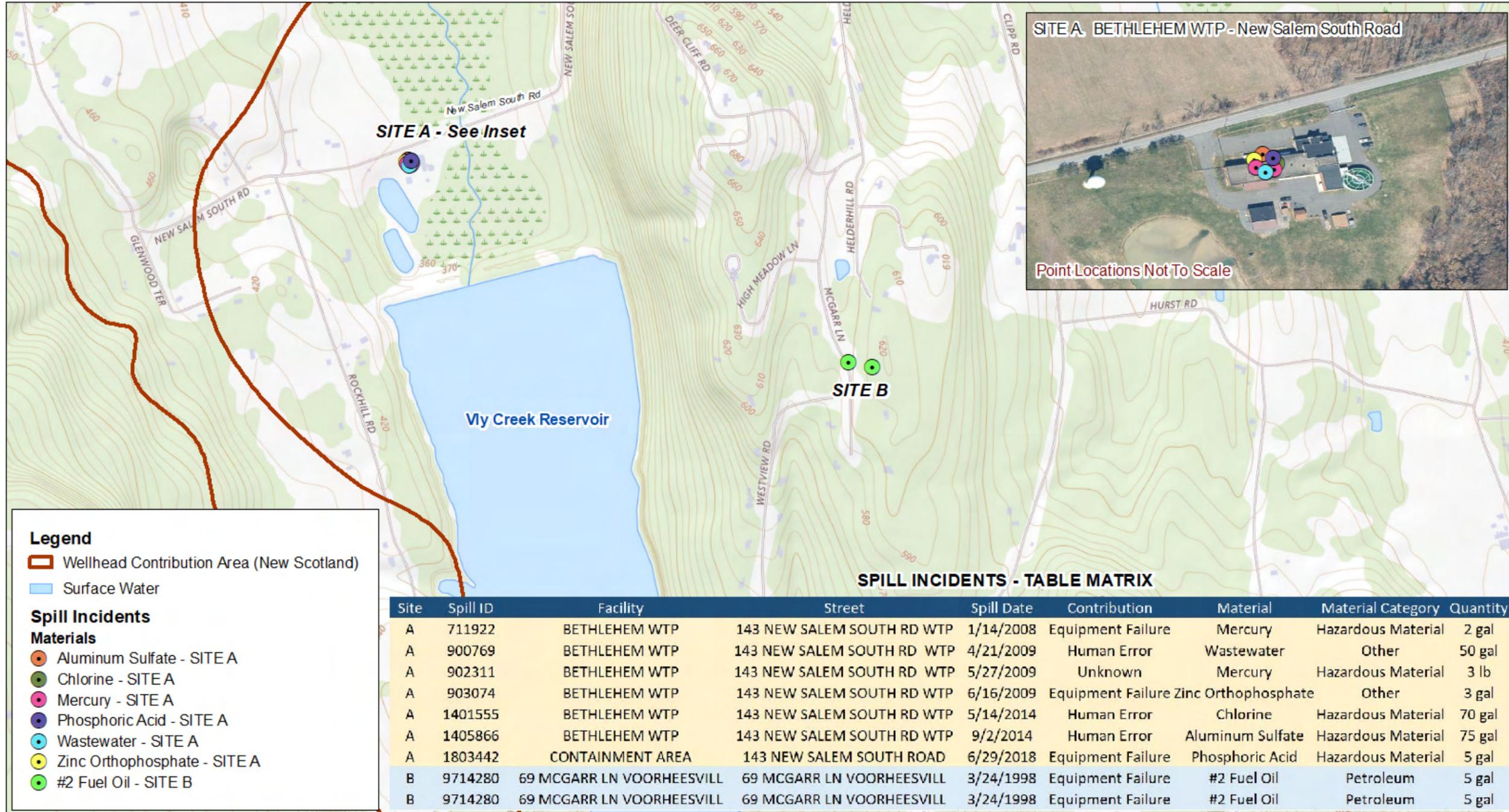
Disclosure: Geographic data represented on this map are based on entries to the Safe Drinking Water Information System (SDWIS), Department of Health, and/or other government agencies. As such, the map may contain errors or inaccuracies, and represents a generalized description of the area. Basemap provided by the Environmental Systems Research Institute (ESRI).



Center for Environmental Health,
Bureau of Water Supply Protection GIS
Data Downloaded: 4/28/2022

Figure 12
Previous Spill Incidents (New Scotland Area)

Town of Bethlehem DWSP2 - Previous Spill Incidents (New Scotland)



Data Sources: ESRI, USGS, NYS DEC, NYS GIS Clearinghouse, CEH BWSP GIS

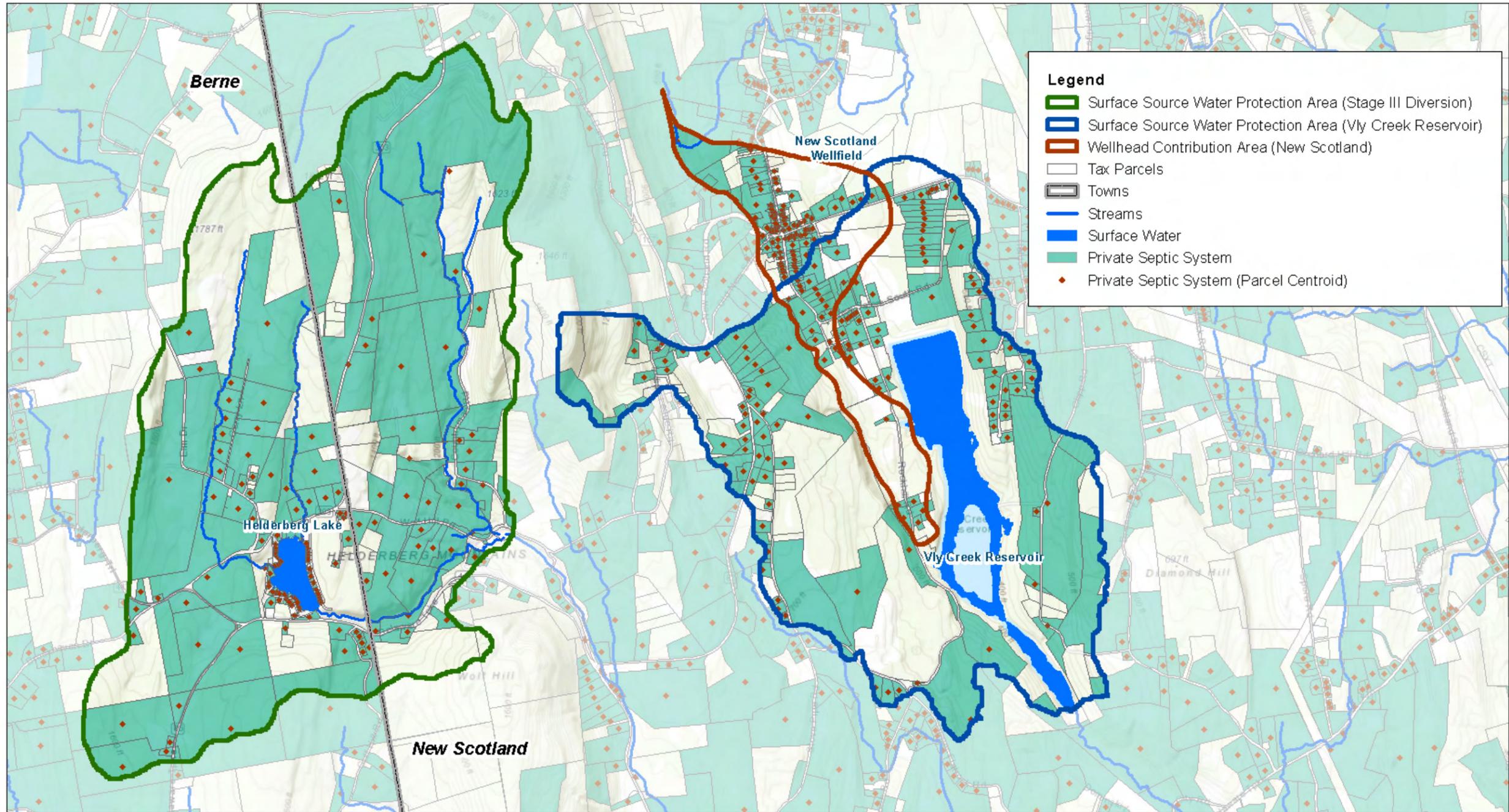


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Bureau of Water Supply Protection GIS
Data Downloaded: 6/27/2023

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Figure 13
Private Septic Systems (New Scotland Area)

Town of Bethlehem DWSP2 - Private Septic Systems (New Scotland)



Legend

- █ Surface Source Water Protection Area (Stage III Diversion)
- █ Surface Source Water Protection Area (Vly Creek Reservoir)
- █ Wellhead Contribution Area (New Scotland)
- ▭ Tax Parcels
- ▭ Towns
- Streams
- █ Surface Water
- █ Private Septic System
- ◆ Private Septic System (Parcel Centroid)

0 0.25 0.5 1 1.5 2 Miles



Data Sources: ESRI, USGS, NYS GIS Clearinghouse, County of Albany, CEH BWSP GIS

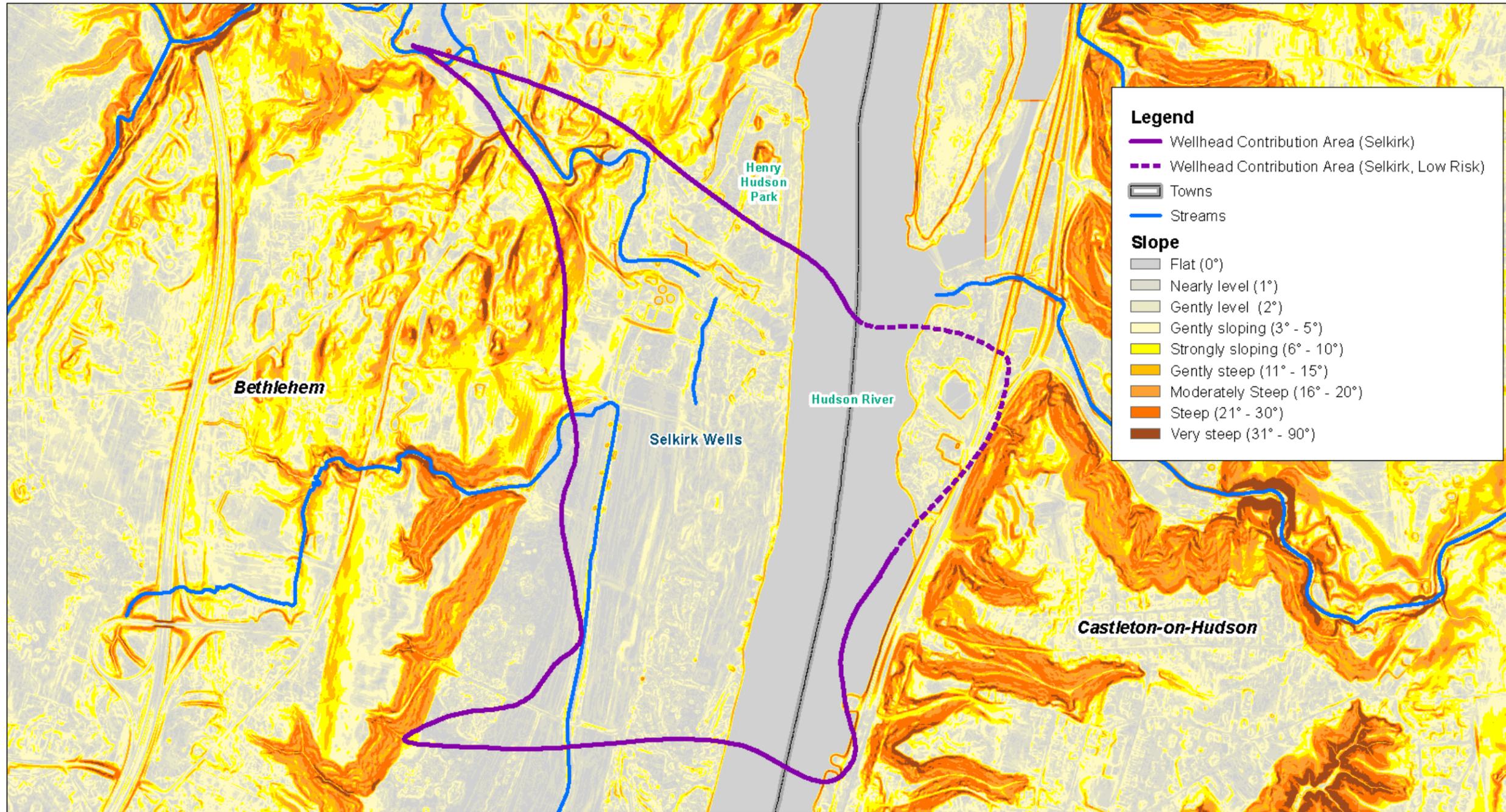
Disclosure: Geographic data represented on this map are based on entries to the Safe Drinking Water Information System (SDWIS), Department of Health, and/or other government agencies. As such, the map may contain errors or inaccuracies, and represents a generalized description of the area. Basemap provided by the Environmental Systems Research Institute (ESRI).



Center for Environmental Health,
Bureau of Water Supply Protection GIS
Data Downloaded: 3/10/2023

Figure 14
Steep Slopes (Selkirk Wellfield)

Town of Bethlehem DWSP2 - Steep Slopes (Selkirk Wellfield)

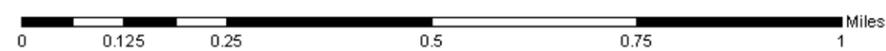


Legend

- Wellhead Contribution Area (Selkirk)
- - - Wellhead Contribution Area (Selkirk, Low Risk)
- Towns
- Streams

Slope

- Flat (0°)
- Nearly level (1°)
- Gently level (2°)
- Gently sloping (3° - 5°)
- Strongly sloping (6° - 10°)
- Gently steep (11° - 15°)
- Moderately Steep (16° - 20°)
- Steep (21° - 30°)
- Very steep (31° - 90°)



Data Sources: ESRI, USGS, NYS GIS Clearinghouse, CEH BWSP GIS

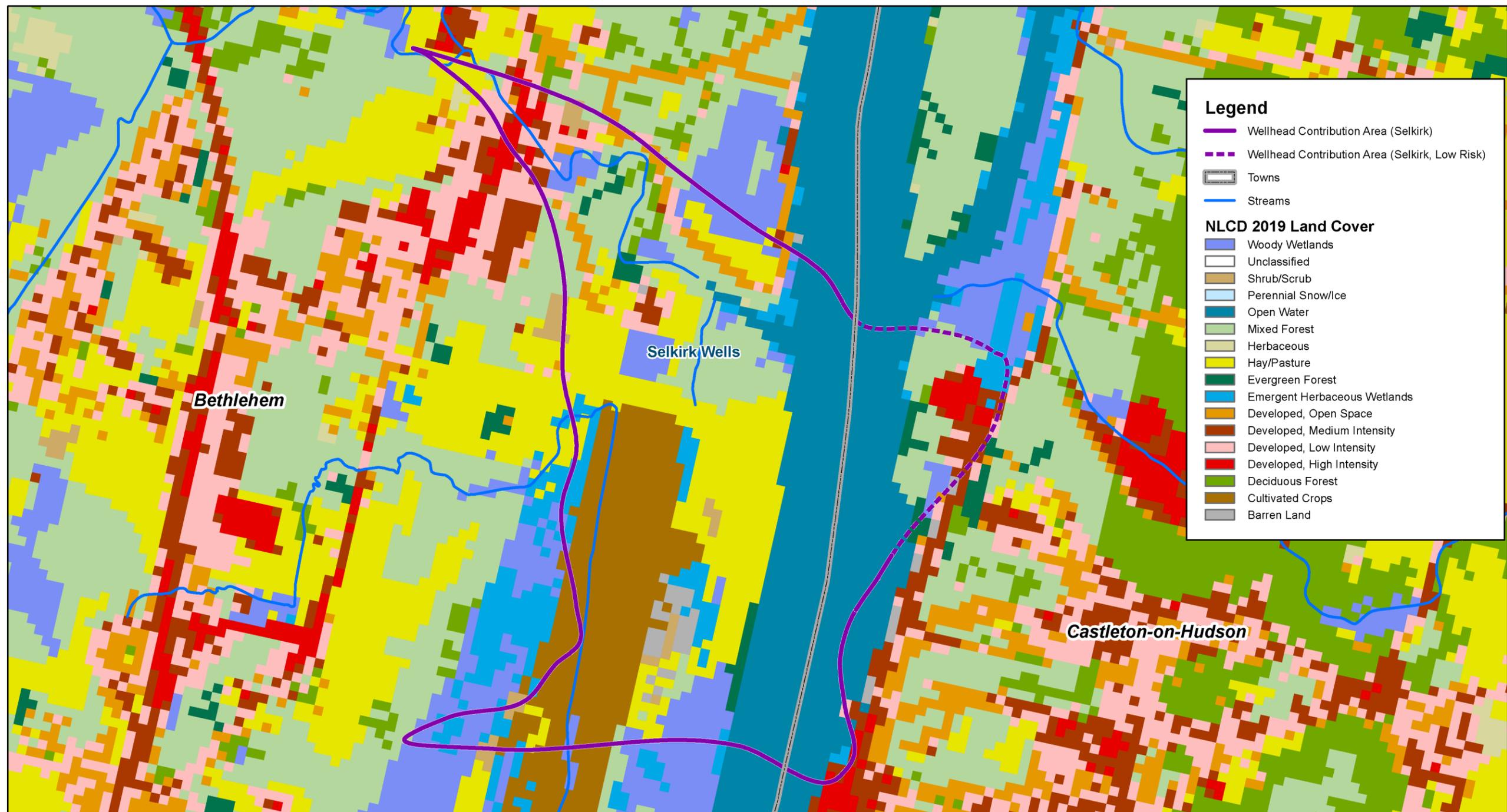


Disclosure: Geographic data represented on this map are based on entries to the Safe Drinking Water Information System (SDWIS), Department of Health, and/or other government agencies. As such, the map may contain errors or inaccuracies, and represents a generalized description of the area. Basemap provided by the Environmental Systems Research Institute (ESRI).

Center for Environmental Health,
Bureau of Water Supply Protection GIS
Data Downloaded: 2/15/2023

Figure 15
Land Cover (Selkirk Wellfield)

Town of Bethlehem DWSP2 - NLCD Land Cover 2019 (Selkirk Wellfield)



Legend

- Wellhead Contribution Area (Selkirk)
- Wellhead Contribution Area (Selkirk, Low Risk)
- Towns
- Streams

NLCD 2019 Land Cover

- Woody Wetlands
- Unclassified
- Shrub/Scrub
- Perennial Snow/Ice
- Open Water
- Mixed Forest
- Herbaceous
- Hay/Pasture
- Evergreen Forest
- Emergent Herbaceous Wetlands
- Developed, Open Space
- Developed, Medium Intensity
- Developed, Low Intensity
- Developed, High Intensity
- Deciduous Forest
- Cultivated Crops
- Barren Land

0 0.125 0.25 0.5 0.75 1 Miles

Data Sources: ESRI, USGS, NYS GIS Clearinghouse, CEH BWSP GIS

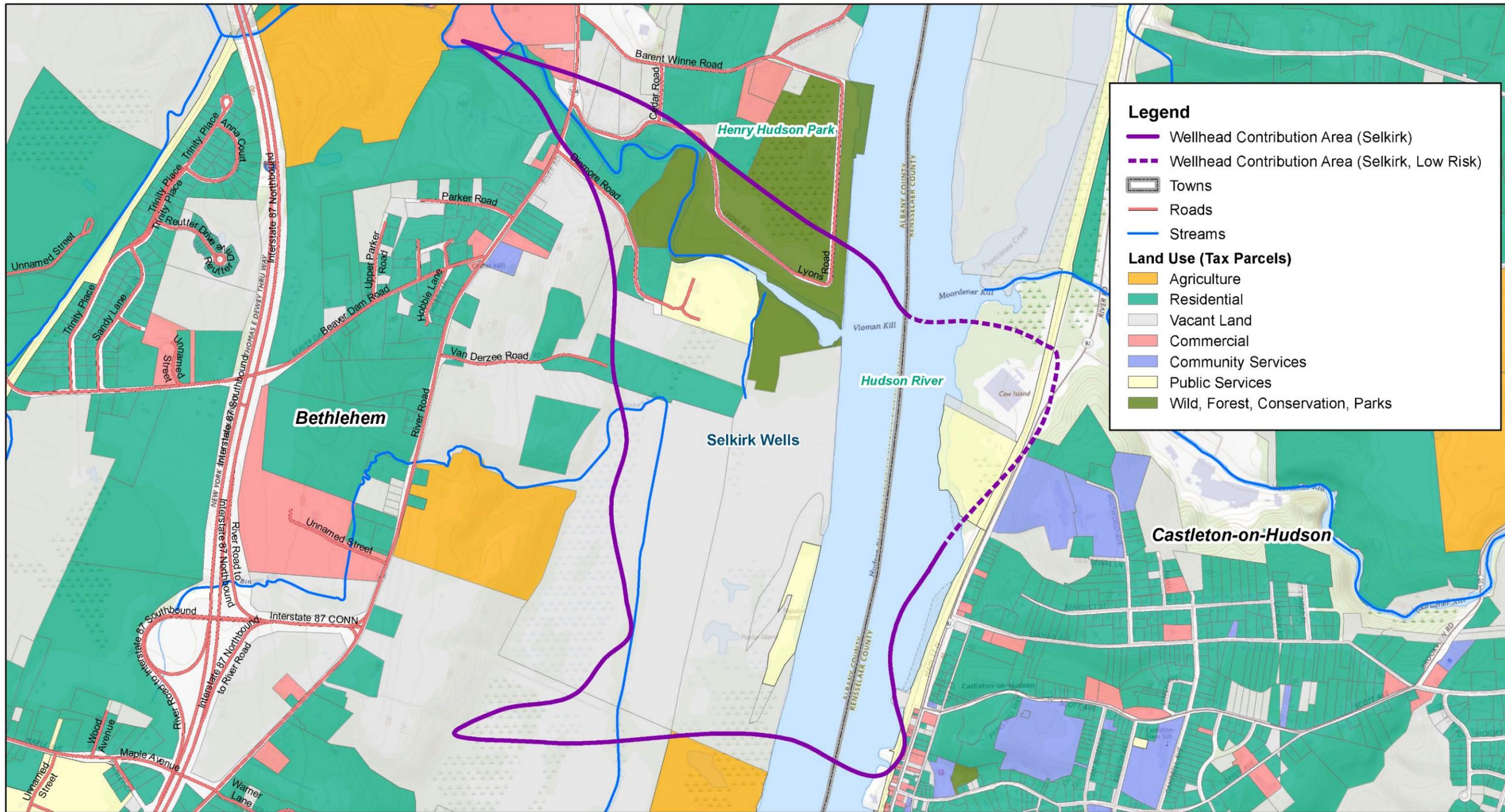


Disclosure: Geographic data represented on this map are based on entries to the Safe Drinking Water Information System (SDWIS), Department of Health, and/or other government agencies. As such, the map may contain errors or inaccuracies, and represents a generalized description of the area. Basemap provided by the Environmental Systems Research Institute (ESRI).

Center for Environmental Health,
Bureau of Water Supply Protection GIS
Data Downloaded: 6/13/2023

Figure 16
Land Use (Selkirk Wellfield)

Town of Bethlehem DWSP2 - Land Use (Selkirk Wellfield)



0 0.125 0.25 0.5 0.75 1 Miles



Data Sources: ESRI, USGS, NYS GIS Clearinghouse, CEH BWSP GIS

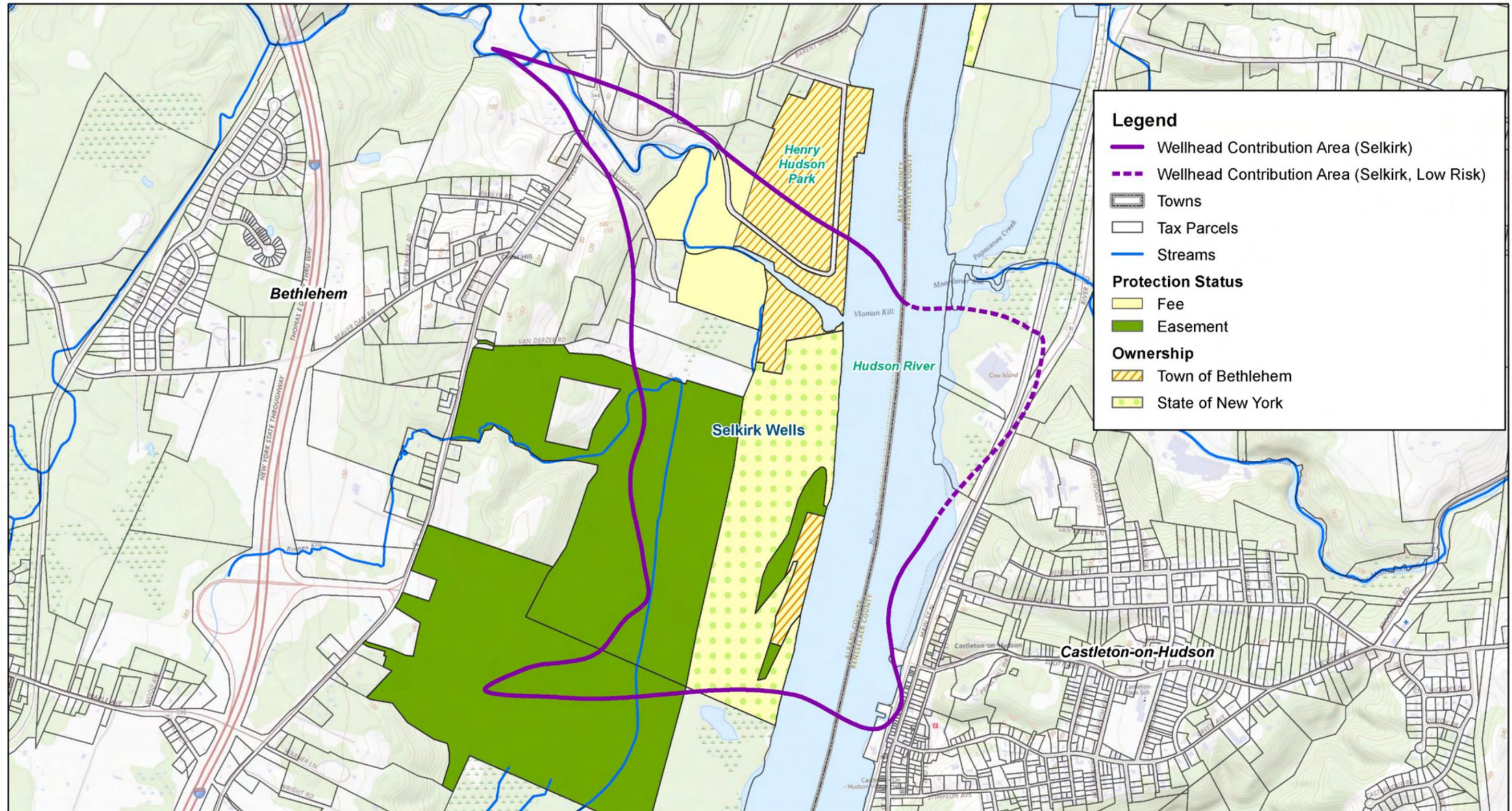


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Disclosure: Geographic data represented on this map are based on entries to the Safe Drinking Water Information System (SDWIS), Department of Health, and/or other government agencies. As such, the map may contain errors or inaccuracies, and represents a generalized description of the area. Basemap provided by the Environmental Systems Research Institute (ESRI).

Figure 17
Protection and Contribution Areas (Selkirk Wellfield)

Town of Bethlehem DWSP2 - Protection and Contribution Areas (Selkirk Wellfield)



0 0.125 0.25 0.5 0.75 1 Miles



Data Sources: ESRI, USGS, Town of Bethlehem, NYS GIS Clearinghouse, CEH BWSP GIS, NYPAD

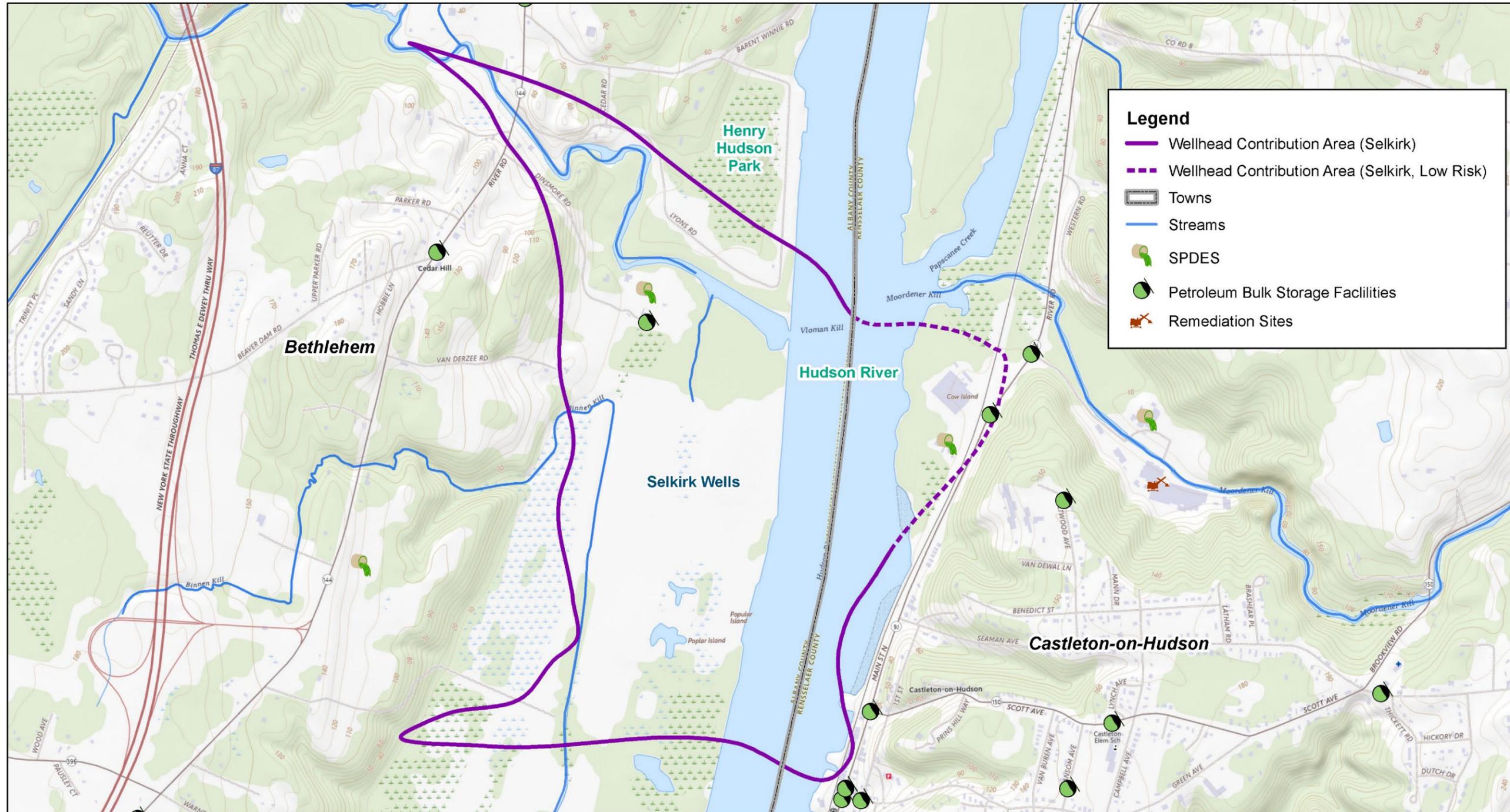


Disclosure: Geographic data represented on this map are based on entries to the Safe Drinking Water Information System (SDWIS), Department of Health, and/or other government agencies. As such, the map may contain errors or inaccuracies, and represents a generalized description of the area. Basemap provided by the Environmental Systems Research Institute (ESRI).

Center for Environmental Health,
Bureau of Water Supply Protection GIS
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Figure 18
Potential Contaminant Sources (Selkirk Wellfield)

Town of Bethlehem DWSP2 - Potential Contaminant Sources (Selkirk Wellfield)



0 0.125 0.25 0.5 0.75 1 Miles



Data Sources: ESRI, USGS, US EPA, NYS GIS Clearinghouse, CEH BWSP GIS

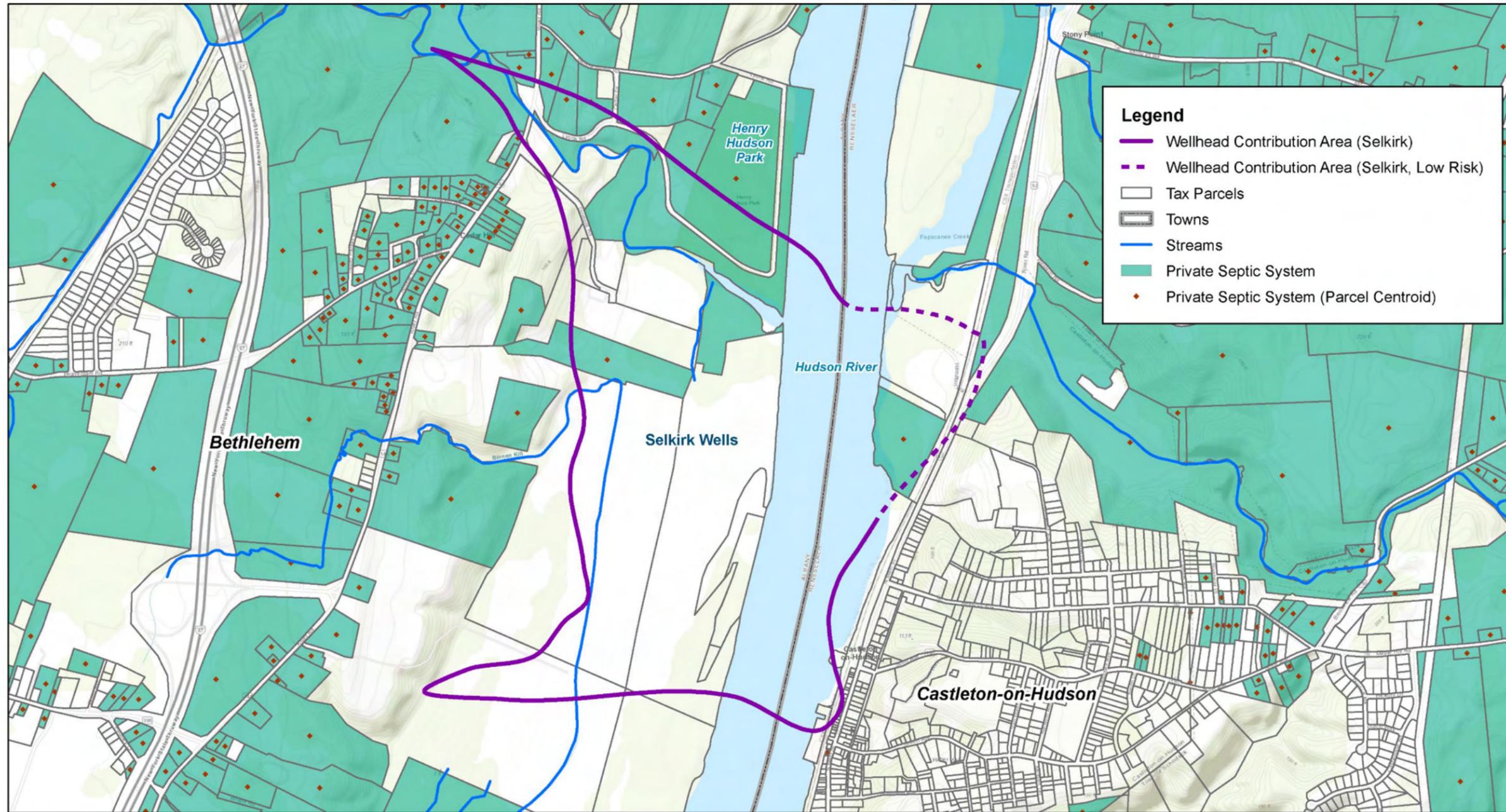


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Bureau of Water Supply Protection GIS
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Disclosure: Geographic data represented on this map are based on entries to the Safe Drinking Water Information System (SDWIS), Department of Health, and/or other government agencies. As such, the map may contain errors or inaccuracies, and represents a generalized description of the area. Basemap provided by the Environmental Systems Research Institute (ESRI).

Figure 19
Private Septic Systems (Selkirk Wellfield)

Town of Bethlehem DWSP2 - Private Septic Systems (Selkirk Wellfield)



0 0.125 0.25 0.5 0.75 1 Miles



Data Sources: ESRI, USGS, NYS GIS Clearinghouse, CEH BWSP GIS

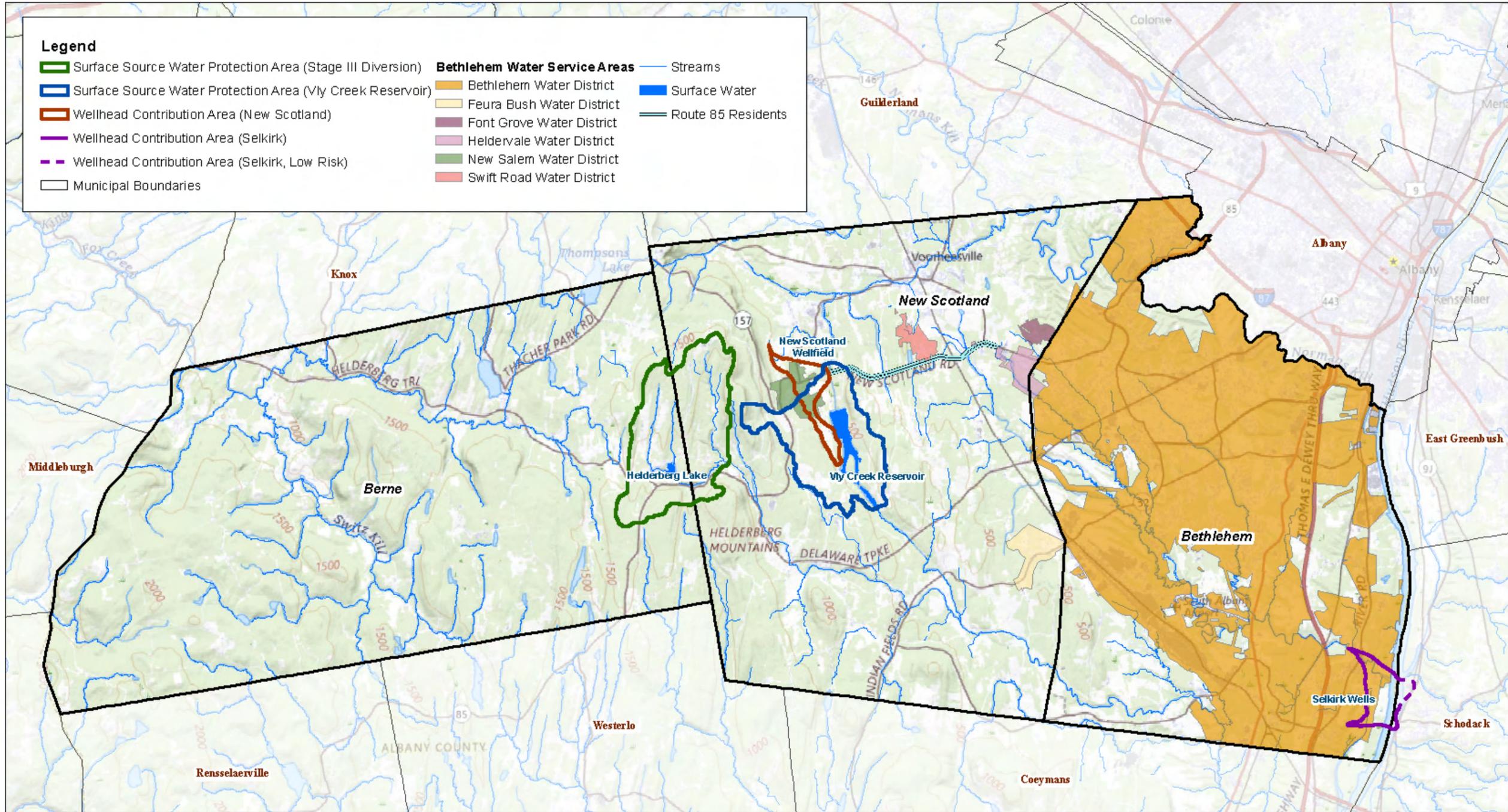
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Figure 20
Water Service Areas

Town of Bethlehem DWSP2 - Water Service Areas



0 0.75 1.5 3 4.5 6 Miles



Data Sources: ESRI, USGS, NYS GIS Clearinghouse, CEH BWSP GIS

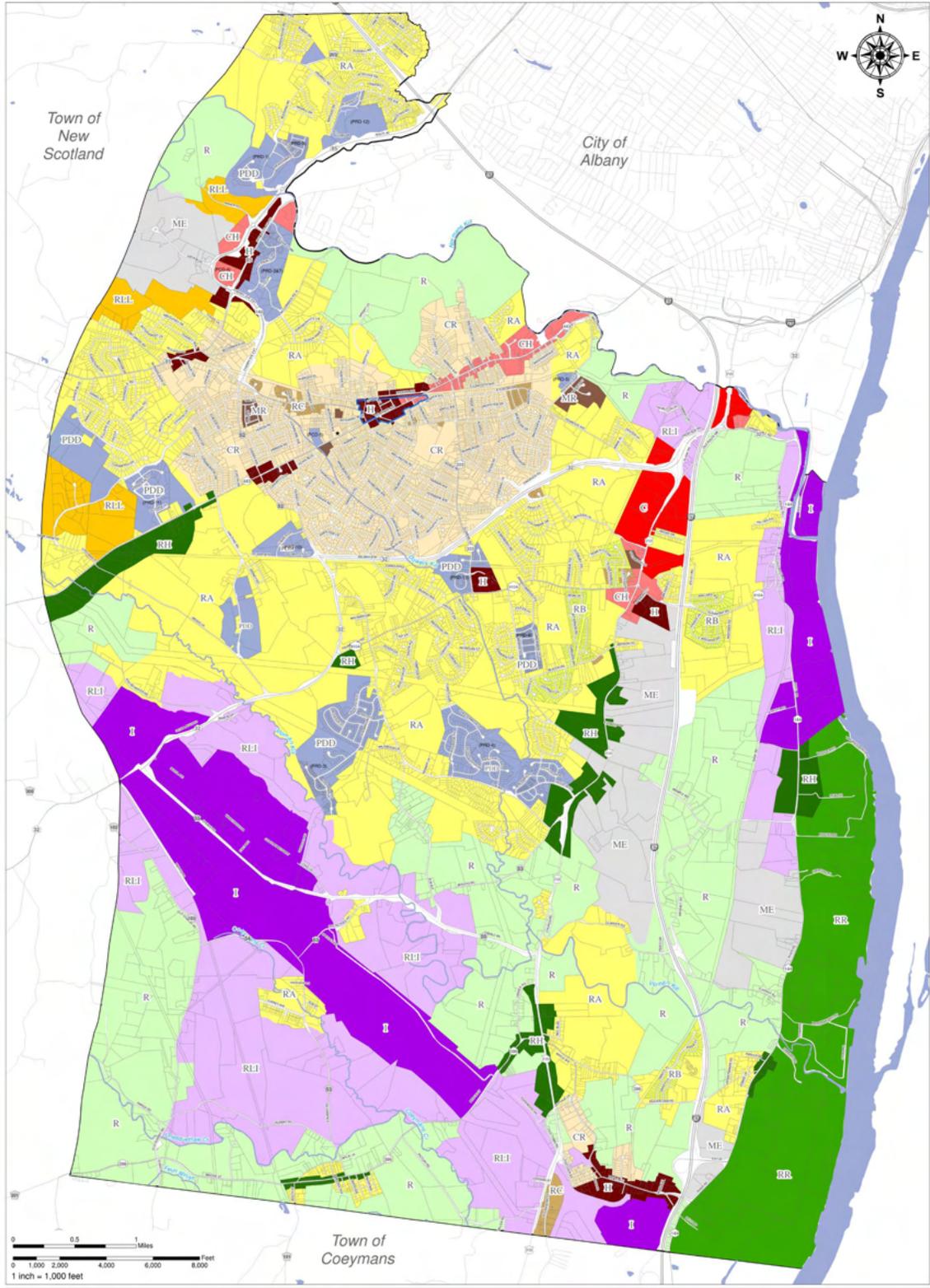
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Figure 21
Zoning-Town of Bethlehem

Zoning Map of the Town of Bethlehem, New York



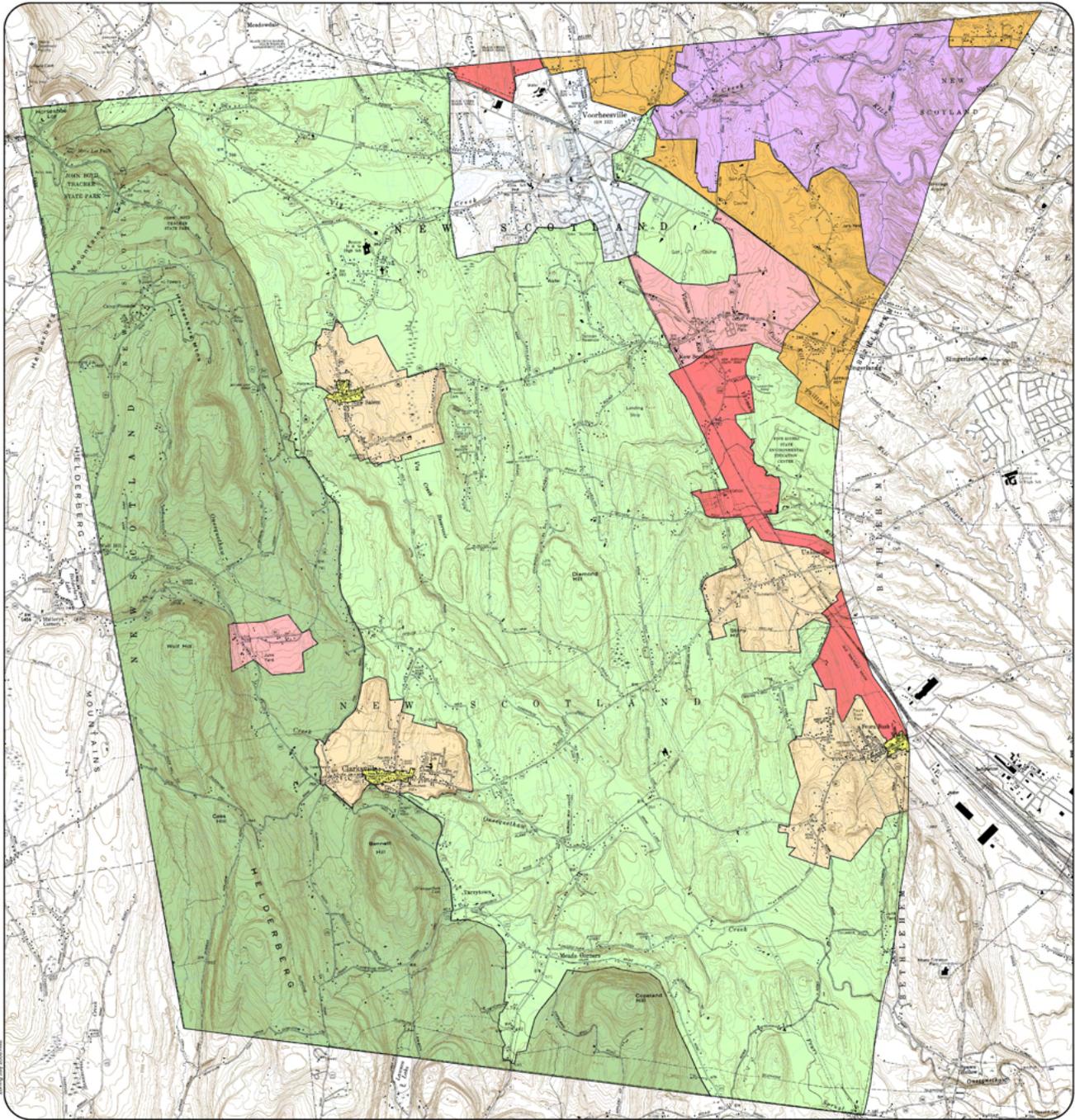
Effective August 24, 2005
 Amended September 1, 2008
 Amended October 17, 2008
 Amended June 23, 2010
 Amended July 1, 2013
 Amended March 23, 2015
 Amended April 27, 2016

* (PRD #): FORMER ZONING CLASSIFICATION

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| Legend | |
|---|------------------------------------|
| ■ | COMMERCIAL HAMLET (CH) |
| ■ | RESIDENTIAL A (RA) |
| ■ | RESIDENTIAL B (RB) |
| ■ | RESIDENTIAL C (RC) |
| ■ | RESIDENTIAL LARGE LOT (RL) |
| ■ | RESIDENTIAL (R) |
| ■ | RURAL (RI) |
| ■ | RURAL HAMLET (RH) |
| ■ | RURAL LIGHT INDUSTRIAL (RLI) |
| ■ | RURAL REVERFRONT (RR) |
| ■ | MIXED ECONOMIC DEVELOPMENT (ME) |
| ■ | MULTI-FAMILY (MR) |
| ■ | PLANNED DEVELOPMENT DISTRICT (PDD) |
| ■ | DELAWARE AVE HAMLET OVERLAY (DAH) |

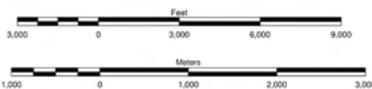
Figure 22
Zoning-Town of New Scotland



Legend

- Residential Forestry RF
- Residential Agricultural A
- Residential 2 Acre R2
- Residential Hamlet RH
- Commercial Hamlet CH
- Commercial COM
- Industrial IND
- Medium Density Residential MDR
- Village of Voorheesville

Town Of New Scotland
Official Zoning Map
 Adopted by Town Board Resolution, July 2006



Zoning District Boundaries that follow along public roads are intended to follow the Right Of Way line of said public road and not the centerline of pavement.

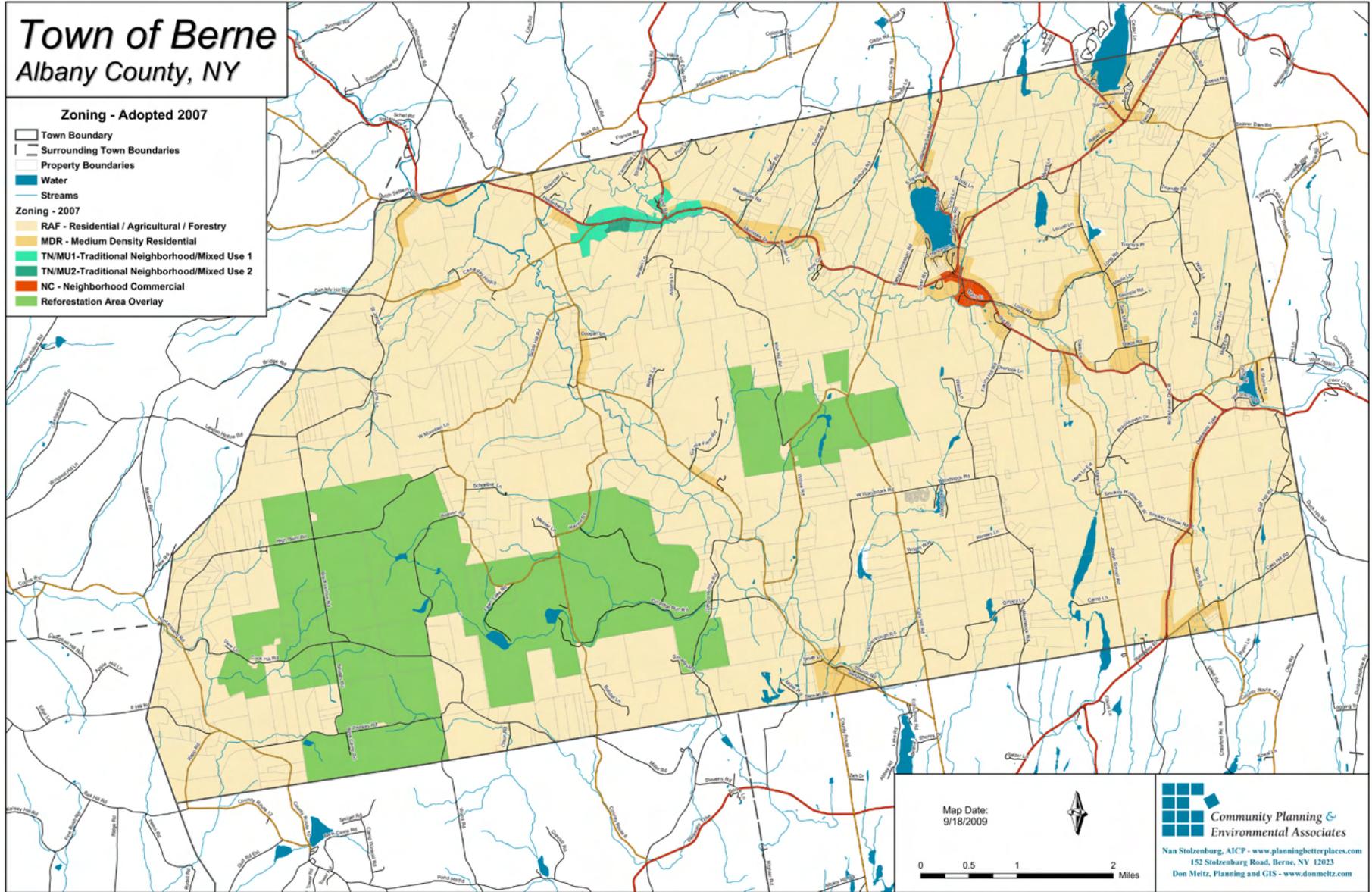
Zoning District Boundaries generally follow along the rear of properties and occasionally follow a direction through parcels from adjoining property owner to adjoining property owner.

Figure 23
Zoning-Town of Berne

Town of Berne Albany County, NY

Zoning - Adopted 2007

-  Town Boundary
-  Surrounding Town Boundaries
-  Property Boundaries
-  Water
-  Streams
- Zoning - 2007**
-  RAF - Residential / Agricultural / Forestry
-  MDR - Medium Density Residential
-  TN/MU1-Traditional Neighborhood/Mixed Use 1
-  TN/MU2-Traditional Neighborhood/Mixed Use 2
-  NC - Neighborhood Commercial
-  Reforestation Area Overlay



Map Date:
9/18/2009



 **Community Planning &
Environmental Associates**
Nan Stolzenburg, AICP - www.planningbetterplaces.com
152 Stolzenburg Road, Berne, NY 12023
Don Meltz, Planning and GIS - www.donmeltz.com

Appendices

Appendix A
DWSP2 Data Summary

Appendix A.1
DWSP2 Plan Check List

Drinking Water Source Protection Program (DWSP2) Plan Data Summary

This DWSP2 Plan Data Summary is a tool to summarize data gathered throughout the protection planning process using the [DWSP2 Framework](#). The sections in this Data Summary align with the components of the DWSP2 Framework.

Communities may seek to include information beyond what is outlined in this document and should make additions based on local needs. The tables and information in this document will be valuable to include within a community's DWSP2 Plan.

For guidance on writing a DWSP2 Plan, refer to the [DWSP2 Plan Template](#). The DWSP2 Plan Template specifies where the tables from the data summary can be included in a DWSP2 Plan.

DWSP2 Plan Checklist

This checklist can be used throughout the protection planning process to keep track of components that are in-process or complete.

| Component | Status |
|---|-----------------|
| Phase 1 | Complete |
| 1.1 Form a Stakeholder Group | Complete |
| 1.2 Establish Goals and Formulate a Vision | Complete |
| Phase 2 | Complete |
| 2.1 Develop an Overview of the Water System | Complete |
| 2.2 Prepare a Drinking Water Source Protection Map | Complete |
| 2.3 Create a Potential Contaminant Source Inventory | Complete |
| Phase 3 | Complete |
| 3.1 Identify Protection and Management Methods | Complete |
| 3.2 Develop an Implementation Timeline | Complete |
| Phase 4 | Complete |
| 4.1 Designate a Plan Management Team | Complete |

Appendix A.2
Stakeholder Group

1.1 Stakeholder Group

| Member Name Relevant Affiliation(s) | Relevant Affiliation(s) |
|--|--|
| George Kansas ¹ | Town of Bethlehem Commissioner of Public Works |
| Dave Blenis ² | Town of Bethlehem Chief Water Treatment Plant Operator |
| David VanLoven | Bethlehem Town Supervisor |
| Maureen Cunningham | Bethlehem Town Board Member |
| Rad Anderson | Town of Bethlehem Planning Board Chair |
| Mark King | Executive Director, Mohawk Hudson Land Conservancy |
| Maureen McGuiness ² | President, Bethlehem Chamber of Commerce |
| Max Ferris | Albany County Department of Health |
| Doug LaGrange | New Scotland Town Supervisor |
| Lauren Axford | Town of Bethlehem Open Space Coordinator |
| Keith Menia ³ | Town of Bethlehem GIS Coordinator |
| <p>1 Left the stakeholder group in October 2023, former Point of Contact</p> <p>2 Left the stakeholder group in June 2022</p> <p>3 Left the stakeholder group in August 2022</p> <p>4 Secondary Point of Contact</p> | |

1.1 Stakeholder Group: Meetings

| Date | Topics Covered |
|------------|---|
| 11/30/2021 | DWSP2 Introduction provided by NYSDOH. Water system overview provided by Town. Began discussion of goals for DWSP2. |
| 12/15/2021 | Workshopped vision statement and goals. Discussed plans for water system tour and working on mapping. |
| 3/9/2022 | Reviewed and edited vision statement and goals. DWSP2 mapping overview provided by NYSDOH. Mapping progress presented by Town. Discussed maps. |
| 7/6/2022 | Reviewed data summary template and current progress. Continued discussion of maps and protection areas. Discussed plan for future meetings. |
| 9/7/2022 | Reviewed mapping updates, continued discussion of protection areas, and discussed additional mapping requests. |
| 11/2/2022 | Discussed protection strategies currently in effect and future opportunities for protection of Vly Creek Reservoir. |
| 12/7/2022 | Discussed draft protection and management strategies for DWSP2 implementation. The group workshopped each strategy and assigned priority levels to each action. Stakeholders also discussed ideas for the plan management team. |
| 2/1/2023 | Finished discussion of the implementation strategies. Reviewed preliminary groundwater models prepared for the Hudson Wells and New Salem wells. |
| 4/5/2023 | Discussed updates and feedback on the groundwater models. Potential protection strategies in the well fields were discussed. Discussed initial thoughts on the plan management team, state review, and plan adoption. |
| 9/6/2023 | Discussed revisions to the DWSP2 report draft. |
| 10/11/2023 | Discussed revisions to the DWSP2 report draft. |
| 11/1/2023 | Discussed cost estimates and revisions to the DWSP2 report draft. |

Appendix A.3
Goals and Vision Statement

1.2 Establish Goals and Formulate a Vision

Vision Statement

Ensure clean and safe drinking water for the Bethlehem and New Scotland communities. The communities of Bethlehem and New Scotland recognize the importance of safeguarding their drinking water sources for their residents. Ensuring clean and safe drinking water is of the highest priority. The Towns will continue to explore source water protection actions that safeguard public health.

Goals

| | |
|----------------|--|
| Goal #1 | Improve the public's awareness throughout the watershed by educating the community on their drinking water sources and how these sources are sustained through protection and treatment methods. |
| Goal #2 | Increase stewardship of the lands surrounding our water supply sources. |
| Goal #3 | Identify improvements or practices for the protection of our water source. |
| Goal #4 | Execute strategies to continuously inform community members about DWSP2 and the longstanding efforts from the plan being implemented. |

Appendix A.4
Overview of Water System

| Public Water Supply (PWS) Information | |
|--|---|
| PWS Name: | Bethlehem WD No 1 |
| PWS ID: | NY0100191 |
| Type of sources identified in the plan: | Both Surface Water and Groundwater |
| Name(s) of sources being protected: | Vly Creek Reservoir and Wells |
| 2.1 Develop an Overview of the Water System | |
| Water system name: | Bethlehem WD No 1 |
| NYS PWS ID: | NY0100191 |
| Type of water system (e.g. community, non-community, transient, non-transient): | Community |
| Name of community, or communities, served by system: | Town of Bethlehem |
| Population served by the system: | 35,000 |
| # of service connections: | 12,000 |
| Summary of wells, intakes, infiltration galleries, and/or springs | <ul style="list-style-type: none"> • Vly Creek Reservoir in Town of New Scotland • Well #1 (72ft deep) and well #2 (92ft deep) in Town of New Scotland • Gallery well system (11 wells) along the Hudson River on Schemerhorn Island. Well casings are 12in thick. Wells sit 22-55ft below mean sea level. • City of Albany Interconnection (Purchased)¹ – Alcove Reservoir on the Hannacroix Creek |
| General treatment information: | <p>Water is pumped to the treatment plant and the water treatment consists of the following processes which begin in the clarifier: 1) coagulation using an alum based product which causes large and small particles to stick together forming what is termed a "floc", these particles are then trapped and removed from the clarifier; 2) filtration then occurs as the water travels through layers of media beds of sand and charcoal; 3) new ultraviolet light technology along with chlorination is used to kill harmful bacteria and other organisms 4) water is then polished in carbon filter tanks and sent to a storage tank where a corrosion inhibitor is added to protect the distribution system piping and household plumbing fixtures from corrosion. The storage capacity at the treatment plant is 100,000 gallons of treated water and a 750,000-gallon storage tank in the Town gives us a combined total storage capacity of 850,000 gallons of water to meet consumer demand and to provide adequate fire protection.</p> |

| | | |
|--|---|---|
| <p>Summary of hydrogeographic setting of drinking water sources including watershed</p> | <p>The Town of Bethlehem draws its main public drinking water resources from three principal resources: a paired-basin Surface Source Water Protection Area and two groundwater Wellfield Contributing Areas. The surface water system consists of the Vly Creek Reservoir with its upslope watershed paired with the neighboring Stage III Diversion basin to the west, draining through the Onesquethaw Creek, which is pumped to the reservoir from a station near Wolf Hill Road. The first of two groundwater systems includes a pair of wells to the north of the Town of Bethlehem Water Treatment Plant, supported via a Wellfield Contribution Area, the extent of which was modeled for this project. The second Wellfield Contribution Area is located along the western shore of the Hudson River, in the hamlet of Selkirk. Both wellfields pull from unconfined sand and gravel aquifers, included in models for both locations. Modeling details are included within the report.</p> | |
| <p>Water quality summary including any known raw or ambient water quality information, finished water detections, and/or history of maximum contaminant level (MCL) violations:</p> | <p>Elevated levels of TTHM in the distribution system exceeded the MCL in 2022. The town continues to take corrective measures to attempt to eliminate this disinfectant by-product. Minor detections of PFAS were tested in two of their Selkirk wells. The levels were very low and did not violate the MCL. The water district disconnected the two wells from the distribution system as a precaution. More information can be found in the Town’s Annual Water Quality Reports.</p> | |
| <p>Water quantity summary:</p> | <p>Current Water Withdrawal Permit Expiration Date(s)</p> <p>Total Permitted Water Withdrawal Capacity for all Town owned sources combined</p> <p>Total Permitted Water Withdrawal for all sources combined</p> <p>Average Daily Water Demand (= Yearly Usage / 365)</p> <p>Maximum Daily Water Demand* (Unofficial 3-day average in peak month – e.g. July)</p> <p>Daily Water Losses (Can be obtained from Water Conservation Program form)</p> | <p>2/20/2029</p> <p>10.13 MGD</p> <p>12.63 MGD</p> <p>4.54 MGD</p> <p>7.39 MGD</p> <p>0.3 MGD</p> |
| <p>Additional Information</p> | <p>Font Grove Water District (NY0123019), Heldervale Water District (NY0111900), Swift Road Water District (NY0121204), Feura Bush Water District (NY0121203), and residents along Route 85 near the New Salem WTP are in the Town of New Scotland and purchase water from the Town of Bethlehem WD No 1. See Figure 21.</p> | |

¹ At the end of 2023, the Town of Bethlehem's contract with the City of Albany expired which had allowed for the purchase of water from the City of Albany since 2003. The interconnection was constructed at a time when the Town of Bethlehem was experiencing severe drought and needed more water to meet its system's demand. Since the contract expired, the City of Albany was not included in this DWSP2. However, the interconnection between the City of Albany and the Town of Bethlehem will be maintained as an emergency interconnection.

Appendix A.5
DWSP2 Map Creation

2.2 Prepare a Drinking Water Source Protection Map

Provide a description of established drinking water source protection areas below, including distances and/or time of travel information. In addition, make note of any applicable studies (e.g. Wellhead Protection Plan) or technical assistance that were used to determine each protection area and/or delineation method:

| Protection Areas | Description | Delineation Method |
|--|---|----------------------------------|
| Surface Source Water Protection Areas | Watershed Basins (contributing upslope area) for Vly Creek surface system (Vly Creek Reservoir basin and Stage III Diversion basin) | Surface Water Delineation Method |
| Wellhead Contribution Area | Groundwater recharge area modeled for (2-well) New Scotland Wellfield and (11-well) Selkirk Wellfield | MODFLOW-2005 |
| Ownership and Control Area (for groundwater) | Ownership and Control Area of 100 and 200-foot buffers for land ownership and control of land activities, respectively. | Arbitrary Fixed Radius |

Below is a list of sources of publicly available data:

| URL | Publicly Available Data |
|---|---|
| https://data.ny.gov/ | <ul style="list-style-type: none"> • Bulk Storage Facilities • Solid Waste Management Facilities • Environmental Remediation Sites • Superfund Sites • Spill Incidents • Oil, Gas and Other Regulated Wells • SPDES Multi-Sector General Permit • Combined Sewer Overflows (CSOs) • Water Withdrawals by Facility • Boat Launch Sites • Inventory & Priority Waterbodies |
| https://gis.ny.gov/ | <ul style="list-style-type: none"> • State Pollutant Discharge Elimination System • NYSDOT Facilities • NYS Tax Parcels • USGS Digital Raster Graphic Quadrangle • NYS Tax Parcels |
| https://mrlc.gov/ | <ul style="list-style-type: none"> • NLCD Land Cover |
| http://opdgig.dos.ny.gov/index.html#/home | <ul style="list-style-type: none"> • Unconsolidated Aquifers |
| https://datagateway.nrcs.usda.gov/GDGOrder.aspx | <ul style="list-style-type: none"> • NRCS Conservation Easement Areas by State |
| https://www.conservationaleasement.us/ | <ul style="list-style-type: none"> • Conservation Easement Areas US |
| https://datagateway.nrcs.usda.gov/GDGOrder.aspx# | <ul style="list-style-type: none"> • National Hydrography Dataset 1:24,000 |
| http://www.dec.ny.gov/lands/5374.html | <ul style="list-style-type: none"> • Mines |
| https://www.eia.gov/ | <ul style="list-style-type: none"> • Pipelines |
| https://www.epa.gov/ | <ul style="list-style-type: none"> • TRI Basic Data Files |
| https://nypad.org | <ul style="list-style-type: none"> • New York Protected Areas Database (conservation lands) |
| https://livingatlas.arcgis.com/ | <ul style="list-style-type: none"> • NYS Bedrock Geology • NYS Surficial Geology • NYS Hydrologic Soil Groups • NYS Principal Aquifers |
| Albany County, NY | <ul style="list-style-type: none"> • Detailed spatial analysis of county-wide karst topographic features |

Provide a description of the map layers created or acquired to create the source water protection map below:

| Layer | Date created or acquired | Description |
|-------------------------------------|--------------------------|---|
| Air Photo (base maps) | 6/14/2023 | Range of high-resolution air imagery from ESRI Online Data Services. |
| Bedrock Geology | 4/3/2023 | Rock units constituting the bedrock lithology from NYS GIS Clearinghouse. |
| Hydrology | 6/15/2023 | Surface water features (rivers, streams, lakes, ponds) of New York State, from the USGS National Hydrological Data Plus (NHD+) program. |
| Municipal Boundaries | 4/28/2022 | Boundary polygons for Cities, Towns, Villages, Indian Territories, and Incorporated Areas in New York State. |
| National Land Cover Data | 6/13/2023 | Satellite-derived 30m, 19-class land cover data, circa 2019 from MRLC\USGS program. |
| Natural Gas Pipelines | 4/28/2022 | Major natural gas transmission lines in the U.S., including interstate, intrastate and gathering lines. |
| Potential Contaminant Sources (PCS) | 4/28/2022 | Data obtained from NYS GIS Clearinghouse and DATA.NY.GOV, includes Bulk Storage Facilities, Solid Waste Management Facilities, Remediation Sites, Oil and Gas Wells, SPDES sites, CSOs, Superfund sites, Mines, NYSDOT Facilities. |
| Potential Parcel Acquisition | 9/9/2022 | Provided by the Town of Bethlehem. Land parcels in the process of acquisition for source water protection. |
| Principal Aquifers of New York | 6/21/2023 | ESRI Online Data Services. |
| Private Sewer Use (parcel centroid) | 3/10/2023 | Created for this project by coding and symbolizing NYS Tax Parcel data (Point Centroids) on the "SEWER_DESC" variable (description of sewer type employed within the property, from possible values of: PRIVATE, COMM\PUBLIC (common or public), NONE or UNKNOWN. Point features added to highlight the "singularity" or dot density, of one point per parcel (due to variable parcel sizes). |
| Private Sewer Use (parcel) | 3/10/2023 | Created for this project by coding and symbolizing NYS Tax Parcel data on the "SEWER_DESC" variable (description of sewer type employed within the property, from possible values of: PRIVATE, COMM\PUBLIC (common or public), NONE or UNKNOWN. |
| Protected Lands | 6/13/2023 | NYS Protected Areas Database (NYPAD). Parcels that have a documented protection status through either being owned (in fee) or having a conservation easement attached to it. |
| Regional Land Use | 3/10/2023 | Created by coding and symbolizing NYS Tax Parcel data, on "Property Type Classification Codes", to illustrate the assigned uses of individual property parcel, and potential impact on water quality, across the landscape. |

| | | |
|--------------------------------------|-----------|---|
| Soil Hydrologic Groups | 2/15/2023 | Drawn from ESRI ONLINE data library, features illustrate the USDA 7 class SSURGO soils for the region, reflecting the respective soil units' rate of runoff or conversely, the ability to absorb water during a rainfall event. |
| Spill Incidents | 6/27/2023 | Downloaded from NYSDEC Spill Incident Database. |
| Steep Slopes | 2/15/2023 | Created for the project through a surficial slope model, calculating percent % slope categories, upon a 30-meter resolution Digital Elevation Model (DEM). |
| Surface Source Water Protection Area | 4/28/2022 | Created for the project using a watershed basin calculation via USGS StreamStats tool to estimate upslope contributing area (watershed basin) for surface water protection areas. |
| Surficial Geology | 4/3/2023 | Rock units constituting the surficial geology (overlying bedrock) from NYS GIS Clearinghouse. |
| Tax Parcels | 2/15/2023 | Tax parcel (property) data drawn from NYS GIS Clearinghouse of publicly available geospatial features. |
| USGS Topographic Map | 4/28/2022 | Drawn from ESRI ONLINE data library, this base map composition from the USGS contains a wide range of useful spatial and contextual features relevant to identifying locations and landscape patterns. |
| Water Intakes | 10/5/2022 | Provided through NYS State Drinking Water Information System (SDWIS) and the Town of Bethlehem. |
| Wellhead Contribution Area | 4/28/2022 | Created for the project to estimate important protection areas for the Town of Bethlehem Wellfields (use of MODFLOW-2005 Groundwater Vistas software). |
| Wellhead Locations | 6/13/2023 | Provided through NYS State Drinking Water Information System (SDWIS) and the Town of Bethlehem. |
| | | |

Appendix A.6
Potential Contaminant Source Inventory

| Potential Contaminant Source Inventory | | | | | | | | |
|--|-----------------------------------|--|---|---|-----------------|---|--|--------------------------------|
| Potential Source Category | Potential Source | Facility | Contaminant(s) of Concern | Protection Area(s) Impacted | Status | Relevant Information | Address | Identification |
| Conveyances and Pipelines | Natural Gas Transmission Pipeline | Tennessee Gas Pipeline Company | Chemical | Surface Source Water Protection Area | Current/ Active | Overlaps Vly Creek Reservoir Surface Source Water Protection Area. Detailed location can be found here: https://www.npms.phmsa.dot.gov/ | NA | Pipeline ID: 200-3 |
| Residential Sources | Private On-Site Septic Systems | NA | Chemical (nutrients from fecal matter and septic system maintenance), biological (effluent may contain bacteria, parasites, viruses, and nutrients) | Surface Source Water Protection Area, New Scotland Wellfield, Selkirk Wellfield | Future | Estimating through geospatial assessment of contributing areas. No known impact. Should be monitored in the future, particularly in the New Salem Well protection area. | NA | NA |
| Residential Sources | Lawn and Garden Management | NA | Chemical (Pesticides, Fertilizers, and added nutrients) | Surface Source Water Protection Area | Future | Estimating through geospatial assessment of contributing areas. No known impact. This should be monitored in the future. | NA | NA |
| Agriculture | Agricultural Activities | NA | Physical (erosion and sediment runoff), Chemical (pesticides and fertilizers), Biological (bacteria, parasites, viruses) | Surface Source Water Protection Area | Current | Estimating through geospatial assessment of contributing areas. Known impact of nutrient loading in Vly Creek Reservoir. | NA | NA |
| Discharge to Water | SPDES | Bethlehem Water Treatment Plant | Chemical and Biological (outfall: treated sanitary) | Surface Source Water Protection Area, New Scotland Wellfield | Current/Active | The Water Treatment plant is a regulated entity by New York State. Although contamination is possible, concern is low | 143 New Salem South Rd, Voorheesville, NY 12186 Lat: 42.629412 Long: -73.960742 | Permit # 4012200006 |
| Discharge to Water | SPDES | Town of Bethlehem Wastewater Treatment Plant | Chemical and Biological (sanitary wastewater) | Selkirk Wellfield | Current/Active | The Wastewater Treatment plant is a regulated entity by New York State. Although contamination is possible, concern is low. | 98 Dinmore Road Selkirk, NY 12158 Lat: 42.61768908 Long: -73.95743629 | Permit # NY0099651 |
| Discharge to Water | SPDES | Castleton-on-the Hudson Sewage Treatment Plant | Chemical and Biological (sanitary wastewater) | Selkirk Wellfield | Current/Active | The sewage treatment plant is a regulated entity by New York State. Although contamination is possible, concern is low. | State route 9j-s Main Street Castleton-on-Hudson, NY 12033 Lat: 42.534066 Long: -73.755116 | Permit 4384400007 |
| Bulk Storage | Petroleum Bulk Storage (PBS) | Bethlehem Wastewater Treatment Plant | Chemical (#2 fuel oil) | Selkirk Wellfield | Current/ Active | Petroleum is held in bulk for onsite use. | 98 Dinmore Road Selkirk, NY 12158 Lat: 42.61768908 Long: -73.95743629 | Unique PBS ID Number: 4-601100 |

| Potential Source Category | Potential Source | Facility | Contaminant(s) of Concern | Protection Area(s) Impacted | Status | Relevant Information | Address | Identification |
|---------------------------|------------------------------|---|---|--------------------------------------|----------------|--|--|--------------------------------|
| Bulk Storage | Petroleum Bulk Storage (PBS) | Fort Orange Paper Co Inc | Chemical (Gasoline, #6 fuel oil, diesel) | Selkirk Wellfield | Inactive | Fort Orange Paper Co. is closed. The property is a remediation site under the DEC brownfield cleanup program. It is unclear if the PBS on 1900 River Road remains in place. Three above ground tanks and two out of service underground tanks were recorded on site previously. This site is in the low-risk area outside of the Selkirk's primary contribution area. Rensselaer County currently possessive ownership of the land | 1900 River Road Castleton-on-Hudson, NY 12033 Lat: 42.538337 Long: -73.744596 | Unique PBS ID Number: 4-385093 |
| Bulk Storage | Chemical Bulk Storage (CBS) | Town of Bethlehem Water Treatment Plant | Chemical (orthophosphate, aluminum sulfate) | Surface Source Water Protection Area | Current/Active | Orthophosphate is used for corrosion control. Aluminum sulfate is used as a coagulant. | 143 New Salem South Rd, Voorheesville, NY 12186 Lat: 42.629412 Long: -73.960742 | Unique CBS ID Number: 4-000035 |

Appendix A.7
Implementation Timeline

| Protection and Management Methods & Implementation Timeline | | | | | | | | |
|---|----------------|---|--|---|--|---|--|--|
| Priority Issue | Priority Level | Targeted Potential Contaminant Source(s) | Goal | Protection Method and/or Management Method | Potential Cost** | Potential Funding Sources | Project Leader and Partnerships Needed | Implementation Timing |
| Land Use | High | For future land use in the contribution area of the wells and reservoir. | Prevent future contamination and control runoff from existing land uses | Continue the establishment of land acquisitions and conservation easements as appropriate; Continue to advance the conservation of open space acquisition*; Consider protection areas in zoning updates | \$3,109.62 plus the parcel's appraised value | Water Quality Improvement Project (WQIP) for Land Acquisition, NYSDOS Smart Growth Community Planning and Zoning Grant Program. | T. Bethlehem, T. Bethlehem Open Space Coordinator, T. Bethlehem and T. New Scotland Zoning Boards, Mohawk Hudson Land Conservancy, PMT | Year 1-2, ongoing |
| Agricultural Activities | High | Nutrient Loading | Reduce the amount of overland flow of chemicals and nutrients applied in the source water protection areas; enhance communication with local farms and Albany County soil and water conservation district. | Establish a partnership with Albany County Soil and Water Conservation District to work with farmers and funding agencies to implement BMPs in priority areas through Agriculture Environmental Management assessments. | \$777.40 | NYSAGM Agriculture Nonpoint Source Abatement and Control Grant Program, Conservation Reserve Enhancement Program, NYSDEC Trees for Tribes, NYS AGM/NYS SWCC Source Water Buffer Program, USDA NRCS Agricultural Conservation Easement Program | PMT, T. Bethlehem, T. New Scotland, Albany County Soil and Water Conservation District, Cornell Cooperative Extension, Stormwater coalition | Year 1-2 |
| | | | | Support Albany County Soil and Water Conservation District and Cornell Cooperative Extension in efforts to communicate current best practices for agricultural lands* | \$1,277.40 | | PMT, T. Bethlehem, T. New Scotland, Albany County Soil and Water Conservation District, Cornell Cooperative Extension | Year 1-3. Once initiated is an ongoing activity |
| Outreach and Education: Lawn and Garden Management | Medium | All fertilizers including those derived from biosolids, Pesticides, and added Nutrients | Reduce the number of pesticides, fertilizers, and added nutrients applied. Mitigate overland flow into source water areas. | Education and outreach on how to reduce pesticide and fertilizer use and promote alternative treatment practices*; best practices for lawn and garden care, including native plants, riparian buffers, and maintaining trees on private property* | \$2,544.81 | EFC Septic System Replacement Fund, USEPA Environmental Education Grants | PMT, T. Bethlehem/Open Space Coordinator/Sustainability Committee, T. New Scotland, Cornell Cooperative Extension | Year 1-3. Once initiated is an ongoing activity. |
| Outreach and Education: Private On-Site Septic Systems | Medium | Residential source: Private On-Site Septic systems | Reduce the amount of nutrients from failing septic systems within the source water areas from entering the reservoir or groundwater. | Education and outreach for homeowners on proper septic system maintenance and existing programs that can support them. Albany County Health will post on its website updates. | \$2,544.81 | USEPA Environmental Education, USEPA Free Septic Education Materials, EFC Septic System Replacement fund. | PMT, T. Bethlehem, T. New Scotland, Albany County Soil and Water Conservation District (inspections), Albany County Department of Health, Public Works commissioner. | Year 1-3. Once initiated is an ongoing activity. |

* Mentioned in T. Bethlehem Comprehensive Plan

| Priority Issue | Priority Level | Targeted Potential Contaminant Sources(s) | Goal | Protection Method and/or Management Method | Potential Cost** | Potential Funding Sources | Project Leader and Partnerships Needed | Implementation Timing |
|---|----------------|---|--|---|------------------|--------------------------------------|---|--|
| Outreach and Education: General | Medium | All Potential Contaminants | Increase the awareness of property owners on how to assist in the protection of the watershed | Signage, School presentations, Town board presentations, water system tours, flyers in water bills, email blasts, website, Town library; Consider incorporating joint outreach efforts into existing Intermunicipal Agreement between Bethlehem and New Scotland; Support creation of communications committee* | \$2,544.81 | USEPA Environmental Education Grants | PMT, T. Bethlehem/Open Space Coordinator, T. Bethlehem Sustainability Committee, T. New Scotland, Cornell Cooperative Extension, DOS (if exploring IMA changes) | Year 1-3. Once initiated is an ongoing activity. |
| Reservoir security | Medium | Security and Erosion | Increase awareness of sensitive reservoir areas and reduce trespassing activities; continue to monitor trespassing occurrences | Explore the need for added signage, motion sensing lighting, video surveillance, and restoring buffer around the reservoir. | \$1,777.40 | Trees for Trib, Buffer in a Bag | PMT, T. Bethlehem | Year 1, ongoing |
| Management of Regulated Potential Contaminant Sources | Low | Gas Transmission Line | Enhance communication with specific facilities or DEC staff that work with these regulated facilities to understand the nature of the threat as associated with risk and response efforts. | Review conveyances and pipeline information. Increase communication with US DOT Community liaisons regarding pipeline safety inquiries (e.g. risk of leaks). | \$64.78 | NA | PMT, T. Bethlehem, T. New Scotland, US DOT community liaison, Property owners (where pipeline crossing overlaps with properties in the source water area) | Year 2, ongoing annual review |
| | Low | Petroleum Bulk Storage Facility | | Review petroleum bulk storage facilities, monitor, and report. Review any spill incidents, and refer to mapping and PCS inventory for storage tanks in the critical area and/or source water areas. | \$64.78 | NA | PMT, NYSDEC, NYSDOH, Local PBS facilities | Year 2, ongoing annual review |
| | Low | SPDES Discharges | | Review SPDES permitted facilities. | \$64.78 | NA | PMT, Town representatives, NYSDEC Division of Water, NYSDOH, SPDES permitted facilities | Year 2, ongoing annual review |

* Mentioned in T. Bethlehem Comprehensive Plan

Appendix A.8
Plan Management Team

| Title | Contact Information* | | Primary Contacts Telephone |
|--|----------------------|--|----------------------------|
| | Name | Email | |
| T. Bethlehem Public Works Commissioner ₁ | Paul Penman | openman@townofbethlehem.org | (518) 439-4955 |
| T. Bethlehem Chief Water Treatment Plant ₂ Operator | Dave Blenis | dblenis@townofbethlehem.org | (518) 765-4433 |
| T. Bethlehem Open Space Coordinator | Lauren Axford | laxford@townofbethlehem.org | |
| T. Bethlehem Planning Board Department liaison | Rad Anderson | randerson@townofbethlehem.org | |
| New Scotland Town Representative | Doug LaGrange | dlagrange@townofnewscotland.com | |
| Albany County Health Department – short term/as needed | Max Ferris | maxwell.ferris@albanycountyny.gov | |
| *Emails and names may be subject to change as members of the plan management team change ₁ Primary point of contact ₂ Secondary point of contact | | | |

Use the table below to document the Plan Management strategy for keeping your DWSP2 Plan up to date:

| Plan Management Summary | |
|--|----------|
| Item | Status |
| Designate a Plan Management Team | Complete |
| Determine progress report frequency: # months | Complete |
| Share progress reports | |
| Review and share the plan | |
| Verification from NYSDOH and NYSDEC for completeness | |
| Create a revision schedule | |

Use the table below to track updates and revisions to the DWSP2 Plan. Use the notes section to detail changes made in each update and/or revision:

| Update/Revision Tracker | | |
|-------------------------|------|-------|
| Report | Date | Notes |
| First Report | | |
| Update/Revision 1 | | |
| Update/Revision 2 | | |
| Update/Revision 3 | | |
| Update/Revision 4 | | |
| Update/Revision 5 | | |
| Update/Revision 6 | | |
| Update/Revision 7 | | |

| | | |
|-------------------|--|--|
| Update/Revision 8 | | |
|-------------------|--|--|

Appendix B

Project Profiles

The suggested project profiles outlined in this document are meant to be a guide to implement protection and management methods. Each project profile outlines the priority issue, targeted potential contaminant sources (PCS), goals and priorities for the project, potential costs and funding sources, potential partnerships for project success, and specific implementation steps.

Please note that potential funding sources are not guaranteed. It is the responsibility of the Town to determine eligibility and apply for any potential funding source listed in this report. Several project profiles do not have a numerical cost estimate but, instead, indicates potential cost by using (\$, \$\$ and \$\$\$) symbology. This DWSP2 plan uses the symbols based on the Towns' 2022 Comprehensive Plan definitions. The symbology is defined as "\$ Can accomplish substantially with current operating and/or capital budgets, \$\$ Some new or increased funding required for implementation with or without minor grant funding support, \$\$\$ Significant new Town funding or major grant support needed" (Town of Bethlehem Comprehensive Plan Update 2022). Detailed cost estimates are included in Appendix C

Project schedules and timelines are incorporated into each implementation project. This includes an approximate schedule for when to begin work for each action, assigning to Year 1 those actions that may be most urgent or may require less up-front investment of time or funding. Actions assigned to Years 2 and beyond are either less urgently needed or may require more budget or thought to implement. Many of the actions on the implementation timeline should be refreshed annually, particularly those including coordination between local officials and project partners to ensure persisting potential contaminant source awareness or ongoing education practices.

Although all issues listed in the plan are critical to the plan's success, the project profiles are listed in order of highest to lowest priority for the Town of Bethlehem.

Project Profile 1: Land Use

DWSP2 Program Implementation – Town of Bethlehem, NY

New development associated with potential contaminant sources could occur in sensitive areas of the source water area with little consideration to the source water or best management practices. Potential contaminants may include nutrients, sediments, lawn and garden chemicals, salt/chlorides, unregulated/newly regulated contaminants, among others. Bethlehem is proactive about land acquisition and conservation easements. The Town of Bethlehem plans to continue this work in addition to incorporating protection areas into upcoming zoning code updates. Additionally, there is a need for increased coordination with the Town of New Scotland.

| | |
|--|---|
| Priority Issue: | Land Use |
| Priority Level: | High |
| Targeted Potential Contaminant Source(s): | Potential contaminants from future land use in the contribution area of the wells and reservoir. |
| Goal: | Prevent future contamination and control runoff from existing land uses |
| Protection Method and/or Management Method: | <ul style="list-style-type: none"> • Continue establishment of land acquisitions and conservation easements as appropriate. • Continue to advance the conservation of open space acquisition. • Consider protection areas in zoning updates. |
| Potential Costs: | <p>Estimated Cost: \$3,109.62 plus the parcel’s appraised value.</p> <p>Effort hours for identifying and prioritizing parcels, updating zoning codes, and increasing coordination with the Town of New Scotland. Funding is required for land acquisition.</p> |
| Potential Funding Sources: | <ul style="list-style-type: none"> • NYSDEC Water Quality Improvement Project (WQIP) for Land Acquisition (Click Link) • NYSDOS Smart Growth Community Planning and Zoning Grant Program(Click Link) |
| Project Partnerships Needed: | <ul style="list-style-type: none"> • Plan Management Team • T. Bethlehem • T. Bethlehem Open Space Coordinator • T. Bethlehem Zoning Board |

| | |
|---|--|
| | <ul style="list-style-type: none"> • T. New Scotland Zoning Board • Mohawk Hudson Land Conservatory |
| Implementation Timing: | Year 1-2, ongoing |
| Implementation Start Date: | April 2026 |
| Step-by-step Process: | |
| Land Acquisition for Source Water Protection | |
| Step 1 | Involve project partners on land acquisition plans and potential assistance. |
| Step 2 | Determine and prioritize parcels of land in the protection area that can influence source water protection. |
| Step 3: | Continue to monitor the sale of priority parcels for potential land acquisition or conservation easements within the source water area for the Vly Creek Reservoir, New Scotland Wells, and Selkirk Wells. |
| Step 4: | <p>Apply for funding through WQIP for Land Acquisition.</p> <p>To learn more about the NYSDEC WQIP Land Acquisition grant program visit DEC's WQIP webpage (Click Link) to learn more about the grant program and when funding is available.</p> <ul style="list-style-type: none"> • Visit WQIP Land Acquisition Projects for Source Water Protection Toolkit - NYSDEC webpage (Click Link) to learn more about land acquisition and available resources for an awardee to complete such a project. <p><u>Grant application steps:</u></p> <ol style="list-style-type: none"> i. Choose the desired parcel. Use the information gathered in Step 2 to prioritize parcels or an area for outright purchase or conservation easement that will protect the public drinking water source. If additional assistance is needed to identify parcels, consider working with land acquisition and source water protection experts in your area who could aid with the Town's land acquisition for source water protection goals. For example, a consulting firm or land trust may be a great partner and aid with the transaction side (e.g., appraisals, surveys, environmental assessments, title, etc.) of the land acquisition program. ii. Apply for funding. iii. Acquire the parcel if selected for the grant. |

| | |
|--------------------------------|---|
| | iv. Steward the land, and ensure it is only used for activities that will not harm the public drinking water source. |
| Open Space Preservation | |
| Step 1: | Increase communication between Bethlehem’s water operators, the Open Space Coordinator, and the Town of New Scotland. |
| Step 2: | Identify ways to continue efforts to advance the preservation of existing and future open spaces, particularly within Source Water Protection Areas. |
| Zoning Updates | |
| Step 1: | Incorporate identified Source Water Protection Areas in future zoning updates. Identify opportunities for zoning restrictions. These could include groundwater protection overlay districts, setback requirements in zoning codes to protect riparian zones, and zoning ordinances to encourage Low Impact Development (LID), such as conservation design. Consider setting Site Plan Review standards and requirements to protect and improve water quality. |
| Step 2: | Assess additional regulatory land use protection methods that can be incorporated into existing/future planning work in T. Bethlehem and T. New Scotland. |
| Step 3: | Collaborate with neighboring T. New Scotland to discuss potential revisions to their zoning and planning activities. Discuss incorporation of regulatory land use protection methods into the priority protection area parcels around Bethlehem’s sources. |
| Step 4: | Apply for additional funding if needed. |

Project Profile 2: Agricultural Activities

DWSP2 Program Implementation – Town of Bethlehem, NY

Runoff from agricultural activities in Source Water Protection Areas is a high priority for Bethlehem, particularly in the Surface Source Water Protection Area. At the time of this report, Albany County Soil and Water Conservation District reports that there are AEM participants in the towns that overlap with Bethlehem’s water sources: 28 in New Scotland, 29 in Bethlehem, and 44 in Berne. Additionally, Bethlehem will look at increasing Best Management Practice outreach and education in the protection area.

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| Priority Issue: | Agricultural Activities |
| Priority Level: | High |
| Targeted Potential Contaminant Source(s): | Nutrient loading |
| Goal: | Reduce the amount of overland flow of chemicals and nutrients applied in the source protection water area. Enhance communication with local farms and Albany County Soil and Water Conservation District (SWCD). |
| Protection Method and/or Management Method: | <p>Establish a partnership with Albany County SWCD to work with farmers and funding agencies to implement best management practices in priority areas through Agriculture Environmental Management assessments.</p> <p>Support Albany County SWCD and Cornell Cooperative Extension in efforts to communicate current best Management practices for agricultural lands.</p> |
| Potential Costs: | <p>Estimated Cost: \$2,054.80</p> <p>Effort hours for communicating with responsible parties. Supporting public outreach.</p> |
| Potential Funding Sources: | <ul style="list-style-type: none"> • NYSAGM Agriculture Nonpoint Source Abatement and Control Grant Program (Click Link) • USDA Conservation Reserve Enhancement Program (CREP) (Click Link) • NYSAGM/NYSSWCC Source Water Buffer Program (Click Link) • USDA Agricultural Conservation Easement Program (Click Link) • NYSDEC Buffer in a Bag (Click Link) |

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| Project Partnerships Needed: | <ul style="list-style-type: none"> • Plan Management Team • T. Bethlehem • T. New Scotland • Albany County Soil and Water Conservation District • Cornell Cooperative Extension • Stormwater Coalition |
| Implementation Timing: | Year 1-3 |
| Implementation Start Date: | March 2025 |
| Step-by-step Process: | |
| AEM expansion and promotion | |
| Step 1: | Identify gaps in local knowledge of the AEM program. |
| Step 2: | Establish a partnership between T. Bethlehem, T. New Scotland, and the Albany County Soil and Water Conservation District by clarifying points of contact. |
| Step 3: | The Plan Management team and partners will work closely with Albany SWCD to determine methods of targeting AEM Landowners. Assess how Albany SWCD will interact with landowners. |
| Step 4: | Discuss the location of the Source Water Protection Areas with Albany SWCD and discuss overlapping goals between this plan and Albany SWCD agenda. Communicate with SWCD if there are interested farm owners in the area that would benefit from AEM that could be targeted for AEM outreach. |
| BMP outreach and education | |
| Step 1: | Identify gaps in local knowledge or actions based on best management practices for agricultural activities. |
| Step 2: | Determine opportunities to support SWCD and Cornell Cooperative Extension with their efforts to conduct outreach to farmers to be involved in AEM and implement BMP that positively influences water quality. |
| Step 3: | Incorporate information about the Towns' Source Water Protection Areas into future outreach for SWCD and CCE to provide in their outreach efforts to increase BMP. |

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| Step 4: | Support the education and implementation of BMP such as increasing riparian buffers to decrease the amount of runoff to the reservoir. Encourage BMP rollout in education messaging and include the importance of BMP, what BMP to implement, and grants to support BMP practices (i.e. NYSDEC Trees for Tribs Click Link). |
| Step 5: | Follow up with Albany SWCD and Cornell Cooperative extension on a scheduled basis to determine the status of landowners involved in BMP and AEM. |

Project Profile 3: Outreach – Lawn and Garden Management

DWSP2 Program Implementation – Town of Bethlehem, NY

Overland flow from activities on nearby residential land can bring excess nutrients into Vly Creek Reservoir. Potential contaminants can also enter the groundwater, posing concerns for the Town’s well sources.

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| Priority Issue: | Outreach and Education: Lawn and Garden Management |
| Priority Level: | Medium |
| Targeted Potential Contaminant Source(s): | All Fertilizers, including those derived from biosolids, pesticides, and added nutrients |
| Goal: | Reduce the amount of pesticides and fertilizers applied and mitigate overland flow into the reservoir. |
| Protection Method and/or Management Method: | Education and outreach on how to reduce pesticide and fertilizer use and promote alternative treatment practices; best practices for lawn and garden care, including native plants, riparian buffers, and maintaining trees on private property. |
| Potential Costs: | Estimated Cost: \$2,554.81 Effort hours to research best management practices. Effort hours to conduct the outreach. Potential material costs for outreach and education materials. |
| Potential Funding Sources: | <ul style="list-style-type: none"> • USEPA Environmental Education Grants (Click Link) |
| Project Partnerships Needed: | <ul style="list-style-type: none"> • Plan Management Team • T. Bethlehem • T. Bethlehem Open Space Coordinator • T. New Scotland • Cornell Cooperative Extension • Albany County Soil and Water Conservation District • Albany County Natural Resources |
| Implementation Timing: | Year 1-3. Once initiated is an ongoing activity |
| Implementation Start Date: | August 2025 |
| Step-by-step Process: | |
| Step 1: | Identify gaps in knowledge or action based on best management practices for lawn and garden chemical applications. |

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| Step 2: | Gather information on previous or current concerns, current efforts to reach out, and current community knowledge. Consider combining outreach and education efforts from each project profile to consolidate and streamline efforts (e.g. consider combining efforts with septic system maintenance outreach if it targets the same audience). |
| Step 3: | Research best management practices for applying fertilizers and pesticides. Research alternative treatment recommendations and general best practices for lawn and garden care (e.g. native plants, riparian buffers, maintaining trees on private property). Look into pre-existing materials that can be distributed or used as a reference (EPA, DEC Publications, etc.). Utilize the education departments from Cornell Cooperative Extension, NYSDEC, and EPA to gather materials. Highlight the connection between water quality and agriculture, lawn, and garden activities. Refer to the Outreach and Education highlight in the 'Protection and Management Methods' section of this report. |
| Step 4: | Partner with the Town of New Scotland to discuss methods to reach landowners in the Source Water Protection Areas. |
| Step 5: | Determine which communication channel(s) would be most effective to reach residents in the Town of New Scotland. These may include social media, mailings, newspaper postings, websites, email lists, public forums or workshops, event outreach, etc. Collaborate with partners, such as Cornell Cooperative Extension, Five Rivers Environmental Education Center, Albany County Soil and Water Conservation District, or County Natural Resource Planner. |
| Step 6: | Apply for funding as needed. Note that local governments are not eligible to apply for the USEPA Environmental Education Grants and will require a representative from an approved group to apply. |
| Step 7: | Present findings in a simple, informative manner to landowners in the Town of New Scotland. |
| Step 8: | Keep up with all forms of communication and monitor feedback received. Adjust accordingly. |

Project Profile 4: Outreach – Private Septic Systems

DWSP2 Program Implementation – Town of Bethlehem, NY

Biological leaks and spills from private on-site septic systems can enter Bethlehem’s water sources, particularly the New Scotland Wellhead Contribution Area. Septic system leaks can be a source of E. coli, PFAS, nutrients, pharmaceuticals, etc. At the time of this report, municipalities in Albany County are not eligible for NYS Environmental Facilities Corporation (EFC) Septic System Replacement Fund.

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| Priority Issue: | Outreach and Education: Private Septic Systems |
| Priority Level: | Medium |
| Targeted Potential Contaminant Source(s): | Residential sources: Private On-Site Septic Systems |
| Goal: | Reduce the amount of nutrients from failing septic systems from entering the reservoir or groundwater. |
| Protection Method and/or Management Method: | Education and outreach for homeowners on proper septic system maintenance and existing programs that can support them. |
| Potential Costs: | Estimated Cost: \$2,554.81 Effort hours to research best management practices. Effort hours to conduct the outreach. Potential material costs for outreach and education materials. |
| Potential Funding Sources: | <ul style="list-style-type: none"> • USEPA Environmental Education Grants (Click Link) • USEPA Free Septic Education Materials (Click Link) • EFC Septic System Replacement Fund (Click link) |
| Project Partnerships Needed: | <ul style="list-style-type: none"> • Plan Management Team • T. Bethlehem • T. Bethlehem Public Works Commissioner • T. New Scotland • Cornell Cooperative Extension • Albany County Health Department |
| Implementation Timing: | Year 1-3. Once initiated is ongoing activity |
| Implementation Start Date: | August 2025 |
| Step-by-step Process: | |
| Outreach and Education for homeowners | |
| Step 1: | Identify gaps in knowledge or action based on best management practices for septic system maintenance. |
| Step 2: | Determine which residents are served by public sewer systems and which have private septic systems. Gather information on private septic systems |

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| | within the protection areas, including locations, age, status of owner, and maintenance practices. Consider combining outreach and education efforts from each project profile to consolidate and streamline efforts (e.g. consider combining efforts for septic system maintenance and lawn/garden chemicals outreach if targeting the same audience). |
| Step 3: | Research best management practices to manage septic systems. Look into pre-existing materials that can be distributed or used as a reference (EPA, State, NYSDEC Publications, etc.). Highlight the connection between septic system maintenance and water quality in Bethlehem’s water sources. Refer to the Outreach and Education highlight in the ‘Protection and Management Methods’ section of this report. |
| Step 4: | Partner with T. New Scotland to discuss methods to reach landowners in Source Water Protection Areas, particularly the New Scotland well protection area. |
| Step 5: | Determine which communication channel(s) would be most effective to reach residents in the Town of New Scotland located within the Source Water Protection Areas. These may include social media, mailings, newspaper postings, websites, email lists, public forums or workshops, event outreach, etc. Coordinate with Albany County Health Department to host information on their website. |
| Step 6: | Present findings in a simple, informative manner to landowners in T. New Scotland. |
| Step 7: | Perform outreach to residents of any new private septic system programs available to them. |
| Step 8: | Keep up with all forms of communication and monitor feedback received. Adjust and update accordingly. |
| Septic Replacement | |
| Step 1: | Stay up to date on current and future eligibility requirements for EFC’s Septic System Replacement Fund and address any changes to the program. |
| Step 2: | Utilize the above outreach and education strategies and coordinate with Albany County Health Department on how to provide resources to the public (e.g. eligibility, application, and technical assistance) for the EFC’s Septic System Replacement Program. |

Project Profile 5: Outreach – General

DWSP2 Program Implementation – Town of Bethlehem, NY

Increasing public awareness and confidence in the Town of Bethlehem’s water sources is a priority. The Town of Bethlehem plans to be proactive in outreach efforts and open lines of communication with residents in the source protection areas and service areas. Two overarching goals of this DWSP2 plan are to engage these audiences through online platforms and public engagement events each year.

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| Priority Issue: | Outreach and Education: General |
| Priority Level: | Medium |
| Targeted Potential Contaminant Source(s): | All Potential Contaminants |
| Goal: | Increase the awareness of property owners on how to assist in protection of the watershed. |
| Protection Method and/or Management Method: | <ul style="list-style-type: none"> • Outreach to both water consumers in T. Bethlehem and landowners in Source Water Protection Areas. • Provide two public outreach meetings each year to educate the public on Bethlehem’s water sources and how they are protected and treated for consumers. • Create and maintain a website that outlines DWSP2 plan. • Consider incorporation of joint outreach efforts into existing Intermunicipal agreement between T. Bethlehem and T. New Scotland. • Support creation of communications committee. |
| Potential Costs: | Estimated Cost: \$2,554.81 Effort hours to plan and conduct the outreach. Potential material costs for outreach and education materials. |
| Potential Funding Sources: | <ul style="list-style-type: none"> • USEPA Environmental Education Grants (Click Link) |
| Project Partnerships Needed: | <ul style="list-style-type: none"> • Plan Management Team • T. Bethlehem • T. Bethlehem Open Space Coordinator • T. Bethlehem Sustainability Committee • T. New Scotland • Cornell Cooperative Extension • NYS DOS (IMA updates) |
| Implementation Timing: | Year 1-3. Once initiated is ongoing activity |
| Implementation Start Date: | March 2025 |
| Step-by-step Process: | |

| Develop and maintain consistent communication with water consumers and landowners | |
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| Step 1: | Initiate and utilize conversations with partners to identify audiences and gaps of knowledge or action. |
| Step 2: | Partner with Town representatives (Bethlehem and New Scotland) to discuss methods to reach landowners in Source Water Protection Areas and water consumers in T. Bethlehem. Consider other community partners as well, such as Cornell Cooperative Extension, Five Rivers Environmental Education Center, and County Natural Resource Planner. |
| Step 3: | Determine which communication channel(s) would be most effective to reach water consumers within the T. of Bethlehem and landowners in Source Water Protection Areas. This may include signage, school presentations, Town board presentations, water system tours, flyers in water bills, email blasts, and education via the Town website or Town library. Consider creating and maintaining a website that outlines DWSP2 and provides easy access to information for the community. |
| Step 4: | Apply for funding as needed. Note that local governments are not eligible to apply for the USEPA Environmental Education Grants and will require a representative from an approved group to apply |
| Step 5: | Present findings in a simple, informative manner to each audience. |
| Step 6: | Keep up with all forms of communication and monitor feedback received. |
| Step 7: | Incorporate overlapping outreach initiatives between T. Bethlehem and New Scotland into existing inter-municipal agreements. Contact NYS DOS for guidance. |
| Host two public outreach meetings each year | |
| Step 1: | Identify key messages and target audiences. For example, messages about water treatment and water use may target water users in the Town of Bethlehem whereas messages about land activities may target homeowners in the Town of New Scotland. |
| Step 2: | Utilize partnerships to develop a plan for public outreach meetings. |
| Step 3: | Determine which communication methods (e.g., PowerPoint presentation, interactive activity) would be most effective to reach audiences. |
| Step 4: | Determine a schedule and location(s) that are inclusive and accessible to a wide range of audiences (i.e., time of day, location, virtual and in-person options). |
| Step 5: | Conduct public outreach meetings and monitor feedback. |
| Step 6: | Adjust as necessary. |
| Create and maintain a website about DWSP2 | |
| Step 1: | Determine goals, key messages, and target audiences for website materials. |

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| Step 2: | Identify platform to host information (e.g., webpage within existing Town website). |
| Step 3: | Utilize partnerships and internal resources to develop web content. |
| Step 4: | Apply for funding as needed. Note that local governments are not eligible to apply for the USEPA Environmental Education Grants and will require a representative from an approved group to apply |
| Step 5: | Inform target audiences that web content is available. Consider integrating with public outreach meetings or other outreach efforts. |
| Integrate outreach efforts into municipal structure | |
| Step 1: | Incorporate joint outreach efforts into existing Intermunicipal agreement between T. Bethlehem and T. New Scotland. |
| Step 2: | Utilize partnerships for assistance. |
| Step 3: | Support the creation of a communications committee in the Town of Bethlehem, as mentioned in the Town's Comprehensive Plan. |
| Step 4: | Develop and conduct communication efforts to municipalities where the source water areas or the low-risk area overlap (i.e. Town of Berne, Village of Casselton-on-Hudson). Utilize communication to inform municipalities of the DWSP2 plan and the importance of the source water area or low risk area to Bethlehem's source water. |

Project Profile 6: Reservoir Security

DWSP2 Program Implementation – Town of Bethlehem, NY

The Town of Bethlehem owns a residential property where the water operator used to reside and keep watch of the reservoir. This house is currently vacant. Trespassing in sensitive areas near Vly Creek Reservoir is a concern for the Town of Bethlehem. Prohibited activities include ATV, snowmobiles and foot traffic have previously caused erosion of the shoreline. Stakeholders discussed potential options extensively. Increased monitoring is needed in these areas.

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| Priority Issue: | Reservoir Security |
| Priority Level: | Medium |
| Targeted Potential Contaminant Source(s): | Security and Erosion |
| Goal: | Increase awareness of sensitive reservoir area and reduce trespassing activities, continue to monitor trespassing occurrences. |
| Protection Method and/or Management Method: | Explore need for added signage, motion sensing lighting, video surveillance and restore buffers around the reservoir. |
| Potential Costs: | Estimated Cost: \$1,777.40 Effort hours for increased monitoring. Potential material costs for security cameras, motion sensor lighting, and signage. |
| Potential Funding Sources: | <ul style="list-style-type: none"> • NYSDEC Buffer in a Bag (Click Link) • NYSDEC HREP Trees for Tribes (Click Link) |
| Project Partnerships Needed: | <ul style="list-style-type: none"> • Plan Management Team • T. Bethlehem |
| Implementation Timing: | Year 1, Ongoing |
| Implementation Start Date: | March 2025. Once initiated is ongoing activity |
| Step-by-step Process: | |
| Step 1: | Explore options for obtaining additional security and monitoring equipment (e.g. timed lights). Identify areas where each option would be most effective. |
| Step 2: | Increase signage in areas where trespassing is frequent. |
| Step 3: | Facilitate further discussion with the Town of Bethlehem about future of the house owned by the Town and the potential of increasing security guard staff. |
| Step 4: | Increase vegetation around the reservoir to strengthen and restore the buffer and slow shoreline erosion from trespassing activities. Apply for funding to gain riparian buffer services. |

Project Profile 7: Gas Pipeline

DWSP2 Program Implementation – Town of Bethlehem, NY

Gas pipeline crossings pose a risk of spills and leaks. There is one pipeline located near the southern end of Vly Creek Reservoir.

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| Priority Issue: | Management of regulated potential contaminant sources: Gas Pipeline |
| Priority Level: | Low |
| Targeted Potential Contaminant Source(s): | Gas Transmission Line |
| Goal: | Enhance communication with specific facilities or NYSDEC staff that work with these regulated facilities to understand the nature of the threat as associated with risk and response efforts. |
| Protection Method and/or Management Method: | Review conveyances and pipeline information. Increase communication with US DOT Community liaisons regarding pipeline safety-related inquiries (e.g. risk of leaks). |
| Potential Costs: | Estimated Cost: \$64.78 hourly labor cost. Effort hours to meet with pipeline facility and/or regulatory agencies and conduct site visits. |
| Potential Funding Sources: | Not applicable |
| Project Partnerships Needed: | <ul style="list-style-type: none"> • Plan Management Team • T. Bethlehem • T. New Scotland • US DOT Community Liaison • Property owners (where pipeline crossing overlaps with private properties in the source water areas) |
| Implementation Timing: | Year 2, ongoing annual review |
| Implementation Start Date: | March 2026 |
| Step-by-step Process: | |
| Step 1: | <p>Identify areas of concern for pipeline leaks or breaks within the Surface Source Water Protection area of Vly Creek Reservoir. Discuss with US DOT Community Liaisons to increase understanding of current conditions and permits.</p> <p>Contact Information: US DOT Community Liaison</p> |

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| | PHMSA: Stakeholder Communications: Community Liaison Services (dot.gov) (LINK) (US DOT, Pipeline and Hazardous Materials Safety Administration, Search on: "Community Liaison Services"). |
| Step 2: | Conduct a site visit to areas of concern and assess current conditions as necessary. |
| Step 3: | Review annual reports for inspection planning. Identify preventative measures that can be taken to prevent a leak or spill. Anticipate impacts and potential risks. Take note of exposed pipes. |
| Step 4: | Work with appropriate parties to implement spill prevention measures as needed. |
| Step 5: | Monitor conditions and act appropriately if issues arise. |

Project Profile 8: PBS Facilities

DWSP2 Program Implementation – Town of Bethlehem, NY

There are 3 PBS in the Source Water Protection Areas. Only one is not owned by the Town of Bethlehem, which was previously owned by Fort Orange Paper Company. Further investigation is needed to determine if this PBS is still in place.

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| Priority Issue: | Management of regulated potential contaminant sources: Petroleum Bulk Storage Facility |
| Priority Level: | Low |
| Targeted Potential Contaminant Source(s): | Petroleum Bulk Storage Facility |
| Goal: | Enhance communication with specific facilities or NYSDEC staff that work with these regulated facilities to understand the nature of the threat as associated with risk and response efforts. |
| Protection Method and/or Management Method: | Review petroleum bulk storage facilities, monitor and report. Review any spill incidents, refer to mapping and PCS inventory for storage tanks in the critical area and/or source water areas. |
| Potential Costs: | Estimated Cost: \$64.78 hourly labor cost. Effort hours to collect and review permits, monitoring data. Effort hours to communicate with responsible parties as necessary. |
| Potential Funding Sources: | Not applicable |
| Project Partnerships Needed: | <ul style="list-style-type: none"> • Plan Management Team • NYSDEC, NYSDOH • Local PBS facilities |
| Implementation Timing: | Year 2, ongoing annual review |
| Implementation Start Date: | March 2026 |
| Step-by-step Process: | |
| Step 1: | Check to ensure each facility has a current registration including the owner and emergency contact information. Information for facilities can be accessed using the NYSDEC Info Locator at www.dec.ny.gov/pubs/109457.html (NYS DEC, Search On: “DEC Info Locator”). These facilities are required by state law to report any spills within two hours. Contact all petroleum bulk storage facilities and request them to add the community’s emergency contact to their spills notification procedures. |

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| Step 2: | Regularly check the NYSDEC Spills Database at www.dec.ny.gov/chemical/8437.html (NYS DEC, Division of Environmental Remediation, Search on: "Environmental Site Database Search") for any spills from these facilities. Follow up with NYSDEC for clean-up and any concern of impacting the community's drinking water supply. |
| Step 3: | To the extent the community has access to these facilities, regularly visit the facilities to see if there are any obvious spills and mishandling of stored chemicals. Report any spills or obvious mishandling of the stored materials that would likely cause a release of the materials to the environment to NYSDEC Spills Hotline. |
| Step 4: | Work with the local health department if interested in developing a raw water and/or ambient water sampling plan for contaminants of concern. |
| Step 5: | Conduct an annual emergency response practice to ensure that the emergency response plan is up to date. |

Project Profile 9: SPDES

DWSP2 Program Implementation – Town of Bethlehem, NY

NYSDEC Division of Water regulates wastewater discharges to groundwater and surface water through the State Pollutant Discharge Elimination System (SPDES). SPDES permitted dischargers include both municipal and industrial operations. Examples of industrial dischargers are laundromats, car washes, food processing, photographic manufacturing operations, and pharmaceutical research facilities. Municipal dischargers include wastewater treatment facilities that treat either residential wastewater or a mixture of residential and industrial wastewater.

There are three SPDES facilities within the Source Water Protection Areas. Only one is not owned by the Town of Bethlehem.

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| Priority Issue: | Management of regulated potential contaminant sources: SPDES |
| Priority Level: | Low |
| Targeted Potential Contaminant Source(s): | SPDES Discharge |
| Goal: | Enhance communication with specific facilities or NYSDEC staff that work with these regulated facilities to understand the nature of the threat as associated with risk and response efforts. |
| Protection Method and/or Management Method: | Review SPDES permitted facilities. |
| Potential Costs: | Estimated Cost: \$64.78 hourly labor cost. Effort hours to collect and review permits, and monitoring data. Effort hours to communicate with responsible parties as necessary. |
| Potential Funding Sources: | Not applicable |
| Project Partnerships Needed: | <ul style="list-style-type: none"> • Plan Management Team • Town representatives • NYSDEC Division of Water • NYSDOH • SPDES permitted facilities |
| Implementation Timing: | Year 2, ongoing annual review |
| Implementation Start Date: | March 2026 |
| Step-by-step Process: | |
| Step 1: | Use NYSDEC Info Locator Environmental Quality Map Viewer to obtain a copy of the SPDES permit for all permitted facilities in the critical and extended source water areas. The permit may include information about effluent limitations, monitoring requirements, and compliance schedules. |

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| Step 2: | Review NYSDEC's Permit Applications Database for information about the permit application history of the facility. |
| Step 3: | Use information and data collected from speaking with the regulated facility using the DWSP2 Framework Form titled "Questions to Ask the Regulated Entity" and USEPA's Enforcement and Compliance History Online (ECHO) database to record facility-specific information including monitoring data, permit data, inspection dates and findings, violations, enforcement actions and penalties assessed. |
| Step 4: | Using the facility information from NYSDEC and USEPA, notify the owner of the facility that the facility is discharging in the critical protection area. |
| Step 5: | Using the facility information on the permits from NYSDEC and USEPA, provide the owner of the permitted facility with the proper contact for emergency notifications of any unpermitted wastewater discharges |
| Step 6: | Make sure the facility emergency response plan for spills is up to date. |
| Step 7: | Work with the local health department to develop a raw water and/or ambient water sampling plan for contaminants of concern. Notify the local health department of any detection of the contaminants of concern. |
| Step 8: | Follow up with the NYSDEC Division of Water if there are concerns about the facility impacting the community's drinking water supply. The contact number for the NYSDEC Division of Water Region 4 is (518) 357-2045. |

Appendix C
Cost Estimates

Preliminary Cost Estimates

Note: These estimates are based on an opinion of time requirement and transactional costs. Dependent on emerging needs or altered priorities, these could change. It is recommended that dedicated staff are designated to assist with these efforts, and it is not assumed that consultants will be hired to lead these efforts. The wage rate is based on one staff person with a salary of \$77,000, including a 75% increase for staff benefits, overhead costs, etc. This cost estimate is based off occupational wage rates estimated by NYS Department of Labor in Q1 2021 dollars for an average environmental scientist. All transactional costs are preliminary and subject to change greatly; THIS IS NOT INTENDED TO BE A FINAL EXACT ESTIMATE. Please note that many efforts across various projects can be combined to save costs. For the purposes of this estimate, each project is estimated individually. It is likely that actual costs will be lower given that efforts for steps like education and outreach are combined.

| Project Profile # | Priority Issue | Goal | Protection Method and/or Management Method | Responsible Party | Anticipated Start Time | Time Requirements | Monthly Hourly Requirements | Monthly Hours Required (Total per year) | Labor Cost per Hour (NYS DOL Wages) | Approximate Transactional Costs (Materials, Construction) | Total Cost |
|-------------------|-------------------------|---|---|---|------------------------|--|-----------------------------|---|-------------------------------------|---|--|
| 1 | Land Use | Prevent future contamination and control runoff from existing land uses | Continue establishment of land acquisitions and conservation easements as appropriate; Continue to advance conservation of open space acquisition and consider adding protection areas in zoning updates. | Town of Bethlehem Zoning Board, Town of New Scotland Zoning Board Town of Bethlehem Open Space Coordinator Town of Bethlehem, Mohawk Hudson Land Conservancy. PMT | 1-2 Years | Review real estate listings, meet with current landowners, Review of zoning regulations, apply for relevant funding. | 2 | 24 | \$64.78 | Plus, the parcel's appraised value | \$3,109.62 plus the parcel's appraised value |
| 2 | Agricultural Activities | Reduce the amount of overland flow of chemicals and nutrients applied in the source water areas; enhance communication with local farms and County soil and water district. | Establish partnership with Albany County Soil and Water Conservation District to work with farmers and funding agencies to implement BMPs in priority areas through Agriculture Environmental Management assessments. | Town of Bethlehem Public Works Commissioner Town of New Scotland Cornell Cooperative Extension Albany County Soil and Water Conservation District, Stormwater coalition PMT | 1-2 years | Participation in relevant meetings | 1 | 12 | \$64.78 | \$0.00 | \$777.40 |
| | | | Support Albany County Soil and Water Conservation District and Cornell Cooperative Extension in efforts to communicate current best practices for agricultural lands | Town of Bethlehem Public Works Commissioner Town of New Scotland Cornell Cooperative Extension Albany County Soil and Water Conservation District, PMT | 1-3 years | Public outreach planning, developing outreach and educational materials, participation at necessary meetings | 1 | 12 | \$64.78 | \$500.00 | \$1,277.40 |

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| 3 | Outreach and Education: Lawn and Garden Managment | Reduce the amount of pesticides, fertilizers and added nutrients applied. Mitigate overland flow into source water areas | Education and outreach on how to reduce pesticide and fertilizer use and promote alternative treatment practices; best practices for lawn and garden care, including native plants, riparian buffers, and maintaining trees on private property | PMT, Town of Bethlehem, open space coordinator, T. New Scotland, Cornell Cooperative Extension, Bethlehem sustainability committee. | 1-3 years | Public outreach planning developing outreach and educational materials (i.e. handouts and tabling), participation at necessary meetings | 2 | 24 | \$64.78 | \$1000.00 | \$2,554.81 |
| 4 | Outreach and Education: Private On-Site Septic Systems | Reduce the amount of nutrients from failing septic systems within the source water areas | Education and outreach for homeowners on proper septic system maintenance and existing programs that can support them. Albany County Health will host on the website. | PMT, Albany County Health Department Town of Bethlehem Public Works Commissioner, Town of New Scotland, Town of Bethlehem | 1-3 years | Planning public outreach, periodic website updates; discussions with Albany County Health Dept. staff | 2 | 24 | \$64.78 | \$1000.00 | \$2,554.81 |
| 5 | Outreach and Education: General | Increase the awareness of property owners on how to assist in the protection of the watershed | Signage, School presentations, Town board presentations, water system tours, flyers in water bills, email blasts, website, Town library; Consider incorporating joint outreach efforts into existing Intermunicipal Agreement between Bethlehem and New Scotland; Support creation of communications committee | PMT, Town of Bethlehem, open space coordinator, T. Bethlehem sustainability committee, T. New Scotland, Cornell Cooperative Extension, DOS (If exploring IMA changes). | 1-3 years | Community outreach and participation at necessary meetings; develop outreach and education materials (i.e. handouts/flyers) | 2 | 24 | \$64.78 | \$1000.00 | \$2,554.81 |

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|--|---|---|---|--|--------|---|---|----|---------|--------------|--------------------|
| 6 | Reservoir security | Increase awareness of sensitive reservoir area and reduce trespassing activities; continue to monitor trespassing occurrences | Explore the need for added signage, motion sensing lighting, video surveillance, and restore buffer around the reservoir. | Town of Bethlehem, PMT | 1 year | Internal meetings; purchasing/funding security resources, Implementation of security measures | 1 | 12 | \$64.78 | \$1000.00 | \$1,777.40 |
| 7 | Management of regulated potential contaminant sources within the source water area | Enhance communication with specific facilities or NYSDEC staff that work with these regulated facilities to understand the nature of the threat as associated with risk and response efforts. | Review conveyances and pipeline information. Increase communication with USDOT Community liaisons regarding pipeline safety related inquiries (e.g. risk of leaks). | PMT, T. Bethlehem, T. New Scotland, US DOT Community Liaison, Property owners. | 1 year | Analyze pipeline issues as they arise | 1 | 12 | \$64.78 | \$0.00 | \$64.78 |
| | | | Review petroleum bulk storage facilities, monitor, and report. Review any spill incidents, and refer to mapping and PCS inventory for storage tanks in the critical area and/or source water areas. | PMT, NYSDEC, NYSDOH, Local PBS Facilities | 1 year | Review facilities in the critical and or source water area; Review state spill website periodically | 1 | 12 | \$64.78 | \$0.00 | \$64.78 |
| | | | Review SPDES permitted facilities. | PMT, Town representatives, DEC Division of Water, NYSDOH, Speed permitted facilities | 1 year | Online/desktop reviews | 1 | 12 | \$64.78 | \$0.00 | \$64.78 |
| *Cost estimates are based on existing labor resources. For projects beyond the scope of internal resources that require contractual support, costs will be higher; the expected range is a 30-70% increase from base estimates | | | | | | | | | | Total | \$14,800.00 |

Appendix D
Development of Wellhead Contribution Area

The groundwater modeling effort completed by NYSDOH/New England Interstate Water Pollution Control Commission (NEIWPCC) staff serves as a supplement to DWSP2 plans created for community drinking water systems throughout NYS. Using advanced modeling software, staff will design, implement, and interpret conceptual and numerical groundwater models for systems on a case-by-case basis. These models may be changed based on the needs of the community, but they should include a simulation of the current groundwater regime and pumping schedules validated by the most up to date data available to the modeling staff. End products will include shapefiles for Wellhead Contribution Areas created using model-produced particle tracing simulations to aid in delineating the source water protection areas for that community.

This document describes the DWSP2 groundwater model for the Bethlehem Selkirk Wells and infiltration galleries, and the New Scotland Wells 1 and 2. The groundwater model in this report is subject to change with new or additional information. The Town's DWSP2 TA Provider may reach out at any time for additional information.

The purpose of the groundwater modeling effort was to provide simulated contribution areas to community well(s) for the purpose of creating a DWSP2 plan. As the Town worked on the DWSP2 plan development process, groundwater models for the Selkirk Wellfield and the New Scotland Wells 1 and 2 were created for use in this DWSP2 plan.

The two separate contribution areas for the Selkirk Wellfield and the New Scotland Wells 1 and 2 were delineated using Environmental Simulations Incorporated Groundwater Vistas modeling software, a pre- and post-processor for MODFLOW-2005 models. For the Selkirk Wellfield, the model has four layers: Layer 1 (the top layer) represents overburden (sand/mud/silt), Layer 2 represents a sand aquifer, Layer 3 represents a sand and gravel aquifer, and Layer 4 represents a sandstone/mudstone bedrock. The New Scotland Wells 1 and 2 model had two layers: Layer 1 (the top layer) represents a sand and gravel aquifer, and Layer 2 represents a sandstone/siltstone bedrock. The top elevations of Layer 1 for both models were assigned using a USGS 1/3 Arc Second GeoTIFF dataset. Layer thicknesses were determined using well logs and engineering reports provided by the Town's DWSP2 stakeholder group.

The northeastern portion of the Selkirk Wellhead Contribution Area goes east of the Hudson River into the Village of Castleton-on-Hudson, and this area is represented by a dashed line. This area is dashed because the model suggests the wells could pull from this area under variable river conditions and pumping rates, but it would be unlikely. See Figures 15 through 20.

The estimated hydraulic properties of these lithologic units were initially set to standard values and best fit using the PEST (Parameter Estimation) software extension and manual calibration. As these values are best estimates, they are subject to change with new or additional information. Any changes to these values will require a modification to the current delineations for them to remain valid.

In addition to this documentation, the Town of Bethlehem will be provided one shapefile for the following items:

- A Wellhead Contribution Area for the Selkirk Wellfield wells VW-2, VW-3, VW-4, VW-5, VW-7, AW-1, AW-2, AW-3, AW-4, AW-5, and the four Selkirk Wellfield infiltration gallery pumps.
- A Wellhead Contribution Area for the New Scotland Wells 1 and 2.

Appendix E
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